The Impact of Village Midwives and Cadres in Improving the Nutritional Status of Pregnant Women in Selected Rural Villages in Two Districts, Banten Province Indonesia 2003: A Longitudinal Descriptive Study

Setyowati M.App.Sc., BSN., BA., DBO.

Thesis Submitted for the Degree
Doctor of Philosophy

Faculty of Nursing, Midwifery and Health
University of Technology, Sydney

2003

Certificate of Authorship and Originality

I certify that the work in this thesis has not previously been submitted for a degree nor has or has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Production Note:
Signature removed prior to publication.

_____

Setyowati

Candidate

Acknowledgements

I wish to record my deep gratitude to the Faculty of Nursing, Health and Midwifery at the University of Technology, Sydney and the Faculty of Nursing at the University of Indonesia in Jakarta for all of their support during my study in Australia. Dr Elly Nurachmach, the Dean of the Faculty of Nursing the University of Indonesia, has always encouraged and supported me in all aspects of my study.

Professor Lesley Barclay, who supervised me for three years, has not only been a good supervisor, but also my guiding angel and my friend who guided me in solving my problems during my study in Australia. Her experiences in working in Indonesia gave me the opportunity to discuss the Indonesian culture and health situation. I'm especially grateful for her patience in reading and editing the draft of my thesis. Associate Professor Virginia Schmidt, with her expertise in qualitative research in midwifery has guided me seriously and with patience until I finished my thesis. I'll never forget her smiling face every time she talked with me. Dr Margaret Cooke, who supervised with patience, helping me to understand quantitative research, Dr Julia Byford, with her expertise in anthropology research also guided and helped me to understand the cultural aspects of the study.

My special thanks to Ruth Worgan, Sue Kruske, Kim McEvoy, Sue Kildea, Priya Nair and everybody in the Centre for Family Health and Midwifery, Faculty of Nursing, Health and Midwifery at the University of Technology, Sydney. Mrs Sari Mulyati from the Academy of Nursing in Serang, Indonesia, who never stopped helping me finish the draft of my thesis. Without their efforts and supports I would have never got to this stage.

My thanks to all the women, midwives, health centre staff in all districts and villages where I carried out my research, especially to all participants, the pregnant women, village midwives and cadres. The approval and assistance given to me by the Banten State government, Serang and Cilegon Health Officers, Puskesmas Cilegon two, Serang Kota, Rawu and all other agencies are also acknowledged. Thanks to all my friends in Sydney and Indonesia for their support and encouragement.

My doctoral program would not have been a success without the sponsorship from the University of Diponegoro Semarang, Central Java and the University of Indonesia, Jakarta.

Last, but not least, I wish to record my deepest gratitude to my late Mum and Dad for their thinking and blessing of me. My sisters, brothers and all my family, but especially my sister Mrs Sutomo and family. Also Mrs Suhardjo and her family for their prayers and their support both physically and mentally during my, and my family's stay, in Sydney. Thank you also for my mother-in-law and sisters and brothers-in-law for their prayer and support.

My very special thank goes to my husband Syahrul Azwar, for his support, his willingness to let me go and his understanding of my academic ambition. Thankyou for all your support during the difficult time of our life in Australia.

To my loving son, Wahyu Hidayat Syasetyo, who always stands beside me and accompanies me everywhere. Thank you for your understanding and your love.

Finally, I thank Allah s.w.a. who permits, guides and protects me from harm and makes my PhD program a success.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

LIST OF PICTURES

Glossary

Arisan	A neighbourhood club where women met monthly and everybody collects a little money. The money is given out in turns.
BdD	Bidan di Desa (Village Midwife)
BMI	Body Mass Index
Cadre	Volunteer Health Worker
CPEP	Calcium for Preeclampsia Prevention
Fe	Iron
GNP	Gross National Product
GOI	Government of Indonesia
Hb	Haemoglobin
Hcl	Hydrochloride
Ibu Bidan	Term that villagers use to call village midwives
IDA	Iron Deficiency Anaemia
IMR	Infant Mortality Rate
Kurang darah	Decrease of blood (used to explain anaemia in the community)
Mcg	Micrograms
Mg	Milligrams
MMR	Maternal Mortality Rate
Multip (arous)	Second and subsequent pregnancies
NGO	Non-government organizations
NTB	Nusa Tenggara Barat
NTT	Nusa Tenggara Timur
ORS	Oral Rehydration Solutions
PEM	Protein-Energy Malnutrition
Pengajian	Moslem Prayer Group
PKK	Family Welfare Movement
Polindes	Community birthing place
POD	Post Obat Desa (Health medication post in the village)
Posyandu	Community Integrated Service Post
PPBA	3-year nursing program from junior school with one-year midwifery training
PRA	Participatory Rural Appraisal
Primip (arous)	First pregnancy
PROM	Premature Rupture of Membranes
Puskesmas	Pusat Kesehatan Masyarakat (Community Health Centre)
RDI	Recommended Dietary Intake

UN	United Nation
UI	University of Indonesia
UPGK	Usaha Perbaikan Gizi Keluarga (Family Nutrition Improvement Program)
UTS	University of Technology, Sydney
WHO	World Health Organisation

Abstract

This study is a longitudinal descriptive study conducted in eight villages of Banten province, Indonesia. The research describes the nutritional status of two groups of pregnant village women and investigates the implementation and impact of an intervention to improve nutrition in pregnancy.

The intervention aimed to improve the effectiveness of village midwives and cadres by improving the nutrition of pregnant women, particularly iron deficiency, through the use of a community development approach.

The thesis identifies the importance of good nutrition during pregnancy and some of the factors, which influence it in the context of this study. It examines the health promotion programs for improving iron intake and nutrition in developing countries and specifically examines the programs that are used in Indonesia. A small decrease in the rate of anaemia appears to have occurred due to these programs, but the anaemia rate remains high. There has been little systematic examination of the cultural and social factors that may influence nutrition in pregnant women in Indonesia and few studies, which have measured the nutritional status of pregnant women.

The goals of the study are to:

- Describe the social and cultural factors that influence nutrition, under nutrition and iron deficiency anaemia during pregnancy and to measure the nutritional status of rural women in Banten Province, Indonesia.
- Improve the knowledge and skills of village midwives and cadres in using community development and effective communication to improve iron supplementation and nutrition.

The conceptual framework for the study was derived from principles of health promotion, in particular the 'Proceed and Proceed' model (Green & Kreuter 1991). The study took place in eight villages in Banten province, Indonesia. Four of the villages received a community development intervention and four villages were used for comparison. The study was undertaken in three stages: Stage 1 - Baseline Quantitative and Qualitative Data Collection; Stage 2 - Intervention; and Stage 3 - Follow Up Evaluation. The intervention was guided by the results of Stage 1 and consisted of a two-day workshop aimed to

improve their knowledge, communication skills of the midwives and cadres and their ability to use a community development approach to improving nutrition in the villages.

Qualitative and quantitative methods were used in the research at Stage 1 and Stage 3. Ethnographic methods of interview, observation, field notes and survey were used to collect information about the cultural and social factors that influence nutrition and nutritional practices during pregnancy. The knowledge and practices of midwives and cadres were also explored. Thematic analysis was used to analyse the data. Forty pregnant women (20 from the intervention villages and 20 from the comparison villages) participated in the qualitative component of the research before the intervention (Stage 1). The follow up evaluation occurred 12 months later, and a different group of 35 pregnant women (20 from the intervention villages and 15 from the comparison villages) participated in the qualitative component of the research at Stage 3. The same eight midwives and 16 cadres participated in the qualitative research at Stage 1 and Stage 3. Quantitative data collected at Stage 1 and Stage 3 included socio demographic data, obstetric information and nutritional data (haemoglobin level, body mass index, and the weight gain of pregnant women). Data was collected from 210 women before the intervention and 189 women after the intervention.

Some changes in the practices of midwives and cadres were apparent after the intervention with midwives building better rapport, communicating more effectively and providing more information and support to pregnant women. Cadres also talked more about nutrition in community meetings. Changes in the behaviour and approach of village midwives and cadres' in relation to nutrition education resulted in improved nutritional behaviour of pregnant women to some extent, but poverty and culture restricted the ability of pregnant women to access better food. The intervention did not effect the overall nutritional status of the pregnant women. Because of time and logistical constraints, the intervention was not able to influence the community's health in the medium term in the intervention villages. The results of this study showed that the comparison villages sometimes had better results than the intervention villages. A possible explanation is that the systematic evaluation

of nutritional status may have increased the awareness and practice of the better-educated and more knowledgeable midwives who were located in the comparison villages. The comparison midwives had a better basic education in midwifery when compared to the intervention midwives. It appeared these better-educated workers responded positively to the research even without exposure to the intervention.

The study showed that the position of the pregnant woman is low within the hierarchy of both the health care system and the power structures of the broader community. Husbands, mother-in-law, village midwives, cadres and village leaders all have more power to determine what pregnant women can and cannot eat and drink than women do themselves. However, some women tried to access better food after the intervention by subverting culture and the authority of husbands and mother-in-law and eating nutritious food in secret.

Chapter 1: Introduction

Background

Approximately 600,000 women die each year due to complications associated with pregnancy and childbirth across the world (UN-ACC/SCN 1997; Kodyat 1998; WHO 1998A; Donnay 2000). Mortality and morbidity show a great disparity between rich and poor nations with more than 60% of maternal deaths occurring in Asia. Women who become pregnant in developing countries face a risk of death due to pregnancy that is 80 to 600 times higher than women in developed countries depending on their location (United Nations 1991). In most developing countries, around a quarter to and a third of the deaths of women in their reproductive years can be attributed to pregnancy-related causes (Royston 1989; United Nations 1991). In some rural areas of Africa and South Asia, one out of two women die due to pregnancy related causes (WHO 1994). The major causes of the high maternal mortality rates in developing countries include: the lack of trained personnel attending births; a delay in provision of adequate care; a lack of availability and/or access to services for high-risk pregnancies; a delay in arriving at the health facility; and/or a delay in the decision to seek care (World Bank 1994; Berer & Ravindran 1999).

Indonesia is an archipelago state consisting of more than 1,700 tropical islands. The five main islands are inhabited by most of the country's population that stands at a total of 204.2 million. Vital statistics reveal a life expectancy at birth as 63 years (males) and 67 years (females); a crude birth rate of 24 per 100,000; IMR 48 per 100,000 and the MMR as 390 per 100,000. The economy of Indonesia is largely based on oil and mineral resources. The current per capita food production index is 145 (from 100 in 1980) and the GNP per capita has increased to US$980 ($1,650AUD) (WHO 2000A). The major nutritional problems in Indonesia are protein energy malnutrition (PEM) and micronutrient malnutrition.

Indonesia is the largest country in South East Asia with a population of 204.2 million (Indonesia Department of Health 1999). The infant mortality rate (IMR), and the maternal mortality rate (MMR), commonly used as an indicator of a country's welfare or health status, remains high despite policies, programs and activities designed and implemented to reduce this. As reported by the

World Health Organization (WHO) in 1998, Indonesia had the third highest infant mortality rate in the world (58 per 1,000 live births) and the highest in South East Asia (WHO 1998A). The IMR is, however, distributed differentially across the archipelago with the poorest province, Nusa Tenggara Barat (NTB), having the highest rate (70 per 1,000 live births in 1998) and Jogyakarta with the lowest (15.53 per 1,000 live births) (Indonesia Department of Health 1999).

The three most common reasons for maternal mortality are haemorrhage (40 - 60%), infection (20 - 30%) and eclampsia (20 - 30%) (Indonesia Department of Health 1999). Some of these conditions can be influenced by iron deficiency anaemia (IDA), which occur in about 51% of women in Indonesia (Kodyat 1998). The risk of death greatly increases with the severity of anaemia (Hb <70 or 80 gm/L) (Indonesia Department of Health 1998; Kodyat 1998).

In an attempt to reduce infant and maternal mortality rates, the Government of Indonesia (GOI) began routine iron supplementation for pregnant women in 1974. It currently provides 60% of pregnant women with 90 supplement doses of 60mg iron/folic acid supplements during their pregnancy (Ministry of Health 2000). Since 1996, factories have been required to provide their female workers with iron supplementation once a week for 16 weeks a year. Dietary guidelines were also prepared for other groups such as female adolescents, school children and non-pregnant women (Schultink & Dillon 1998). Food fortification is currently considered, by some, as a more viable strategy than iron supplementation but is less common than supplementation (Kodyat 1998).

In 1970 the GOI identified the potential of using local community members in health promotional activities (Ministry of Health 1994). Community women known as ‘cadres’ were trained as nutrition workers and these positions soon expanded to take on other roles. In many ways there has been success across the whole program, the infant mortality rate (IMR) declined from 142 per 1,000 in 1968, to 50 per 1,000 in 1998 due to improved socio- economic conditions and preventive and curative services (WHO Indonesia 2002). The cadres appear to have had little impact on lowering the prevalence of anaemia in pregnant women with the national prevalence remaining at about 64% in 1998 (Kodyat 1998; Kosen et-al 1998 1998A). However, it appears that the

iron supplementation programs are not being as effective as intended. Therefore, there is an urgent need to reassess how to reduce anaemia in Indonesian pregnant women.

Rationale

Iron deficiency anaemia (IDA) is commonly caused by low iron in the dietary intake. The nutritional status of a person depends on food consumption patterns and not solely on the production and availability of food. Similarly, attempts to distribute iron supplementation are only effective if women who receive the supplements take them regularly. Anecdotal and practice based opinion of the author of this thesis suggest women in many countries, including Indonesia, do not comply with iron supplementation programs. This view is held by policy makers, program managers and technical experts around iron deficiency and anaemia; iron supplementation programs and community intervention (World Bank 1994; Griffiths 2002). Griffiths (2002) claims that individuals, particularly those who work in iron supplementation programs, express pessimism about whether any action could turn around the high rates of anaemia and iron deficiency among the poor. People frequently report multiple program failures and a lack of consensus on what to do, as reasons not to move forward. They made statements such as: ‘iron is messy’, ‘iron has been neglected due to a lack of good, simple programs to implement’, ‘iron is the most studied micronutrient but we have the least consensus on it’ (Griffiths 2002).

The issue of ‘compliance’ with medication is a common problem seen in many populations (World Bank 1994; WHO 1998A). Compliance refers to the extent to which a person’s behaviour in terms of medications, diets, or executing lifestyle changes complies with medical and health advice (Pappagalo & Bull 1996; Matsui 1997). Compliance with iron supplementation programs is problematic in many countries (World Bank 1994; WHO 1996A; UN-ACC/SCN 1997; Viteri 1997; WHO 2000A).

The World Health Organization reports that the effects of poverty combine with other factors to undermine the nutritional status of women (WHO 2000A). For example, cultural norms regarding food taboos and food allocation within

households often discriminate against females, particularly in Asia (Way 1991; Tinker 2000). Culture and its impact on women's diet influence the infant and maternal mortality rates in South East Asia, especially in Indonesia (UN-ACC/SCN 1997). It was reported and confirmed in the Women's Health and Family Welfare Project (WHFWP) Baseline Survey Findings Volume 1, released in 2001, that culture strongly influences the dietary intake and therefore nutritional status of women. As part of the Baseline Survey, Participatory Rural Appraisal (PRA) assessments were conducted. This report described the assessments of a sample of villages in Nusa Tenggara Barat and Nusa Tenggara Timur. The survey reported that the nutritional status of the women in these two communities was poor with seasonal malnutrition being widespread. An example of cultural food taboos is the prohibition of eggs and fish in the diet of pregnant women in Nusa Tenggara Barat (WHFWP 2001A).

IDA, which increases mortality and morbidity in childbearing women in this region, is mainly caused by dietary patterns including either the storage of food or its inaccessibility due to culture, availability and choice. IDA can be addressed by the consumption of iron and/or iron rich food. However, even this step requires cultural and behavioural change. Women traditionally eat less and eat last in the families surveyed in this recent project described above (Parmenter & Wardle 1999; WHFWP 2001A).

Both insufficient coverage and sub optimal compliance may limit the effectiveness of iron supplementation programs. The available number of iron supplements was reported to be insufficient to cover the needs of all pregnant women in Indonesia. In 1996, population data stated that there are approximately 3.5 million women pregnant each year in Indonesia. This results in the requirement of approximately 472 million supplements required annually (Schultink & Dillon 1998). In villages sampled by the WHFWP in 2000, midwives working in Polindes[1] self-reported high rates of distribution of iron tablets (WHFWP 2001B) (Table 1). It is not possible, however, to correlate distribution patterns to the consumption of the supplementation.

[1] Polindes: A community based birthing place.

Table 1: Midwives Knowledge in Relation to Provision of Essential Antenatal Care: Percentage of Iron Supplement Distribution 2001(Questionnaire Village Midwives, Baseline Survey Findings (WHFWP 2001A)

Province	Health Provider	
	Village Midwife	Midwife Supervisor
East Nusa Tenggara	96.7%	92.3%
West Nusa Tenggara	96.7%	100%

A range of strategies have been used by the GOI to address the high rates of maternal mortality and morbidity, influenced by conditions such as IDA. One such strategy was the village midwife program in Indonesia that increased the number of health personnel in rural areas. This program began its implementation in early 1994, when government began to place one midwife in each of the 61,461 villages (WHFWP 2000A). By 1998, 98.39% of these villages had been provided with a midwife from the Department of Reproductive Health and Research (RHR), (Department of Reproductive Health and Research 1999A). Training of these health care providers involved either recruitment of nurses who were given one year additional training in midwifery (village midwives/midwives) or secondary school graduates who were trained in three years of midwifery (Diploma III or DIII midwives). These graduates were then assigned as village midwives in rural areas (WHFWP 2000A).

The placement of village midwives in rural regions was undertaken to address lack of adequately trained professionals in remote areas. The midwives provide antenatal, delivery, post natal and infant care, as well as family planning services. They also assist in collecting health data on maternal and child health, immunization and nutritional programs (Department of Reproductive Health and Research 1999A). Village midwives have the potential to be agents for maternal and infant health improvement by supporting women and cadres in community nutritional improvement. Village midwives also have the potential to work in remediation of IDA through micronutrient supplementation distributed in ways that women find acceptable to improve compliance with freely distributed iron supplements.

The village midwives are expected to work alongside the local cadres[2]. Health programs, conducted by cadres, now involve maternal and child health, family planning, nutrition, immunization, and oral rehydration (Rahardjo 2000). Although the cadres do not receive financial benefit for their services they do earn recognition and respect from the community and village leaders that is designed to produce long-term occupation and high job satisfaction (Ministry of Health 1994; Rahardjo 2000).

In order to reduce IDA through supplementation, and education on the value of supplementation, it is important to consider the distribution mechanism of the supplements. Currently official health personnel at the community health centre and village health post are responsible for distribution of iron supplements. However cadres, traditional birth attendants (TBA) and religious village leaders have all been used in some villages to improve distribution and compliance rates (Schultink & Dillon 1998). In spite of these efforts to give iron supplements to pregnant women, the prevalence of anaemia amongst this population remains up to 64% (Schultink & Dillon 1998; WHO 2000A). This lack of success in the treatment of IDA through supplementation needs to be explored. Schultink & Dillon (1998) raises the issue of health staff being insufficiently informed about the value of supplementation and the barriers that exist to the women taking supplements (Schultink & Dillon 1998; WHO 2000A). One possible barrier may relate to the power of women in traditional communities to make autonomous health care decisions.

[2] Cadre: A community woman who receives training on a voluntary basis

FIELD OBSERVATION:

An anecdote highlights the importance of the factors described above. Prior to this study, the author took a group of students to undertake clinical practice in community nursing in a small district. The students, alongside a midwife, gave a group of pregnant women some nutritional education. Throughout the 'presentation' the pregnant women listened attentively always answering with an appropriate 'yes' or 'I agree' and 'yes, I will do it' when directed to comply with nutritionally sound food and supplementation advice.

The author, meanwhile, was observing from the back of the room sitting beside a pregnant woman and her mother. After listening to the 'experts' recommendations that women eat more protein rich foods such as fish and meat, the pregnant woman's mother said softly to her daughter that she may not eat fish or meats during her pregnancy because this will make the baby smell like a fish or meat. At the same time they were both nodding their heads in agreement when the health providers were telling them to eat fish and meat.

The author asked how they came to be at this education session. They replied that they had been directed by the community leader to attend because it was compulsory. If they did not attend the community leader would be angry and report her to her husband and she would be punished. The pregnant woman would not be allowed to leave her house or go to her family. The community leaders would also punish her husband. The involvement of the community leaders in overseeing programs such as this one came from a government level whereby senior community members are asked to enforce government policy and directives.

Examples of rural life in Indonesia extracted from observations made by the researcher before she commenced this research, demonstrated how women are powerless in decision making both in the home and community. They have to agree with the men in their family and village. Observation also demonstrated that many women do not have an understanding of how nutrition is so important to them and their babies. While the maternal mother and mother-in-law has power to force young women to attend health programs, their health beliefs and opinions often conflict with the health educator and may result in lack of compliance with these programs.

It appears, and has been confirmed by others, that health communication, as a central aspect of directed behaviour change in nutrition, is not effective especially in rural areas (Donnay 2000). Health providers in a powerful and authoritative position direct and teach women, without necessarily taking account of the client's needs or their responses. Donnay (2000) describes an example where women often choose services of a TBA even when clinic and

hospital services are available and accessible, indicating that TBAs are more culturally acceptable and work in more respectful ways in caring for women (Donnay 2000). Village midwives need to have knowledge and skills in providing health education rather than giving out medication without understanding the social circumstances of women's lives that influence their nutritional status.

Difficulties in professional relationships between village midwives and community women were confirmed recently in rural Indonesia through the PRA, which was undertaken by WHFWP (WHFWP 2001A). The midwives identified problems with service delivery to their clients. However, only a few identified this as being due to poorly developed interpersonal and counselling skills. Some of the midwives interviewed in the villages described village women as being 'lazy, ignorant, backward and traditional' and thought the major barriers to providing health care were due to 'lack of attention from clients, socio-cultural barriers and literacy' (WHFWP 2001A). In some places however, midwives sampled identified characteristics that helped them work more effectively. For example, some reported a midwife who was being proactive and more perceptive of local norms and beliefs will result in a community, which was more comfortable with the health services provided by the midwife. This correlated with a rise in the number of deliveries at these Polindes (WHFWP 2001A).

FIELD OBSERVATION:

Prior to this study, the author undertook a home visit to one of the high-risk pregnant women. This was her eighth pregnancy and she had severe anaemia. The author noted that the iron supplements were not being taken. When asked why she didn't take them she answered in a frightened manner that she has been told by her husband and her mother-in-law not to take those supplements. They had said that by taking the supplements, her baby would have dark coloured skin. She had been given supplements from the health centre but had never been informed about why she required them.

Indonesia lacks research into health providers' performance, especially in nutrition counselling and education. There appears to be no published studies, using ethnographic methods that explore the effectiveness of the nurse/midwife and village

woman's interactions around nutrition. This is of special importance where village midwives in rural areas and cadres are the only workers of the health care system.

It is necessary to understand the knowledge, attitude and beliefs of health workers about nutrition and nutritional supplementation, and the impact this has on the midwife and cadre, and how this influences the nutritional behaviour of pregnant women. It is equally important to establish how health providers' messages regarding nutrition are delivered, received, understood and acted upon (or not acted upon), by women and their families.

This project describes the roles played by village midwives and cadres to improve the nutritional status of pregnant women, and attempts, through an intervention, to help them improve their communication and community development approaches to nutrition and iron supplement action. The health promotion model used in this research helped the researcher to focus and build a conceptual framework within which the study was conducted. This thesis reports on an intervention based on the 'Green's Health Promotion Model' (Green & Kreuter 1991). After a behavioural and environmental analysis, an intervention was designed to increase the effectiveness of village midwives and cadres in providing nutrition education and iron supplementation for local women.

Research Problem

Many programs have been implemented previously in Indonesia to prevent iron deficiency anaemia in pregnancy e.g. iron fortification programs for pregnant women, adolescent women and nutrition education programs for women health workers (Direktorat Bina Gizi Masyarakat 1998; Schultink & Dillon 1998). Despite this, IDA in Indonesia remains high. The lack of success in the treatment of IDA through supplementation needs to be explored. It appears health communication, as a central aspect of behaviour change in nutrition, is not as effective as it needs to be, especially in rural areas. The challenges in achieving good relationships between village midwives, women, TBA's and local leadership have been identified as an problem by other studies (WHFWP 2001A; WHFWP 2001B). This study addresses the issue of communication, particularly in relation to iron supplementation and nutrition.

Indonesia lacks research into health provider's performance, especially in nutrition education. There appears to be no published studies conducted in Indonesia using ethnographic methods that explore the effectiveness of nurse and midwife/women interactions on nutrition. This is of special importance where village midwives and cadres are the main workers in the health system that can assist with this problem in rural areas.

Research Goals and Approach

Project goal

The project goal was to describe the social and cultural factors which influence nutrition, under nutrition and iron deficiency anaemia during pregnancy and to measure the nutritional status of rural women in Banten Province, Indonesia.

To improve the knowledge and skills of village midwives and cadres in using community development and increase communication in order to improve iron supplementation and nutrition.

Research questions

The research will address the following questions:

- How does culture influence women's eating patterns and consumption of micronutrients?
- How do village midwives and cadres understand and work within the culture and how does this impact on their communication and practice in relation to nutrition?
- Is there a change in women's nutritional behaviour or consumption of micronutrients after they talk with the village midwife?
- Can a brief community development and communication focused intervention with village midwives and cadres improve the nutritional behaviour and status of pregnant women?
- How can village midwives and cadres be better prepared to become effective agents in reducing anaemia?

The research questions in this study are important. Village midwives and the cadres constitute a universal service in Indonesia and should therefore be available to all women in the Indonesian archipelago. They have the potential to be a powerful agent in the improvement in the health of these women. The village midwives and cadres must be supported, supervised and trained to provide appropriate information on nutrition and nutritional supplementation to pregnant women to ensure the nutritional behaviour of the women is optimal and their nutritional status improves. It remains to be investigated whether current levels of training are sufficient. Whether knowledge and skill can be easily enhanced or supplemented with a simple intervention is examined in this study.

Project objectives

- Establish the knowledge, attitudes, beliefs and behaviour related to nutrition and nutritional supplementation of village women, village midwives and cadres;
- Identify how the knowledge, attitudes and beliefs of midwives and cadres in turn influence the nutritional behaviour of pregnant women;
- Record baseline information on the nutritional status and eating behaviour of pregnant women in the sample villages;
- Develop and implement simple educational strategies for village midwives and cadres that maximises the nutritional status of village women before birth (collected on three baseline data);
- Evaluate the impact of the educational intervention and identify how knowledge, attitudes and behaviour of village midwives, cadres and pregnant women have changed (reassess the nutritional status of pregnant women).

Chapter 2 provides an overview of nutrition in pregnancy in Indonesia with the underpinning nutritional detail found in Appendix 1. It looks at nutritional needs and problems in pregnancy as well as the sources of food and nutrition available to rural Indonesian women. There is a focus on iron deficiency anaemia. Social and cultural factors that influence individual behaviour are discussed, as is the potential of health systems and workers to address IDA and

under nutrition. Programmatic responses to IDA internationally and in Indonesia are described.

Chapter 3 addresses some principles and concepts of health promotion, particularly the Precede and Proceed model originating from the work of Green & Kreuter (1999). An overview of the design and method for the study and the three stages of the research project are described in this chapter. Stage 1 collects data to assist the development of the nutritional intervention and is used as baseline data. Stage 2 describes the implementation of an intervention program to improve nutrition of women, based on community development principles. Stage 3 is the process and impact evaluation of the intervention. The rationale for and complementary nature of quantitative and qualitative data collection is described.

Chapter 4 presents the context of how the Indonesian government applies health promotion principles in Indonesia within the health care system. It describes the setting in which the research is being conducted. That is, it gives a picture of the two districts and eight villages that were selected to participate in the research. Four of the eight villages were chosen to receive a program with the aim to improve the nutritional status of pregnant women. These were called intervention villages. The remaining four villages were called comparison villages.

Chapter 5 presents the qualitative methods and results used during Stage 1. Stage 1 explores social influences of nutritional behaviour in pregnant women and the knowledge and attitudes of midwives and cadres in all eight villages. Ethnographic and other data describing nutritional knowledge and behaviours of the community and health workers is presented. Participants of the ethnographic study and the processes used to collect and analyse data are described.

Chapter 6 presents the quantitative methods to measure nutritional status of pregnant women in all the study villages. Details of the sample, procedure, data measurement and results are provided. The proportion of women with anaemia, low weight gain during pregnancy and low BMI are described.

Chapter 7 describes Stage 2. Stage 2 is the implementation of the intervention program based on the results of Stage 1, that is, the analysis of behaviours and nutritional status. A community development style of intervention was used in the four intervention villages surveyed at Stage 1.

Chapter 8 presents qualitative data collected during Stage 3. Stage 3 occurred over twelve months after the intervention. Both intervention and comparison villages were resampled using similar ethnographic methods to those used in Stage 1. Health workers' knowledge of nutrition as well as their work with women was observed and studied to attempt to measure the impact of the intervention. The results are provided in this chapter and compared to those of Stage 1.

Similarly, Chapter 9 reports the repeat quantitative measurement of nutritional status (ie anaemia, weight gain and BMI) with a second cross sectional sample of pregnant women from the eight villages. Paradoxical findings are discussed in detail in the Chapter 10.

Chapter 10 analyses the findings of the study within a framework of culture and social context and literature that is used to synthesise the results of the research.

Chapter 11 readdresses the original research questions and presents the conclusion to the work and addresses recommendations for professional organisations, further research, government's programs and the education of health workers.

Chapter 2: Nutrition and Anaemia in Pregnancy

Introduction

This chapter locates the research within the context of nutrition and pregnancy in Indonesia. It describes how health and nutrition in pregnant women is influenced by biology, social and cultural factors, and individual behaviour. It looks at outcomes of nutritional deficiencies and particularly, the nature and consequence of anaemia in pregnancy.

The relationship between nutrition and health has been long understood. Before the 20th century, scientists had discovered that food contained fat, water, carbohydrate, protein, minerals, and a sixth class of food element called vitamins (Dong 1980; Olson 1989; Godfrey et-al 1996; Feldman 2000). It has also been long identified that nutritional demands in pregnancy change as increased demands are placed on the woman's physiology to meet her own and fetal needs for growth. Adequate nutrition in the pregnant woman is the key to a healthy developing embryo/fetus, a healthy pregnancy and a healthy infant and mother (Godfrey et-al 1996; Kolasa & Weismiller 1997; Reifsnider 2000; Christian 2002; Ramachandran 2002).

Appendix 1 reviews in detail the nutritional needs for pregnancy and relates this to a typical diet of rural Indonesian pregnant women in Java.

This chapter describes the range of nutritional requirements during pregnancy and the influence of social and cultural beliefs, on nutritional intake of pregnant women. It provides an overview of relationships between diet and pregnancy; labour complications and anaemia in pregnancy; and, how policy, programs and health workers can influence this. It also reviews the international and Indonesian nutritional and iron deficiency anaemia prevention programs.

Energy Requirements for Women During Pregnancy

Pregnant women have special nutritional needs to support optimal fetal growth and development and maintain their own health. Provision of all necessary nutrients can be obtained through an adequate well balanced diet which is necessary to promote the birth of healthy, full-term infants and maternal well being (Aaronson 1989; Seibel 1999; Allen 2000; Reifsnider 2000). A study by

Godfrey et-al (1996) and others indicated that placental and birth weights were related to energy intake (primarily carbohydrates) in early pregnancy. In late pregnancy, low intakes of dairy protein in relation to carbohydrate were also associated with low placental weight. These researchers found high intakes of iron and folic acid from supplements late in pregnancy were also associated with both higher placental and birth weights (Godfrey et-al 1996).

An additional 300 kcal per day is recommended to meet energy requirements during the second and third trimesters. If well nourished, and the diet is from a wide range of sources, iron and other supplements are not necessary (Reifsnider 2000). General caloric needs can be estimated by calculating 32-38 kcal/kg per ideal body weight An additional 10gm protein/day is needed to cover the estimated 925gms of protein deposited in fetal, placental, and maternal tissues during gestation (Seibel 1999). If there is a nutritional risk recommended daily supplements include 30mg of ferrous iron daily during the second and third trimesters, 300mcgs of folic acid daily and a standardised prenatal vitamin-mineral formula (Seibel 1999).

The appropriate weight gain range during a singleton pregnancy is based on the pre-pregnant weight for height. Recommended weight gain ranges are as follows in Table 2.

Table 2: Recommended Weight Gain Ranges in Pregnancy (Referenced work by (Givens & Moore 1995; Carmichael 1997; Kolasa & Weismiller 1997; USA Institute of Medicine 2000)

Before Pregnancy	Weight Range	Optimal Weight Gain (kg)
Underweight	< 90% of desirable weight	12.7 to 18.0
Normal weight	90 to 120% of desirable weight	10.5 to 15.9
Overweight	121 to 135% of desirable weight	6.8 to 11.4
Obese	> 135% of desirable weight	6.8 kg

The weight gain pattern should be gradual and steady throughout the pregnancy, and based on the body mass index before pregnancy. In the first trimester weight gain should be about 0 to 2.5 kg. In the second and third trimesters weight gain may be at about 1 to 2.5 kg per month (Givens & Moore

1995; Kolasa & Weismiller 1997; USA Institute of Medicine 2000). The WHO recommends that women in developing countries gain at least 1 kg per month during the last two trimesters of pregnancy, resulting in a weight gain of at least 6 kg (UN-ACC/SCN 2000).

It is important to identify those women with nutritional risk factors who may require special nutritional support and/or management. The risk factors that have been identified in work such as Hally (1998) include: significant deviation of pre-pregnant weight from ideal weight (<90% or >135%); failure to gain weight; weight loss, or excessive weight gain of more than 1 kg week; and, age less than 17 or more than 35 years. Psychological, social, cultural, religious, or economic factors that limit or affect adequacy of nutrient intake need to be identified (Department of Reproductive Health and Research 1999A).

In Indonesia, problems of under nutrition and malnutrition are common, therefore encouraging increased consumption of healthy foods by the health worker is important and requires the support of family and community.

A detailed analysis of the nutritional requirements of women are provided in Appendix one. A summary of some of this information is provided below in Table 3.

Table 3: Recommended dietary pattern during pregnancy in Western and Indonesian style food

Western Style Food	Indonesian Style Food	Number of Serves	Serving Size	
			Western	Indonesian
dairy products, milk, cheese, yoghurt	tempeh, tofu, milk powder	4	227 gms	2-3 pieces (4x4 cm)
lean meat, fish, poultry, cheese, eggs	dry fish, eggs, poultry, meats	4	57 gms	seldom eaten or eaten in small amounts
bread and cereals	rice	4 or more	1 slice or ½ cup	1 rice scoop
vegetables: dark green leaf or orange yellow, other vegetables	vegetables: dark green leaf or orange yellow, other vegetables	1-2 or more	½ cup	1 small bowl
fruits: citrus fruit or juice, cantaloupe, strawberries other fruits	fruits: citrus fruit, papaya, mango, banana and other fruits	1-2 or more	½ cup	2-3 pieces (3x5 cm)

Role of Nutrition in Reducing Maternal Mortality and Morbidity[3]

Anaemia

Anaemia remains the major nutritional problem associated with maternal and perinatal morbidity and mortality (UN-ACC/SCN 1997; UN-ACC/SCN 2000) and continues to be responsible for a substantial proportion of anaemia perpetuated by blood loss during labour and delivery (Ramachandran 2002). In contrast, Christian (2002) and others argued recently that although the assumption is commonly made that women with lower haemoglobin are at a higher risk of death due to haemorrhage, there is little data to support this (Christian 2002).

Poor intake of folic acid and coexisting folate deficiency also contributes to the problem of anaemia. Deficiency in folate in early pregnancy is associated with neural tube defects in the fetus (Wald et-al 1998; Green & Kreuter 2002). In settings where malaria is endemic or where the prevalence of hookworm and malaria infestation is high, additional interventions, along with improved diet and iron supplementation need to be considered (Stoltzfus 1997; Baruth 1998; Christian 2002). Iron supplementation is not the only way to improve iron deficient populations. For example, reports demonstrate culturally sensitive and appropriate materials can be used to achieve successful intervention outcomes (Kosen et-al 1998 1998A). In Indonesia this involves the iron fortification of 'Jamu', a traditional herb drink consumed as a hot beverage by the women. It has been reported that this initiative has resulted in significant increases in haemoglobin levels (WHO 1996A).

Definition of anaemia

The World Health Organisation (2000) defines anaemia as a pathological condition in which the blood haemoglobin concentration drops to abnormally low levels due to a deficiency in one or several essential nutrients (WHO

[3] Read in association with Appendix 1.

2000A). Defined cut-off-values of haemoglobin indicative of anaemia are found in Table 4.

Table 4: Haemoglobin Levels Indicative of Anaemia (Reference: (UN-ACC/SCN 1997)

GENDER	AGE	HAEMOGLOBIN (gm/L)
Children	6 months to 5 years	< 11
Children	6 years to 14 years	< 12
Males	Adults	< 13
Females: non pregnant	Adults	< 12
Females: pregnant	Adults	< 11

From the above table, a value of 12 gm/l of haemoglobin in non-pregnant women would indicate anaemia. However in pregnancy, the dilution of red blood cells, due to an increase in circulating blood volume, results in a lower criteria for anaemia to 11gm/l (UN-ACC/SCN 1997). WHO criteria for anaemia which has been used for this research are as follows: normal > 11gm/L; moderate = 7-11gm/L; severe < 7 gm/L (WHO/RHR/00 2000). These criteria are used to define high (> 40%), moderate (10 to 39.9%) or mild (< 10%) prevalence of anaemia (< 11gm/L) within a population (WHO 1996A). Anaemia in pregnant women, usually in the form of iron deficiency anaemia, contributes to maternal morbidity and mortality, and increases the risk of fetal morbidity and mortality and low birth weight (WHO 1998A).

Anaemia in pregnancy

This most common anaemia in pregnancy is caused by a depletion of iron stores, followed by an inadequate production of haemoglobin (Edmundson 1992). Iron deficiency occurs when an insufficient amount of iron is absorbed to meet the body's requirements. This may result from inadequate iron intake, reduced bioavailability of dietary iron, and/or an increased need of iron for growth, pregnancy or blood loss. Iron deficiency is common during pregnancy because of the need to supply additional iron to the fetus.

Iron deficiency anaemia is a world wide problem with a stated prevalence around 10% of pregnant women in Western countries (WHO 1996A; Baruth 1998; Brabin 2001). However, in developing countries, mild to moderate (sub-

clinical) anaemia may affect up to 50% of the adult female population. In South East Asia the prevalence of iron deficiency is around 60% to 80% among pregnant women (Edmundson 1992; UN-ACC/SCN 1997; WHO 1998A; WHO 2000A).

Pregnancy is associated with physiological changes that result in increased plasma volume, red blood cells and decreased concentrations of circulating nutrient-binding proteins and micronutrients. Normal physiological changes occur in the blood during pregnancy in order to support and sustain the pregnancy and result in increasing total circulating blood and red blood cells volume. Total plasma volume in non-pregnant women is on average 2,600ml. Near the end of the first trimester of pregnancy, the plasma blood volume increases, and by 34 weeks is about 50% greater than it was at conception (Edmundson 1992; Dowdy 1999). Red cell production is stimulated during pregnancy so the number of red cells gradually rises to about 300 to 500mls but the increase is not as large, or directly proportional to the expansion of plasma volume. The hematocrit is normally around 35% in women. This decreases to 29% to 31% during pregnancy. The amount of haemoglobin in each red blood cell does not change, but because there are fewer red blood cells per 100 ml of blood, haemodilution occurs. The increasing red blood cell mass is not sufficient to compensate for the marked increase in plasma volume, and as a result of this dilution, a mild drop in haemoglobin occurs (Edmundson 1992). This is known as physiological anaemia.

Symptoms of anaemia in pregnancy

Women who suffer from IDA may be asymptomatic particularly if the anaemia is not severe. As anaemia increases and haemoglobin reduces further, women can develop symptoms. These can include fatigue, lack of vitality, breathlessness, paleness, dryness of mucus membranes and nail beds, irritability, dizziness, memory problems, palpitations/unusual awareness of heartbeat, inflamed sore tongue, headaches, bone pain, jaundice and abdominal pain (Edmundson 1992; Baruth 1998; Dowdy 1999).

Types of anaemia in pregnancy

The most common form of anaemia in pregnancy is iron deficiency or hypo chromic anaemia. A number of circumstances, in addition to the direct consequence of disease or pathology, increase the risk factors for iron deficiency anaemia. These include, poor nutrition or assimilation of nutrients, previous use of birth control medications, smoking (interferes with nutrient absorption), alcohol consumption, use of anticonvulsants, vegetarian diet, excess cooking of food, malaria and hookworm (Stoltzfus 1997; Baruth 1998; Brabin 2001). The level of certain nutrients can also be influenced by a number of maternal factors such as age and parity (Edmundson 1992; Baruth 1998; Dowdy 1999).

Potential complications will increase in pregnant women and at delivery if they are anaemic. They have fewer reserves to deal with birth and post partum blood loss, which could lead to severe anaemia and increased susceptibility to post partum infections (United Nations 1995; Baruth 1998).

Preeclampsia and hypertension

Preeclampsia and eclampsia are important causes of maternal mortality in both the developing and developed world. Numerous clinical trials have been conducted to study the effect of nutrition on preeclampsia, for example the effect of calcium supplementation on hypertension in pregnancy. Results from these trials are reported in a 14-study meta-analysis involving 2,459 women that shows a 60% and 70% reduction in preeclampsia and hypertension, respectively, with daily calcium supplementation to women during pregnancy (Bucher 1996). These findings have been refuted, however by the Calcium for Preeclampsia Prevention (CPEP) trial, a large multicentre trial involving 4,589 healthy women in the United States which found no effect of a daily 2 g calcium supplementation on the incidence or severity of preeclampsia and hypertension (Levine 1997). These equivocal findings suggest the question of the beneficial impact of calcium supplementation remains somewhat unclear.

Similarly, a study by Chappell (199) aimed to show the role antioxidants have in decreasing the risk of preeclampsia in US women (Chappell 1999). Such a relationship has been previously observed in humans especially with vitamins

E and C and beta-carotene. Mikhail (1994) in a randomised clinical trial found that daily supplementation with 400 IUs of vitamin E and 1,000 mgs of vitamin C resulted in a 60% reduction in preeclampsia among 283 women who were identified as being at increased risk of preeclampsia (Mikhail 1994). Dekker (1995) describes that low folic acid levels throughout pregnancy increase the risk of severe early onset preeclampsia (Dekker 1995).

Puerperal infection

Two studies, one from Denmark (Jonsson 1996) and the other from Indonesia (Hakimi 1999) have examined the impact of maternal zinc supplementation during pregnancy on maternal infection during the postpartum period. Neither of the trials found zinc to have any measurable impact. In a trial in Indonesia, which tested vitamin A, there was, however, 78% reduction in the episodes of elevated body temperature (>38 deg C) on at least 1 day postpartum among vitamin A recipients versus those not given vitamin A (Hakimi 1999).

Complications of labour and delivery

Zinc deficiency may be important in increasing complications of labour and delivery. Caulfield et al (1998) provides an excellent review of the literature on this topic. To summarize, although strong associations have been found between maternal low zinc status and increased risk of premature rupture of membranes (PROM), placental abruption, prolonged labour and severe laceration, supplementation trials have failed to show any effects on these conditions (Caulfield 1998). Possible explanations for these negative results may relate to flaws in the study designs and to possible lack of zinc deficiency in study populations. These authors state supplementation trials need to be conducted in developing country settings, where maternal zinc deficiency is common, and where women have little access to adequate obstetric care and are thus in greater need of nutrition interventions that ameliorate labour and delivery complications.

Obstructed labour

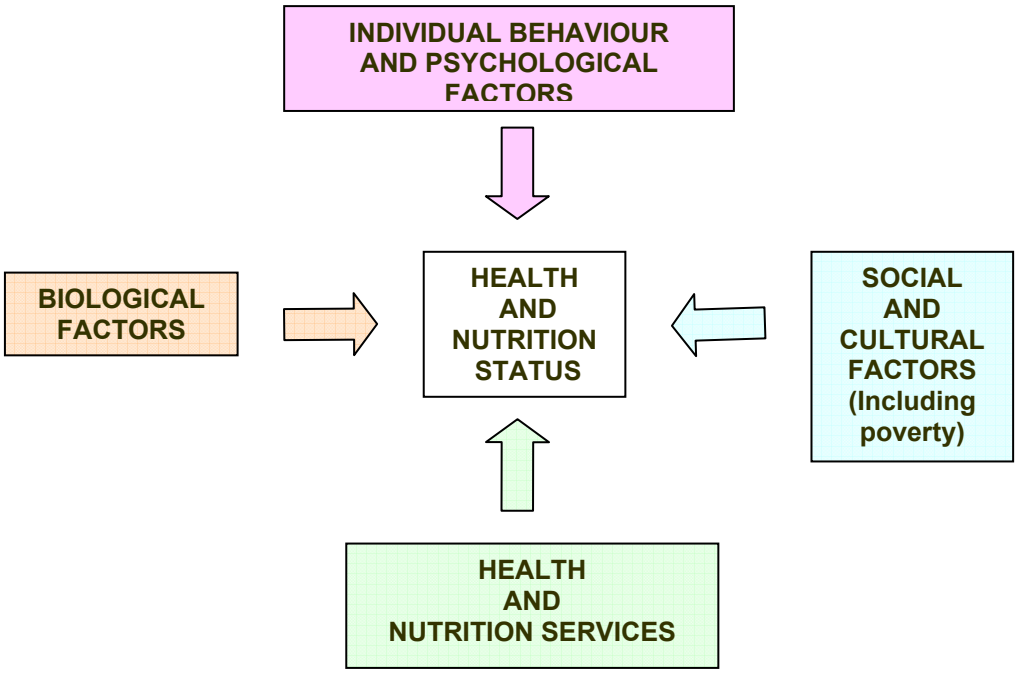
Obstructed labour is one of the main causes of maternal mortality in developing countries. Short maternal height has been known to increase the

risk of obstructed and prolonged labour (UN-ACC/SCN 1997). This has serious implications for short women in developing countries for whom access to emergency obstetric care is minimal. However, although height is used commonly as a surrogate measure of risk, pelvic size and cephalopelvic disproportion are stronger determinants of obstructed labour and may vary across maternal stature. Young age at pregnancy is an important risk factor as the pelvises of young girls tends to be smaller and less mature (Martorell 1994; UN-ACC/SCN 1997). Poor adolescent nutrition may exacerbate this effect. In some populations, normal adult height has been attained without intervention despite early childhood stunting due to poor nutrition (Martorell 1994).

Cultural Beliefs and Social Practices Related to Food Behaviours and Effective Intervention During Pregnancy

The determinants of a woman's health and nutritional status throughout the life cycle result from a combination of biological, social and cultural factors. The model presented below is conceptualised and adapted from the work of Tinker (2000) in Figure 1.

Figure 1: Women's Life Cycle health and nutritional status (Modified from: Tinker (2000))



Individual and psychological factors

Individual and psychological factors include choices available, knowledge about healthy foods, individual preferences and availability of iron supplementation and compliance.

Biological factors

Biological factors are an important determinant of health and nutritional status. Women in Indonesia are subject not only additional risks related to pregnancy and childbearing, but also conditions such as malaria which can be exacerbated by pregnancy and cause low grade anaemia to become worse (Heyman 1990; Stoltzfus 1997; Baruth 1998; Brabin 2001).

Social and cultural factors

Social and cultural factors affect women's health and knowledge throughout their life. Poverty underlies the poor health status of developing country populations and women represent a disproportionate share of the poor in these countries (Tinker 2000). Women's lower social value, which is often related to economic value, places them at risk of receiving an inadequate diet. For example, in Indonesia, data from two provinces, showed the husband to be the first person in the family to eat; that men receive the best in quantity and quality of food; and the wife is the last person to eat (WHFWP 2001A).

Many cultures have beliefs concerning appropriate behaviour during pregnancy. These behaviours often relate to food, particularly the avoidance of certain foods (WHFWP 2001A). Other examples involve more general beliefs such as the belief that overeating during pregnancy will result in a large baby and difficult delivery (Way 1991; Jerome 1997; WHFWP 2001A).

It is widely recognised that cultural beliefs and social practices play a role in the successful delivery of nutrition messages to the community (Andersen 1983; Purtilo 1996; Jerome 1997; UN-ACC/SCN 1997; AbuSabha 1998). The largest collection of relevant data about the importance of cultural beliefs and practices comes from case studies. Social scientists have used ethnographic and survey data to show how people in a community have interpreted a health or nutrition intervention in ways that were not intended by the health providers.

Such as the use of oral rehydration solutions (ORS) for childhood diarrhoea (Andersen 1983; UN-ACC/SCN 2000). In many populations, families give ORS in teaspoon-size quantities instead of larger quantities. This misunderstanding may occur because the ORS is being promoted in such a way that families conclude that the solution is a medicine and therefore must be given in small doses. In reality ORS needs to be given in large quantities, as it is a fluid replacement given to dehydrated children with diarrhoeal disease. This confusion therefore dramatically reduces the effectiveness of the intervention (UN-ACC/SCN 2000).

Further publications regarding the importance of cultural beliefs and social practices for nutrition in pregnancy come from India (Jerome 1997). Jerome found two opposing views in the same area about why eating a large quantity of food during pregnancy could result in a bad outcome for either the fetus or the mother. One community group believed that food shares the same space as the fetus in the mother's abdomen, thus limiting the space for the fetus to grow and eventually causing it to waste away. Another group thought that eating a lot of food can make the fetus grow fat thus, causing problems for mother at delivery. Both scenarios produce a fear of eating too much during pregnancy (Jerome 1997). Way (1991) conducted a study in Hindu pregnant women. She described how a sample of Hindu women, living in England, follow the ancient science of Ayurda. Under this belief, the individual tries to maintain health equilibrium between 'hot' and 'cold' bodily states (Way 1991). Food is also classified as either hot or cold, depending on whether it is believed to have a heating or cooling effect on the body, the emotions and personality. Hot foods include animal products, often associated with their blood content and foods that are hot to taste like chillies and radishes whilst cold foods include milk products. Pregnancy is considered a hot period in a Hindu women's life. Hot foods are therefore avoided, and foods that are cool in nature are eaten. Hot foods are believed to cause over-excitement, inflammatory reactions, sweating and fatigue. If hot foods are eaten in early pregnancy, it is believed to cause miscarriage and fetal abnormalities. Cold foods are thought to engender strength, calm and cheerfulness.

Similar descriptions of hot and cold are common in other Asian cultures, including Indonesia, China and Vietnam. A study carried out by Ngoc Nga (Ngoc Nga 2000) in a Vietnamese village has shown that 'eating down' or reducing food intake was a contributory factor in low birth weight.

It is important to understand that wide variations exist in the cultural beliefs and social practices related to food behaviour during pregnancy, as these will affect interventions aimed at improving maternal diet. To date, health professionals have focused on biophysical determinants of good nutrition and food intake during pregnancy, but it is also necessary to understand the effects of pre-existing beliefs and practices on the ways in which individuals and groups respond to health workers interventions. Attention must be given to the role of cultural beliefs and social practices as determinants of responses to directed behaviour change (UN-ACC/SCN 2000).

Availability of food

Another factor affecting the health and nutritional status of pregnant women is the availability and accessibility of foods. These are subject to seasonal variations, which are made worse by problems such as drought and floods resulting in food shortages. This is a particular problem for village communities as there is usually no capacity (no cash income) to purchase additional food if local crops and gardens fail (See Table 5 on page 45 and 46).

Health services and improving nutrition

The accessibility of health services to women also has potential to influence nutritional status particularly in rural areas. Village midwives and cadres are potentially very important workers in a primary health care service for the community. They need knowledge in nutrition, especially nutrition for pregnant and lactating women, to fulfil their key role and potential for improving women's nutritional status. Village midwives and cadres are arguably the most important health workers as they are the only primary services in the local community. The role of village midwives as a public health provider, counsellor, and advocate will be stronger if they have the skills

to communicate effectively with their clients and the community as a whole, in order to influence social and cultural patterns and choices around food. The village midwives need to work with the community to identify strategies to maintain nutrition for pregnant women during the seasonal variation and availability (WHFWP 2001A).

Communication is a central aspect of effective behavioural change, and communication, by definition, involves multiple parties. In Indonesia multiple parties not only include the recipients of the interventions or clinical care (the pregnant women herself) but also her husband, mother, mother-in-law, neighbour, and community leaders. The cultural beliefs of health providers at different levels of the system must also be examined and understood.

Schultink & Dillon (1998) described a multiple level approach to improve iron status including improvement of diet, food fortifications, antihelminthic (deworming) treatment, and iron supplementation (Schultink & Dillon 1998). The most efficient way to achieve adequate iron absorption from natural diet would be through increasing the intake of fish and/or meat. In addition, it would be important to reduce the intake of iron absorption inhibitors such as phytate, which is found in foods like tea, coffee, chocolate and soy products and to increase the intake of an absorption enhancer such as vitamin C. It could be possible for local health workers to encourage most of these changes and implement worming programs. There are many vegetables that are good sources of iron and vitamin C, such as green leafy vegetables, commonly found in Indonesia. These could be easily and cost effectively promoted in combination with other vitamins and minerals including iron by health workers. Schultink & Dillon (1998) suggests that in order to alleviate iron deficiency through supplementation, some issues have to be considered such as distribution mechanisms and expanding the target group (Schultink & Dillon 1998). The following section discusses the programs that have been used to improve nutritional status and prevention of anaemia in pregnancy.

Table 5: Summary of recommended dietary nutrients in Indonesian food sources and availability in Java villages

Nutrient	RDI non pregnant (per day)	RDI Pregnant (per day)	Indonesian Food Sources	Rural foods availability, cost and restrictions	
				Availability and cost of food	Foods restricted by pregnant women
Protein (g)	46-50	60 to 65	meats*, poultry* fish**, eggs, dried beans, nuts, grains and seeds	*expensive and seldom eaten **dried, high in salt and small pieces	fish, calamari and egg
Carbohydrate (g)		150 min	Breads and cereals, vegetables*** and fruits e.g. papaya* banana* oranges**	*seasonal **expensive, seldom eaten ***grown in village gardens	pineapple
Fats (Kcal)		660	Lean meats* skinless poultry* fish	* expensive and seldom eaten	
Minerals					
Iron (mg)		15-30	egg yolk*, red meats*, organ meats*, liver *, non haeme - prunes, beans, fish, dried beans	* expensive and seldom eaten	meats, liver and organ meats are prohibited for pregnant women. eggplants
Calcium and phosphorous (mg)		1,200	skim powder milk*, nonfat milk*, buttermilk**, cheese**, green leafy vegetables, sardines, nuts, dried beans	* expensive and seldom eaten	women do not want to eat fish, especially sardines because of the smell
Iodine (mg)		175-200	iodised salt, saltwater fish*, grown in iodine-rich soil**	* expensive and seldom eaten ** not available in the village	some women avoid salt water fish
Magnesium (mg)		320- 340	dark green leafy vegetables, dried beans, nuts, soybeans (tofu, tempeh), milk, meat*, seafood*	* expensive and seldom eaten	most women avoid eating seafood
Zinc (mg)		15 - 16	animal protein*, shellfish*, nuts milk*, cheese**	* expensive and seldom eaten **expensive and not available in village	most women avoid eating shellfish
Nutrient	**RDI**	**RDI**	**Indonesian Food Sources**	**Rural foods availability, cost and restrictions**	

	non pregnant (per day)	Pregnant (per day)		Availability and cost of food	Foods restricted by pregnant women
Vitamins					
Folic acid (ug)	180	260 -400	liver*, green leafy vegetables, kidney beans, lean beef* wheat bread**	* expensive and seldom eaten **not available in the village	chicken liver, giblets
Vit.B12 (mg)	2.0	2.2-2.6	animal proteins*, seaweed**	* expensive and seldom eaten **salty and eaten in a small amounts	fish and calamari, some women do not eat any meat
Vit. B6 (mg)	1.6	2.1-2.2	meat*, poultry*, fish**, eggs*, milk powder*, wheat bread***	* expensive and seldom eaten **salty and eaten in a small amounts ***not available in the village	fish restriction
Vit. C (mg)	60	70 - 90	Citrus fruits juices, green peppers, chilli potatoes, tomatoes, cabbage***	***grown in village gardens	some women avoid cabbage to prevent abdominal distension some women avoid citrus to prevent abdominal pain
Vit. A (ug)	800	800-1,300	beef liver, * butter, * margarine*, skim milk powder*, dark green leafy vegetables eg: cassava leafs, kangkung, spinach and carrot**	* expensive and seldom eaten **carrot is seldom to eaten especially hill villages (usually sold to the city)	some women avoid carrots to prevent their baby becoming yellow.
Vit. D (ug)	5-10	10	Margarine*, fish, liver oils, sunlight	* expensive and seldom eaten	
Vit. E (mg)	8	10 -12	vegetables and seed oils, green leafy vegetables, liver*	* expensive	some women avoid liver to prevent their baby becoming clumsy
Vit. K			green leafy vegetables, egg yolk*, liver*	* expensive	some women avoid liver to prevent their baby becoming clumsy
Energy (kcal)	2200	2,500-2,700			

Global Anaemia Prevention Programs Aimed at Pregnancy

There are many programs currently implemented across the world to try to improve the nutrition of pregnant and lactating women. These include supplementation, fortification, dietary modification and parasitic disease control (UN-ACC/SCN 2000; WHO 2000A). The debate concerning iron supplements for pregnant women remains controversial and no definite consensus has been reached (Cook 1995; UN-ACC/SCN 1997; Milman 1999) though there is little doubt that anaemia at birth and postnatally can be detrimental to the birthing woman. Administration of iron supplements maybe indicated if the woman is unable to substantially increase dietary iron (UN-ACC/SCN 1997).

The dietary programs that are currently implemented throughout the world for pregnant women focus on the widespread adoption of iron/folate supplementation with growing support for fortification of staple foods with iron and dietary diversification. There is still lack of agreement on dosage, optimal duration of supplementation for pregnant women or even whether supplements are necessary in well-nourished women. The United Nations describes that requirements for iron in the second and third trimesters cannot be satisfied by dietary iron alone, even if there is high bioavailability, unless stores of about 500 mgs of iron existed before pregnancy. WHO recommends universal iron supplementation for pregnant women (60mg of elemental iron plus 250ugs of folic acid, once or twice a day) to be taken throughout the second half of pregnancy (WHO 1998A).

According to WHO (1996) most of the countries in South East Asia have adopted a universal preventive supplementation policy for part or all of the pregnancy and have used the recommended iron/folic acid combination. Indonesia, India, Nepal, Thailand, and Sri Lanka all promote universal supplementation programs (WHO 1996A). Some countries, however, such as Korea, Burma, and Bangladesh have adopted policies where only those pregnant women found to be anaemic (determined by blood test and clinical judgment) are given supplementation (Milman 1999). Day (1998) reports there is concern of over-supplementation because certain nutrients including folic acid, iron, zinc, selenium and vitamins A, B6, C and D, in large doses, can be

toxic to the fetus (Day 1998). Moreover, an increase in the amount of one nutrient may negatively affect how other nutrients are absorbed and used.

Nutritional health should be viewed within the context of improving overall health and lifestyles rather than as medical treatment. Regular supplies of supplement are obviously important for program effectiveness in populations with sub optimal nutrition, but so is compliance with supplementation. Factors relating to compliance include the health belief of the client, symptoms and level of ill health felt by the client, frequency of the doses required, duration of short or long term regimes and palatability of the medication (Matsui 1997). Other studies have shown that some women will not take iron pills once they are counselled that side effects (nausea, constipation) may occur (Galloway 1994).

The fortification of foods with iron is a preventive measure that aims to improve and sustain improved iron nutrition on a long-term basis. Fortification with iron has been practiced for many years in industrialized countries. For example, in Australia, breakfast cereals, commercially prepared baby foods and many other cereals have been fortified with iron (Seibel 1999). Five large studies in developing countries have demonstrated the effectiveness of iron fortification to reduce the iron deficiency anaemia prevalence (in Guatemala, India, South Africa, Thailand, and Venezuela), but only when based on careful planning and well-established guidelines (UN-ACC/SCN 1997).

The improvement in supply, consumption and bioavailability of iron in food is an important strategy to improve the iron status of population. Non-haeme iron is an important source of dietary iron, especially in the developing world where meat intake is low (Appendix one). Other food components and food preparation methods influence the bioavailability of iron in foods. Vitamin C, meat, fish and an acidic pH, in food eaten, all enhance iron absorption. There are many vegetables that are good sources of iron and vitamin C, and the promotion of their use in combinations should be undertaken with families and communities.

Health Promotion around Nutrition in Pregnancy in Indonesia

The major nutritional problems in Indonesia are Protein-Energy Malnutrition (PEM) and micronutrient malnutrition (WHO-SEARO 2002A). According to recent surveys, the proportion of malnutrition was higher in rural areas (>40%) as compared to urban areas (>30%). The growth monitoring system in the country is satisfactory except the weight measuring scales require standardisation, routine servicing and quality checks (WHO-SEARO 2002A). Iron deficiency is the most common cause of nutritional anaemia among pregnant women and pre-school children in Indonesia.

Community participation around prevention of anaemia in pregnancy

In Indonesia, improving the nutritional status of the population has been explicitly recognised as one of the major goals of development. In 1974, a nationwide intersectoral Family Nutrition Improvement Program, Usaha Perbaikan Gizi Keluarga (UPGK) was established (Ministry of Health 1994; Kodyat 1998; Rahardjo 2000).

Revised in the 1980s' and still in place today, the 'New UPGK', is a community-based strategy relying on active involvement of the agricultural sector including the national family planning program, non-formal education sector, religious organizations and non-government organizations (NGO), particularly the Family Welfare Movement (PKK), (Ruslan 1983; Hadijono 1999). The New UPGK as part of an overall rural development program undertakes three major activities. These are community nutrition education, provision of nutrition services to mothers and children under-five through Posyandu (community integrated service posts), and the development of home and community gardens to generate income and food for small farmers (Ministry of Health 1994; Rahardjo 2000). By 1995, with all parts of the country involved in the New UPGK, national nutritional data was reflecting the success of the program by a decrease in anaemia rates in the general community (Ministry of Health 1994; Rahardjo 2000).

Some studies indicate the prevalence of anaemia dropped from 70% in 1986 to 51% in 1995 among pregnant women while in pre-school children, it reduced to 40.5% in 1995 from 55.5% in 1992 (Indonesia Department of Health 1998).

Low consumption of haeme iron and exposure to parasitic infections contribute to the high rates of anaemia in Indonesia.

Iron supplementation programs in Indonesia

The Indonesia government started the iron supplementation program in 1974 and currently provides a minimum of 60% of pregnant women with ninety free supplement doses during the second and third trimesters of pregnancy (Kodyat 1998; Kosen et-al 1998; Fitrah 2000; Rahardjo 2000). In 1996 the Indonesian government also established new regulations for female workers, where factories should provide female workers with an iron supplement once a week for 16 weeks of the year. Dietary guidelines have been distributed to other groups, for example female adolescents, school children and non-pregnant women (Kodyat 1998). Food fortification may become a more viable strategy to employ, for example - noodles, weaning foods and jamu (traditional herb drinks) are fortified with iron, alongside natural absorption enhancers such as tamarind, which is rich in vitamin C.

Current Indonesian nutrition and health programs aim to reduce the prevalence of iron deficiency anaemia (Kodyat 1998; Schultink & Dillon 1998). These include:

- The nutrition recuperation program: improve family food patterns with a healthy diet e.g. breastfeeding; UPGK and counselling by village health volunteers;
- Programs for nutrition improvement in institutions such as schools and factories; and
- Food and nutrition surveillance at provincial and district levels.

The Ministry of Health, in coordination with other ministries such as the Ministry for the Empowerment of Women, the National Family Planning Coordinating Board, the Ministry of National Education and the Ministry of Home Affairs and Regional Autonomy, lead these programs. The programs also rely on contribution of donors, professional organisations and NGOs' (Ministry of Health 2000).

In 2000, the Ministry of Health launched 'Making Pregnancy Safer' with key messages, which included:

- Every pregnant woman must have access to a skilled attendant for basic obstetric care and regular monitoring of any life-threatening symptoms;
- All pregnant women must be enabled to reach a functioning referral facility within a short time after the onset of symptoms; and
- Every pregnancy should be wanted.

To ensure the success of this program, the government is encouraging home, family and community level practices that promote maternal and newborn health. Nutrition programs for pregnant women therefore directly addresses this policy.

A study in West Java (Moore 1991) compared the coverage and compliance of iron supplementation where official health personnel in health centres distribute the iron supplements and compared it with an alternative where TBAs were used to reach and educate pregnant women on nutrition and distribute iron supplements. The results of the study showed that the TBA's coverage was 92% compared to 53% from the health personnel (Moore 1991). The average total number of supplements reported to be taken during pregnancy was 62 under the TBA system, whereas it was reported to be only 24 under the existing health care system. It was concluded that the coverage as well as compliance with supplement intake was influenced by the type of distribution system.

Similar results were also obtained in a study in Lombok using religious community leaders (Fahmida 1997). This study was conducted in 1997 among fertile age women from the island of Lombok and investigated the compliance with once a week supplement intake during a period of eight weeks. One group of women received the supplement from the village health worker (n = 93) and another group received the supplement from religious community leaders (n = 94) who have close contact with the Muslim community. At the end of the 8 weeks the women were asked how many supplements they had taken and this was checked by counting the remaining supplements. The women who were provided the supplements by the health workers stated that on average they

have taken 5.8 supplements whereas the women provided the supplements by the religious leaders stated that they have taken on average 6.9 of the supplements (Fahmida 1997).

Expanding the target group is another alternative to more effective implementation of the iron supplementation programs. The problem of iron deficiency in pregnant women should not be seen in isolation from other physiological needs such as growth and development. The prevalence of anaemia among adolescent girls and non-pregnant women is still high. This suggests that iron stores before pregnancy are inadequate. It was shown in a survey in Jakarta in 1997 that around 30% of adolescents and 30 to 40% of non-pregnant women, in the population sampled, were anaemic (Kodyat 1998). It is clear, therefore, that many women will already be iron deficient through adolescence and at the start of pregnancy will have few reserves of iron.

Cook examined another strategy to the costly approach of daily supplementation, in a study in 1995. Cook (1995) found that changes in haemoglobin levels in a supplementation program were similar to the changes occurring in a group receiving daily supplementation. Weekly supplementation may be especially useful when supplement intake is semi supervised in places such as schools and factories. School or workplace supplementation may assist women who may not be permitted supplementation at home.

Sub optimal vitamin A status has been recently recognised as important in anaemia. Combined iron and vitamin A supplementation was more effective in improving iron status than iron supplementation alone (Suharno et-al 1993). Suharno and colleagues undertook this supplementation in a study in West Java in 1993. Their results showed achievement of maximum haemoglobin level in the group that were given the supplementation with vitamin A and iron. The Indonesian government has not used this combined method due to the decreasing national budget and the additional cost to add vitamin A to the program.

Other indirect attempts to address the problem of anaemia have been addressed by increasing the number of health personnel. The placement of village midwives in rural regions was expected to address problems of insufficient and inadequately trained professionals in remote areas. The midwives provide

antenatal care, delivery assistance, post-natal care, infant care and family planning services as well as being assigned to run Post Obat Desa (Health Medication Post in the village). They also assisted in collecting health data (surveillance) on maternal and child health, immunisation and nutrition programs (Departemen Kesehatan 1999).

In the existing programs, the official health personnel in the health centre distribute the iron supplements. Some argue this strategy may be less effective because the health staff may be insufficiently informed about cultural beliefs to ensure supplementation is acceptable to women, their families or communities (Kosen et-al 1998) or perhaps they do not have the authority to make these changes.

Conclusion

This chapter together with Appendix 1 identify nutrition and energy requirements for pregnancy. They conclude that the nutritional status of women both before and during pregnancy can influence the outcomes of pregnancy and childbirth for the mother and the infant. Despite many programs addressing anaemia the risk of iron deficiency anaemia is still prevalent in Indonesia and can influence maternal mortality and morbidity and fetal well-being. The determinants of women's health and nutritional status throughout the life cycle are not only biological but also social and cultural. Therefore all these need to be taken into account when trying to influence their status.

A review of the literature suggests that health providers need knowledge and awareness of the cultural beliefs and social practice that interfere with nutrition and health messages. Health workers and women often hold conflicting assumptions regarding certain beliefs. Engaging in cross-cultural communication without recognizing or understanding these differing views can present a major hurdle for many health providers (Pojda 2000). Health information needs to be given to clients in ways that respect their beliefs and adapting cultural practices may be more successful when involving family or community members in positions of power.

One of the aims of this study is to identify how the cultural practices of Indonesians relate to food during pregnancy and how the knowledge and attitudes of midwives and cadres may impact on the nutritional status of women. This information is used to guide an intervention to improve the nutritional status during pregnancy. Chapter 3 will discuss health promotion models and principles that will be used to guide both the intervention and the design of the research.

Chapter 3: Application of Health Promotion Models in Research Design

Introduction

This chapter defines health promotion and discusses models and important principles of health promotion programs. It describes how these models are applied and used as a framework for this research thesis. The rationale for using both qualitative and quantitative methods is provided. The objectives of the research are restated and the three stage research design is summarised.

Definition of Health Promotion

The Ottawa Charter defines health promotion as *'a process of enabling people to increase control over the determinants of health and thereby to improve their health'* (WHO 1986). An individual or group must be able to identify and to realise aspirations, to satisfy needs, and to change or cope with the environment in order to reach a state of physical, mental and social well-being, (WHO 1986; Breslow 1999). Health is, therefore, seen as a resource for everyday life and this definition emphasises social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but of the community as a whole (WHO 1998B).

Health promotion strives to achieve equity in health. Health promotion action can work to reduce differences in current health status by improving resources to enable people to achieve their fullest health potential. This includes a secure foundation in a supportive environment, access to information, life skills and opportunities for making healthy choices (WHO 1998B; Breslow 1999). People cannot achieve their fullest health potential unless they are able to take control of those things, which determine their health. This must apply equally to women and men (WHO 1998B).

Health Promotion Action

The first comprehensive definition of health promotion was carried forward in the Charter for Health Promotion, which was adopted in Ottawa in 1986 (WHO 1986). The Charter set the challenge for the new public health by reaffirming social justice and equity as prerequisites for health, and advocacy and

mediation as the processes for their achievement. The Charter identified five health promotion action areas:

- Build healthy public policy;
- Create supportive environments;
- Develop personal skills;
- Strengthen community action; and
- Reorient health services.

Health promotion is a process directed towards enabling people to take action. Therefore, health promotion is not something that is done on or to people, it is done by, with, and for people either as individuals or as groups (O'Byrne 2000; WHO 2000B). The fifth major conference of health promotion in Mexico (WHO 2000B) declared that health promotion supports personal and social development through providing information, education for health, and enhancing life skills. Enabling people to learn, throughout life, to prepare themselves for all of its stages is an essential component of this approach.

Other health promotion conferences (WHO 1986) declared that countries need to undertake further work in implementing combinations of the health promotion strategies listed above. The principles of effective health promotion according to the Ottawa Charter (WHO 1986) are relevance, acceptability to the community, evidence based, multi strategic and accountable.

Application of Health Promotion to the Research

The WHO conference described strategies to improve the implementation of health promotion. Two of these strategies, increasing community capacity and empowering communities for promoting health, are particularly relevant to this thesis. Community capacity building however, requires considerable skill. These skills should be addressed in the training of health professions in order to avoid or minimise the chances of top-down or governmental interventions in the future. Advocacy skills are seen as particularly important (Restrepo 2000; WHO 2000B). The application of these components of health promotion, to this thesis, are discussed next.

Advocacy

Political, economic, social, cultural, environmental, behavioural and biological factors can all help health or be harmful to it. Health promotion action aims at making these conditions favourable through advocacy for health within social systems (Restrepo 2000; WHO 2000B). This study works with local communities and local systems to advocate for the importance of good nutrition in pregnancy.

Enable

Health promotion focuses on achieving equity in health by enabling people to act to maintain health and prevent illness. The use of community strengthening activities to improving fairness in access to nutritious foods for women will not only increase the health of women and infants, but will also enable communities to take this action themselves. Fairer distribution of food is not dependant on health workers or cost.

Mediation

The prerequisites and prospects for health cannot be ensured by the health sector alone. More importantly, health promotion demands coordinated action by all concerned by: governments, health and other social and economic sectors, nongovernmental and voluntary organizations, local authorities, industry, individuals, families and communities (WHO 1986; WHO 1998B; WHO 2000B).

Health personnel have a major responsibility to mediate between different interests in society to achieve health. Health promotion strategies and programs should be adapted to the local needs and possibilities of individuals, countries and regions to take into account the differences of social, cultural and economic systems (WHO 1986; WHO 2000B). This project works with local people to bring culture, local leaders and health workers together through simple, low cost strategies to improve nutrition in pregnant women.

Build Healthy Public Policy

Health promotion goes beyond health care. It puts health on the agenda of policy makers in all sectors and at all levels (WHO 1986; WHO 2000B). For example, the Indonesian government and Health Ministry have been very involved for many years in multi agency policies to improve nutrition. Some of these nutrition programs have been described in Chapter 2. A detailed description of use of cadres to improve health by the Indonesian government is described in the next chapter to provide a deeper understanding of the context of the research.

Create supportive environments

Health cannot be separated from other community goals. The links between people and their environment constitutes the basis for a socio-ecological approach to health (WHO 1986; WHO 2000B). This project works with local communities and resources available to them to enable these to be more equitably used in the nutrition of pregnant women. It also provides low cost interventions to improve the knowledge and skills of health workers and community workers.

Strengthen community action

Health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health (Restrepo 2000; WHO 2000B). At the heart of this process is the empowerment of communities, their ownership and control of their own activities and destinies. The project focuses on the relationships between village midwives, pregnant women, cadres and the community to enhance self-help and social support, and to develop flexible systems for strengthening public participation and direction of health matters. The project provides better access to information and learning opportunities for health.

Develop personal skills

Health promotion supports personal and social development through providing information, education for health and enhancing life skills (Breslow 1999; WHO 2000B). In this project, the intervention is designed to improve the

knowledge and skills of village midwives and cadres so they can improve the nutrition of the community through social and cultural change.

Reorient health services

The responsibility for health promotion in health services is shared among individuals, community groups, health professionals, health service institutions and governments (Breslow 1999; WHO 2000B). This project aims to improve the knowledge of the village midwives about nutrition, communication and community development. This is designed to reorient the way health services are provided at village level from a ‘top down approach’ to one that uses negotiation and discussion to identify the best strategy to improve nutrition.

Health Promotion Planning and Implementation Models

Health promotion programs operate in primary (prevention), secondary (early detection) and tertiary (prompt treatment) stages. Effecting change in the health of populations requires the development of comprehensive programs of action that use a variety of approaches and strategies such as policy, best practice guidelines, workforce development, legislation, social marketing and community development. There are validated models of planning and evaluation of public health action, and models linking program strategies and outcomes. Another model used widely in health promotion research (Li 2001) which guides this thesis is the 'Precede - Proceed' model (Green & Kreuter 1991). This model was selected, as it is compatible with the capacity building model of health promotion and has a process which strengthens relevance, acceptability to the community, evidence based, multi strategic and accountability. The model is discussed in more detail below.

Precede - Proceed model

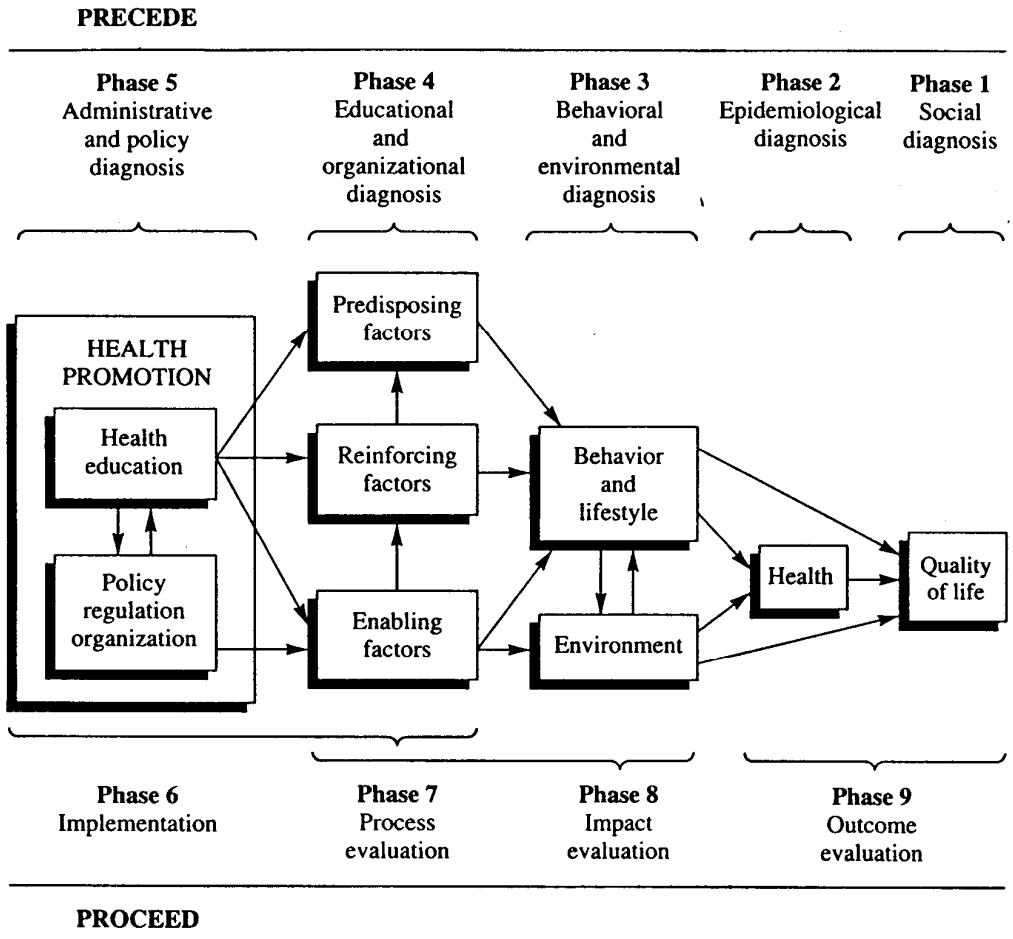
This model, developed over many years, takes into account the multiple factors that shape the health status of a population and guide health promotion programmers to focus on targets for intervention (Green & Kreuter 1991; Green 1999A; Green 1999B). Recent work in health promotion continues to be

based on this original work and has been applied with childbearing women in Uganda (Gennaro 2002).

The Precede component generates specific objectives and criteria for evaluation while the Proceed provides additional steps for implementation and evaluation. The two frameworks (Precede - Proceed) work in one cycle in one framework, providing a continuous linking of planning, implementation, and evaluation of a health promotion program.

There are nine phases of the Precede - Proceed model as shown in Figure 2 below.

Figure 2: Precede - Proceed Method (Reference: (Green & Kreuter 1991) pg 24)



The following describes and modifies the work of Green & Kreuter (1991) and applies it in the conceptualisation and conduct of the research reported here (Green & Kreuter 1991).

Phase 1: This phase requires social diagnosis, which is a statement, describing the quality of life by assessing some of the health problems of the target

population, for example, the high infant mortality rates and maternal mortality rates.

Phase 2: This epidemiological diagnosis identifies the specific health goals or problems that may contribute to the social goals developed in Phase 1, for example, the high rates of anaemia in pregnancy. In this Phase, accurate data is collected by appropriate investigation and are included in the model. This may also be addressed as part of the evaluation of the program. *The quantitative data collected in Stage 1 of the research identifies the nutritional status of the target population.*

Phase 3: The behavioural and environmental diagnosis identifies specific health related behaviour and environmental factors that could be linked to the health problem in Phase 2. They must be very specifically, identified and carefully ranked. Environment factors are those external to the individual that can be modified to support the health behaviour. For example, iron supplementation programs. The environment factors in this study include: health services; economic status of villagers; distribution systems and communication; and cultural or social barriers influencing diet and iron supplementation.

Phase Four: Educational and organizational diagnosis. This Phase consist of sorting and categorizing the factors that seem to have direct impact on target group health behaviour and environment according to three classes of factors, namely:

- Predisposing factors, these include the knowledge, attitudes, beliefs, values and perception of women, cadres and village midwives that support or inhibit improvement in pregnant women's nutrition and supplementation. *The baseline qualitative data collected in Stage 1 of this research identified these.*
- Enabling factors, are those skills, resources, or barriers that can help or impede the preferred behavioural as well as environmental changes. These factors are the antecedents to behaviour that enable a change to occur. For example, the attitudes and behaviours of village midwives, cadres, pregnant women and their families. Other factors may be the

availability of the food and community resources. *Qualitative data from Stage 1 also gathered information about enabling factors. The intervention program provided in Stage 2 of the research was also informed by this information*.

- Reinforcing factors, include rewards and feedback received from others following adoption of the behaviour. They are factors subsequent to behaviour that provide the continuing reward or incentive for the behaviour and contribute to its maintenance. This may include praise from village midwives supervisors, support and gratitude of women, support and acceptance of the community. *Stage 3 of the research examined the reinforcing factors and the sustainability of change as a result of intervention*.

Any plan for a health promotion program that influences behaviour has to consider all three factors above. These factors make it possible to identify what form the health promotion activity will take. Such as direct communication to women, village midwives and/or cadres to strengthen the predisposing factors and indirect communications through community leaders, peers or village midwives to strengthen the reinforcing factors. Community organisation, or activity such as in-service training to strengthen the enabling factors and improve skills and knowledge of village midwives and cadres.

Phase Five: Administrative and policy diagnosis. This Phase is the assessment of readiness and capability of an organisation for the development and implementation of the program. The agreement and support of the health systems and communities suggested this was favourable. There was also an attempt to include village leaders in an effort to improve the nutrition of pregnant women in the village.

Phase Six, Seven, and Eight. These include the implementation and evaluation of the program strategies and involves process evaluation and impact evaluation. Stage 2 and 3 of the research describe and evaluate the intervention implementation, and evaluate process and impact.

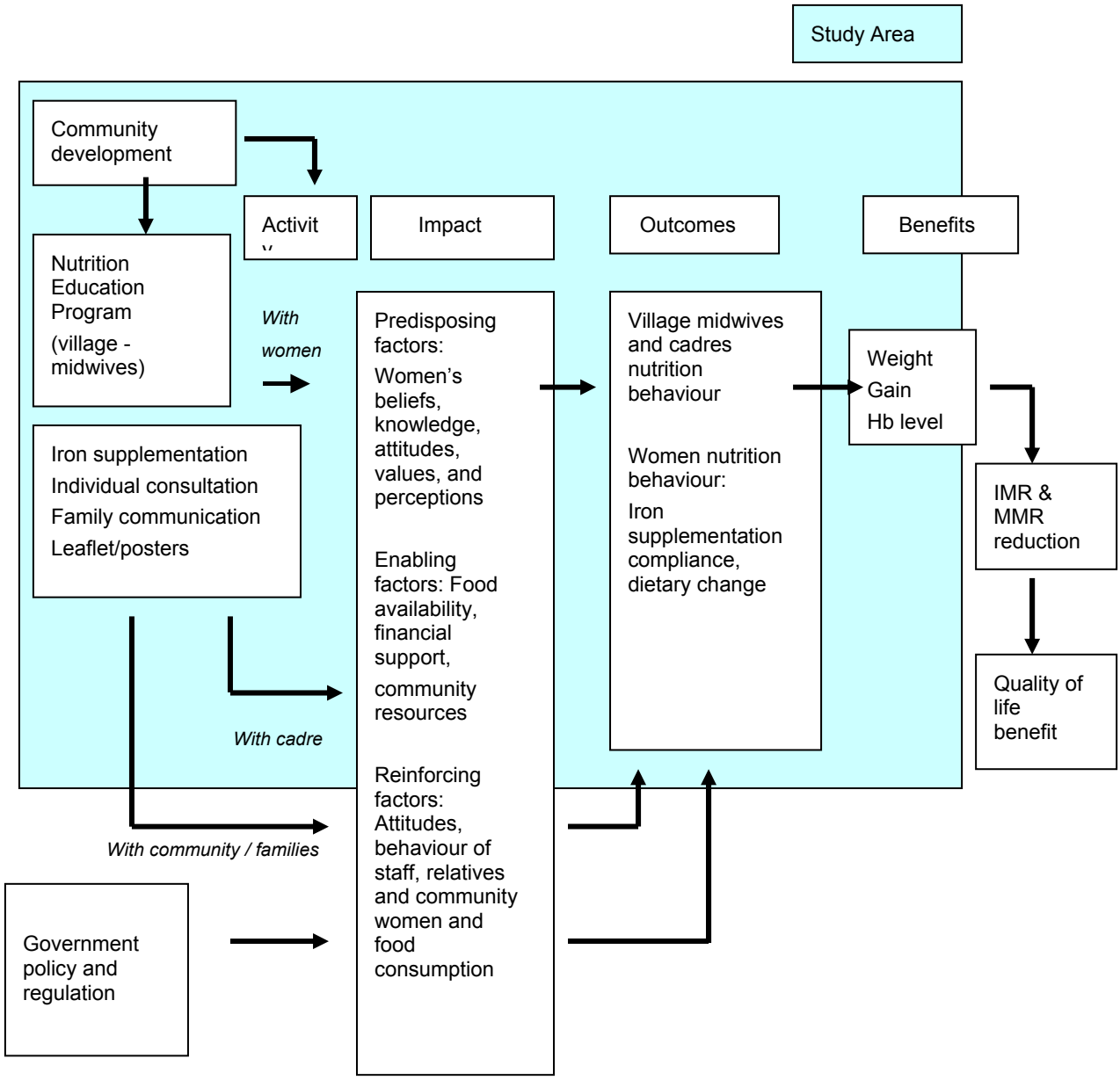
Phase Nine is an outcome evaluation. The long term outcome of the intervention was unable to be carried out because of time and logistical constraints.

The research focuses on three factors which act as determinants of nutritional behaviour of women based on their situation.

- Direct communication with pregnant women and community leaders to strengthen the predisposing factors.
- Indirect communication through influencing families, community leaders and peers to strengthen the reinforcing factors.
- Community organization and training in community capacity building and communication for village midwives and cadres that strengthen the enabling factors and reward achievements.

These three factors are amenable to improvement at least in theory and can be positively influenced by village midwives and cadres.

Figure 3: Conceptual map of the study process



Rationale for Use of Multiple Research Methods

The history of successful community development indicates that a wide variety of innovative strategies are required. The impact of these strategies is often based on context, local strengths and needs. The systematic documentation of the strategies used and their effectiveness is crucial (Restrepo 2000). This requires the development of research skills amongst health workers, as well as the development of a greater number of opportunities to communicate successes across health sectors. A simple measure of the outcome of

community capacity building could be the actions that people take in response to programs (Restrepo 2000).

Because health promotion is a dynamic and complex process the number of variables that need to be investigated often exceeds the number of data points, which reduces the power of quantitative analysis (Isreal 1994). This reduction of power limits the use of quantitative methods. Moreover the measurement and evaluation of process may actually influence the outcomes. The evaluation becomes part of the process itself and it would be inappropriate to assume that the outcomes would have occurred without this measurement and evaluation. Another limitation of quantitative data in this study are that factors which may influence nutritional status such as food availability, malaria, tuberculosis and intestinal worms could not be accurately measured. However the measurement of nutritional outcomes were standardised as much as possible. Because of the time and logistical constraints, this research study will not be able to measure the long term effectiveness or benefits of the study. Nevertheless quantitative methods are useful because they provide some evidence for both the need for health improvement and together with qualitative data can identify positive trends towards improvement in villages, which have successfully implemented community development in the area of nutrition (Cooke 1998).

Qualitative methodology also plays a major part in providing valid evidence (Tones 2000). Anthropological and qualitative research methods may be useful to understand the broader social context of change and how cultural and social factors may hinder or promote the change in the study villages (Green & Kreuter 1991; Isreal 1994). Several authors suggest investigating the process is as important as investigating outcomes. Information about the interrelationship between context, strategies and outcomes is necessary to understand the practicality and flexibility of the program. Ethnography, the description and analysis of human behaviour, has formed the basis of all anthropological research (Denzin & Lincoln 1994). In studying human behaviour, anthropologists have found it necessary to collect data through long-term informal contact, establish good rapport with the study community, and have proficiency in the language of the group. Ethnography is supposed to deal with all aspects of human behaviour and the interrelationships existing

between different behavioural components and the beliefs, attitudes, and values associated with the behavioural practices (Denzin & Lincoln 1994). In this research however, ethnographical methods will be used to identify the complexity of factors affecting nutrition. Following this analysis an attempt will be made to identify key personnel who can act as communicators to develop effective messages for modifying nutritional behaviour.

The use of multiple methods and sources is consistent with Green's suggestion to use both epidemiological and social/cultural analysis (Green & Kreuter 1991). A restatement of the objectives of the study and the design follows.

Study Objectives

The study objectives are to:

- Establish the knowledge, attitudes, beliefs and behaviour related to nutrition and nutritional supplementation of village women, village midwives and cadres;
- Identify how the knowledge, attitudes and beliefs of the midwives and cadres in turn influence the nutritional behaviour of pregnant women;
- Record baseline information of the nutritional status and eating behaviour of pregnant women in the sample villages;
- Develop and implement simple educational strategies for village midwives and cadres that maximise the nutritional status of village women before birth based on baseline evaluation
- Evaluate the impact of the educational intervention and identify how knowledge, attitudes and behaviour of village midwives, cadres and pregnant women have changed. Reassess the nutritional status of pregnant women.

The first 3 objectives are compatible with the Precede component of Green & Kreuter Precede-Proceed model (i.e. Phase 1 to 5). The fourth objective is compatible with phase six of the model and the last objective is compatible with phase seven and eight of Green's Model.

Design

The design is a longitudinal descriptive study carried out over 12 months, with baseline data collection (Stage 1), intervention (Stage 2) and evaluation (Stage 3). Eight villages in two districts were used in the research. A full description of these villages are provided in the next chapter. Four villages in one of the districts were provided with the intervention which was an educational workshop for village midwives and cadres. A description of the intervention, which was guided by the findings of Stage 1, can be found in Chapter 7. The remaining four villages were used as comparison villages. The comparison villages added to the richness of the analysis and understanding of the findings. A summary of the three stages are provided below but more detail of both the methods used and the results, are provided in Chapters 5, 6, 8 and 9.

Stage 1

An ethnographic approach was used to describe the cultural beliefs and practices of pregnant women in eight villages in Banten province in Java in relation to nutrition during pregnancy.

A full description of the methods used is provided in Chapter 5. Observation, group discussion and semi structured interviews were used to establish the knowledge, attitudes, beliefs and behaviour of village midwives and cadres in relation to nutrition, micronutrient supplementation and the impact on nutritional behaviour of pregnant women. Group discussions were held with the community. Individual interviews were conducted with village midwives, cadres and women. With the permission of participants, these group and individual interviews were video-audio recorded with a battery-operated video recorder. In addition, descriptive field notes were collected around observations of the practice of village midwives and cadres' activities and analysis of their communication with clients in nutrition and nutritional behaviour.

On average, this data consisted of multiples of ten minutes of observation with individual pregnant women interacting with a midwife in Posyandu or during a home visit. These observations occurred in all eight villages (four intervention

and four comparison villages). In total there were forty pregnant women and eight village midwives who participated in these observation and interviews.

Observations were also made within the homes of a sample of twenty pregnant women to record activities around food preparation at mealtime, food knowledge and food consumption of women/families. On average there were ten women from intervention villages and ten from comparison villages who were observed preparing food in their homes.

A questionnaire was also given to 16 cadres and eight village midwives from the eight villages to examine knowledge, attitudes and practice relating to nutrition for pregnant women.

Quantitative methods were used to measure the nutritional status of all pregnant women in eight villages who were known to be pregnant during the data collection period. A total of 121 pregnant women in intervention villages and 89 pregnant women in comparison villages had this data collected at Stage 1. Participant's weight, height and haemoglobin was measured using standardised procedures. These are described in detail in Chapter 6. Other demographic and obstetric data were also collected via a self reported survey and medical record check.

This multiple method approach is consistent with Green & Kreuter's (1991) 'Precede - Proceed' method where in Phase 1 the health problem in the research area is described. Phase 2 describes the specific health issue (nutritional status of pregnant women), and Phase 3 is the assessment of specific health related behaviour and environmental factors e.g. social economic factors (Green & Kreuter 1991).

Ethnographic data assessed the factors that seem to have direct impact on target group health behaviour and environment. Predisposing factors were assessed by a questionnaire completed by midwives and cadres. Enabling factors were assessed by observations in the Posyandu. Reinforcing factors were judged by interview and observation of pregnant women. In addition the readiness and support of the district health office, the health centres, staff and community leaders were assessed.

Stage 2

Four villages were chosen for implementation of the intervention. The intervention was based on concepts and principles of community development and health promotion and the results of the baseline assessment and ethnographic study undertaken in Stage 1. The midwives were provided with a workshop, which informed them of the nutritional status of women they cared for, and provided them with knowledge about nutrition during pregnancy. It also aimed to provide the midwives and cadres with skills in communication and the community development approach. The intervention and strategies used to improve nutrition in the villages were developed in consultation with the village midwives, cadres and women. Details of the intervention program are explained in Chapter 7.

Interim field work

Interim fieldwork visits were carried out three months after the intervention. This visit consisted of observation of village midwives and cadre's interaction with pregnant women. The researcher also reinforced the learning from the workshop and encouraged village midwives and cadres to implement the plans they had made in the workshop.

Stage 3

The third stage of the study was to evaluate the impact of the intervention in four intervention villages twelve months after the intervention occurred. This was compared to the impact in the comparison villages which only had the evaluation process and no workshop.

The observation and interviews, similar to Stage 1, were carried out in both intervention and comparison villages. The participant midwives and cadres were again asked to complete a survey of knowledge, attitudes and practice. They were also asked to collect monthly reports of activities carried out by midwives and cadres related to nutritional improvement. The details of the methods and results are reported in Chapter 8.

Quantitative data collection was also repeated for anaemia, nutritional status, and demographic and obstetric variables. A total of 100 women from

intervention villages and 89 women from comparison villages had this data collected. It is recognised that this cross sectional sampling can provide only a crude measurement of nutritional status during pregnancy but time constraints meant that it was impossible to follow a cohort of women for their entire pregnancy. The quantitative methods and results of Stage 3 are presented in Chapter 9.

Ethical Considerations

The study was approved by the Ethics Committee of the University of Technology, Sydney (UTS) Appendix 2 and the University of Indonesia (UI) (Appendix 3).

The researcher held many discussions with supervisors and the Ethics Committee at UTS and UI prior the research implementation. A letter to the Provincial Government was sent from the Dean of the Faculty of Nursing at the University of Indonesia to obtain approval to conduct the research project (Appendix 4). The Dean from the Faculty of Nursing, at the University of Indonesia, also wrote a letter to obtain permission from the health state authority. This letter, a copy of the approval letter from the governor of Banten province and ethical approval letters from UTS and UI were brought by the researcher to the state health office authority. Verbal consent was given at state, provincial health district and health centre level. Further negotiations occurred in 2001 with a full explanation of the project and the obtaining of written consent from Health District Official in Banten Province (Appendix 5), Local district health officer in Serang (Appendix 6) and Cilegon (Appendix 7).

None of the participants were known to the researcher. Participants' names (pregnant women, cadres) were not used or mentioned throughout the project. They were identified with a number and a code. Only the village midwives' names were identified on data analysis (with their permission), however these names are not reported in the analysed data. (Appendix 8 and 9)

All participation in this study was on a voluntary basis. Village midwives and cadres were paid for transportation during training sessions and post intervention data collection. They were informed of the project aims and

process prior to the implementation of the study. During the study, participants were free to refuse or leave the study, but they were encouraged to remain in the project to ensure the validity of the study. Oral and written informed consent was obtained from all participants.

Conclusion

This chapter identifies the health promotion models and principles that are used as a framework to guide the research and the intervention. The theoretical framework of the study enhanced the researcher's knowledge of how to apply a broad and comprehensive approach to the research. It provides a rationale for using both qualitative and quantitative methods and gives a brief description of the stages of the research and the methods used. Combining observation, interview, discussion and field notes with quantitative data was designed to strengthened the research outcome and make the study more reliable and useful. The methods chosen provided opportunity for participants to voice their view on nutritional services and health service system. Similarly, the health providers could express their feelings and ideas about the services they provide to the community. A more detailed description of qualitative methods are provided in the chapters which describe the qualitative results of Stage 1 (Chapter 5) and Stage 3 (Chapter 8). Similarly the quantitative methods for Stage 1 are described in Chapter 6 and Stage 3 in Chapter 9. Finally, a description of the ethical considerations of the study were described.

The next chapter will provide an overview of the context and setting in which the research takes place. This description contributes to the environmental diagnosis described by Green & Kreuter (1991) and adds to the richness of understanding of data collected during the field study.

Chapter 4: Context and Setting of the Study

Introduction

The purpose of this chapter is to provide an overview of the environment, conditions, resources and systems that are present in the study area. This chapter describes the health promotion and community development systems that have been put in place by the Government of Indonesia. It discusses the use of community women (cadres) to promote and encourage good nutrition and health in the villages. A general picture of the geographical condition, population, social and economic description of the Banten province is provided. More specific details about the health system and resources available to the eight study villages from their local Puskesmas is also provided.

Posyandu and Cadres: Community System for Health Promotion in Indonesia

In 1970, the Government of Indonesia identified the potential of using local community members in health promotional activities (Ministry of Health 1994; Rahardjo 2000). Community women were trained as nutrition workers known as cadres and their positions soon expanded to take on other roles. In all of Indonesia's 27 provinces, in more than 65,000 villages, thousands of villagers, (mostly women) trained in nutrition education and carried out unpaid work for the village Posyandu. A Posyandu is a village health post which is not manned full time. Mothers are often selected as village cadres, as well as women who are members of local women's social affairs organizations.

The 'cadres' are often the main personnel for promoting the primary health care approach in developing countries such as Indonesia. Services provided by these workers are expected to be more appropriate to the health needs of populations than those of clinic-based services; they should be less expensive and are expected to foster self-reliance and local participation. Because village workers are more accessible and acceptable to clients in their communities, they are expected to improve the overall coverage of services as well as equity

and increased service use by poorer individuals and households (Berman 1984; Ministry of Health 1994; Hadijono 1999; Rahardjo 2000).

The tasks of the health cadres fall into four broad categories (Ministry of Health 1994):

- Encouraging local participation in specific programs;
- Collecting, recording, and minimal processing of data;
- Direct service delivery; and
- Educational activities.

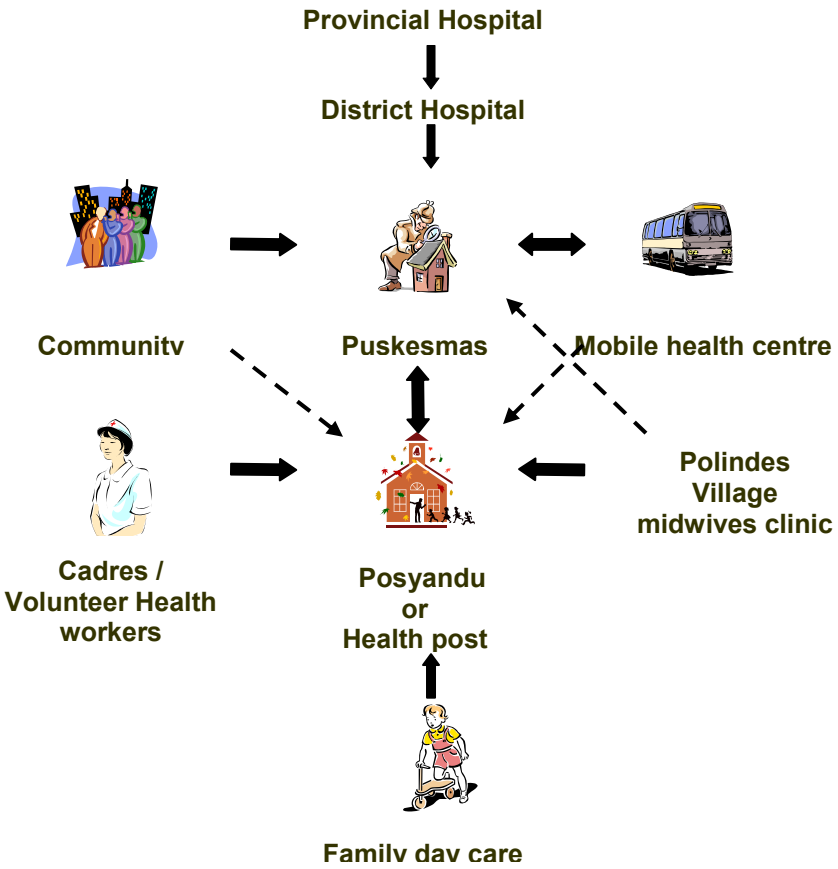
The Posyandu are supervised by the local community health centre (Puskesmas). Most Puskesmas[4] in Indonesia, supervise 30 to 50 health posts (Posyandu). They provide services for maternal and child health, family planning, nutrition, diarrhoeal diseases control and immunization. These Posyandu have been basically managed and controlled by the community using voluntary trained workers or cadres. The Puskesmas is required to give guidance and support to the activities. It provides training, technical support, supervision and monitoring to the village midwife via a midwife supervisor. Each midwife works in a small locality called '*desa'* (village or rural area) and they attend to the health status and health problems in their region. Every desa covers three to four *'kampung'* (hamlets) each of which has one Posyandu. The community selects the location of the Posyandu, e.g. some Posyandu in the intervention villages are in the cadre's house, another Posyandu is located in '*kepala desa'* (rural district leader) and another in the community building. Village midwives are allocated to every village in Indonesia, and live in or close to the villages they support. The position of Posyandu in the health service network and their role in community participation is illustrated in Figure 4.

Posyandu services are provided by the community for the community. This community participation strategy was initiated in 1989, after the announcement of the Ottawa Charter (Ministry of Health 1994; Rahardjo 2000). Its main goals

[4] The Puskesmas is the Indonesian organizing unit of health services that provides accessible, comprehensive and integrated curative and preventive health care within a geographical area of responsibility (Ministry of Health 1994).

are to reduce infant and child mortality and morbidity by improving the health and nutritional status of children under five years of age, as well as pregnant and lactating women (Ministry of Health 1994; Hadijono 1999; Rahardjo 2000).

Figure 4: Posyandu and village health service network



The Posyandu is directed by government policy to provide a forum of communication where mothers are brought together to share relevant experience, in a culturally acceptable context. This includes childbearing practices and the selection and preparation of nutritious food that is affordable and acceptable to the community, however this does not occur in all areas.

There are five basic activities undertaken in the Posyandu (Ministry of Health 1994; Rahardjo 2000):

- Registration;
- Weighing;
- Recording;

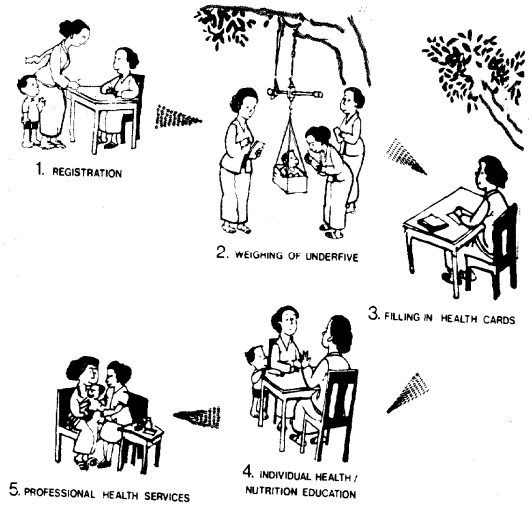
- Individual health/nutrition education; and
- Professional health services e.g. immunization, iron supplement distribution, family planning services.

Picture 1: Posyandu activities by cadres

Cadres conduct activities one to four above. Activity five is undertaken by village midwives and community health nurses. Figure 5 shows the basic activities of the Posyandu.

Figure 5: Posyandu Activities (Reference: Department of Health Indonesia, 1994)

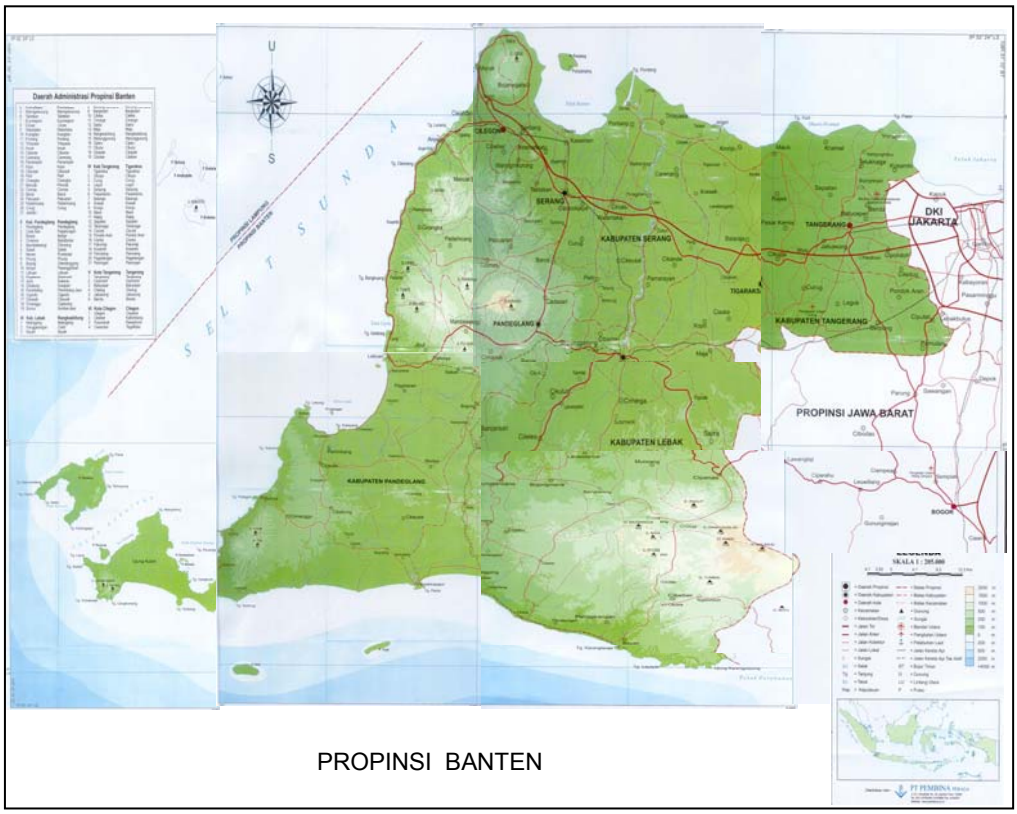
The villages participating in the research used the Puskesmas, Posyandu,



midwives and cadres as described above. The villages also used medical and midwifery private practice and traditional health practices. Although, private

medical and midwifery practitioners were used less because of the expense.

Map 1: Banten Province, Indonesia



Selection of Study Area

The study was undertaken in Banten province, West Java, with four villages acting as the intervention group and another four villages acting as a comparison group. These villages were determined in consultation with district health officials in Serang and Cilegon Banten. These districts were first approached by the researcher in 1998 and invited to participate in the research project. Verbal consent was given at the time. Further negotiations occurred in 2001 when a full explanation of the project and the obtaining of written consent from Health District Official in Banten Province occurred (Appendix 5). The study was approved by the Ethics Committee of the University of Technology, Sydney (Appendix 2), and the University of Indonesia (Appendix 3).

After discussion with health district officials, it was decided that Serang district would provide villages for the comparison group, and Cilegon villages would

be used as the intervention group. The reason these two areas were chosen included close proximity to each other to avoid problems arising through geographical affects on food resources. Also the two districts were similar in size and culture. The health centre leaders selected the intervention and comparison villages within the districts because they had poorer health outcomes and were easily reached by the researcher than other villages in the district.

Cilegon was selected as the intervention setting by senior health officials because it had less bureaucracy. Since Banten was separated as an independent province from West Java province in 1999, Serang (the comparison district) has become the provincial capital city. Because of this, Serang areas are now influenced by a higher level of bureaucracy than Cilegon (the intervention district). However, these two research areas are similar in culture, language, foods, and habits.

Study area description

The Population of Banten province is 43,089,300 with a population density of 932 persons per sq km (Pemerintah daerah propinsi Banten 2003). Geographically, Banten lies near to West Java and Sumatra. Banten is a small province and is around 120 kilometres from Jakarta. Slightly off centre and running to the west, there are famous volcanic mountains the tallest is gunung Krakatao, which last erupted in 1883. Lying just eight degrees south of the equator, Banten has a tropical climate with just two seasons in the year (wet and dry). It has an average annual temperature of around 28° celsius.

In the wide and gently sloping southern region of Banten rice is farmed. In the hilly, northern coastal region, the main products are coffee and vegetables (Pemerintah daerah propinsi Banten 2003). The largest towns are the capital Serang, Cilegon and Tangerang in the south. The main tourist area is Anyer. This small sleepy village became a major attraction because of its white sandy beaches and water sport recreation. Most of the transportation is by foot and motorbikes although buses and four-wheel vehicles are also found.

The Bantenese people have strong spiritual and cultural roots. The main religion is Islam, which arrived in Banten with the spread of Islam through

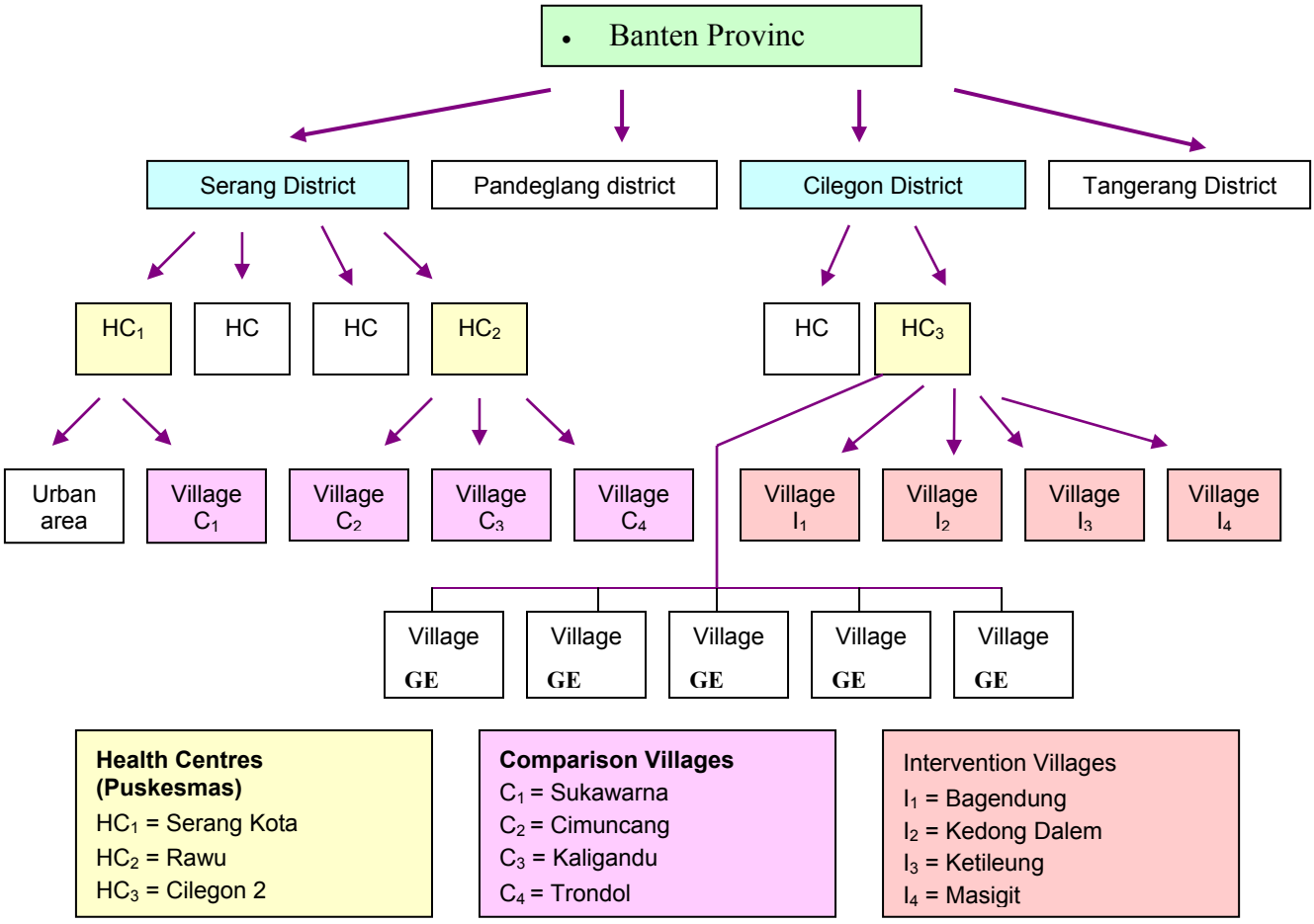
Sumatra and Sulawesi during the fifteenth century. The proportion of population with different religions in Banten province are Moslems (98.12%), Protestants (1.10%), Roman Catholics (0.37%), Hindus (0.07%) and Buddhists (0.27%) (Pemerintah daerah propinsi Banten 2003). The Bantenese culture is unique, and the province has a large number of artist, musicians and fine artists. People live, for the most part, in tight village communities with large extended families (Pemerintah daerah propinsi Banten 2003).

The primary food crops are rice, corn and peanut. Basic daily dishes eaten in Banten consist of steamed rice and a hot fried dish, with a small variation from breakfast to evening meals. Like other parts of Indonesia and South-East Asia, rice is the most important food, along with fish, coconuts, vegetables and chilli. In Indonesia and also for the Banten, the word 'rice', *nasi,* is synonymous with food, 'to eat' is to 'to eat rice'. Two main meals are common in rural West Java and Banten. Food is usually prepared around midday and is to be consumed both for lunch, and dinner on that day. Breakfast could be either sweet food from fried banana with boiled glutinous rice, a mug of boiled green mung beans with coconut milk sweetened with brown sugar or some kind of traditional cakes made from cassava, rice or wheat flour. Drinks are often plain water, tea or coffee.

Research Setting

Within Banten province, there are four districts (Figure 6). Two of these districts Serang and Cilegon were chosen as study sites.

Figure 6: Research Setting



Comparison Villages

Serang district (Comparison district) contains four Puskesmas which supervise health care delivery in four areas. Four villages from two of these Puskesmas (Puskesmas Serang Kota and Puskesmas Rawu) were selected as comparison villages for the study. One village (C_1- Sukawana) came under Puskesmas Serang Kota's supervision and three villages (C_2 - Cimuncang, C_3 - Kaligandu and C_4 - Trondol) came under Puskesmas Rawu's supervision. Each village contains four to twelve Posyandu or health posts. Table 6 provides and overview of population and number of pregnant women in a year in the comparison villages.

Table 6: Distribution of pregnant, delivery and breastfeeding women in the villages under Puskesmas Serang Kota and Rawu in a 12 month period (Puskesmans Rawu 2000; Puskesmas Serang Kota 2000)

No	Village	Puskesmas	Population	Pregnant women	Delivery	Breast-feeding women
1	Cipare	Serang Kota	17,145	710	676	377
2	Sumur Pacung	Serang Kota	14,525	549	524	245
3	Sukawana (C_1)	Serang Kota	3,624	137	131	103
4	Cimuncang (C_2)	Rawu	17,145	551	446	526
5	Kaligandu (C_3)	Rawu	14,525	321	271	245
6	Trondol (C_4)	Rawu	3,624	139	107	103

Sukawana village (C_1) is rural which is located some distance from the main population centre and most of the men work as rice farmers or factory workers. Four percent of the population in Sukawana village are illiterate (Puskesmas Serang Kota 2000). The other villages (C_1, C_2, and C_3) are semi rural and lie on the outskirts of an urban area. They are located near a large traditional market where many of the men work as sellers.

Intervention villages

Cilegon district has two Puskesmas and each Puskesmas covers six to nine villages. The research was carried out in four of the nine villages under the supervision of Puskesmas Cilegon Two. Each village has three to four Posyandu. The four villages chosen for the intervention study sites are called I_1- Bagendung, I_2 - Kedong Dalem, I_3 – Ketileung and I_4 – Masigit.

Table 7 below lists the female population and distribution of pregnancy and breastfeeding women as well as number of births in 2001 in each of the villages within the Cilegon II district.

Table 7: Distribution of pregnant, delivery and breastfeeding women in Cilegon II (Source: (Puskesmas Cilegon 1999).

No	Village	Puskesmas	Population	Pregnant women	Delivery	Breast-feeding women
1	Bagendung (I_1)	Cilegon	3,004	83	81	160
2	Kedong Dalem (I_2)	Cilegon	2,783	87	83	158
3	Ketileng (I_3)	Cilegon	5,248	157	152	294
4	Masigit (I_4)	Cilegon	11,757	316	306	580
5	Bendungan	Cilegon	6,809	187	181	346
6	Ciwaduk	Cilegon	8,006	165	160	298
7	Ciwedus	Cilegon	7,700	179	173	332
8	Jombang wetan	Cilegon	18,356	568	543	1,033
9	Panggung rawi	Cilegon	5,933	188	179	342

Bagendung village (I_1) is the most distant village from the city and is located in the hills. It takes about half an hour by motorbike. There is no clean water and water must be bought from a water truck. Most of the houses were semi permanent with a half wall. In general the homes were well cared for. Some houses were made of bamboo (Picture 2) which indicates the low economic status of the village. All the houses had small bedrooms with limited ventilation however, the families appeared comfortable.

Picture 2: Village houses, Cadres and TBAs

The men mostly work as factory workers or Ojek drivers (motor bike taxi). The Cilegon district garbage dump is situated in this village (Picture 3).

Picture 3: Village garbage dump

Kedong dalam (I_3) is also a rural village and employment is mostly in the rice field, factory or Ojek driver. The remaining two villages are semi rural on the outskirts of a city and many work as factory workers. Most of the intervention villages do not have good sanitation.

Table 8 presents the health and education resources available in the two comparison districts and one intervention district. The comparison district has more high schools and tertiary education facilities. The intervention district appears to have fewer health resources per head of population. A summary of the total population for each of the villages is presented in Appendix 10.

Table 8: Population, education and health system resources associated with research districts Serang Kota, Rawu and Cilegon 2002 (Sources: Puskesmas Cilegon2 2000, Puskesmas Serang Kota 2002 and Puskesmas Rawu 2002)

	Comparison districts		**Intervention**
	Puskesmas Serang Kota	**Puskesmas Rawu**	**Puskesmas Cilegon**
Population	35,294	36,801	61,526
Education resources	8 kindergartens, 23 primary schools, 3 junior high schools 9 senior high schools (including 4 1slamic centre schools), 1 university.	7 kindergartens, 10 primary schools, 3 junior high schools 12 senior high schools (including 10 Islamic centre schools), 1 Nursing academy (DIII)	5 kindergartens 21 primary schools 4 junior high schools 5 senior high schools (including Islamic centre schools).
Puskesmas resources	2 general medical practitioners 5 general registered nurses 1 nurse assistant 1 midwife in the health centre 1 village midwife 1dentist 1 dental assistant 1 laboratory personnel 1 nutritionist 1 office assistant 1 sanitarian 1 pharmacist assistant	1 general medical practitioner 4 general registered nurses 3 midwives in the health centre 1 village midwife 2 dentists 1 dental assistant 4 other casual employees	2 general medical practitioners 7 general registered nurses 4 midwives in the health centre 5 village midwives 2 dentists 2 dental assistant 1 laboratory personnel 1 nutritionist 1 office assistant 1 nurse assistant 12 trained TBAs conducting private practice in the villages
Posyandu and private practice	46 Posyandu private practices: 9 medical specialists, 18 general medical practitioner, 6 dentists, 17 midwives in private practice, 2 traditional health service, 1 Polindes (village birth centre)	36 Posyandu private health services: 1 general hospital, 8 general medical practitioners, 1 dentist, 6 midwives in private practice, 1 Polindes (village birth centre)	39 Posyandus private practices: 9 medical specialists, 18 general medical practitioners, 6 dentists, 8 midwives in private practice, 2 traditional health services.

Conclusion

This chapter describes the setting and context of the study area. It identifies how the health system is structured at the level of the districts and village with Puskesmas, Posyandu and health workers (village midwives and cadres). Geographical, social and cultural characteristics common to all the villages are identified. The diversity in the villages is also briefly discussed. The intervention villages appear to have less bureaucracy, more breastfeeding women, are more rural and have fewer educational and health resources relative to population compared to comparison villages.

Chapter 5: Stage 1 - Qualitative Methods and Results

Introduction

The aim of this chapter is to describe the qualitative methods used to examine the knowledge, attitude, beliefs and behaviour related to nutrition and nutritional supplementation of pregnant women before the intervention (i.e. Stage 1). It also examines the knowledge, attitudes and practice of the midwives and cadres and how this may impact on the nutritional behaviour of pregnant women. The literature review in Chapter 2 identified few Indonesian studies that explored the cultural and social beliefs about nutrition and food. One study found that in Indonesia women often eat least and last in the family and consume poor quality food (WHFWP 2001A; WHFWP 2001B). This study did not specifically examine the beliefs about food during pregnancy. Nor are there any Indonesian studies which examine the beliefs and practice of midwives and cadres related to nutrition during pregnancy. This research aims to increase the knowledge in this area.

This chapter presents a description of the recruitment of participants, their characteristics and the methods used to collect data. The sources used for data collection were: pregnant women, midwives and cadres. The methods used are interview, observation and survey questionnaire. The characteristics of the sources are provided first followed by a description of the data collection and analysis and then the results.

Sources Used for Ethnographic Study

Participating pregnant women, recruitment and characteristics

Five women from each of the eight villages were asked to participate in the Stage 1 ethnographic study using observations and interviews. In total, 20 women from the intervention and 20 women from the comparison villages participated in this part of the study. Purposive sampling was used to ensure a broad age range of characteristics were present in the participants (e.g. parity, age and gestation) reflecting the range of characteristics in the target population in the villages.

Matrix 1: Sources of data for Ethnographic Study. (Before intervention).

Information collected	Informant	Number of informants	Methods of data collection
Perception of health and nutrition services	Selected pregnant women (convenience sample)	40	In- depth interview
Cultural values attached to food	as above	28	Observation at women's house with video recording
Nutrition services, perception related to nutrition for pregnancy	Selected village midwives(convenience sample)	8	Short interview
Nutrition services, perception related to nutrition for pregnancy	Selected cadres in the sample villages (convenience sample)	16	Short interview
Interaction midwife, cadres and clients	Selected village midwives and cadres in the same village (convenience sample)	8 midwives 16 cadres	Observation and video record – average time of observation

The researcher with either the cadre or the village midwife approached the pregnant women in the villages when they came for an appointment at the Posyandu and asked them if they would agree to participate in the study. Participation was strictly voluntary and the women were told that they could refuse or leave the study at any point during the data collection. Most of the women were asked to come to the Posyandu for this research, but some women, at their request, were interviewed in their homes.

All pregnant women in the selected region were eligible for this study. Some women with pre existing problems, such as tuberculosis or another disease were included. In these cases, the researcher, with the cadres' direction, went to their house, and with permission, conducted the observation and interviews there.

The data of women who participated in the ethnographic study are presented below.

Table 9: Pregnancy data for the ethnographic study for pregnant women in selected rural villages in two districts Banten province Indonesia 2001.

	Total sample n = 40		**Comparison n = 20**		**Intervention n = 20**	
	Freq	**%**	**Freq**	**%**	**Freq**	**%**
Gestation						
Trimester I: 0-16 weeks	10	25	6	30	4	20
Trimester II: 17-28 wks	9	22.5	4	20	5	25
Trimester III: >29 wks	21	52.5	10	50	11	55
No. of births						
Primipara: First pregnancy	14	35	8	40	6	30
Multipara: 1-5 births	23	57.5	10	50	13	65
Grand Multipara >5 births	3	7.5	2	10	1	5

The age of the pregnant women who participated in the ethnographic part of this study ranged between 17 and 43 years. The mean age was 27 years across both the intervention and comparison villages.

Of the 40 participants in both groups, 60% indicated that they had received education to primary school level. One woman was illiterate. The rest were educated to secondary school level. Three women had tertiary school education.

Most participants in the comparison and intervention village were not working with only about 8% employed. As expected within Indonesian culture, all of the women were married. Participants' husbands were the ones who earned money for the household. Most participants' husbands were working as factory employees.

Participating village midwives, recruitment and characteristics

The next group of participants comprised the village midwives in the eight villages participating in the study (four midwives from the intervention and four from the comparison villages).

The researcher initially approached village midwives in the Puskesmas in a meeting with all staff and explained the study. They were informed that they could refuse to participate or withdraw at any point in the study and then they were asked to sign the consent form.

The Puskesmas leaders assigned one midwife supervisor to coordinate and organize the research activities. Appointments were made one week before the observations, interviews and surveys in their area. Fortunately, the Posyandu activity schedule for each of the villages was not on the same day, so the researcher could make a suitable schedule to visit each selected region and village.

All village midwives in the selected regions were included in this study. There was one midwife supervisor in the intervention villages and two midwife supervisors in the comparison villages involved actively in this study. The age of the village midwives at the commencement of the research, ranged between 29 and 40 years. The mean was 31 years in the comparison villages and 34 in the intervention villages.

Four of the eight midwives had undertaken a three-year nursing program and a one-year midwifery-training program. Two of the midwives in the comparison villages had undertaken a DIII[5] midwifery program and one of them had undertaken a Bachelor in Nursing after her midwifery training. Only one midwife in the intervention village had undertaken further study in the

[5] DIII is a three-year diploma with entry from senior high school.

Bachelor of Public Health program and is currently completing her studies. The remaining were PPBA (three year nursing program from junior school with one year midwifery training). This indicates that there was some difference in the education level between midwives in the comparison and intervention villages.

Table 10: Education level of village midwives from selected villages in two districts Banten province 2001

Education level	Comparison village midwives n=4	Intervention village midwives n=4
PPBA	1	3
DIII midwifery	2	
Bachelor degree	1 (currently studying)	1 (currently studying)

This may have worked against the success of the intervention as the better-educated midwives were in the comparison villages. All participants had worked as a village midwife for more than five years. Some of them have moved from one village to another village, however, they all worked in the villages sampled for more than five years. Most of village midwives were born in other provinces; only one of them was born in Banten Province [6].

Although they are not born in Banten, half of village midwives could speak the Banten dialect (two village midwives in the intervention village and two from the comparison village). This is very important for effective communication in a community development approach. The other midwives speak the Indonesian language, as this is understood by all Indonesians.

Most of village midwives (six out of eight) conducted their own private practice in their homes. They undertake private practice in the evening (after 4 p.m.) for outpatients. Some midwives have a birthing bed at their own home.

Participating cadres, recruitment and characteristics

The cadres who participated were selected by the village midwives. This decision was based on the cooperation with the midwife, ease, and willingness of cadres to be involved in this research. The village midwife decided to select

[6] People born in Banten are called Bantenese and speak Banten dialect.

cadres based on the midwives experience working together with the selected cadre. Eight cadres from the intervention and eight from the comparison villages were asked to participate in this research. These 16 cadres were selected from a possible 40 cadres who worked across the villages.

The village midwives who had agreed to participate and the researcher approached all selected cadres and explained about the research. They were told about their right to refuse and withdraw from this study. Explanation and discussion was held in the Posyandu and then they were asked to sign the consent form.

All selected cadres were willing to participate to the study. One cadre in each group (intervention and comparison village) was illiterate. In the intervention village, this cadre was included in the study because the village midwife in this area explained that this cadre was 'special' and was very active and enthusiastic to be involved in the project. She was also the wife of the community leader and this would make it easy for the researcher to make arrangements in her village.

The age of the cadres who participated in this research study ranged between 26 and 50 years, the mean age was 32 in comparison villages and 33 in intervention villages.

Cadres in the comparison villages had the same level of education as cadres in the intervention villages. Six of the sixteen had completed primary school level only.

Most of the cadres participating in this research study had more than two years experience as a cadre in the village. Only two cadres from the comparison villages were new. They were just elected as cadres several months before this study began. Most of the cadres who participated in this study were born in Banten Province (94%); only one of them was from another province. All participants were married, but one of them was a widow.

There were some cadres who had not yet received formal cadre training from the Puskesmas. Three out of eight in the comparison villages and two out of eight in the intervention villages.

Ethnographic Data Collection

During Stage 1 of the study data was collected using observations of food preparation and consumption by women, observations of interactions between pregnant women and midwives/cadres, interviews with pregnant women and interviews with midwives and cadres. Audio visual aids (video and cassette tape recorder) were used during observations and interviews with permission of the participants. The interviews and discussions were conducted in the Indonesian language, then transcribed and translated into English. A questionnaire was also given to midwives and cadres. These methods are described in detail below.

Interviews and observations of pregnant women

Semi structured interviews were conducted with 40 pregnant women, 20 from the intervention villages and 20 from the comparison villages. (See Appendix 11 for interview guidelines). Most interviews (32 out of 40) were conducted in the Posyandu, while the pregnant women were waiting to be examined by village midwives or after examination. The remaining eight interviews were conducted at the participants' homes. These cases provided an opportunity to observe the cultural values attached to food; how food is prepared and the associated ritual or ceremonies; as well as family dynamics and the setting in which the participants lived.

The interviews were 20 to 30 minutes in duration and women were asked a series of questions that related to nutrition during pregnancy. The interviews were audio or video recorded. The recorder was placed in the corner of the interview room on a shelf or table. The main purpose of using the recorder was to get an accurate audio recording of the interview. These recordings were transcribed, verbatim, then translated and analysed in English by the researcher.

In addition to this interview data, the researcher also spoke with women in groups as they were waiting for their appointments with the midwives or cadres. In Stage 1 of the study there were four group discussions with between four to eight women in each group. Field notes were made of these discussions, particularly noting any points related to nutrition in pregnancy and the services

provided by the midwives or cadres. Guidelines for group discussion are in Appendix 12.

Observations of a sub sample of 28 of the participating women who were interviewed were also conducted. These observations occurred within women's homes in order to record activities around food preparation and mealtime, food knowledge and behaviour of women and their families. There were ten women from intervention villages and ten from comparison villages who were observed in their homes for 10-30 minutes each. In addition the eight women who wanted to have their interviews conducted at home were also observed undertaking food preparation. The researcher and the women talked about diet and food preparation while the woman was working in the kitchen. These observations were selectively video recorded, resulting in 180 minutes of recorded data. Unfortunately, 50% of the visual data was not useful as the room was very dark. The audio data was however, available for analysis. At the same time and immediately after the observation, the researcher made detailed field notes of the food preparation and the discussion. These field notes were used to supplement the recorded data.

Interview with midwives and cadres

Interviews were conducted in the Posyandu with the eight participating village midwives and the 16 cadres. The interviews were usually conducted after the completion of a clinic session. Interviews took between 10 to 15 minutes and an interview guide was used (Appendix 13). Field notes of the participants answers were written as they responded to interview questions. Many of the interviews were also audio or video recorded in a similar way to the interviews with women. In total there was two hours of recorded data that was of good quality.

Observations of the practices of village midwives and cadres

The practice of village midwives and cadres' activities and their communication with clients, about nutrition and nutritional behaviour, were observed by the researcher in both the intervention and comparison villages. (Observation guidelines are in Appendix 14). On average, this data consisted of ten minutes of observation while a pregnant woman interacted with a midwife

in the Posyandu or during a home visit in all eight villages (four intervention and four comparison villages). In every village, observations were conducted with five pregnant women when they interacted with the village midwife and cadres (Picture 4 and 5).

Picture 4: Observation of village midwives practice in the Posyandu

Picture 5: Observation of village midwives activity in home visit

In total 40 observations were carried out. These observations included the 40 women who participated in the interviews and the eight village midwives and 16 cadres. With the permission of the participants, most of these observations were recorded by video recorder and field notes were made. Typically the researcher positioned herself standing in the corner of the room in order to

operate the hand held video recorder. In total, this generated 180 minutes of good quality video recorded data relevant to nutrition.

Survey Questionnaire: Assessing Knowledge and Attitudes of Midwives and Cadres in Nutrition

The survey to assess the nutritional knowledge of health workers was modified from Perry (Perry 1997B) and extended to address issues of particular interest to this study (Appendix 15). The questions were translated by the researcher and piloted with two midwives in the Cilegon Hospital and one midwife supervisor in Cilegon Health Centre, one week before it was distributed to the village midwives and cadres in the study area. Some questions (Numbers 19 and 20) required modification and added oral explanation. It was then delivered to all village midwives and cadres in the eight participating villages.

The survey consisted of sections that focused on respondents' attitudes to nutritional care issues, knowledge about nutrition during pregnancy and routine practice for assessing nutritional status. Likert scales and space for additional comments were used.

Arrangements were made for the administration of the questionnaire with the district health officer and with Puskesmas leaders in Cilegon II, Serang Kota and Rawu, and a high level of cooperation was gained from these health district officers. Surveys were distributed to 16 cadres and 8 village midwives by the researcher before the observations and interviews in the village commenced.

In order to maximize the response rate, it was requested that surveys be distributed and collected on the same day, so completing the survey would not be deferred and forgotten. After the researcher explained about the aim, objectives and the procedure of the research, all participants were happy to sign the consent form (Appendix 9). They then completed the surveys that had been distributed. Of the 24 surveys delivered, a total of 24 questionnaires were returned, giving a 100% response rate. The support and direction of the senior health district officers were thought to contribute to such a high response rate.

Data Analysis

The researcher selectively transcribed the video and audio recordings of the observations and interviews. That is, only discussion relevant to nutrition, availability of food, eating patterns, and micro nutrient supplementation and their expectation of nutrition services were recorded and transcribed from the video tapes. Interview recordings were transcribed verbatim then translated into English. Data analysis occurred concurrently with data collection. In total there were five hours of video recordings, two hours of audio recordings and 60 pages of hand written field notes. To avoid an error in interpretation the researcher replayed the audio and video recordings three to four times to ensure the understanding of the interviews was correct. Footnotes and glossary are given to present the closest alternative meaning to the words and participants' ideas. The transcribed interview and observation data were analysed manually by thematic content analysis (Spradley 1979; Denzin & Lincoln 1994; De Laine 1997; Hammersley &Atkinson 1997).

The process of analysis focused on three stages (De Laine 1997):

- Selection and definition of problems, concepts and themes;
- Establishing frequency and distribution of concepts;
- Construction of a descriptive model; and
- The results of the survey describing midwives and cadres knowledge and attitudes around nutrition were analysed using simple frequencies.

Findings

The women's perception of nutrition during pregnancy

This section describes the beliefs and practices held by the pregnant women in relation to nutrition during pregnancy. As was to be expected, there were few differences between women living in the intervention villages and those living in the comparison villages in relation to the practices and beliefs. For this reason the results are discussed for the 40 women as if they are one group.

Foods that woman eat during pregnancy

At the start of each interview pregnant women were asked to describe the food they ate during pregnancy. Women then also elaborated to include the food and drink that they avoided during pregnancy. They talked in detail about why they avoided these foods. Importantly, when discussing these foods and drinks, the participants named a wide range of foods that were avoided and many beliefs seemed to be contradictory. For example, some women stated that they eat less during pregnancy and other women described eating more than before pregnancy.

All participants described rice as their staple food. They ate rice two or three times a day with vegetables, tofu, tempe (soya bean) or sometimes meat depending on their ability to purchase it. They also explained that they eat fruits, mostly papaya and banana.

Approximately one quarter of the women indicated that they limited their food intake during pregnancy. These women believed that if they consumed less food than usual during pregnancy that the baby would be smaller and the birth would therefore be easier. In contrast, half of the women believed that the size of the baby was not affected by how much they ate. These women stressed it was important to eat enough quantity and quality of food for the baby's health. They said that they tended to eat more than usual during pregnancy, depending upon availability of food and the amount of money their family had at the time. As one woman said: "*If you eat too little your baby will be sick".* The remaining quarter of women stated that they did not alter the amount of food they ate. All participants reported having cravings for particular foods during pregnancy, the most common of which included young mangoes and papayas.

Beliefs in food restriction during pregnancy

Nearly half of the women stated that they continued with their usual diet and ate everything without restriction as before pregnancy. They did not make any changes because of the pregnancy. What they ate depended for some upon the money available. In all of the villages there were some women who said: *"I eat everything if I have money".* One woman was ambivalent about food

restrictions for pregnant women that had been recommended by her parents. She said: "*Food restriction on one hand is wrong but sometimes it is right"*.

However, over half of the women believed that they had to avoid some food during pregnancy. They all stressed that their parents had recommended this. Generally, these women explained that the food that they avoided was 'hot food' especially in the first trimester. For example: pineapple, calamari, soft drink and ice. In Indonesian cultures, foods classified as 'cool' are generally considered more healthy, than those classified as 'hot'. Foods such as leafy vegetables and most fruit are major dietary sources of vitamin A and are classified as 'cool' foods.

There are two main reasons that women gave for restricting certain foods. They mentioned if they ate those restricted foods that either the baby or mother will be affected. For example: eating chilli during pregnancy is believed to result in a more painful birth. This is because some women believe that chilli affects the cervix and vagina and will make the tissue rougher. Around forty percent of the pregnant women in the study believed that calamari is dangerous for their baby. They were afraid that their baby would become clumsy, black or smelly like calamari.

Interestingly when talking about avoiding hot foods, pineapple also is considered to be a hot food. Some women stated "I do not eat pineapple during pregnancy, because it is hot food, and in the beginning of pregnancy it is dangerous for your baby as it causes abortion". Other women said that they were afraid to eat pineapple because: "If you eat pineapple during pregnancy, your baby will have skin like a pineapple, the baby will be stripped like the skin pattern of pineapple".

There were also some individual practices described by one or two women that did not seem to be common practice. One woman talked about avoiding eating chicken giblets because this would make her baby blue. Another woman told me that she did not eat meatballs during pregnancy because of her personal taste, she feels nauseous if she ate meatballs. Another interesting belief described by one woman was that she avoids eating eggplant during pregnancy because eggplant would produce eye damage in the baby.

Some women were afraid to answer the question about food restrictions. During our conversations they would touch the table as a sign that they hoped it would not happen to her baby. Similar to Australians 'crossing their fingers' many Indonesians 'table touch' to bring them good luck.

Restriction of drinks is another practice that some women follow during pregnancy. Most of the women avoided drinking ice. They were afraid that if they drank ice their baby would be big and difficult to deliver. Only seven of the 40 women interviewed believed that ice does not affect their pregnancy. One woman said: *"I'm not afraid to drink ice, I drink ice especially in the night, if I drink a lot of plain water, it makes me nauseous".* Soft drink is considered as 'hot drink' and 'hot gas' is dangerous for the fetus and may cause abortion. They also believed that hot gas will not be good for the mother's body, but they did not explain this further.

Influence of Community and Family on Women's Nutrition Behaviour

Being 'afraid' of husband and parents and 'depending' on a husband's decisions are generally explanations given by women who are not eating or drinking specific foods. These concerns were mostly held in the study villages that were further from city areas, e.g. Bagendung (I_1), Gedong Dalem (I_2). Women who lived closer to city areas, like Ketileung (I_3) or Masigit (I_4), appeared to be more confident to decide which foods they are going to eat. For example, one woman in Ketileung said: *"I do not eat meatball during this pregnancy because if I eat it I will become nauseous. But my husband has nothing to do with my decisions. He allows me to eat anything. I feel free to choose the food that I want to eat".* One woman in Masigit village said: *"I eat everything I want, even though sometimes my mother-in-law said that I have to avoid some foods, my husband does not get angry".* In contrast, a woman from Bagendung village said: *"I'm afraid of my parents and my husband if I eat calamari or fish in front of them, they will be angry with me".*

Most of the participants cooked their food by themselves after they have bought the foods from the market or 'vegetable man' who delivers to the house. Some participants lived with their mother or mother-in-law. They talked

of having to confirm the food that they choose with their parents. If they get permission from their parents they will buy and cook the food they want, but if their parents do not want them to buy it, they will obey. Women always do the preparation of the meal and the husband is the first person who gets fed. He gets the best quality and quantity of food available in the family. They explained that because their husbands are tired and must earn money for the family, they must have or deserve the best food. As one women said: "*My husband has to get better food quantity and quality because he has to work, earn money so he has to eat a lot".*

Some participants in the village have planted vegetables, fruits or spices in their garden, such as, cassava, papaya, chilli, and banana. They use the leaf of fruit trees as a vegetable in their meal. They purchase protein foods, mostly tofu or soya bean or sometimes fish or dry fish that is considered a popular, affordable side dish. Chicken or meat are considered an expensive, luxury meal.

All participants were Muslim. According to Muslim regulation there are some foods to be avoided at all times, e.g. pork and alcohol. For that reason all the women who participated in this study never cooked that food.

Women's attitude toward iron supplementation

One of the most important issues to be examined in this study was the level of iron supplement consumption by pregnant women. As described in detail in Chapter 3, the distribution of iron supplements during pregnancy is an important government strategy for improving the nutritional status of pregnant women.

During the interviews all women were asked whether they have received and/or taken iron medication and they were asked to describe their feelings about taking iron supplements. In answering this question, all participants who had previous pregnancies spoke in detail about what they had done during the previous pregnancy and what they intended to do in this pregnancy.

There were only eight women, out of the 40 interviewed, who had completed their iron supplements by the end of their pregnancy. Most of the women reported consuming iron supplements irregularly, both in their previous

pregnancies and in this pregnancy. For example, one woman said: *"I only swallowed two tablets, the rest I threw away".* Some women had taken iron supplements during the second trimester of pregnancy and others only in the first trimester.

Around one third of women (13 out of 40) stated that they experienced nausea if they took iron supplements. Seven women claimed that the supplements are too big to swallow. Four women reported that they were afraid that the baby would become big from the iron medication and thus they are reluctant to consume iron supplements. Some women also found it monotonous or boring to continue taking supplements each day.

Forgetting to take the supplement was another reason, as one woman in the intervention village explained, "I swallow supplements sometimes, if I forgot to take yesterday or the day before, then I usually take them one time (seven supplements) in one day (take the one that I have missed all in one day). I am usually very sleepy, and I forget to swallow them. To prevent this, I swallow four to six supplements in one time".

The village midwife and cadre had told these women that they should take the supplement after dinner or before going to bed. This appeared to be a problem for some women as they found themselves getting very tired in the evening.

It is important to note that three women said that the village midwife had not given them the supplements. When the researcher interviewed the village midwives, they said that the time that those women visited the Posyandu there were no supplements in stock in the Posyandu and the women were asked to come again to get the supplements a week later, but they did not come back. None of the women interviewed complained about constipation as a side effect of taking iron supplements, perhaps because the supplements were not taken regularly enough to cause this side effect.

Pregnant Women's Perception of Health and Nutrition Services

All participants were asked to express their opinions and expectations of the health service, especially nutritional service for pregnant women. The analysis

of this data indicated that seventy five percent of the participants were not satisfied with the current services. In the beginning of the interviews the women always described receiving 'good' services. Later in the interviews, however, when the women became more relaxed they brought up some issues that conveyed dissatisfaction with current services.

Women's expectation of health services

All participants believed that improving health is important and that this is related to reducing maternal and infant mortality. They also understood it is important to improve nutrition among pregnant women. It was identified that most of the participants believed that the health services have to be improved. They also suggested improving the communication skills and knowledge in nutrition amongst health workers especially in the rural areas. One woman said: *"As the health provider, the village midwife has to be active in communicating with the patient. They have to improve their communication skill".*

Communication with health provider

Four themes relating to the communication skills of the midwives were identified in this part of the analysis.

Having to ask the midwife

Many women reported that the village midwife was not forthcoming with information and advice in relation to all aspects of pregnancy care especially nutrition education. The women felt that they were the ones who had to ask for information. Comments like the following exemplify this: "*When communicating you have to be active to ask because the village midwife will only talk with you about your concerns if you ask it"* (mother from an intervention village).

"The village midwife in this area is now better than the village midwife before, who did not want to talk. People had difficulties in talking with her, so the community refused her. But this village midwife only talks when patients ask her. If some one did not ask a question, she would never talk or give health information", said a mother from an intervention village.

"The health services are good enough but the health provider is very quiet, she only ever says one or two words. If you ask her, she answers you with very short information, probably because she is very busy and there are a lot of patients in the waiting room" said another women from an intervention village.

The experiences of these women are confirmed by the analysis of the observations of interactions that were recorded using the video recorder. In a number of these recorded interactions (18 out of 40 observations) the village midwife participated in very limited conversations with the woman. For example, in one of the interactions, the village midwife was talking to a woman who had just been examined. The woman was found to be anaemic and had low blood pressure. The village midwife said in a very snappy voice: *"are you dizzy?"* The woman answered: *"yes, I'm dizzy"*. The village midwife said: *"your blood pressure is low, 80 over 50"*. She said nothing else, but then went to get the iron supplements. She gave the supplement to the woman and asked her to take it every night before sleep. There was no further conversation or explanation.

Not giving enough information

Women were also concerned that when the midwife did bring up the issue of taking iron supplements, they often did not give enough information about the medications that they were distributing to them. One woman from the intervention village stated in her interview: *"The health worker does not explain to us about the side effect. I do not know the side effect and the benefit of medications or vitamins that she gave to me because she has never explained"*.

This statement confirmed the observations of the interactions that were undertaken in the Posyandu during antenatal visits, in many interactions, the village midwives did not give enough information about iron supplements. For example, in one village after a conversation with the woman, the village midwife gave a package of iron supplements and said: *"You take these supplements once a day after dinner or before you sleep"*. The village midwife did not explain the side effect or benefit of iron supplements and the woman took the supplements and went home without further questions.

In another village after undertaking the physical examination, the village midwife went to get the iron supplements and then gave them to the woman asking her to take it every night before sleep. There was no further conversation. In another instance, the village midwife asked the woman to come back the next day to get iron supplements from the cadres without any explanation as to why.

The style of communication used by village midwives.

The above illustrations of interactions between the women and the village midwives indicate that the style of communication used by the midwives is very important in the way the women perceive the care.

In many of the interactions that were recorded and observed, the village midwives took a directive, authoritative stance. She was the 'expert'. For example: in the Posyandu in one village, the village midwife examined a woman who was pregnant with her first baby. The woman was found to have anaemia with a haemoglobin level of 8.9gm/L. The village midwife started to talk about the need for her to have extra food, for example: egg, fish or meat. The village midwife said, "y*ou have to eat, what will the baby eat if you do not eat the foods?* (while shaking her finger to the mother). The woman said*: "I eat spinach*". The village midwife asked: "i*f you eat only spinach so what do you think your baby will eat?"* She answered*: "rice, spinach and tofu or tempe".* The village midwife said: "*So, it means your baby will only eat vegetables and tofu and will not eat fish"* Women said*: "baby will smell".* The village midwife said*: "who said that the baby becomes smelly. I guarantee that the baby will not smell when you deliver we are going to kiss the baby"*. The woman said: *"I'm afraid of my parents"*. The village midwife then explained*: "if you eat do not do it in front of your parents, now you live with your husband alone, so you eat those food in your house. Do not eat those foods in their house, we have to respect them, if we are stubborn they will be angry with us"*. The woman knocked her head. She looked scared to argue with the village midwife.

In another recorded interaction the midwife chastised a mother for not coming to the Posyandu for antenatal care. The village midwife looked angry because

she has never seen the woman before. She said: "y*our pregnancy is already advanced, but you just visit me now for the first time".* The woman remained silent; she appeared to be afraid of the village midwife. Throughout many of the interactions the women appeared to be scared to talk to or argue with village midwives.

Predetermined ideas and being judgmental of women's behaviour was evident in another interaction recorded. This interaction occurred in one Posyandu: After a pregnant woman was weighed, the village midwife took her blood pressure and asked: *"do you eat enough?"* The woman answered*: "yes, how high my blood pressure?"* The village midwife answered, *"90*". The woman said: "*I do not like vegetables".* Village midwife said: *"You are a woman, why you do not like vegetable, usually women's meal number one is vegetable".* After this short communication, the village midwife examined the fetus's heartbeat, and she did not talk anymore about nutrition.

Comfort with talking to midwives and cadres

In these interviews most of the women stated that they were more satisfied and felt more comfortable when seeking or receiving information from the village midwife in comparison to the visiting medical doctor. As one woman said: "*I can talk with village midwife easier than with medical doctor".* Another woman said: *"I feel afraid to talk a lot with doctor, they always give very short answers to my question, if with midwife I can talk freely".* Another woman said, *"the midwife gives health education but medical doctor never gives health education, probably because of time constraint".*

Other women spoke negatively about cadres not believing that they had knowledge in nutrition. For example, one woman stated, "Cadre does not know very much. If you can give cadre more information about nutrition in pregnancy, cadre will give the community health education about nutrition in pregnancy".

The women in this study felt strongly that health providers must explain about the medication that they are distributing to clients.

Another recommendation made by the women was to improve the economical status of villagers. These women were concerned that many people did not

have enough money to pay for medications (other than iron supplements) and treatments. There is no health insurance for them and they found health care too expensive.

Perceptions of Village Midwives and Cadres

In order to explore the perception of village midwives and cadres in relation to nutrition for pregnancy, it was necessary to interview them. Interviews were conducted with six village midwives and 16 cadres from eight villages. This data complemented information gained from the questionnaire.

This component of the study examined the village midwives' and cadres' beliefs about nutrition in pregnancy; their understanding of culture and beliefs: e.g. what is good and what should be restricted; and what do they see as the problems/barriers to good nutrition in pregnancy. It also explores what they do to promote good nutrition and what they do to advocate pregnant women to get better nutrition. Other information including village midwives, cadres, and community relationship and communication were also explored.

The village midwives' and cadres' beliefs about nutrition in pregnancy

Most of the participants were able to talk with ease about good nutrition in pregnancy. For example, in answering the question about what they think is the best way to prevent anaemia in pregnant women, most of them (village midwives and cadres) answered: *"I explain to the pregnant women the need to increase the quality of their foods for example: vegetables, fish, tofu, tempe, drink milk and take the iron tablets."* Another cadre said: "*I explain to the woman, that if you are pregnant you have to eat food that is rich in vitamins and nutrients. Also I asked them to take iron tablet so that you do not become anaemic".*

Only the two cadres, who were both illiterate, (one in intervention and one in comparison village) had difficulty in understanding the questions or expressed basic knowledge. For example one woman said, *"but I think in the village you do not have to eat fish, only vegetables*".

Half of the cadres said that the older generation is the main problem for them in promoting good nutrition for pregnant women e.g. one cadre said: "*I talk*

with pregnant women about healthy foods, but sometimes it is not allowed by old people, because here there are some restriction. I also feel afraid to do it". Another woman said: "*I talked directly to women about healthy foods, but sometimes I'm afraid to talk in front of old people and the healer or TBA. They will blame me".*

Up to 90% of cadres said that they were giving advice to pregnant women directly during Posyandu visit. However, only three of the cadres had identified that they have undertaken any activity to prevent anaemia in pregnancy.

Half of the group of cadres said that the women would follow their instruction; as one cadre said, *"they respond well to my suggestions, but they said they do not have enough money to buy the good foods".* This was contrary to the view of village midwives and some other cadres. They complained that the villagers are stubborn. One cadre said, *"they follow our direction, but some of them are stubborn, generally they are afraid of their husband or mother-in-law".*

All the village midwives complained that most of the community are stubborn. For example, one village midwife said, "I have many experiences in this village, but villagers are the most difficult people to change. The people would do everything you say if you give them something like money, food or free services. Many government program have been implemented, but as soon as the money finished, they will be back to the same behaviour as before, they are very stubborn".

The next question was about their actions in promoting nutrition in pregnancy. Only five cadres stated that they undertook health promotion such as hanging posters or leaflets in the Posyandu, while all village midwives said that they did some action in health promotion in nutrition, for example, they described promoting the use of 'Jodium' salt to prevent goitre. In one village, which is considered as a very poor area, there were some campaigns about nutrition, such as, during the Ramadan; some rich families gave food to the community. The village midwife said: *"but not anymore, last year was the last, there were food distribution for children in the Posyandu but usually it was the mother or parent who ate the food".*

On the other hand, during her observations, the researcher did see specific activities in anaemia prevention program. Even more importantly perhaps, there were times when the village midwives did not have tools required to asses nutritional status, for example, weighting scales, callipers, or haemoglobin metres necessary for their practice in the village.

Another issue that is important for health promotion and community development is the relationship and communication between village midwives as government agents and the community leaders. Most of village midwives reported that they have good relationships with community leaders. Only one village midwife complained: "*We have difficulty in relation with the community leader. The community leader in this village is very bossy for example; every activity has to be reported to him, and have to get permission from him. The leader is corrupt because if there was program activity, we should pay the leader. If we did not pay, then the leader did not allow us to implement the program. The community leader has bad relationship with health centre leader".*

Survey Results on Nutritional Attitude and Knowledge of Village Midwives and Cadres

Cadres nutritional attitudes

The first question asked the cadres[7] to consider which one group of professionals was felt to have major responsibility for assessment of the nutritional status of pregnant women. The majority (12/16) identified the midwives, 3/16 stated all professions and 1 the physician.

Table 11: Perception of cadres about profession who has responsibility to monitor nutrition amongst pregnant women in study areas 2001.

Answer (n = 16)	Frequencies
All profession	3
Midwives	12
Physician	1
Total	16

[7] The illiterate cadres filled out the questionnaire with family and under the supervision of the researcher.

When asked how often appropriate and adequate the nutritional support was provided in their village, 15/16 of the cadres replied 'most times' and 1/16 'sometimes'.

When asked to respond to the statement 'It is important to assess the nutritional status of every pregnant women', 13 cadres agreed or strongly agreed, three disagreed or strongly disagreed. Two cadres commented on the survey that nutritional assessment depended upon facilities in the Posyandu.

All cadres agreed that it was important to weigh every pregnant woman at every antenatal visit.

Cadres' stated about their activities in nutrition prevention program

This section opened with the question 'If you were assessing the nutritional condition of your patients, what criteria would you use?' and most respondents made at least one suggestion. Most of cadres stated that, at best, body weight and upper arm circumference (11/16) was the criteria they used.

Table 12: Criteria used by cadres in study areas for assessing nutritional condition. In 2001

Answer	Frequencies
No answer	3
Body weight and arm circumference	6
Body weight, arm circumference & haemoglobin	5
Not relevant	2
Total	16

The questionnaire then went on to ask, for what proportion of pregnant women the cadre carried out a nutritional assessment. Thirteen cadres stated 'all' or 'most patients'; one replied 'some patients' and two said 'none'.

This was followed by questions aimed at identifying actions in ongoing monitoring of nutritional status. The most popular suggestions involved weighing the woman (7/16) and they reported they did this to most women. Conducting health education in nutrition or iron supplementation was only identified by three (3/16) of cadres as being an important activity.

Table 13: Cadres' states about their actions in ongoing monitoring of nutritional status

Answer	Frequencies
Weighing patients	7
Physical assessment	1
Not relevance	3
No answer	5
Total	16

When asked what would make them decide to weigh patients, five cadres stated to monitor nutritional status, three of them replied to know women's weight, four cadres answered just for routine job, two gave no answers and two cadres stated not applicable.

When asked what they would do if they felt that a patient was not receiving adequate nutrition, eleven cadres suggested to give health education, two suggested refer to health professional, two cadres did not answer and one stated to ask patient to avoid food restriction.

Cadres' nutrition knowledge

This section asked questions related to nutrition and energy requirements for pregnant women. In answering questions related to the importance of protein for pregnancy, 13 cadres answered for mother and child's health and growth and development; two cadres answered the question was not relevant and one did not answer.

When asked the sources of protein, nearly half (7/16) replied that they did not know and a quarter (4/16) gave the wrong answer (only vegetables and fruits). Only the remaining five were able to answer this question correctly (fish, meat, egg etc.).

When asked to describe the nutrition requirements for pregnant women, most cadres (9/16) answered wrongly, their answer was not relevant or they provided no answer. Only seven of them answered in ways that showed they understood the value and importance of protein. About half (9/16) were able to

recognise sources of vitamins and minerals with most of the rest making irrelevant answers.

Asked what they would do if they felt that a patient was not receiving adequate nutrition, two cadres answered to ‘give health education’, eleven answered they would refer to the health provider or health centre to explore the possibility the woman has another disease that caused anaemia. Three cadres provided no answer.

The last question identified the influence of socio culture factors on nutrition intake in pregnant women. Twelve cadres showed a good understanding of the influence of socio culture factors on nutrition intake, while only two cadres did not recognise this and two provided no answer.

When questioned about the need to improve their knowledge in nutrition for pregnant women, two cadres answered *“no, this was not necessary”,* while ten of them answered yes and four had no answer. This demonstrated moderate level of readiness and motivation for the intervention.

The village midwives’ nutritional attitudes

The same questionnaires were administered to eight village midwives from the villages studied. When they were asked which one group of professionals had major responsibility for assessment of the nutritional status of pregnant women, the majority identified all professionals.

When asked how often appropriate and adequate nutritional support was provided in their village, all midwives replied 'most times’. When asked to respond to the statement 'It is important to assess the nutritional status of every pregnant women’ (that nutrition assessment was an important element of antenatal care), 7 out of 8 village midwives agreed or strongly agreed, one disagreed. Comments they made identified that it depended upon facilities and equipment that was available. For example, if there were no scale and haemoglobin metre in Posyandu. These positive answers are not surprising answers as otherwise they would be criticising their own work performance.

When asked whether it was important to weigh every pregnant woman at every antenatal visit, seven of the eight village midwives agreed but one did not agree, giving as the reason that scales were not available in the village.

Most respondents made at least one suggestion when answering the question *"If you were assessing the nutritional condition of your patients, what criteria would you use?"* Only two of the village midwives stated that body weight and upper arm circumference and haemoglobin (as recommended by Indonesia Department of Health) were the criteria they used (See Table 14).

Table 14: Criteria for assessing nutritional condition

Answer	Frequencies
No answer	1
Body weight & arm circumference	3
Body weight, upper arm circumference & Hb	2
Only arm circumference	2
Total	8

In the light of this stated criteria, they were asked what proportion of pregnant women they carried out a nutritional assessment. Seven village midwives stated 'all' or 'most patients'; one replied 'some patients'.

The following questions aimed at identifying actions in ongoing monitoring of nutritional status. A similar range of activities was proposed. The most popular suggestions involved a combination of weighing, measurement of upper arm circumference, and haemoglobin level of the woman with weighing only or physical assessment provided as responses by two village midwives. Again one village midwife did not answer the question (See Table 15).

Table 15: Village midwives' state about their actions in ongoing monitoring of nutritional status

Answer	Frequencies
Weighing patients	1
Physical assessment	1
Weighing patients, Hb & UAC	2
Weighing patients & UAC	3
No answer	1
Total	8

Village midwives were asked for what proportion of women they carried out nutritional monitoring. Four midwives stated 'all' or 'most women' but half of this sample replied 'some pregnant women'.

In answering the question in monitoring nutritional status, six village midwives agreed the patient's weight was used as an assessment tool, but two midwives did not agree. Comments expressed that they need more facilities and equipment to do so.

When asked whether they ever weighed patients more than once, all replied that they did. When asked what would make them decide to do this, five village midwives stated this was to monitor nutritional status, one of them replied to know women's weight and two did not answer.

Asked what they would do if they felt that a woman was not receiving adequate nutrition, five of the eight village midwives suggested giving health education, two suggested that they would refer her to other health professionals and one did not provide an answer.

Village midwives' knowledge of nutrition in pregnancy

This section asked questions related to nutrition and energy requirement.

The first question of this section is about the approximate energy requirement for pregnant women. Six answered correctly (2,200 to maximum of 2,700 calories), one wrongly answered and one did not know the answer. All the village midwives were able to identify correctly the approximate protein requirements of pregnant women.

In answering questions related to why protein is beneficial for pregnancy, there were seven village midwives that answered for mother and child's health and growth and development while one midwife answered for mother's health only. When asked the sources of protein, 5/8 replied that they did not know or provided an answer that was not relevant. One gave the wrong answer (only vegetable and fruit). Of great concern was that only two of the eight village midwives provided a satisfactory answer (fish, meat, egg etc).

While describing nutrition requirements for pregnant women, half of the village midwives answered correctly, three gave an irrelevant answer, and one of them gave a wrong answer.

Most village midwives, however, answered the question related to the source of vitamin and minerals correctly. One gave the wrong answer (meat and fish) and one gave an irrelevant answer (conduct health education).

Asked what they would do if they felt that a patient was not receiving adequate nutrition, five answered they would refer to another health provider or health centre to explore the possibility the woman has another disease that causes anaemia, one midwife had no answer and two suggested to check the haemoglobin.

Seven village midwives understood very well the influence of socio cultural factors to nutrition intake while one answered incorrectly.

In answering questions about the need to improve their knowledge in nutrition for pregnant women, seven of them answered 'yes', and one did not answer. This suggested a high level of motivation for nutrition education and the answers to the questions overall suggest this is greatly needed.

Conclusion

The ethnographic study found that there was a strong influence of the socio cultural beliefs in the nutritional intake of pregnant women in the research area. The husband and mother or mother-in-law played an important role in the selection, preparation and eating pattern of pregnant women. Decision on the type of food, food restriction and preparation were ultimately in the hand of mothers or mother-in-law and husbands. In the observational data, findings

showed that village midwives used an inappropriate approach and communication style that made women feel inferior and made them avoid communicating or complying with their advice.

The survey result shows that village midwives and cadres have minimal knowledge in nutrition and their attitude and activity in preventing anaemia during pregnancy is sub optimal. The next chapter will describe the nutrition survey of pregnant women in the study areas.

Chapter 6: Stage 1 - Quantitative Measurement of Nutritional Status Before Intervention

Introduction

The aim of this chapter is to describe the quantitative measurement of nutritional status of women in the eight villages who are participating in the study at Stage 1 prior to the intervention. The rationale, methods and results for the study will be described in detail.

As identified in Chapter 2, there have been several studies, which have examined the rate of anaemia in women in Indonesia. For example, it has been reported in various studies that the anaemia in pregnant women dropped from 70% to 51% in the years 1986 to 1995 and reduced from 55% to 40.5% between the years 1992 to 1995 (WHO 1996A). It has been argued that this drop is due to programs such as iron supplementation and health education. In these studies the level of anaemia was estimated from household health survey (WHO 1996A). The reliability and validity of this estimation is unknown. It is possible that these figures are under estimated due to the tendency of midwives and other health personnel to use clinical judgment of pale conjunctiva rather than biological analysis.

Another study conducted in 1995, investigating the health profile of pregnant women (Sri Martuti & Saidin 1997), surveyed 308 pregnant women in West Java province and 387 pregnant women in West Nusa Tenggara province. The data included haemoglobin level. This study used the cyanmethemoglobin method for measuring haemoglobin as recommended by WHO in 1967. The results indicated that there was a negative correlation between the gestation, parity and haemoglobin level among pregnant women in both areas. That is the higher the parity and gestation the lower the haemoglobin level. The prevalence of anaemia in this study was 53.6% in West Java and 43.7% in West Nusa Tenggara.

Data on weight gain during pregnancy in Indonesia is difficult to obtain (Jus'at et-al 2000). Jus'at described one study in Kupang, Indonesia (East Nusa Tenggara), which indicated that weight gain during pregnancy was very low, approximately 50 to 60% (approximately 6.6 to 7.8 kilograms) compared with

the standard twelve kilograms recommended weight gain during pregnancy (Jus'at et-al 2000). This study did not explain in detail about the respondents and the methodology used. The height of the woman was not measured in this study and BMI could not be calculated.

No other Indonesian studies on BMI and weight gain during pregnancy could be identified. The measurement of BMI and weight gain of Indonesian pregnant women, in this current research will add to the understanding of the nutritional status in this population.

The aim of this part of the study was to:

- Describe the nutritional status of pregnant women in the Banten region of Indonesia; and
- Determine the baseline rates and differences between villages participating in the study to enable the examination of the impact of a community intervention to improve the nutritional status of childbearing women.

Method

Design

A cross sectional design was used to collect data of the Haemoglobin level, BMI and weight change in all pregnant women in the study villages during a three-month period. Each woman was only assessed once.

Setting

Eight villages were studied. Descriptions of the villages has been described in more detail in Chapter 4. The comparison villages selected were labelled C_1, C_2, C_3 and C_4. The intervention-selected villages are labelled I_1, I_2, I_3 and I_4. Government officials selected the villages which participated in the research.

Participants

Data available from the district in 1999 indicated that there were 1,967 pregnant women (in nine villages) or 164 per month, averaging 18 pregnancies per village per month (Puskesmas Cilegon 1999). The Stage 1 data collection

was carried out over a period of three months in eight villages. All (312) women, known to be pregnant in the eight villages, were approached by the village midwives or the researcher. The identified women were informed about the research and invited to participate. Participation was strictly voluntary and the women were informed that they might leave the interview session or refuse at any point during the data collection. Seventy percent (210) of the women agreed to participate. The sample consisted of 121 women from the intervention villages and 89 from the comparison villages. The majority of women who refused to participate reported being scared of the blood prick for the haemoglobin measure.

Measures

All the women who participated in the study had demographic, nutritional and haematological data collected during routine visits to the midwife (the survey form is presented in Appendix 16). Women were asked about their demographic and obstetric data. Details were checked in medical records to increase reliability. The women's non-pregnant weight was provided by the women. Current weight and height was measured as described below.

Demographic data

The data collected related to each woman's pregnancy and consisted of the following variables: -

- Age;
- Education level;
- Socio economic status; and
- Employment.

Obstetric data:

- Gestation in weeks, this was later categorised to (first trimester = 0-16 weeks, second trimester = 17-28 weeks and third trimester = 29-42 weeks);
- Presence or absence of antenatal bleeding;

- Number of pregnancies (primipara, multipara (2 - 5 pregnancies), and grand multipara (more than 5 pregnancies)).
- Previous abortions (loss of fetus before 20 weeks of pregnancy);
- Previous still birth (loss of fetus after 20 weeks pregnancy);
- Complications of current pregnancy e.g. premature labour, hypertension, vaginal infection, tuberculosis, parasitic infections;

Current nutritional status data:

- Initial weight at first visit, current weight, height and fundal height on examination (weight, with clothes, was measured using Seca scales that were calibrated and checked for reliability with a health centre scale prior to use for this study);
- Height was measured using a metre line with the woman standing straight against the wall with no shoes;
- BMI was calculated by the formula weight method (kilograms divided by the square of height in metres (USA Institute of Medicine 2000; Stephansson 2001). Women were categorised as underweight if the BMI was less than 20; desirable or normal weight if the BMI was between 20 to 24.9 and obese if the BMI was greater than 25. Weight gain was calculated by subtracting the initial weight from the current weight. The weight gain was then categorised using the United States Institute of Medicine graphs (USA Institute of Medicine 2000) detailed in Appendix 17. These graphs indicate the range of expected weight gain, of women, according to gestation of pregnancy. The weight for each woman was plotted on the appropriate graph for her BMI level. Women with weight gain more than one standard deviation below average weight gain for gestation were classified as having low weight gain. Women with weight gain more than one standard deviation above average weight gain for gestation were categorised as having high weight gain and the remainder were classified as normal weight gain.
- Measurements of haemoglobin were recorded as a baseline of their nutritional status by using the cyanmethemoglobin method with the

Sahli Haemometre. A study by Van den Broek et –al in 1999 using a sample of 729 women visiting rural antenatal clinics in Malawi found that sensitivity using the Sahli colour scale was consistently better than the conjunctiva inspection (Van den Broek 1999). The Sahli method also showed good inter-observer agreement. The Sahli method was found to be accurate within ± 10% of the actual Haemoglobin level. It is recommended that Haemoglobin measurement by the Sahli method be recorded to the nearest 0.5 gm/L (Gandasoebrata 2001). This research shows considerable potential for the use of the Sahli colour scale in screening for anaemia in antenatal clinics in settings where resources are limited. The Haemoglobin Colour Scale is recommended by WHO as a simple to use, reliable, efficient and cheap tool for haemoglobin measurement and has been in this study.

Blood was taken by a finger prick blood sample method using the Sahli machine. The machine was calibrated, prior to use, by midwives and the researcher trained in its use at the local health centre laboratory. This machine is typically used to test anaemia levels in health centres around Indonesia.

Procedure for haemoglobin measurement (as per instrument instruction manual)

Fill haemometre tube to level of lowest graduation (0.02 grams) with standard Hydrochloric acid dilute 1:10;

Place ready water for dilution, clock with second hand for checking reaction time;

Sterilise finger tip or lobe of ear with spirit and allow to dry;

Sterilise a Franck's needle and pierce skin blood should flow freely without any applied pressure;

Wipe away first few drop of blood and then suck a little blood in to capillary pipette until mark is reach 20 cu mm;

Avoid air bubble, wipe outside of pipette clean;

Blow blood out of capillary pipette into hydrochloric acid already in haemometre tube;

Suck blood back in to pipette several times and blow out again;

Place the haemometre tube in the stand so the scale is turned to the side and cannot be seen;

Dilute with pure water until colours are the same; and

Read results exactly 3 minutes after blood has been added to hydrochloric acid.

Results should be read under non-direct natural or artificial light.

WHO criteria for anaemia which are used for this research are as follows: normal > 11gm/L; moderate = 7-11gm/L; severe < 7 gm/L (WHO/RHR/00 2000). These criteria are used to define high (> 40%), moderate (10 to 39.9%) or mild (< 10%) prevalence of anaemia (< 11gm/L) within a population (WHO 1996A).

Analysis

Simple descriptive statistics such as frequencies, means and standard deviations have been used to describe the results. Where appropriate, graphs have been used to present the data. Differences between the villages were examined. Differences in anaemia level in relation to gestation were also examined.

Results

Socio demographics variables: Stage 1

There were no significant differences between the intervention and comparison villages in age, education, socio economic status or employment (Table 16).

Age: The age of respondents before intervention was between 17 and 43 years. The mean being 27 years (for both intervention and comparison villages) with standard deviation of 4.03 years in comparison villages and 4.88 years in intervention villages. There is no significant difference in the age of respondents between comparison and intervention villages.

Education level: Two percent of women (5 out of 210) had no schooling with 38% of women (79 out of 210) attending primary school only. Twenty seven percent of women (57 out of 210) had completed senior high school and 4% only had completed university.

Socio economic/financial status: Both comparison and intervention village participants reported low incomes. Seventy one percent of respondents (148 out of 210) obtained less than the equivalent of $100 (AUD) per month.

Employment: In both groups most respondents were not in paid employment (189 out of 210). Three percent of respondent's partners were not working. The

majority of partners (68%- 142 out of 210) had low skilled employment e.g. farmers or factory employees.

Table 16: Socio demographic data of pregnant women in comparison and intervention villages from selected villages in two districts in Banten Indonesia 2001

Variables	Total sample n = 210		Comparison n = 89		Intervention n = 121	
	Freq	%	Freq	%	Freq	%
Education level						
No schooling	5	2	1	1.1	4	3.3
Primary school	79	37.6	36	40.4	43	35.5
Junior High	61	29	24	26.9	37	30.6
Senior High	57	27.1	26	29.2	31	25.6
University	8	4	2	2.2	6	5
Salary/months						
Under $60/month	56	26.6	21	23.6	35	28.9
$60-$100/month	92	43.8	38	42.7	54	44.6
$101-$140/month	36	17.1	16	18	20	16.5
More than $140/mon	26	12.4	14	15.7	12	9.9
Maternal Employ						
Not working	189	90	78	87.6	111	91.7
Working	21	10	11	12.4	10	8.3
Maternal Occupation						
Office	18	8.5	10	11.2	8	6.6
Others	2	1	1	1.1	1	0.8
Father Employ						
Non employ	7	3.3	2	2.2	5	4.1
Employment	203	96.6	87	97.8	116	95.9
Father Occupation						
Farmer	53	25.2	25	28	28	23.1
Factory employ	89	42.4	37	41.6	52	43
Government official	9	4.2	5	5.6	4	3.3
Others	55	26.2	22	24.7	33	27.3
Mean Maternal Age (17-43 yrs)			26.52		26.76	
			± 4.03		±4.88	

Description of obstetric characteristics of sample before intervention (Table 17)

Gravida: Sixty nine percent (144) of women were multiparous. Twenty one percent (45 out of 210) women had had a previous miscarriage while 7% (14 out of 210) had had a previous stillbirth. This did not significantly differ between the comparison and intervention villages before intervention.

Gestation: Twenty seven percent (56 out of 210) women were in their first trimester of pregnancy, 32% (68 out of 210) in their second trimester and 41% (86 out of 210) in their third trimester. There was a greater proportion of women in the intervention villages in their third trimester (47%) than in the comparison villages (33%) but this difference did not reach statistical significance ($\chi 2= 4.63$, $p>.05$).

Table 17: Pregnancy data of women in comparison and intervention villages from selected villages in two districts in Banten Indonesia 2001

Variables	Total sample n= 210		Comparison n = 89		Intervention n= 121	
	Freq	%	Freq	%	Freq	%
Gestation						
Trimester I: 0-16 weeks	56	26.7	26	29.2	30	24.8
Trimester II: 17-28 wks	68	32.4	34	38.2	34	28.1
Trimester III: >29 wks	86	41	29	32.6	57	47.1
Ante natal bleeding	10	4.8	5	5.6	5	4.1
Gravida						
Primipara	66	31.4	25	28.1	41	33.9
Multipara: 1-5 pregnancy.	121	57.6	56	62.9	65	53.7
Grand Multipara >5	23	11	8	9	15	12.4
Previous Abortion						
No abortion	165	78.6	69	77.5	96	79.3
1-3 times abortions	43	20.5	19	21.3	24	19.8
More than 3 abortions	2	1	1	1.2	1	0.8
Still birth	14	6.7	8	9	6	5
Pregnancy Complication						
None	176	83.8	71	79.8	105	86.8
Threaten prem. labour	15	7.1	10	11.2	5	4.1
High blood pressure	6	2.9	3	3.4	3	2.5
Vaginal infection	2	1	1	1.1	1	0.8
Others	11	5.2	4	4.5	7	5.8

Complications of pregnancy: Only 5% (10 out of 210) women had experienced any antenatal bleeding during their current pregnancy. Seven percent (15 out of 210) women had threatened premature labour during this pregnancy. Three percent (6 out of 210) women had high blood pressure. The rate of these complications did not differ between comparison and intervention villages.

Nutrition Data at Baseline (pre-intervention)

Anaemia

There were high levels of anaemia (62%, n = 125) in the sample group although overall the comparison and intervention villages did not significantly vary in the proportion of women who had anaemia (Tables 18 and 19 and Figures 7 and 8). Two percent in each group had severe anaemia (< 7 gm/L). There was a large range of haemoglobin levels in both groups of the study villages. The comparison villages had the highest proportion of anaemic women (71% in C_3 village) and the lowest proportion of anaemic women (46% in C_4 village).

Table 18: Nutritional data of pregnant women in comparison and intervention villages from selected villages in two district Banten Indonesia 2001

Variables	Total sample n = 210		Comparison n = 89		Intervention n = 121	
	Freq	%	Freq	%	Freq	%
Anaemia level						
Severe < 7 gm/L	4	2	2	2	2	2
Moderate 7-10.9 gm/L	121	58	55	62	70	58
Normal > 11	85	40	32	36	49	41
Anaemia* (M and S) by gestation						
Trimester 1	39/56	69	19/26	73	20/30	67
Trimester 2	38/68	56	19/34	56	19/34	56
Trimester 3	48/86	55	15/29	52	33/57	58
BMI rate level						
BMI Low	101	48	37	42	64	53
BMI Normal	97	46	49	55	48	40
BMI High	12	6	3	3	9	7
Weight Gain						

Poor weight gain	143	68	55	62	88	73
Normal weight gain	54	25.7	29	33	25	21
High weight gain	13	6	5	6	8	7

*Anaemia includes severe and moderate anaemia (M and S).
These were combined due to the small cell sizes in the severe category.

Figure 7: Proportion of women in villages with anaemia at study baseline from selected villages in two districts Banten Indonesia 2001

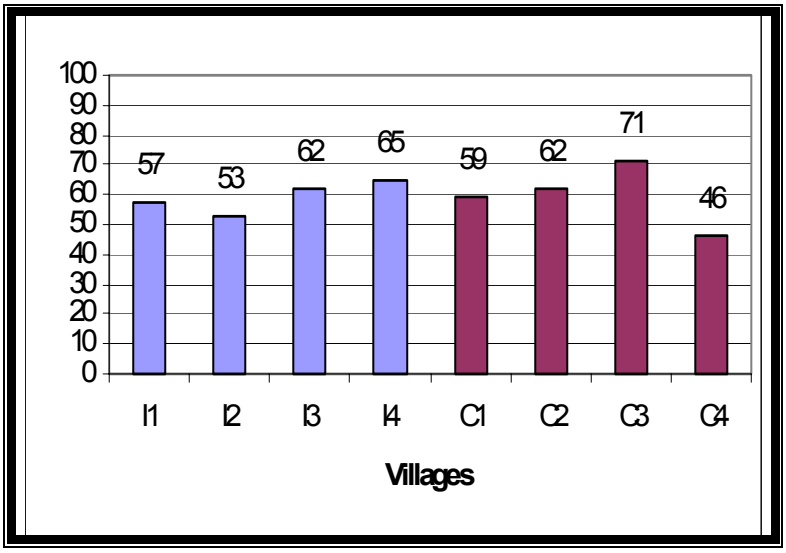


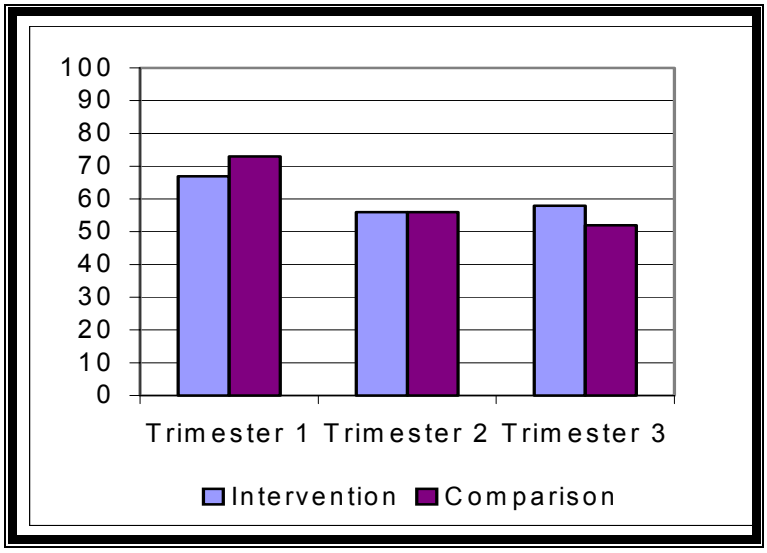
Table 19: Proportion of women with anaemia, low BMI and poor weight gain in selected study villages in two districts Banten Indonesia 2001

Village	n	Anaemia %	Low BMI %	Poor Weight Gain %
I_1	28	57	43	75
I_2	30	53	63	77
I_3	32	62	66	78
I_4	31	65	39	61
C_1	22	59	41	54
C_2	21	62	35	57
C_3	24	71	42	75
C_4	22	46	48	59

Unexpectedly the proportion of women categorised as anaemic decreased with gestation for both the intervention and comparison groups. More women had anaemia in the first trimester (67 to 73%) than women in the second and third trimesters (52% to 58%) (See Figure 7). It is expected that haemoglobin

measures would decrease with gestation in the second trimester due to haemodilution (Henderson 1997; Sloan 2002).

Figure 8: Proportion of women with anaemia by gestation in the intervention and comparison villages' pre intervention from selected study villages in two districts Banten Indonesia 2001.



Body Mass Index

The BMI of women in the sample were categorized into low, normal and high BMI according to the World Health Organisation levels (WHO 1979; WHO 1994; UN-ACC/SCN 1997). Overall, 48% (101 out of 210) of women had low BMI levels, 46% (97 out of 210) of women had normal BMI levels and 6% (12 out of 210) had high BMI levels. The intervention villages appeared to have a higher proportion of women with low BMI at 53% (64 out of 121) than in the comparison villages at 42% (37 out of 89) (See Figure 9). The proportion of women with low BMI varied in the villages between 35% and 66% but only two villages in the intervention group had more than 50% of pregnant women with low BMI (See Figure 10).

Figure 9: Proportion of women with low, normal and high BMI in intervention and control villages at baseline from selected study villages in two districts Banten Indonesia 2001

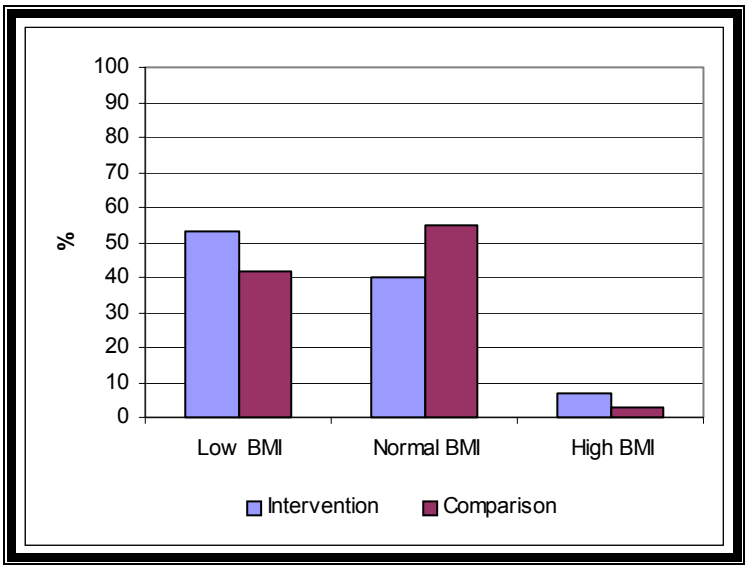
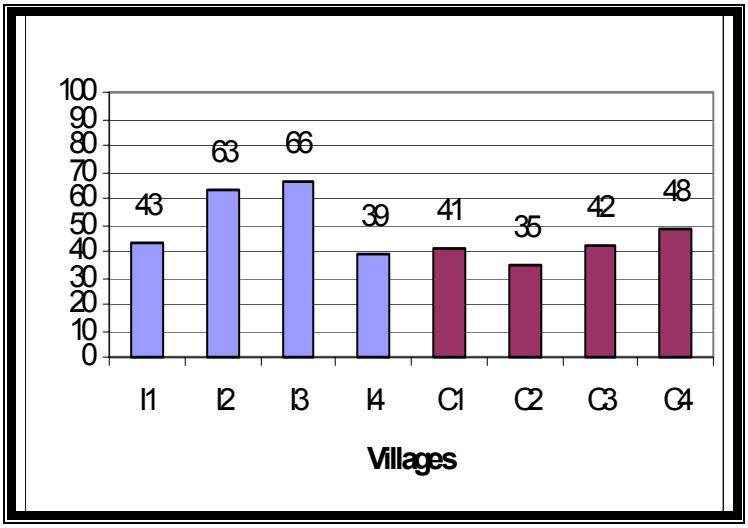


Figure 10: Proportion of women with low BMI pre-intervention in study villages from selected study villages in two districts Banten Indonesia 2001



Weight gain

The weight gain of women was plotted using the weight gain graphs (USA Institute of Medicine 2000). The weight gain data was categorized into poor weight gain, normal weight gain and high weight gain, adjusted for gestation and BMI level. The results are presented in Table 18. Overall, 68% of women (143 out of 210) had poor weight gain, 26% of women had a weight gain within a normal range and 6% of women had high weight gain according to

gestation and BMI level. The intervention villages appeared to have a greater proportion of women with poor weight gain than the comparison villages, 73% versus 62% (See Figure 11) but this did not reach statistical significance. The proportion of women who had low weight gain during pregnancy in the villages ranged from 54% to 77%. Four villages had more than three quarters of women with poor weight gain (See Figure 12).

Figure 11: Proportion of women with poor, normal and high weight gain adjusting for BMI and gestation in comparison and intervention villages from selected study villages in two districts Banten Indonesia 2001

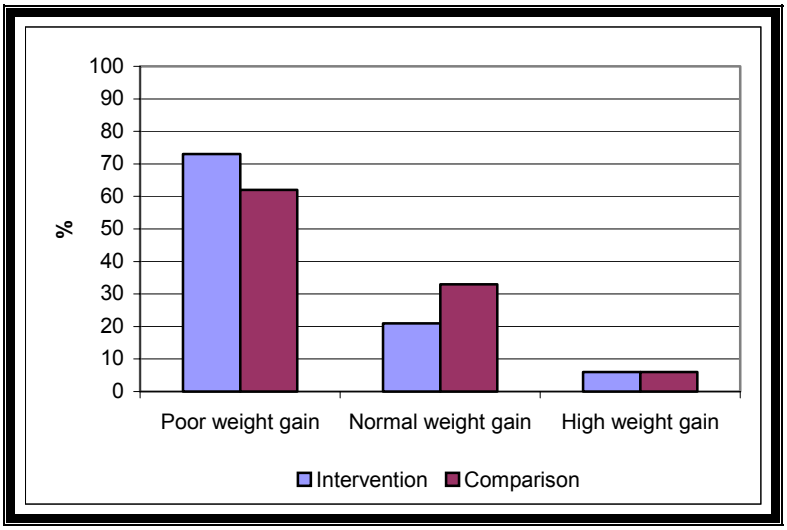
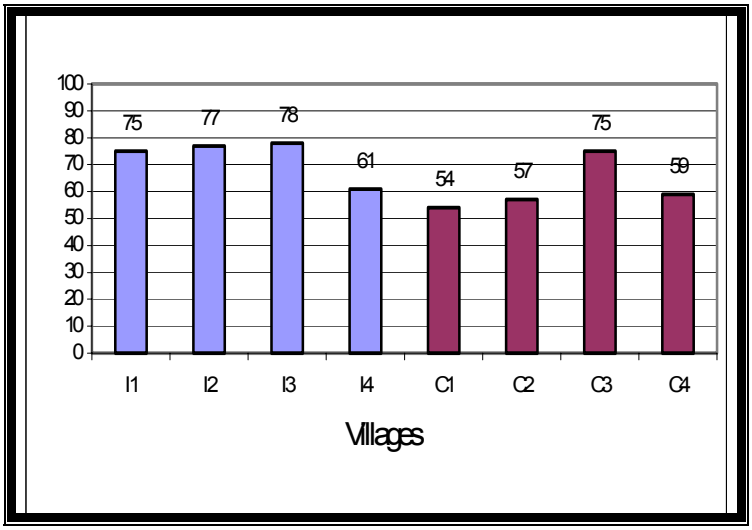


Figure 12: Proportion of women with low weight gain adjusted for gestation and BMI in study villages at Stage 1 from selected study villages in two districts Banten Indonesia 2001



Discussion

This study examined the demographic, obstetric characteristics and nutritional status of women in eight Indonesian villages, who had agreed to participate in this study.

The aim of this section of the study was to describe the nutritional status of women in the area and to determine if there were any significant differences in the study villages prior to conducting a community intervention program to improve the nutritional status of childbearing women.

The limitations of this study are the poor reliability of some of the measurements eg the women's self reporting of pre-pregnant weight might not be accurate. However, the method of measurement for weight, height and haemoglobin are similar to methods currently being used by midwives in the field. Midwives use these measurements to base their clinical decisions about the nutritional information provided to women.

Another limitation of this study is that the women's data was categorised using standard definitions for BMI level and weight gain. These definitions have been developed using samples from developed countries and may not be appropriate measurement in this population.

The findings generally indicate that the population in the villages had a significant proportion of women who had low income also had a low educational status. There is, however, no difference between the comparison and intervention villages in demographic characteristics of age, educational status, income or family employment. The demographic characteristics are similar to rural populations elsewhere in Indonesia (Indonesia Department of Health 1999).

About two thirds of the women had more than one infant, 20% had a previous miscarriage and 7% had a previous stillbirth. Only 5% of women had any major bleeding during this pregnancy. These rates did not significantly vary between intervention and comparison villages.

The intervention villages compared to the comparison villages had a greater proportion of women in the third trimester of pregnancy, 47% versus 38%.

This difference, whilst not statistically significant, increases the possibility of a difference in the level of anaemia in the groups because of the physiological haemodilution, which occurs in the second and third trimester. This however did not occur and the overall rate for moderate anaemia was similar for the comparison and the intervention group. The prevalence of anaemia for the whole sample was 62%. This proportion is similar the 2000 Indonesian Nutrition Profile prevalence of 64% of Indonesian pregnant women being anaemic (WHO-SEARO 2002B).

Unexpectedly, the proportion of women with anaemia reduced with gestation. The reverse usually occurs due to haemodilution (Sri Martuti & Saidin 1997). Possible reasons for fewer women being diagnosed as anaemic in the later trimester is that some women may comply with iron supplementation program offered during pregnancy. However, qualitative data collected in this study suggests many women do not take the iron supplementation regularly. Many women also do not attend antenatal clinics until late in the third trimester so would not have had access to supplies of supplements.

A cause of concern is that almost half of the women in the sample had low BMI and 68% had poor weight gain during pregnancy. The poor weight gain during pregnancy has been associated with poorer outcomes such as low birth weight (Ramachandran 2002). This finding demonstrates and confirms the need for the proposed community intervention in these villages.

There was a large proportion of women with low BMI (range 35% to 66%) and poor weight gain during pregnancy (range 54% to 78%) in the study villages. Although the difference between comparison villages and intervention villages did not reach statistical significance, the variability between the study villages will make interpretation of the impact of the intervention more difficult. The villages with higher proportion of women with low BMI and poor weight gain are I_1, I_2, I_3 and C_3. The possible reasons for these villages having poorer weight gain and BMI were poverty, as the qualitative data shows that the intervention villages especially I_1, I_2 and I_3 are poorer areas with, isolation from cities, and poor sanitation with resulting difficulties in access to services. Another possible reason is that the midwives in these villages had less training, which could result in lower attention being paid to giving nutrition education.

Chapter 7: Stage 2 - Intervention Program for Village Midwives and Cadres

Introduction

This chapter describes a brief workshop to improve community development for nutrition for pregnant women. The principles on which the workshop is based are explained. Objectives and processes used for the workshop are also discussed. Some limitations and difficulties in implementing this intervention are also discussed in this chapter.

The Stage 1 data collection described in the previous chapter indicated that women in the study villages had high rates of anaemia, low BMI and poor weight gain during pregnancy. Chapter 5 described that midwives, cadres and women had poor knowledge about what constitutes good nutrition and how to improve nutrition during pregnancy. The villagers had cultural practices related to nutrition that restricted the types of food they had available to them i.e. women eat less and last and should restrict their food intake during pregnancy to particular foods. The women in the study villages often did not comply with taking micronutrients such as iron supplementation during pregnancy and did not have supplementation or nutrition explained to them by midwives and cadres in an optimal manner. These results indicate a critical need to improve the knowledge and capacity of midwives, cadres, and child bearing and pregnant village women.

Community Development as Intervention Method Description

The intervention program was developed using concepts and principles of community development (Fisher 1999). Fisher describes the concept of community development as bringing people together to:

- Identify and support existing community networks, thus improving health;
- Identify health needs, in particular those of marginalized groups and those suffering inequality (i.e. pregnant women);
- Work with other relevant agencies, including community groups, to tackle identified needs, e.g. cadres, midwives, community and religious groups (e.g. '*Pengajian'* Moslem prayer group);

- Encourage dialogue with bureaucrats, community and religious leaders to develop more accessible and appropriate services; and
- Conduct a need assessment as a basic pre requisite of a community development program.

Minkler (1990) suggested that community development is a 'process that stresses working with people as they define their own goals, mobilize resources, and develop action plans for addressing problems they collectively have identified' (Minkler 1990). Anyanwu (1988) states community development is basically a democratic process. The fundamental principle being that when people are given the opportunity to work out their own problems, they will find solutions that will have a more permanent effect than when they are not involved in the problem solving (Anyanwu 1988).

Community development as a primary health care approach is not a new concept in Indonesia. The way of life of Indonesian people '*gotong royong'* (mutual help), *'musyawarah'* (consensus through consultation) and *'Arisan'* (a monthly social hamlet meeting) are '*Indonesian adat'* (Indonesian customs) which are widely practised throughout the country. These community activities are common features of the rural scene, and are basically the principles underlying the concept of village health services in Indonesia, such as the integrated health posts or Posyandu currently used as a health system in rural Indonesia (Rahardjo 2000).

Intervention Process

The process of intervention was based on the community development process described above and also informed by the work of others (Steven 1998; Buysse 1999; Fisher 1999).

Identifying community needs

The program was developed to encourage 'bottom-up' program design, in which the village midwives, cadres and pregnant women were empowered to identify specific issues that affect the nutrition for pregnant women and to propose solutions that make sense.

Involving midwives and cadres

The second principle guiding the program was involving village midwives and cadres in the needs assessment and the program design phases. They were asked to examine the various factors identified in the community development process and identify strategies to address these factors.

Strengthen relationships

Strategies were also used to strengthen the relationship between village midwives, cadres and pregnant women. The cadres and midwives were asked to attend to factors that influence community development e.g. the influence of religious leaders' power and how they could use this and traditional birth attendant roles in the village.

Intervention design

The design of the intervention was developed through a process of consultation with village midwives, cadres and women (by group discussion and individual interview) in the four intervention group villages. It was informed by the community development and health promotion literature and knowledge about the levels of sub optimum haemoglobin and general nutrition problems in the population of pregnant women in rural Indonesia. It was developed within a national framework and commitment to address the problem through available human resources.

Workshop

The midwives and cadres were invited to participate in a workshop to improve skills and develop strategies to improve the nutritional status of women. Access and facilitation of the project occurred through the village midwife supervisor in coordination with the regional health centre. Most of the village midwives and cadres were enthusiastic about the workshop. Only one village midwife from intervention village four (I_4) was difficult to recruit to the project because she was pregnant with her second child and she seldom attended the regional health centre. She was unable to come to the workshop, but agreed to meet with the researcher one-week after the workshop at the regional health centre.

At this time the researcher explained the concepts covered in the workshop to the midwife and provided her with relevant handouts.

The concepts of community development and nutrition were introduced to the village midwives and cadres in four intervention villages during the workshop. After a group discussion with these individuals at the workshop, it was agreed this method would be used to guide strategies to improve the nutritional status of pregnant women in their villages.

Setting and participants

The workshop was conducted in a hostel the researcher was staying in during her village fieldwork. The hostel was easily assessable to most of the participants. The workshop had a comfortable and informal atmosphere. Thirteen participants attended the workshop. These included: three village midwives, one midwife supervisor, a health centre representative and eight cadres (two from each intervention village). The attendance list is attached in Appendix 18.

As is common in village settings, the workshop was conducted with people seated in a circle on the floor. Printed handouts were provided at the beginning of the meeting in a satchel that included payment for transport to and from the workshop. The researcher served Indonesian food for lunch and provided snacks and a tea break.

Program of the Workshop

The two-day workshop program included activities that were designed to improve the communication between midwives, cadres and women and families in the village. There were also activities in the workshop designed to improve knowledge about nutrition in the village and to enable midwives and cadres to develop strategies to improve the nutrition of women in the village (Appendix 19).

In the beginning of the workshop, the health centre representative gave an introduction speech on behalf of the health centre leader and staff. They reported that they appreciated being included in the workshop, as it would improve the knowledge and skill of the health providers about nutrition.

The researcher then presented an overview of the Stage 1 data from the villages. This was followed by a presentation of a community development concept, effective communication techniques and nutritional issues in pregnancy. Printed handouts (Appendix 20, 21 and 22) and some posters were used to enhance the presentation. Small group discussions occurred after each short presentation. The workshop participants were then divided into four village nutrition groups, which consisted of one village midwife and two cadres. These small groups were used to ensure active discussion of the concepts by all workshop participants to ensure issues and strategies specific to each village were identified. The midwife supervisor participated in the village group where the village midwife was absent.

Large group feedback was then used to further develop ideas and understandings. For example, when the researcher talked about food restrictions, the health centre representative, who is a medical doctor, responded that sometimes she was a little bit confused about food restrictions for pregnant women. She gave an example when she was pregnant with her first child, she ate calamari; she realized that her first baby had darker skin compared with her second child, so she did not eat calamari during the next pregnancy. Most of the group did not appear to agree with her. It was challenging to address these misconceptions when they were held by the health worker with the highest status and experience. This statement confirmed to the researcher the importance of the health provider's perception of food restriction and the influence of beliefs and culture to the food choice in this area. The comment stimulated discussion in this area within the larger group and encouraged the group to develop strategies for working with women about cultural beliefs and practices about food.

Group activities used during the workshop were also designed to identify strategies for improving women's nutrition in the village. Some of the strategies examined and developed by the groups were; the cadres planned to talk with the religious leaders about nutrition in pregnancy and discuss strategies to improve the nutritional status of pregnant women in their village; the cadres planned to talk with pregnant women in a community meeting about

nutrition, the midwives planned to change the way they approached women about their nutrition from directive to more women centred care.

The groups also developed resources such as posters about nutrition for pregnant women, which could be used to stimulate discussion about nutrition with women and their families'. Cadres were provided with posters developed during the workshop and were requested to display them in their village in a place that was easy to see and read by all. They were encouraged to use these resources to provide an opportunity to improve the communication with villagers about importance of good nutrition for women and in particular pregnant women.

The midwives and cadres examined ways in which their activities, related to nutritional improvement of village women, could be communicated to the researcher and shared with other participants in other intervention villages. The cadres agreed to complete a monthly written report of their activities in relation to nutritional community development. These reports were submitted each month to the village midwife who was responsible for the district area (Appendix 23).

Village midwives were also requested to complete another report to inform the researcher of the activities they used to improve nutrition and prevent anaemia in pregnancy based on the community development principles they had learned. Previously the emphasis in their work was only on distribution of iron supplementation. This report acted as a reminder or stimulus to communicate to the pregnant women and community in a range of ways about nutrition for pregnancy (Appendix 24).

Facilitation in the field

The second day of the workshop involved a practical demonstration of how to communicate with women in the community about nutrition. This involved exploring the women's understanding of good nutrition, likes and dislikes, the factors which influence what and when food is eaten and working with women to develop strategies for improving their nutritional status. The demonstration was conducted in one of the intervention villages close to the health centre.

A group of pregnant women from the village were asked to come to a discussion about nutrition during pregnancy. The women received an explanation about the project and were asked permission for workshop participants to observe the discussion. The researcher explored women's perceptions of food restriction and women's expectations of health and nutritional services.

The village midwife of the demonstration village, I_3, was also asked to approach the village leader and practise some of the skills she had learnt in the workshop. The researcher attended this meeting to offer support, facilitate and provide feedback about the communication. The midwife was asked to use her communication skills to improve the village leaders understanding about community development, to discuss a possible role in improving nutrition for women in the village and to get his support for the project. Unfortunately the village leader was not cooperative. He reported he only gave permission for the researcher to do research in this area, and he expected that every activity should be reported to him. He did not perceive that he had a role in any of the activities of the project.

After the meeting with the village leader, the village midwife looked disappointed. She reported to the researcher that she knew that the village leader in this area was not cooperative with any government health program that was implemented by the health centre. She said that this leader always asked for payment for all health activities that occurred in his village. The workshop group discussed the difficulties in gaining cooperation from village leaders. It was impossible to pay village leaders to participate in the project and alternative strategies were discussed such as seeking help from other powerful village members and seeking support from the health centre leader to assist in the process. Participants were reminded that good listening and communication skills and ongoing commitment were required to achieve their project goals if long-term change was to occur.

At the end of the workshop, participants discussed methods for sharing information and providing support to each other during the change process. The workshop participants reported that the workshop was useful. The research provided ongoing support and advice to the village midwives and the midwife

supervisor from the health centre visited the four remaining intervention villages to support the midwives and cadres as they commenced their activities (Pictures 6 and 7).

Picture 6: Village midwives and cadres workshop

Every intervention village was distributed with one calibrated weighing scale and a Sahli haemometre for use during the study. This equipment remained with the village midwives in the Posyandu following the completion of the study for their continued use.

Picture 7: Small group discussion in the workshop

Strategies Used by Intervention Villages to Improve Nutrition of Pregnant Women

Some activities and findings from monthly reports from village midwives and cadres in the intervention villages are presented in Tables 20 and 21. This data indicated that the village midwife and cadres in I_4 were less active than the

other intervention villages. One reason for this was that the village midwife from I_4 was not able to attend the workshop and was ill for three-months during the project due to her own pregnancy. See Appendix 25 for an example of village midwives report and Appendix 26 for examples of cadres activity reports.

The midwives and cadres in the other villages were very active and enthusiastic. While it is possible that the midwives and cadre in the intervention villages reported doing more activities than actually occurred, observations by the researcher and the midwife supervisor and questioning of the villagers about the type of activities they had experienced confirmed that the I_1, I_2 and I_3 villages were active in organizing activities to improve the nutrition of women in the villages. In particular, I_1 and I_3 appeared to have more intensive and prolonged activities in this area (See Table 20 and 21).

Table 20: Summary report activities of cadres in intervention villages around nutrition during intervention period from selected study villages in two districts Banten Indonesia 2001

Village	Activities					Intensity (x/month)	Duration (months)
	Health education	Leaflet	Home visit	Religious leader	Others		
I_1	Yes	Yes	Yes	Yes	Community leaders	2-5	7
I_2	Yes	Yes	Yes	Yes	Community leaders, TBA	2-4	7
I_3	Yes	Yes	Yes	Yes	Community leaders, TBA, Healers	4-5	8-10
I_4	Yes	No	No	No	None	1-4	4

Table 21: Summary of reported activities of village midwives in intervention villages around nutrition during intervention period from selected study villages in two districts Banten Indonesia 2001

Village	Activities									
	ANC service	**Health education (x/months)**	**Leaflet**	**Iron Distribution**	**Anaemia Detection**	**Home visit (x/months)**	**Religious leader (x/months)**	**Others**	**Intensity**	**Duration (months)**
I_1	Yes	Yes: 2	Yes	Yes	Yes	Yes: 2	Yes: 4	Community leaders	2-5 x/months meeting with community leaders	7
I_2	Yes	Yes: 2	Yes	Yes	Yes	Yes: 2-4	Yes: 2	Community leaders, TBA	1x/months meeting	7
I_3	Yes	Yes: 2-3	Yes	Yes	Yes	Yes: 2-4	Yes: 1	Community leaders, TBA, Healers	1x/months meeting with community leaders	8-10
I_4	Yes	Yes: 2	No	Yes	Yes	No	Yes: sometimes	None	1-4 x/months	4

Conclusion

This chapter has described a community development approach in improving women's nutrition. This approach was used and introduced to key village health professionals and community workers during a two-day workshop, which used small and large group activities.

The participants planned activities for village midwives and cadres. These activities were recorded monthly and used to inform the midwifery supervisor and researcher of the community activities used to improve nutrition in women. Posters and handouts were also developed during the small groups.

The strategies developed through a community needs assessment by midwives and cadres were approach:

- Approach religious leader through Pengajian;
- Approach community leaders through Arisan;
- Home visiting to pregnant women;
- Displaying posters and leaflets; and
- Conduct health education in the Posyandu, Arisan or Pengajian.

When the researcher visited the villages after the workshop the midwives in these villages had distributed the leaflets and hung the posters that they made during workshop in every Posyandu. They had approached the religious leaders through Pengajian, which occurs weekly in the villages, and they had approached the community leaders through Arisan, which occurs every month in their villages.

Some of the barriers identified during this process were the:

- Time that village midwives used were very limited, due to other tasks e.g. child immunization. Nutrition and anaemia prevention was not a priority program in the health services, and the health providers had to focus on government health programs, which had to be audited and evaluated;
- Resources/equipments were insufficient, e.g. Pens and paper to draw the posters; and.

- Supervision was not adequate (midwife supervisor who was assigned to supervise, was very busy).

It was planned that the impact of the community intervention would be examined after one year. The results of the impact from the intervention are described in Chapters Eight and Nine.

Chapter 8: Stage 3 - Qualitative Results After Intervention

Introduction

This chapter describes the qualitative data collection and results one year after the intervention. The purpose of the Stage 3 qualitative data collection was to describe the consequences of the intervention in terms of changes in midwives' knowledge, attitudes and practice relating to nutrition during pregnancy. This component of the study examined the change in communication behaviour of village midwives and cadres in providing nutrition information to pregnant women, and their efforts to provide information to the community through community development approaches. It also evaluates the effectiveness of the interventions undertaken by village midwives and cadres on women's attitudes and behaviour related to nutrition.

Stage 3 data was collected for a period of two months after the intervention in all the study villages. Similar to Stage 1, the data sources were pregnant women, midwives and cadres. The same midwives and cadres were working in the villages in Stage 1 and Stage 3 of the research. Due to the twelve-month time lapse between Stage 1 and Stage 3, a different cohort of pregnant women were used in Stage 3. Similar to Stage 1, data comprised interview data, field notes, observation and survey.

Participating Women Characteristics

Women were recruited to the study using a similar process to Stage 1. Interviews and observations were conducted with 25 pregnant women, 15 pregnant women in the intervention villages and 10 in the comparison villages. The following characteristics of the pregnant women who participated in the post intervention analysis are noted: The age of respondents, at the time of recruitment, ranged between 15 and 40 years. The mean was 24 years in the intervention and 26 years in comparison villages. Of the 25 participants in the two groups, 40% indicated that they received education to primary school level and one in each group was illiterate. The rest were educated to secondary school. Most of respondents in the comparison and intervention villages were not working. All women were married. Participants' husbands were the ones who earned money for the household. Most participants' husbands in

comparison villages were working as factory employees and government officials. While most of the men in the intervention villages were working as factory employees or sellers.

Participating Midwives

Eight midwives were interviewed and their practice observed. Eight midwives completed the knowledge questionnaire. In summary, the midwives from comparison villages did not differ in experience but comparison midwives were more likely to have higher educational qualifications. Three of the four intervention village midwives had the lowest level of qualification PPBA. Two midwives in comparison and two midwives in the intervention villages spoke the Banten language.

Participating Cadres

Sixteen cadres were interviewed and their practice observed. All the cadres also completed the knowledge and practice survey. In summary, half of the cadres had only primary school training or were illiterate. By Stage 3 all the cadres had received cadre training from the Puskesmas. Only one of the cadres was not born in Banten province.

Matrix 2: Sources of data for Ethnographic Study. (After intervention).

Information collected	Informant	Number of informants	Methods of data collection
Perception of health and nutrition services	Selected pregnant women (convenience sample)	25	In- depth interview
Culture values attached to food	as above	25	Observation at women's house with video recording
Nutrition services, perception related to nutrition for pregnancy	Selected village midwives (convenience sample)	8	Short interview
Nutrition services, perception related to nutrition for pregnancy	Selected cadres in the sample villages (convenience sample)	16	Short interview
Interaction midwife, cadres and clients	Selected village midwives and cadres in the same village(convenience sample)	8 midwives & 16 cadres	Observation and video record

Ethnographic Data Collection and Analysis

Similar data collection methods to Stage 1 were carried out at Stage 3 (see Chapter 5). These were: interviews and observations of women preparing food, interviews with midwives and cadres, observation of interactions between women, midwives and cadres at the Posyandu, and a survey of knowledge and practice completed by cadres and midwives Analyses similar to Stage 1 were carried and the findings were compared with the Stage 1 analysis.

Ethnographic Study: Results After Intervention

Women's perception of nutrition for pregnancy

Foods that woman eat during pregnancy

The contradictory beliefs about the amount of food a mother should eat in pregnancy did not appear to change after the intervention. Approximately one quarter of the women in both groups indicated that they limited their food intake. These women, similar to those interviewed and observed in Stage 1, believed that if they consumed less food than usual during pregnancy that the baby would be smaller and birth would therefore be easier. However, other women stressed that it was important to eat enough quantity and quality of food for baby's health. These women said that they ate more than usual during pregnancy, depending upon availability of food and the amount of money their family had at the time. As one woman said, "*I do not care about having big baby as long as it is healthy. If you eat too little your baby will be sick".* All participants reported having cravings for particular foods during pregnancy, the most common of which are young mangoes and papayas.

Beliefs in food restriction during pregnancy

More than half of the women in intervention and comparison village still believed that they had to avoid some foods during pregnancy. They all stressed that their parents had recommended this. They provided examples of pineapple, calamari, soft drink and ice. Some women appeared to be afraid to answer the question about food restriction. They tried not to answer the question by saying, "*I do not know"*. However, more than half of women in the

intervention villages and only two women in comparison villages did not believe in food restriction, even though their parents advised them strongly to avoid certain foods like fish and calamari. As some women said in the group discussion in an intervention village, "*I will eat calamari, if my parents are not home, because fish provides important nutrition for my baby".*

Restriction of drinks is another practice that some women follow during pregnancy. Most of the women avoided drinking ice and soft drink, especially during the first pregnancy. They still believed that soft drink will be a danger for the baby, as one woman in the intervention village said, "*We may not drink coca cola, fanta, or sprite because it could cause abortion".* They were afraid that if they drink ice their baby would be big and difficult to deliver. Only a quarter of women in the intervention and comparison villages believed that ice does not affect their pregnancy. One woman said, "*I'm not afraid to drink ice, I drink ice especially in the night, if I drink a lot of plain water, it makes me nauseous".*

The influence of community and family on women's nutrition behaviour

The findings from the observations and interviews in Stage 3 were frequently the same as the findings in Stage 1. For example being 'afraid' of her husband and parents and 'depending' on the husband's decision are still general explanations for why women do not want to eat or drink particular foods. As one woman in Bagendung (I_1) said, "*My husband likes to eat Bakwan*[8] *so I also eat that".* Some women in Kedong Dalem village (I_2) said, "*I do not eat grilled fish because according to my mother and mother-in-law this can make the baby clumsy, and I follow them because I'm afraid of them and worry about my baby".* Another woman said, "*I'm afraid of my parents and my husband if I eat calamari or fish in front of them, they will get angry, so I eat it when they are not at home".* In contrast a woman in Ketileung (I_3) said, "*I do not eat meat and fish during this pregnancy because if I eat it I will become nauseated".*

[8] Bakwan is a cake that made from cassava root and mixed with wheat flour and carrot

Most of the participants cooked their food by themselves after they have bought the foods from the market or 'vegetable man' that delivers to the house. Some participants live with their mother or mother-in-law. They talked of having to confirm the food that they choose with their parents. If they get permission from their parents they will buy and cook the food they want, but if their parents do not want them to buy it, they will obey. Women always prepared the meal and the husband is the first person who gets fed. He gets the best quality and quantity of food available in the family. All participants stressed that their husbands are tired and must earn money for the family, so they must have or deserve the best food.

Similar to Stage 1, the expense of fish and meat was again noted. For example: one respondent (Picture 8) stated during the interview in their home with her husband, that they breed chickens. Her husband said, "*We have chickens but we never eat chicken meat or even the egg, because we are going to breed them and we are going to sell in the city".*

Picture 8: Respondents house with her husband and cadre

There were, however, some elements of change evident. A few women appeared to feel obliged to eat more nutritious food to meet their own and the needs of their fetus during pregnancy.

Women's attitude toward iron supplement consumption

Problems regarding iron compliance were still evident in this study area. It appeared that following the educational intervention there was little or no change as a consequence in the pattern of iron consumption of pregnant women. Most of the pregnant women in the research area still did not take iron supplementation regularly. One woman in Bagendung (I_3) said, "*I have never taken the tablet, because I do not like that, if the midwife gives to me I keep it or throw away"*.

More than half of the women (13 out of 25) stated that they experienced nausea if they took iron supplements. They also found it monotonous to continue taking supplements each day and they often said that they forgot to take the supplement. Two women claimed that the supplements are too big to swallow. Six women from intervention village and five women from comparison villages have reported that they were afraid that the baby would become big from the iron medication and thus they were reluctant to consume iron supplements.

It is important to note also that there were some women in both intervention and comparison villages who stated that the village midwife had not given them the supplements. When the researcher interviewed the village midwives, they said sometimes they run out of stock on the Posyandu. Also, some women did not come back to the Posyandu. The midwives did not know of these particular women and said that they were probably receiving services from a private practice midwife not the village clinic. When the midwives comment was confirmed with the women, they replied that they did not know that the Posyandu also provided services for pregnant women. They believed that Posyandu provided services for immunization and family planning only. Some of these women did not go to the midwives' private practice because they do not have enough money to pay so were receiving no care at all. This was confirmed by the researcher during observation in the villages. Some participants had never visited a health provider for antenatal care even though their pregnancy was already advanced (trimester two and three).

It is clear from observations that the village midwives are very busy giving immunizations to children under the age of five, and also treating sick people.

They also have to organise some additional services. For example, organise sanitation service, run Post Obat Desa[9] (POD). For example, every village midwife has to conduct POD in their village at least once or twice in a week. From the observations undertaken by the researcher, every time village midwives go to the village, a lot of older people asked for medication from the village midwives because they feel sick. There was little time for the village midwives to focus on groups for health promotion activities of pregnancy.

Pregnant women's perception of health and nutrition services

The analysis of the Stage 3 data indicated that up to 50 percent of the participants in the intervention villages were still not satisfied with the current services. This compares to 75% found in Stage 1. As one woman and her husband said, "*There is no information here about Posyandu or health service for pregnant women, if they made an announcement it was said fast so that we could not hear it, and we did not know that in the Posyandu we can get services for pregnant women, we thought that is only for children and for family planning".* Another women said, "*I do not have money to go to private practice, we do not know that in the Posyandu a midwife will also examine pregnant women, we thought that the Posyandu only provide health service for children, because there is no announcement that pregnant women can ask health service in Posyandu".*

These statements were also confirmed when the researcher observed in villages. Some midwives in the intervention villages were so are busy conducting immunization and family planning that they appeared to forget to provide antenatal care to pregnant women. Each time the researcher came to collect data the midwives asked around the village so some pregnant women would come for examination. This was the first time the village midwife knew that some of these women were pregnant and blamed those women for not coming to visit the Posyandu before. The midwives justified and defended this by saying that these pregnant women were receiving antenatal care from midwives' in private practice in that area.

[9] POD is Post Obat Desa or Post disease treatment in village usually conducted by the village midwife

Despite these problems, many of the women were satisfied with the health service and this did appear to have improved from data collected in Stage 1. For example, one woman from the intervention village who participated in this study before intervention had now delivered her baby, said, "*my baby is very healthy and she got a cup for a present as the healthiest baby in this village. This was because I got much information and direction from Ibu Bidan*[10] *in nutrition during my pregnancy and after delivery".* Other women were interviewed during home visits and they answered positively about information they received from the village midwife. For example, one woman in Bagendung village (I_1) said, "*Midwife explained that I have to eat healthy food, for example: sometimes we have to eat our own chicken, sometime it is better we eat meat not always eat vegetable only or tofu only (some people have a lot of chicken in their back yard)".* Another woman said, "*Yes, but because we do not have chickens and we do not have money, so we eat whatever we have, only tofu and tempe that are cheap to buy, and the cassava leafs or melinjo leaf that we do not have to buy".* The knowledge of pregnant women about the benefit of nutrition for improved health is noted in the statement of one pregnant women in Kedong Dalem (I_2) village, "*I always try to follow the midwives direction to eat healthy food but I do not have enough money and I think most of the people in this village do not have enough money to buy healthy food. As you see that all the children here are not brave and stupid. This is different with children from city, they are very brave and clever because they got healthy and good food".*

The pregnant women in the intervention group who were attended by the midwives who had received the intervention were more likely to say that the information caused them to think about changing health behaviours and dietary intake. For example one woman in Masigit village (I_4) said, "*If I have enough money I will buy fish or chicken to improve my blood and I will ask my husband to give me more money".* Another woman in Ketileung village (I_3) said, "*After we talked in the Arisan with the cadre, I eat more vegetable and fish or tofu/tempeh rather than rice only or instant noodles".*

[10] Ibu Bidan is a term that villager use to call village midwives

Following the intervention, some women now recognised the importance of improved nutrition but without family support to change their diet resorted to 'secret' eating after the intervention. For example, some women in the intervention village made statements such as, "*I'm afraid of my parents and my husband, if I eat calamari or fish in front of them, they will be angry with me; so I eat it when they are not at home"*.

Communication with health provider

Observational data collected by the researcher in Stage 3 indicated that the communication between midwives and women in the villages had improved when compared to the Stage 1 data in the intervention villages.

The village midwives were more informative and appeared to also listen to the women better. For example, a village midwife who was examining a pregnant woman in her house found out that the woman did not swallow the iron supplement that she was given by the midwife in private practice. She explored the reason. She asked the woman to get the iron supplements and said, "*These are very good supplements for your health and the baby's health, can you tell me why do you not want to take it"*. This midwife also explained the benefits and side effects of the iron supplements. She gave a lot of advice in a way that built a rapport. The village midwife looked friendly and was attentive and listened carefully to the woman's complaints about the supplement (Picture 9).

Picture 9: Village midwife communicating with pregnant woman (after intervention)

In another interview in the same village, a pregnant woman said, “the midwife gave me information on how to take supplements, what benefit it is for me and my baby’s health and what are the side effects. I feel nauseated when I take it but I think it is of benefit to my health, so I try to take it”.

All pregnant women in the intervention villages said they got enough information about nutrition from village midwives and cadres. They stated, “c*adres and village midwives talked a lot about nutrition for pregnancy in the Arisan and the Posyandu but I feel nauseated to eat the iron tablets”*.

Nonetheless it was evident after the intervention that some village midwives from the intervention villages are still using methods of ‘direction or instruction’ to try to force the pregnant women to follow their direction. The use of words ‘harus’ (‘must’) or ‘don’t’ are still commonly used in the conversation. For example, “*you have to eat a lot of vegetables and fruit and meat, drink milk”* or another sentence *“do not restrict your food! (Makannya jangan dipantang-pantang)”.* This indicates that for these village midwives at least, key communication messages from the workshop did not result in practice change.

Stage 1 and Stage 3 Analysis Differences

Communication behaviour between village midwives, cadres and pregnant women

Changes were evident, especially in village midwives and cadres performance in communicating with village women. As shown in the preceding section, they were more assertive in nutrition communication and appeared to have improved their listening skills. Data presented in this section have been tabulated for contrast and changes and are presented in the Table 22.

Table 22: Differences in communication behaviours of village midwives and cadres in the intervention villages[11]

Stage 1	Stage 3
Women were the ones who had to ask for information from the midwife	Most pregnant women said: 'I got a lot of information from village midwives and cadres'.
Not giving enough information. Midwives often did not give enough information about the iron supplements that they were distributing	Pregnant women said that midwife gave them information how to take iron supplements, what benefit it had for them and their baby's health and what the side effects were. One woman said: 'I feel nauseated taking it but I think its benefit to my health, so I try to take it'.
Women were comfortable to talk/ they were more satisfied and felt more comfortable when seeking or receiving information from the village midwife rather than medical doctor. Some women were afraid to talk with midwives, they felt that it is easier to talk about their pregnancy and delivery with the TBA.	All women can talk easily with the village midwives and cadres about their health and the pregnancy. Some women in the intervention village felt closer to midwives and cadres.
Women did not believe that cadres had enough knowledge in nutrition to communicate with women individually or collectively.	Women said that they talked a lot with cadres about nutrition for pregnancy in the Arisan, and cadres have encouraged pregnant women to eat healthy foods and take the iron supplement distributed.
Women stated that the village midwives answer you with very short information, probably because she is very busy and there are a lot of patients. They do not offer much information	One woman said: 'My baby is very healthy and she got a cup for present as healthiest baby in this village. This was because I got much information and direction from Ibu Bidan in nutrition during my pregnancy and after delivery'

Other communication behaviours were observed in the Posyandu or during home visit. The health providers had become more cooperative, assertive and supportive of women in intervention village. Picture 10 was taken in a house of a pregnant woman who was very pale, anaemic, and had low blood pressure. The woman had been visited by the midwife in private practice and she was given iron and other vitamin supplements, but she did not take those supplements. The village midwife found out that she had not been taking the supplements. The village midwife and cadre tried to listen and explore the reasons the pregnant woman gave for not taking the iron supplements.

[11] Data derived from interviews with pregnant women in intervention villages

Picture 10: Village midwives and cadres are more friendly (after intervention)

In addition, research findings from the observations in the Posyandu and during the home visit support these patterns. The summary of observational research findings are shown in Table 23.

Table 23: Differences in communication behaviours of village midwives and cadres in the intervention villages [12]

Stage 1	Stage 3
Village midwives participated in very limited conversation with the woman.	Village midwives are still very busy and prioritise immunization and illness more highly than antenatal care or health promotion.
The village midwife did not explain the side effects or benefit of iron supplements; the woman took the supplement and went home without further questions.	The midwife explored the reason and explained a lot about the nutritional benefits and side effects of the iron supplement. She gave a lot of information.
In many of the interactions that were recorded and observed, the village midwives took a directive, authoritative stance. She was the 'expert'	The village midwife looked friendly and listened carefully to the woman's complaints about the supplement. Some village midwives in the intervention and comparison villages were still instructing women
Midwives chastised a mother for not coming to the Posyandu for antenatal care. They did not do home visit for pregnant women who did not want to come to Posyandu.	Midwives did home visits, and explored whether the woman has been seen by a midwife in private practice or in another health services institution to ensure that they received antenatal care
Predetermined ideas were evident and midwives were very judgmental of women's behaviours. For example, they said the women are lazy, stubborn and spoilt. The women did not want to follow their directions.	Village midwives in the intervention villages were more passionate about their work and displayed good communication when talking with pregnant women. The intervention pregnant women group were more likely to say that the midwives information prompted them to think about changing health

[12] Data derived from observation by researcher.

	behaviours and dietary intake.
Cadres were not involved in the conversations with women. They just watched and listened	Cadres became involved in the conversation with pregnant women. They actively encouraged the woman to take the iron supplements.
Some cadres believed that food restriction should be followed by the women. Cadres were not involved at community level	Cadres that were involved in the intervention villages now stated that food restrictions are not good for pregnant women. Cadres were also working through Arisan and community meetings or in the Posyandu. They also informed to the community leader's wife so that the wife about nutrition could talk with her husband, the leader.

Table 24 summarises findings of women's perceptions of the importance of nutrition in pregnancy from the women's data.

Table 24: Women's perception of the importance of nutrition for pregnancy

Stage 1	Stage 3
Approximately one quarter of the women indicated that they limited their food intake. These women believed that if they consumed less food than usual during pregnancy that the baby would be smaller and birth would therefore be easier	Most women said that they do not restrict their food during pregnancy. Two women indicated that they did not want to eat during pregnancy rice, meat or fish because they feel nauseated, but they ate bread or snacks instead.
Most of the pregnant women followed the instructions of their parents to avoid certain foods, for example: calamari, fish, pineapple, chicken giblet, eggplant, and ice.	Although one quarter of pregnant women still avoid certain foods during pregnancy, more of them stated that they were not following this instruction even if this meant they had to hide their eating from others.

Women's attitudes toward iron supplement consumption

The same rate of iron consumption was found before and after the intervention in both villages. Most of the women reported consuming iron supplements irregularly, both in their previous pregnancies and in this pregnancy. Nausea and monotony are the most common reasons stated by pregnant women for not taking iron supplements.

The influence of community and family to women's nutrition behaviours

The intervention did not appear to change community or family attitudes. Being 'afraid' of her husband and parents and 'depending' on the husband's decision were still common explanations for why women still did not want to eat or drink those foods that are nutritious but culturally 'taboo'. For example:

one woman in Stage 1 said, "*I'm afraid to eat calamari, I do not want to eat this because my baby will be clumsy and my parents do not allow me to eat that"*. They talked of having to confirm the food that they choose with their parents. If they get permission from their parents they will buy and cook the food they want, but if their parents do not want them to buy it, they will obey. One woman in Bagendung who was interviewed after the intervention confirmed these attitudes persisted stating, *"my husband like to eat Bakwan so I also eat that"*.

The perceptions of village midwives and cadres about nutrition for pregnancy

Interviews were conducted with six village midwives and 16 cadres from all eight villages in Stage 1 and Stage 3.

This component of the study examined the village midwives' and cadres' beliefs about nutrition in pregnancy; their understanding of culture and beliefs for example: what food or eating behaviour is good, and what should be restricted and what they see as the problems/barriers to good nutrition in pregnancy. It also explores what the workers do to promote good nutrition and what they do to advocate for pregnant women to get better nutrition. Other information including village midwives and cadres, community relationships and communication were also explored both in Stage 1 and Stage 3 observation, individual interview, group interviews and spontaneous conversations.

The village midwives' and cadres' beliefs about nutrition in pregnancy

Most of the participants were able to talk with ease about good nutrition for pregnancy in Stage 3. For example, in answering the question, 'what they thought was the best way to prevent anaemia in pregnant women in your village?', most of cadres in the intervention villages answered, *"I explained to the pregnant women the need to increase the quality of their foods for example: vegetables, fish, tofu, tempe, drink milk and take iron tablet".* Another cadre said, *"I explained to the woman, that if you are pregnant you have to eat food*

that is rich in vitamins and that is nutritious, also I asked them to take iron supplements so that you do not become 'kurang darah'[13]".

Two cadres (one in intervention and one from comparison village) had difficulty in understanding the questions verbally and written; because they were illiterate. As one cadre from intervention village said before intervention, *"but I think in the village you do not have to eat fish, only vegetables".* After the intervention she said, "*I encouraged all women to eat vegetables from our own gardens like cassava leafs, papaya leaf or at least kangkung".* She was still not recognizing the importance or value of protein foods.

About half of the cadres in both groups said (before and after intervention) that the old generation is the main problem for them when they promote good nutrition for pregnant women. For example, cadres said, "*I talk with pregnant women about healthy foods, but sometimes it is not allowed by old people, because there are some restriction, I also feel afraid to do it".* Another woman said, *"I talked directly to women about healthy foods, but sometimes I'm afraid to talk in front of old people and the healer or TBA. They will blame me".*

Nearly all cadres in both groups said before the intervention, that they were giving advice to pregnant women directly during the Posyandu visit. After the intervention cadres from intervention villages said that they had increased the amount and range of this and also that they gave advice and nutrition education during community meetings or Arisan. Before the intervention only three of the cadres stated that they understood particular activities to prevent anaemia in pregnancy. However, up to 80% of cadres in intervention villages after the intervention stated that they undertook such activities. For example, "*I tried to talk to community leader/religious leader through his wife in Arisan about nutrition for pregnancy and I encouraged their wives to talk with her husband so that the community leader or religious leader will give proper advice to their community".*

Half of cadres in both groups, in Stage 3, said that the woman would follow their instructions. As one cadre said, "*They respond well to my suggestions, but*

[13] Kurang darah means decrease of blood (Used to explain anaemia to the community)

they said they do not have enough money to buy the good foods". This was contrary to the view of other village midwives and some cadres in intervention village in Stage 1. They complained that the villagers are stubborn. One cadre said, "*They follow our direction, but some of them are stubborn, generally they are afraid of their husband or mother-in-law".* All village midwives complained in Stage 1 that most of the community were stubborn. For example one village midwife said, "*I have many experiences in this village, but villagers are the most difficult people to change. The people would do everything you say if you give them something (for example, money, food or free services). Many government programs have been implemented, but as soon as the money finished, they will be back with the same behaviour as before, they are very stubborn".* This situation was still much the same in Stage 3 although some cadres had changed their view, and village midwives in intervention villages were more committed and they communicated better with women and community leaders.

In Stage 1 only five cadres in the intervention village stated that they undertook health promotion by hanging posters or leaflets in Posyandu, while all village midwives said that they undertook actions in health promotion in nutrition. For example, the distribution of iodised salt to prevent goitre and prevention of vitamin A deficiency. In one village, which is considered a very poor area, there were some campaigns conducted about nutrition.

In Stage 3 the researcher saw that four village midwives in the intervention villages had changed the posters that were distributed by them in the Posyandu. However, in two Posyandu no new posters were evident because the midwives said that somebody had taken the posters down. In the last meeting with the researcher they promised to make another poster but had asked for sponsorship from their local government or community to do so. During observation in Stage 3 there was a nutrition model displayed in front of the Women's Health clinic in Puskesmas Cilegon (the main Health Centre overseeing the intervention villages) (Picture 11).

Picture 11: Nutrition model (after intervention)

The health centre said that if it was possible, and if there was enough money, it would also be displayed in the village clinics. The nutrition model is made from plastic and contains all the healthy food for pregnancy with the national nutrition theme, 'Empat sehat lima sempurna'[14].

Another issue that is important for health promotion and community development is the relationship and communication between the community and the village midwives who can be considered as agents of government policies in nutrition, as well as providing health services to community leaders. Most of village midwives in Stage 1 reported that they had a good relationship with their community leader. After the intervention, there were some activities undertaken by village midwives with community and religious leaders about health services and nutrition education.

[14] Empat sehat lima sempurna means 'four healthy and five perfect'. This theme is the Indonesian national nutrition promotion slogan used since 1967 Ministry of Health, R.o.I. (1994). Primary Health Care in Indonesia. Jakarta, Indonesia, Ministry of Health Republic of Indonesia..

Picture 12: Village midwives and cadres activity with community and religious leader

Two village midwives in the intervention villages, however, still complained of the difficulties in their area because of poor cooperation of religious leaders. After discussion with other village midwives, they agreed that the reason for this was a power conflict between village midwives and religious leaders. They decided to try to improve and change their approaches and attitudes to see if they could change the situation.

Survey of Knowledge and Practices of Midwives and Cadres

The survey was distributed to eight midwives and 16 cadres. One midwife from a comparison village did not return the survey. An analysis of the cadres results indicated there was no change in their responses. The eight cadres who had the intervention did not improve their knowledge about nutrition assessment or good nutrition during pregnancy. The cadres low level of education may have contributed to this result for the written survey. A comparison of the results of the surveys at Stage 1 and 3 for the midwives are described in more detail below grouped under headings of attitudes, activities and knowledge.

Village midwives attitudes

The first question asked which group of professionals had major responsibility for assessment of the nutritional status of pregnant women. In Stage 1, the

majority of respondents (5 out of 8) identified all professions. Three of the respondents stated that midwives should be responsible to assess the nutritional status of pregnant women. However, in Stage 3 all the respondents identified that midwives have the major responsibility for the assessment of nutritional status of pregnant women.

When asked how often appropriate and adequate nutritional support was provided in their practice, in Stage 1 three respondents replied 'most times' and five of them replied 'sometimes'. In Stage 3 all respondents (8 out of 8) replied 'most times'. In the space supplied for 'Comments', five midwives were of the opinion that the food suggested during consultation was not always available to the women because of poverty. Three stated that there was a willingness to improve their nutrition behaviour amongst the women.

Written comments from the midwives expressed strong opinions about the importance of assessing nutritional status of pregnant women. Seven midwives in Stage 1 said that assessment was an important element of care, but one midwife from an intervention village answered that it was not a priority. However, in Stage 3 all midwives agreed that assessment was an important element in antenatal care.

When asked whether it was important to weigh every pregnant woman in every antenatal visit in Stage 1, seven agreed but one did not agree, giving the reason of unavailability of equipment. In Stage 3 all midwives agreed that this was important.

Reported activities

This section of the questionnaire opened with the question 'If you were assessing the nutritional condition of your patients, what criteria would you use?' Most respondents from both groups of villages made at least one suggestion as evident in Table 25.

Table 25: Respondents suggestions from selected study villages in two districts Banten Indonesia 2001

Answer	Intervention midwives		Comparison midwives	
	Stage 1	Stage 3	Stage 1	Stage 3
No answer	0	0	1	0
Body weight and upper arm circumference (UAC)	2	1	1	0
Body weight, upper arm circumference & haemoglobin	1	3	1	3
Only upper arm circumference	1	0	1	1
Total	4	3	4	4

Other questions aimed at specifying midwives' actions in ongoing monitoring of nutritional status. This was answered in Table 26.

Table 26: Ongoing monitoring of nutritional status by midwives from selected study villages in two districts Banten Indonesia 2001

Answer	Intervention midwives		Comparison midwives	
	Stage 1	Stage 3	Stage 1	Stage 3
Weighing patients	1	0	0	0
Physical assessment	0	0	1	0
Weighing patients, haemoglobin and UAC	1	3	1	3
Weighing patients and UAC	1	0	2	0
No answer	1	1	0	1
Total	4	4	4	4

Village midwives were asked what proportion of women they carried out nutritional monitoring. In the Stage 1 questionnaire, four midwives stated 'all' or 'most women' and four replied 'some pregnant women'. In Stage 3 there were three midwives (two from intervention and one from comparison villages) stated 'all' or 'most women' and five midwives (two from intervention and three from comparison villages) replied 'some pregnant women'. Altogether six village midwives before the intervention (three from intervention and three from comparison villages) suggested using the patient's weight as an assessment tool and they suggested using this measure for monitoring

nutritional status. After intervention, all village midwives from both the intervention and comparison villages stated weight was an important measure of assessment.

When asked whether they ever weighed patients more than once, in Stage 1 there were five out of eight, two from the intervention and three from the comparison villages who replied that they did. In Stage 3 all of the midwives from both groups said they weighed patients more than once. When asked what would make them decide to do this, in Stage 1 there were five village midwives (two from intervention and three from comparison villages) stated this was to monitor nutritional status. One of them replied to know the women's weight and two did not answer. In Stage 3 there were four village midwives (two from intervention and two from comparison villages) who stated to monitor nutritional status, two from the intervention villages replied to know the women's weight and two from the comparison villages did not provide relevant answers.

When asked what they would do if they felt that a patient was not receiving adequate nutrition in Stage 1, five (three from intervention and two from comparison villages) suggested to give health education and two from comparison villages suggested refer to other health professionals. One midwife from an intervention village did not answer. In Stage 3 there were two midwives (one from an intervention and one from a comparison village) who suggested giving health education, four midwives (two from intervention and two from comparison villages) suggested giving supplementation and health education, and the last two midwives from both groups suggested referring the woman to another health professional.

Changes in responses appeared to be caused by some limited improvement of knowledge of respondents from the intervention villages. However, simply participating in Stage 1 data collection activities seemed to stimulate the better-educated midwives in the comparison villages to improve. The process of completing the survey was enough to stimulate the better-educated midwives in the comparison villages to remember and use their knowledge and skills more in their routine practice.

Nutrition knowledge

The final questions related to women's nutritional requirements. The first asked the approximate energy requirement for pregnant women. In Stage 1 six midwives answered correctly (2,200 to maximum 2,700 cal), one answered incorrectly and one did not know the answer. In Stage 3 six answered correctly. Again one was incorrectly answered and one did not know the answer. Four of the correct answers were from village midwives in comparison villages. The next question was related to the nutritional requirement of pregnant women. In Stage 1 there were four midwives who answered correctly. One answered incorrectly and three did not provide relevant answers. In Stage 3 there were three midwives answered correctly, one answered incorrectly and four had non-relevant answers. The best answers again were found from the comparison villages and not from the intervention villages who participated in the workshop.

The second question was about the approximate protein requirements of pregnant women. In both Stage 1 and 3 all eight village midwives answered correctly. There also were questions relating to protein being beneficial for pregnancy. In Stage 1, seven village midwives answered correctly. In Stage 3, fewer village midwives answered correctly with two midwives providing answers that were not relevant. The incorrect irrelevant answers were found in intervention village midwives. Again, in further questions related to sources of protein, incorrect or irrelevant answers were found in the intervention village with most of the comparison village midwives answering correctly.

Another question was related to sources of vitamins and minerals. In Stage 1 there were six 'good' answers, which was equally proportioned between the intervention and comparison village. There was one incorrect answer and one irrelevant answer. In Stage 3 there were also six 'good' answers again though four of these were from comparison village midwives. All village midwives in these comparison villages had 'appropriate' answers.

Both groups of midwives were asked, through a case study, what they would do if they found a patient who was not receiving adequate nutrition even though she took iron supplements and followed nutritional program advised by health providers. In Stage 1 there were five answers (two from intervention and

three from comparison villages) that were appropriate. The midwives said that they would refer to health providers or health centre to explore the possibility that the woman has other diseases that cause anaemia. One midwife from an intervention village provided no answer and two (one from an intervention and one from a comparison village) gave answers that were not relevant. In Stage 3 there were seven midwives (three from intervention and four from comparison villages) who stated correctly that they would refer to health provider or health centre to explore of possibility the woman has other diseases that caused anaemia and one midwife from an intervention village answered incorrectly.

The last question was about the influence of socio cultural factors in nutritional intake in pregnant women. In Stage 1 there were seven village midwives whose answers were appropriate. They were aware of the influence of socio cultural factors on the nutritional intake in pregnant women. One did not demonstrate this awareness. In Stage 3 there were five village midwives who answered correctly, while three answers, again two midwives from intervention villages were incorrect.

Village midwives' recognized that they needed to improve their knowledge about nutrition for pregnancy. In Stage 1 seven answered that they knew they needed to improve their knowledge. In Stage 3 all of them answered 'yes'.

Conclusion

The Stage 3 ethnographic study showed that the beliefs and cultural practices of pregnant women related to nutrition intake during pregnancy and iron consumption remain strongly influenced by her family and the community. However, there were differences in the communication style and approaches used by village midwives and cadres in the intervention village in Stage 3 to encourage women to improve their nutritional intake and to take iron supplements during pregnancy. Village midwives and cadres in the intervention village applied the community development approach introduced and proposed in Stage 2 workshop.

The survey results in Stage 3 showed that respondents generally felt nutritional assessment to be both a midwife's responsibility and an important element of midwifery care. A number of assessment strategies were suggested, but it is not

clear that these were consistently enacted upon. The lack of universally accepted and easily applied criteria and lack of the necessary equipment for nutritional assessment was clearly evident. Nevertheless, there was a discrepancy between what midwives said, what they did and what they documented in their assessment of nutritional status of pregnant women. On this evidence it could be concluded that lack of nutrition knowledge, or knowledge not well communicated, combined with an absence of generally accepted standards or equipment, was obstructing midwifery practice to improve the nutritional status of pregnant women.

It appeared that by undertaking the survey, the DIII level trained midwives, who received a three-year midwifery training, were mostly in the comparison villages without the program intervention, revised their knowledge which improved their scores on retest. The DIII midwifery graduates also worked better in clinical care, according to the ethnographic data, and were more knowledgeable.

Chapter 9: Nutritional Status of the Rural Pregnant Women After Intervention

Introduction

This chapter evaluates and reports any changes in the nutritional status of pregnant women in the intervention villages in Stage 3. The results will be compared to changes that may have occurred in the comparison villages, which did not receive the community workshop program. The levels of anaemia, BMI and weight gain in pregnancy were the main variables used to measure nutritional status in this study.

Background

Previous trials have been conducted to test a variety of different interventions to decrease the level of anaemia in pregnant women. These have primarily been carried out on samples of anaemic women. For example, Suharno et-al evaluated the impact of providing micronutrients in combination vitamin A with iron to increase the level of haemoglobin in pregnant women (Suharno et-al 1993). In this case, the comparison group consisting of pregnant anaemic women who were having iron supplements and the intervention group consisted of pregnant anaemic women who were given iron plus Vitamin A supplements. This study found that the iron plus vitamin A supplements increased haemoglobin levels. After supplementation, the proportion of women who became non-anaemic was 35% in the vitamin A supplemented group, 68% in the iron-supplemented group, 97% in the group supplemented with both, and 16% in the placebo group.

Another study by Tanumihardjo (2002) attempted to determine the effects of vitamin A and iron supplementation on the vitamin A and iron status of pregnant Indonesian women with smaller sample ($n = 27$). The result of this study reported that iron status was significantly improved in these women ($P < 0.05$) with both iron and vitamin A supplementation (Tanumihardjo 2002).

Both these studies had a narrow focus on nutrition. It examined the impact of iron and micronutrient supplementation only and focused on women with anaemia rather than all women. This thesis reports on a community development approach which the community itself identified needs and

developed strategies. This community approach was used by village midwives and cadres to improve the nutritional status of pregnant women.

Previous studies indicate, that even with specific interventions and programs directed to improve haemoglobin levels, it is difficult to decrease the rate of anaemia (Thurnham 1993). One possible reason for this occurring is women's lack of compliance with taking micronutrients and the poor base nutrition that many women in developing countries.

Data on weight gain during pregnancy is difficult to obtain since it requires a longitudinal study covering the entire duration of pregnancy. Two such studies in four villages in Kupang, Indonesia (East Nusa Tenggara) showed that weight gain in pregnancy was very low, approximately 6.6 to 7.8 kilograms (Jus'at et-al 2000). This is only 50% to 60% of the 11.25 to 15.75 kgs, recommended as a standard weight gain (Carmichael 1997; Kolasa & Weismiller 1997; USA Institute of Medicine 2000). The study by Jus'at et-al did not use the BMI of the women as index of target on weight gain in pregnancy, as recommended by others (USA Institute of Medicine 2000).

The Precede – Proceed health promotion model described in Chapter 3 provided the conceptual framework for the research reported here and identifies 'evaluation of the outcome', as the final stage of the model. Qualitative changes in attitudes and behaviours of relevant individuals in the villages; i.e. midwives, cadres and women were reported in the previous chapter. It is, however; also necessary to examine the impact these changes may have had on nutritional status.

Nutritional status of women is influenced by many factors. Some of these factors such as the economic ability and stable access to a variety of food sources would be difficult to influence in the timeframe defined in this project and were not perceived as achievable objectives by the participants in the workshop. For this reason it is likely that the effect of the intervention would be minimal. The time constraints of the project and the variation between the villages for outcome variables at baseline meant that the sample size obtained to examine the impact of the intervention did not provide sufficient power to examine statistical differences. The data collected in the villages in Stage 3 was therefore examined for possible trends in the improvement on the rate of

anaemia and weight gain during pregnancy rather than seeking statistical evidence of effect.

Method

Eight villages used in the study. These have been described in detail in Chapter 4. The intervention district was randomly selected prior to the collection of baseline (Stage 1) data. The villages from the districts selected to participate in the study were a convenience sample selected by and approved by the provincial government. The villages selected as comparison villages are labelled C_1, C_2, C_3, and C_4. The villages selected as intervention villages are labelled I_1, I_2, I_3 and I_4. The data were collected over a three-month period from August to October 2001 in all villages.

Intervention

After the baseline data (Stage 1) was collected and analysed, a community development workshop was provided to the midwives and cadres in the intervention villages. This occurred in October 2001. The workshop provided feedback of the results of the baseline data collection, and aimed to improve workshop participant's understandings and skills in community development and communication. Details about the intervention workshop has been provided in Chapter 7. The workshop used small group discussion demonstration and experiential activities to develop and practice strategies to improve the nutrition of women, and in particular pregnant women in the villages. Some examples of the strategies used by the intervention villages included approaching religious leaders and community leaders, individual health education and using posters displayed in prominent places.

The comparison villages were not provided with a workshop or feedback of the baseline results but were informed that data collection would be carried out again at a similar time in the following year.

Approximately one year after the intervention the researcher collected data from the eight study villages using the same methods described for baseline Stage 1 data (see Chapter 6). This occurred during the months of August to October 2002.

Participants

Stage 1 baseline data was collected from 210 women (121 in intervention and 89 in comparison villages) (see Chapter 6 for more details). Recruitment for data collection in Stage 3 was similar to Stage 1. That is, all pregnant women in the village were informed about the research and invited to participate. Recruitment continued until a sample size similar to baseline was achieved (i.e. a total of 189 being 100 in the intervention and 89 in the comparison villages). Similarly, as experienced in Stage 1, approximately 30% of women invited to participate refused, due to fear of the pricking of the skin required for the anaemia test.

Data Collection and Measures

Data collection and measures were collected on demographics, relevant obstetric data i.e. parity, gestation, pregnancy complication including bleeding, initial weight, height, current weight, and haemoglobin. The BMI was estimated using the formula: weight/height squared and then categorised into low BMI <20, normal 20-24.9 and high BMI 25 to 29.9. Haemoglobin was measured using the Sahli colour scale. Haemoglobin was categorized into severe anaemia < 7gm/L, moderate anaemia 7 to10.9gm/L and normal 11gm/L or higher. Weight gain was categorised using graphs adjusted by BMI and gestation. Poor weight gain was defined as < 10 centile, normal weight gain 10 to 90th centile and high weight gain > 90^{th} centile.

Analysis

Simple descriptive statistics, frequencies, proportions and graphs were used to present the data. Differences between villages in Stage 1 and 3 were examined.

Results

Demographics

Differences in Stage 1 and 3 samples in demographic characteristics were small as represented in Table 27 below.

Table 27: Differences in demographic data of pregnant women in comparison and intervention villages in Stage 1 and 3. from selected study villages in two districts Banten Indonesia 2001 -2002

Variables	Comparison				Intervention			
	Stage 1 n = 89		Stage 3 n = 89		Stage 1 n= 121		Stage 3 n= 100	
	Freq	%	Freq	%	Freq	%	Freq	%
Education level								
No schooling	1	1.1	1	1	4	3.3	1	1
Primary school	36	40.4	35	39.3	43	35.5	40	40
Junior High	24	26.9	27	30.3	37	30.6	32	32
Senior High	26	29.2	24	27	31	25.6	24	24
University	2	2.2	2	2.2	6	5	3	3
Salary/month $AUD								
Under 60/mo	21	23.6	20	22.5	35	28.9	17	17
60-100/mo	38	42.7	37	42	54	44.6	41	41
101-140/mo	16	18	19	21.3	20	16.5	35	35
More than 140/mo	14	15.7	13	14.6	12	9.9	7	7
Maternal Employment								
Not working	78	87.6	77	86.5	111	91.7	92	92
Office employ	10	11.2	11	12.3	8	6.6	6	6
Others employ	1	1.1	1	1	1	0.8	2	2
Paternal Employment								
Not working	2	2.2	1	1	5	4.1	0	0
Farmer	25	28	23	25.8	28	23.1	5	5
Factory worker	37	41.6	35	39.3	52	43	34	34
Government official	5	5.6	21	23.6	4	3.3	8	8
Others employ	22	24.7	9	10.1	33	27.3	53	53
Mean Maternal Age (17-43 yrs)	26.52		26.67		26.76		24.24	
Standard Deviation	4.03		4.52		4.88		4.78	

Education

There did not appear to be differences in education level in the samples in Stage 1 and 3 in either the comparison or the intervention villages. For example the proportion of the sample with primary school education or lower in the

intervention villages was 39% in Stage 1 and 41% in Stage 3. In the comparison villages 41% in Stage 1 and 40% in Stage 3.

Age

The age of respondents were between 20 to 30 years in both the intervention and comparison villages. The mean age in Stage 1 in the comparison villages was 26.5 ± 4.03 and in Stage 3 was 26.67 ± 4.52. In the intervention villages, mean age in Stage 1 was 26.76 ± 4.88 and after intervention: 24.24 ± 4.78 in Stage 3 (See Table 28).

Socio economic status

Most of the respondents were of very low economical status, and the salary levels house loads were under $100 AUD per month in both the intervention and comparison villages, in Stages 1 and 3. There were some women in Stage 3 intervention villages with > $100 (AUD) (42%) than Stage 1 (26%).

Employment

There were no differences between Stages 1 and 3 in the maternal employment or paternal employment. As shown in the Table 27 most of the women were not working and most of their husbands worked as factory employees.

Obstetric characteristics

In Stage 3 most of the respondents in the intervention villages were in the first and second trimester of their pregnancy. This was different to Stage 1, which found more intervention respondents in the third trimester of their pregnancy. There were no differences in the gestation amongst the respondents in Stage 1 and 3 in the comparison villages.

Most of the respondents were having their second or subsequent pregnancy. However the intervention villages compared to the comparison villages had a higher proportion of first time mothers, particularly at Stage 3.

Previous abortions and stillbirths were more common in the comparison villages in Stage 3 (25%) compared with in the intervention villages (11%).

Table 28: The obstetric characteristic of respondents from selected study villages in two districts Banten Indonesia 2001-2002

Variables	Comparison				Intervention			
	Stage 1 n= 89		Stage 3 n = 89		Stage 1 n = 121		Stage 3 n= 100	
	Freq	%	Freq	%	Freq	%	Freq	%
Gestation								
First Trimester	26	29.2	27	30.3	30	24.8	34	34
Second Trimester	34	38	32	36	34	28.1	43	43
Third Trimester	29	32.6	30	33.7	57	47.1	23	23
Gravida								
Primipara	25	28.1	23	25.8	41	33.9	45	45
Multipara	56	62.9	57	64	65	53.7	51	51
Grand Multipara	8	9	9	10	15	12.4	4	4
Previous Abortion								
No abortion	69	77.5	62	69.7	96	79.3	90	90
Abortion 1-3 times	19	21.3	20	20.2	24	19.8	10	10
Abortion > 3 times	1	1.2	1	1	1	0.8	0	0
Still Birth	8	9	6	6.7	6	5	1	1
Complication of Pregnancy								
None	71	79.8	71	79.8	105	86.8	91	91
Ante natal bleeding	5	5.6	5	5.6	5	4.1	0	0
Threatened premature labour	10	11.2	9	10	5	4.1	0	0
High blood pressure	3	3.4	0	0	3	2.5	0	0
Vaginal infection	1	1.1	1	1	1	0.8	0	0
Others	4	4.5	8	9	7	5.8	9	9

Nutritional status outcome

Table 29: Nutritional outcomes from selected study villages in two districts Banten Indonesia 2001-2002

Variables	Comparison				Intervention			
	Stage 1 n = 89		Stage 3 n= 89		Stage 1 n 121		Stage 3 n= 100	
	Freq	%	Freq	%	Freq	%	Freq	%
Anaemia level								
Severe < 7 gm/l	2	2	2	2	2	2	2	2
Moderate 7-10.9 gm/l	55	62	39	44	70	58	52	52
Normal > 11	32	36	48	54	49	41	46	46
Anaemia*								
First Trimester	19/26	73	10/27	37	20/30	67	17/34	50
Second Trimester	19/34	56	14/32	44	19/34	56	25/43	58
Third Trimester	15/29	52	17/30	57	33/57	58	12/23	52
BMI level								
BMI - low	37	42	39	44	64	53	53	53
BMI - normal	49	55	47	53	48	40	45	45
BMI - high	3	3	3	3	9	7	2	2
Weight Gain								
Poor	55	62	49	55	88	73	60	60
Normal	29	33	27	30	25	21	36	36
High	5	6	13	15	8	7	4	4

** Anaemia <11gm/l*

Anaemia

There was a 46% proportion of anaemia in the comparison and 54% in the intervention villages in Stage 3. Anaemia reduced, in a very small way, from 60% in Stage 1 to 54% in Stage 3 in the intervention villages. In the comparison villages however the anaemia proportion reduced from 64% before intervention to 46% after intervention.

Women in the first trimester of pregnancy in the comparison and intervention villages had decreased proportions of anaemia. It was expected that the most significant decrease in haemoglobin levels should occur in the trimester two or three and not trimester one (Henderson 1997; Abel 2000). Women in trimester

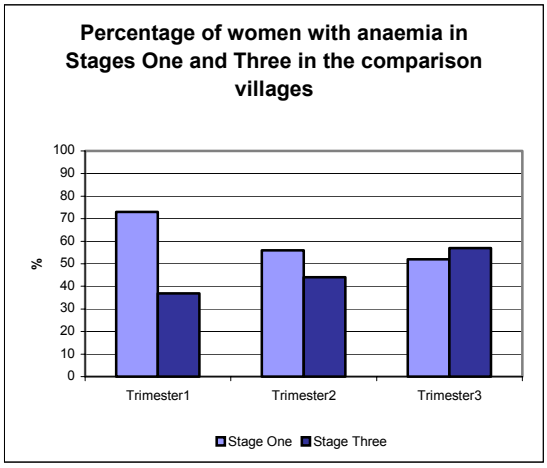
one had little contact with midwives therefore the differences observed in the trimester one are unlikely to have resulted from the intervention.

Table 30: Proportion of women in the study villages with anaemia, poor weight gain and low BMI before and after intervention from selected study villages in two districts Banten Indonesia 2001-2002

	Anaemia*(%)		Poor weight gain (%)		Low BMI (%)	
	Before	**After**	**Before**	**After**	**Before**	**After**
Comparison Village						
C_1	59	41	54	41	41	50
C_2	62	48	57	57	63	44
C_3	71	58	75	67	66	58
C_4	46	36	59	55	39	42
Intervention Village						
I_1	57	48	75	48	43	68
I_2	53	44	77	48	63	44
I_3	63	62	78	83	66	58
I_4	65	62	61	61	39	42

Overall the comparison villages had lower levels of anaemia both in Stages 1 and 3 although this level was unacceptably high (64% before intervention and 46% after intervention).

Figure 13: Percentages of anaemia rates in Stages 1 and 3 from selected study villages in two districts Banten Indonesia 2001-2002



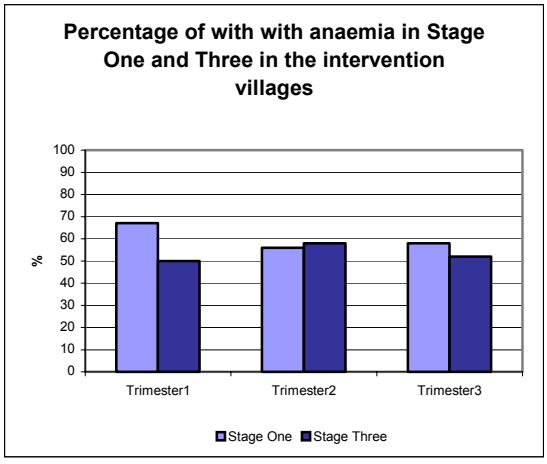
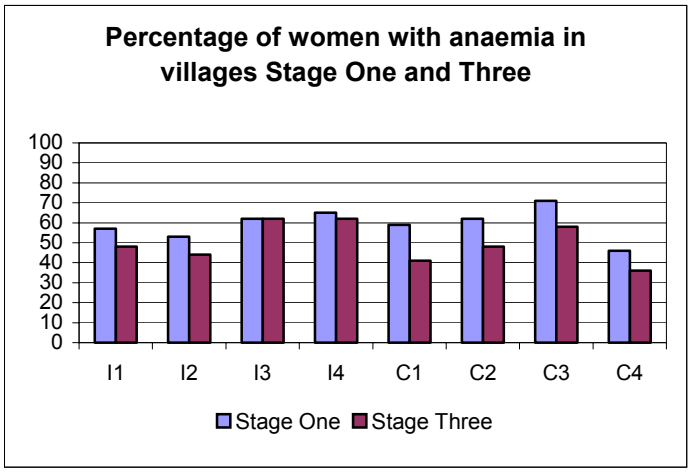


Figure 14 presents the frequency of

anaemia rates in all villages. It shows that there were three villages (two in intervention villages and one in a comparison village) where a high proportion (more than 50%) of anaemia remained in Stage 3.

Figure 14: Frequency of anemia rates in all villages in Stages 1 and 3 from selected study villages in two districts Banten Indonesia 2001-2002



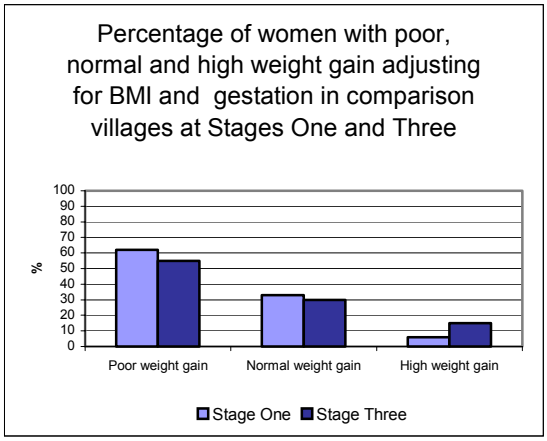
All four comparison villages reduced their proportion of women with anaemia. Two villages in the intervention group, (I_1 and I_2), decreased the proportion of women with anaemia two other villages remained unchanged.

Poor weight gain

The weight gain of pregnant women at all gestations was measured using the weight gain charts of body mass index (BMI) (USA Institute of Medicine 2000) (Appendix 17)

Overall the intervention and comparison villages both reduced the proportion of women with low weight gain during pregnancy. The comparison villages had a slightly lower proportion of women with low weight gain in both Stages 1 and 3, while the intervention villages still had high rates of women with poor weight gain at Stage 3 (60%).

Figure 15: Weight gain in pregnancy in Stages 1 and 3 from selected study villages in two districts Banten Indonesia 2001-2002



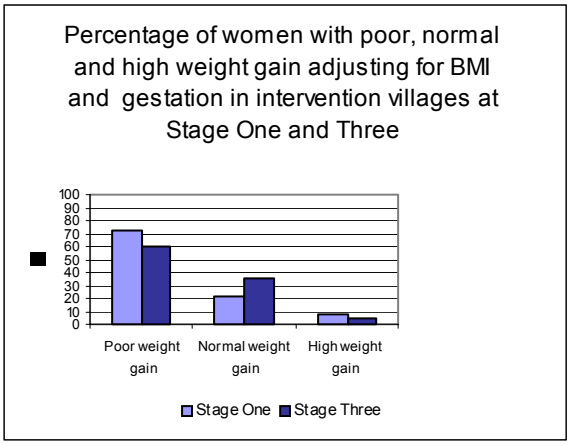
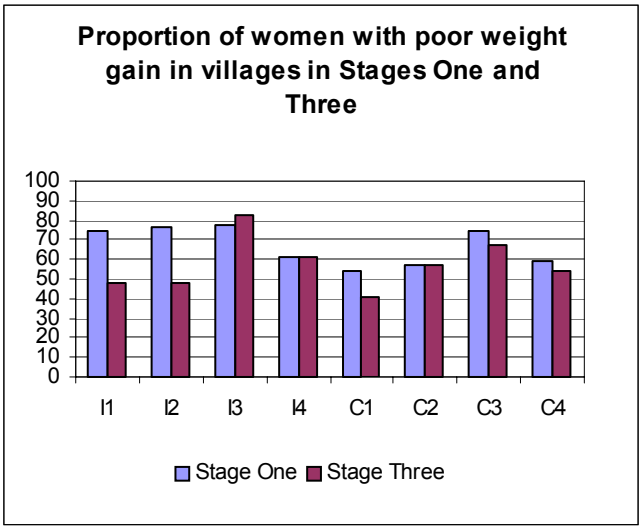


Figure 15 presents the proportion of weight gain in pregnant women in each village in the research area. Two villages in the intervention village decreased proportion of women with poor weight gain after intervention (I_1 and I_2) while intervention villages remained unchanged or increased (I_3 and I_4).

Figure 16:Women with poor weight gain in each village in Stages 1 and 3 from selected study villages in two districts Banten Indonesia 2001-2002

There were three comparison villages that slightly decreased the proportion of



women with poor weight gain (C_1, C_3 and C_4), while one village remained unchanged in Stage 3.

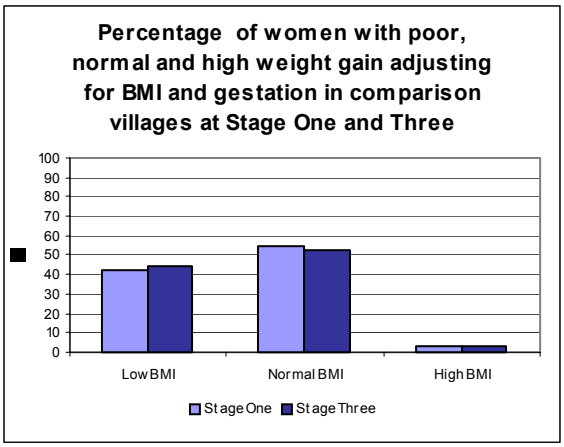
BMI

The next quantitative variable examined which indicates the nutritional status of pregnant women is the BMI level. Figure 17 shows that there was a high

proportion of women with a low BMI (44% in the comparison villages and 53% in the intervention villages).

The proportion of women with low BMI in Stage 1 and 3 did not change in either the comparison or the intervention villages. The comparison villages had a lower proportion of women with a low BMI than the intervention villages.

Figure 17: BMI rates in Stage 1 and Stage 3 from selected study villages in two districts Banten Indonesia 2001-2002



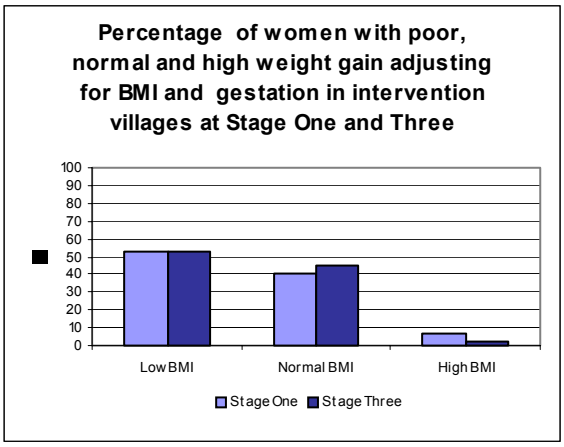
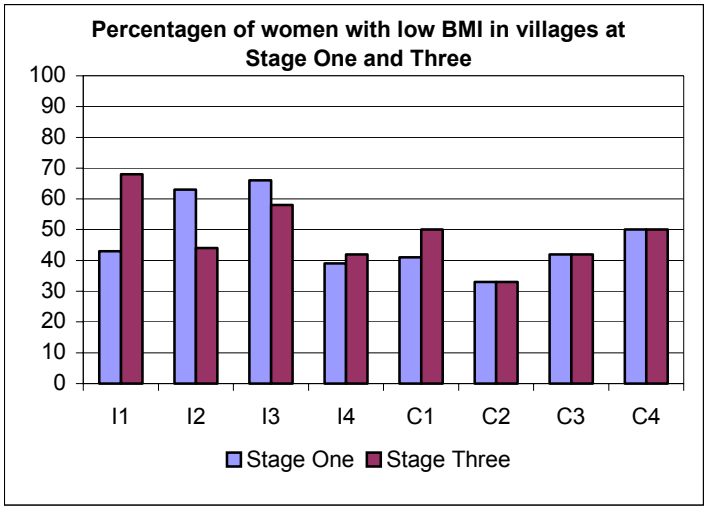


Figure 18 shows the BMI proportion of pregnant women in each village in the research area and the differences in BMI between comparison and intervention villages. I_1 had an increasing proportion of women with a low BMI in Stage 3 compared with Stage 1. I_4 was unchanged, while I_2 and I_3 had decreased in the proportion of women with a low BMI. C_2, C_3 and C_4 remained unchanged in their proportion of women with a low BMI, while C_1 increased in proportion of women with a low BMI.

Figure 18: BMI rates in each village in Stages One and 3 from selected study villages in two districts Banten Indonesia 2001-2002



It is unlikely that the intervention had sufficient time to reduce the percentages of a low BMI. Probably, and this is confirmed by the paradoxical results, any differences seen were due to natural correction within the population and could have been seasonally related.

Limitations and assumptions of the study

The samples of pregnant women selected prior to the intervention and post intervention were different. This was because it was not logistically feasible to 'follow' the same group of women over the duration of their pregnancy.

The time constraints of the project, and the variation between the villages for outcome variables at baseline, meant that the samples obtained to examine the impact of the intervention study did not permit analysis for statistical differences that could be seen as causative by the intervention. A statistical advisor to the project confirmed this. The data collected in the post intervention was only examined for possible trends in the improvement on the rate of anaemia and weight gain during pregnancy. This was a descriptive study, and the type of data collected was not suitable for inferential analyses so the results are presented accordingly. This limits any capacity to derive 'cause and effect' from the research.

It is understood that the infection rate of worm or helminth, malaria or another infections are an important confounding factor of anaemia. Due to the limitation of resources and time constraints these variables were not investigated. The assumption was made that the malaria rate is very low in Java Island. Verbal reports from the head of Puskesmas confirmed that the helminthes rate were not high in these villages. However, this study would have been more valuable if the infection and parasite rate data was able to be collected and analysed.

Discussion

The major limitation of the nutritional measures component of this study is that the sample size did not provide enough power to examine significant differences in nutritional status between Stages 1 and 3. A power calculation was conducted at the beginning of the project but inadequate estimates of the variability between villages were used in the calculation and there were insufficient resources to increase the duration of the research. The objective of this study was therefore to determine whether there was at least a positive trend in the variables, which are indicative of improved nutrition. These variables include the rate of anaemia and the proportion of women with poor weight gain during pregnancy.

The qualitative findings described in Chapter 7 may assist in our understanding about why some villages improved and in others there had been no change or indeed the nutritional status decreased. This numerical analysis of the data is explorative and the interpretation of the data requires further research for confirmation. It is possible that any of the changes identified may have been due to normal variation of these variables in the villages. However the results confirm the high rates of anaemia and poor weight gain during pregnancy.

The results suggest that there has been little change in anaemia, weight gain or BMI in either the comparison or the intervention villages. This was not unexpected as there has been insufficient time since the intervention was conducted and the intensity and strategies used were unlikely to influence factors that influence BMI such as economic status and secure and reliable access to a variety of food sources. As suggested in Chapter 3 the process of

evaluation itself must be seen as part of the intervention process. It is possible that the action of systematically evaluating weight gain and anaemia may have been a sufficient intervention in the comparison villages where the midwives had a higher level of education.

Conclusion

The survey showed that even though two intervention villages did not increase the nutritional status, there was improved nutritional status in two intervention villages. Surprisingly, the comparison villages that did not receive the intervention program, improved their performance as shown in the results in that most of the nutrition variables were better than Stage 1. These results will be discussed further in the next chapter.

Chapter 10: Discussion

Introduction

This chapter overviews the research described in this thesis. It discusses the implications of the qualitative and quantitative results at Stage 1 and Stage 2. There is an emphasis on the social cultural beliefs, community values and professional influence related to nutrition for pregnant women. It compares the results with findings of other research in an attempt to deepen our understanding. It specifically examines how authoritative knowledge and power relations may influence this area. Possible explanations of the paradoxical results are also provided. The implications of the findings for the education of midwives, is outlined.

This study was a longitudinal descriptive investigation that evaluated the effectiveness of an intervention aimed at improving women's nutrition in pregnancy by strengthening the knowledge and communication skills of midwives and cadres.

Four villages in Cilegon district and four villages in Serang district were used as research areas. In Cilegon, the village midwives and cadres were provided with training to improve their knowledge about nutrition for pregnant women, and to improve their skills in communication and community development. Serang was used as a comparison area and the health providers were not provided with any new information but participated in Stage 1 and 3 data collection. These two research areas have similar communities in relation to socio-economic status, religion culture, language, and food availability.

Data was collected in all eight villages both in Stages 1and 3. Three hundred and ninety-nine women were sampled for quantitative biophysical data and 75 women contributed to the qualitative data. The quantitative component of the study measured the nutritional status of all pregnant women in the research areas and the qualitative component looked at nutritional behaviour of pregnant women and the communication patterns and behaviours of village midwives and cadres before and after the intervention. The study also looked at the relationships between pregnant women and their families with village

midwives/cadres, the influence of culture, beliefs and community values on the nutrition intake and behaviour in these communities.

As described in the Chapter 4, this study was based around the Precede - Proceed health promotion model (Green & Kreuter 1991). The conceptual model hypothesised that by focusing on changing the knowledge and behaviour of the target groups (village midwives and cadres) it, in turn, could influence the nutritional behaviour and status of pregnant women.

The results are brought together and discussed in detail in this chapter, particularly in relation to the socio cultural beliefs, community values, and professional and cadre behaviour that influence the dietary intake of pregnant women in villages in this part of Indonesia.

Authoritative Knowledge, Culture, Gender, Religion and Poverty

The concept of authoritative knowledge (Jordan 1997) provides a suitable theoretical framework to understand some of the key findings of this study. Although the concept of authoritative knowledge provides a useful lens to examine and understand the relationships between pregnant women and health care providers, culture, religion, poverty and gender have also been found to influence these relationships, and in turn authoritive knowledge, and must also be considered.

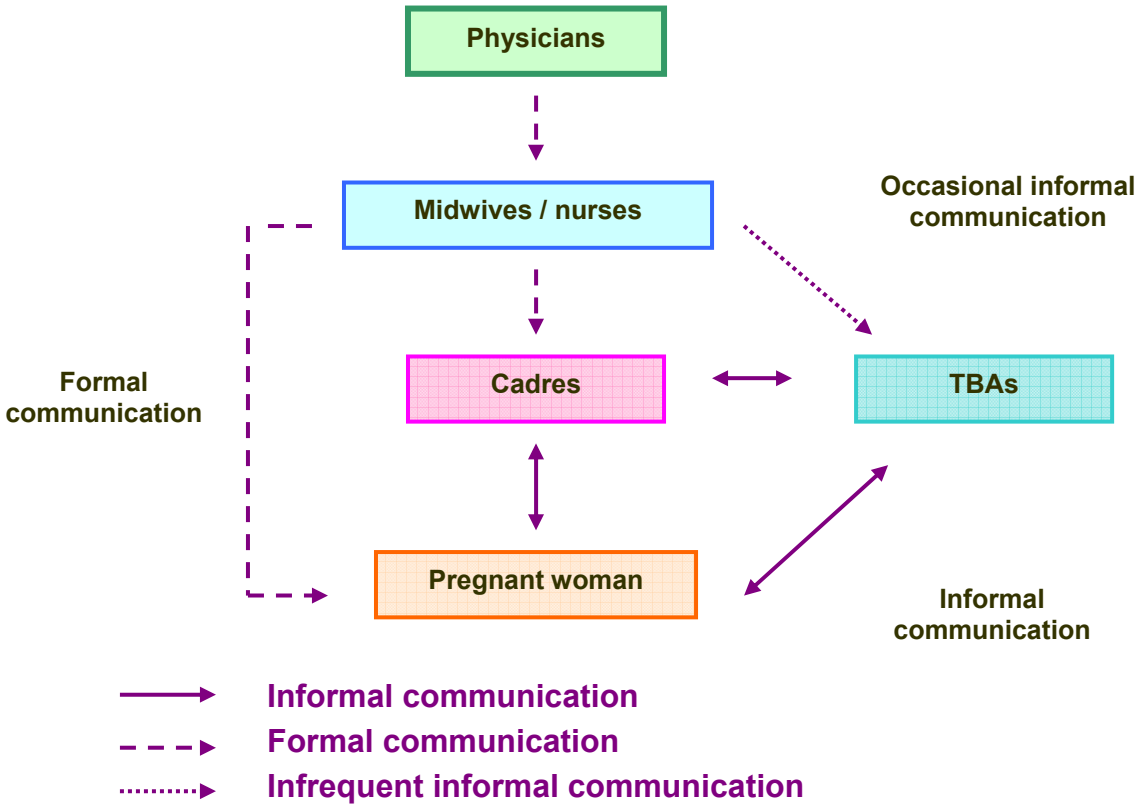
Authoritative knowledge in the health system

Although we can identify different ways of knowing about pregnancy and birth Jordan (1978 and republished in 1993) suggests that, in any particular situation only one way of knowing really counts, or is authoritative. In order to establish whose knowledge counts we need only ask ‘who possesses the information on which action is based?’ As modified and quoted from Byford (1999), in many countries it is the health professional that ‘dominates and controls reproduction and whose hegemony is spreading worldwide, proclaims authoritative knowledge about (all aspects of) birth.

In the context of this study, authoritative knowledge lies in two places. Firstly, with the health care providers and is embedded in the cultural authority of

medicine and midwifery and in the practitioners - doctor, nurses, midwives and to a lesser extent cadres. It also resides in the culture, the mother-in-law and other leaders who enforce food taboos within the community (WHFWP 2001A, Swasono 1998). The following diagram (Figure 19) illustrates the hierarchy of legitimate knowledge and the relative position of health care providers and pregnant women found in this study.

Figure 19: Hierarchy of knowledge and communication patterns demonstrated in the health system in this research



This figure shows how powerless pregnant women are in the health and social/cultural system. They are at the bottom of the hierarchy and are seen to have no considered knowledge of pregnancy. At the top, in the village setting, are midwives, who provide care to pregnant women.

The communication between physicians and village midwives is limited and is characterised by formality as well as the communication between the midwifery supervisors with village midwives. The communication between midwives and cadres is also formal, while communication between midwives

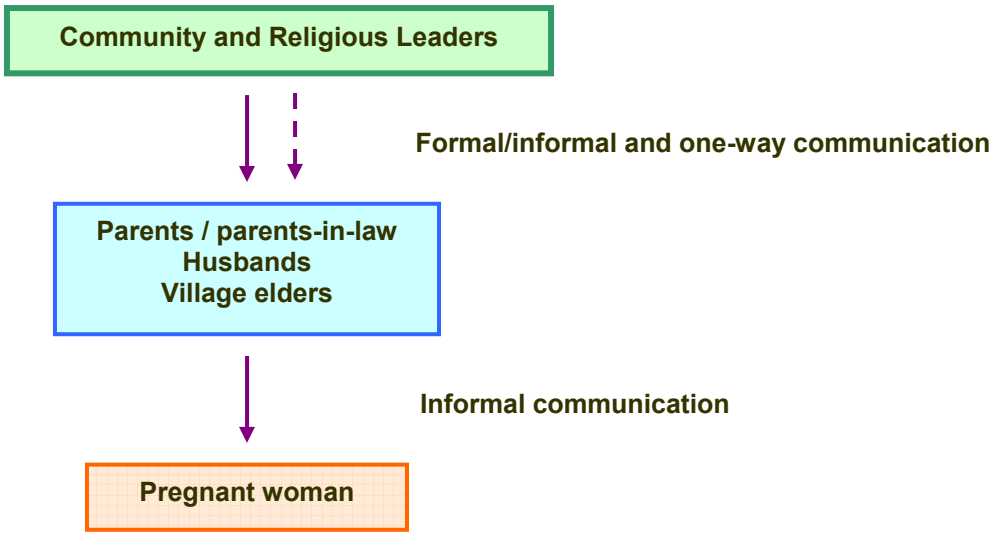
and TBAs' happens occasionally and is informal. The communication between midwives and pregnant women is always formal. Cadres and TBA are on the same level and they communicate freely and informally with each other as well as with pregnant women.

Formal communication is often one way or uni directional and does not encourage open communication between the parties. For example a village midwife will usually advise a pregnant woman about what to eat, what to drink, what to avoid etc, and does not encourage the women to respond to this advice. Thus pregnant women are silenced in this encounter. In the situation where the communication is more informal, and thus more relaxed, there is more possibility of an exchange between the cadre and pregnant woman.

Authoritative knowledge in the broader community

The situation for women within her family and the wider society is no better as revealed by Figure 20.

Figure 20: Hierarchy of authoritative knowledge and communication patterns demonstrated in the family and community in this research



Community and religious leaders need to maintain power in the villages, with all the villagers, including pregnant women and her family, following their directions. The community and religious leaders have the greatest power in the village. Community leaders fill an administrative role and deal with government regulations; he or she is the first person in the village. Next to this person, are religious leaders. They are mostly male, and are very powerful in

the religious regulations, norms and values in the village. All people in the community, including the pregnant women, have to follow their direction.

As Ali found in Malaysia (Ali 2001), the Indonesian pregnant women in this study must always follow the advice or instruction of her husband, parents or parents-in-law who have more authoritative knowledge than she does. In the familial situation authoritative knowledge is embedded in cultural rules about the roles and responsibilities of wives, daughters, husbands, parents and in-laws. In the wider society there are senior men and women, village elders, community and religious leaders whose authority is legitimated by cultural dictates. This research shows the position of a pregnant woman is low; most people surrounding them are considered more knowledgeable about the pregnancy than they are, have more power to determine what they can and cannot eat and drink, what they can and cannot do on a day to day basis. Within the family context, the data in this study shows that men are superior to women and their status is higher than women. It is compulsory for women to follow the direction of her husband, who trusts his mother to look after his pregnant wife. In this study this was demonstrated as pregnant women were not permitted to choose how or what they ate themselves.

In village contexts in Indonesia in this research, pregnant women have little or no ability to participate in decision making, to discuss, challenge or agree with health care personal, family members or village elders. Others have also shown similar findings (WHFWP 2001A, Swasono 1998). Given this situation it is perhaps not surprising that the women in this study who were shown on occasions to rebel or subvert the culture did so in quiet and covert ways. This explanation helps us understand why most women do not follow the instructions of the midwife or cadre in relation to iron supplements. Similarly, perhaps this helps us understand why a pregnant woman will eat meat in secret in contradiction to cultural dictates and the wishes of her husband and/or relatives. This study shows that she will only do so in secret so as not to confront authority.

The most difficult questions for the women who participated in this study to answer were questions related to nutrition and health services provided by government. In a public setting or when there were others present, most women

declined to answer or only did so after several repeated questions. For those who did answer they gave short responses and it was clear that they were careful to make only positive comments about these authority figures and services (village midwives, cadres and government health services). Criticising is not culturally acceptable as it shows disloyalty and lack of appreciation about the services offered by individual health care providers and government health services in general. Whether or not women feel that the services are good or bad they appeared to continue to silently accept them, even though in the privacy of their own homes, women were more willing and able to criticise these services.

In her study in Papua New Guinea, Byford (1999) notes that 'in some respects the silent participation of these women confirms the pre-existent hierarchy of knowledge regarding pregnancy and birth' (Byford 1999). The same can be said of women in this study in Indonesia. Byford goes on the say that;

'Silent though these women may be they were none the less engaged in the production and reproduction of authoritative knowledge of the 'hospital' way of birth and thus continually reinforcing its validity' (Byford 1999).

In this study, the reluctance of the women to be critical of the services they are offered has the same effect as described by Byford. Services are not changing or adapting to women's silent, unexpressed needs, as a result of this. Being at the lowest level in the power structure, rural pregnant women have little say and are inhibited when it comes to giving ideas, opinions and suggestions regarding their treatment during their pregnancy. The directive, authoritative stance used by health providers when communicating with these women makes the situation worse. While women will not complain, they will simply not follow their midwives instructions. Ali showed similar findings in Malaysia.

In her study of birthing women in Papua New Guinea, a non Muslim country, Byford (1999) argues that women who attend the hospital clinic and then return to the village 'move between these spatially separated domains and in so doing move between discursive frameworks; one where discourses of biomedicine and the nation-state prevail and the other where indigenous discourses and meanings dominate' (Byford 1999). The same can be said of women in this study as they move between the clinic run by the village midwives in the

Posyandu and their homes. Women face conflicting instruction and advice from both.

These problems for the women in this study were compounded by the inability of the midwives to speak local languages. The lack of health care providers with local language skills has been identified as a significant barrier to access to health care and compromises the health care that pregnant women receive (Burk 1995; Donnay 2000). In this study, only one village midwife in the intervention villages and two in the comparison villages spoke the local dialect. Even more concerning was the fact these midwives did not consider this to be a problem. Two village midwives in intervention villages changed their approach after the intervention and increased their use of local dialect and listened better to clients' complaints.

Influence of culture

This study assumed that by educating women, via health workers, about a healthy diet negative cultural ideas and practices would be changed. This in turn was expected to have a positive impact on the nutritional status of pregnant women. However, changing people's beliefs and practices is difficult.

A report by the United Nations noted that cultural beliefs and social practices determine people's responses to directed behaviour change (UN-ACC/SCN 2000). This study also found that people's pre-existing beliefs and practices affected the ways in which individuals and groups responded to health worker initiated interventions. According to Rollnick (1993), people who are uncertain about the prospect of change (the 'contemplation stage') and people who are not interested in considering change ('precontemplators') will resist advice although health providers will often assume that they are, or should be, ready to change (Rollnick 1993). He also suggests that health workers be trained to respond in a more flexible manner and be aware of the patient or groups' readiness or capacity to change (Rollnick 1993). Thus health workers may need to work to change belief systems before they can expect changes in eating behaviour in women.

Engaging in cross-cultural communication without recognizing or understanding these differing views can present a major problem for many

health providers (Pojda 2000) and have a negative impact for the nutritional status of pregnant women. According to Rizvi (1989) nutrition education messages can only be developed and communicated effectively if the messages are culturally sensitive and the recommended food is culturally appropriate (Rizvi 1989). Health workers and women may hold conflicting assumptions regarding certain beliefs. For example, a health provider may not be comfortable or effective talking about food taboos with pregnant women if they do not understand the origins of the belief or personally disregard these cultural beliefs. The professional education of village midwives in this study had not incorporated sensitivity to cultural issues and thus the midwives instructed women to eat food that contradicted deeply held cultural beliefs of the women and their families.

Even health workers from the same place as the pregnant women may be culturally insensitive to the needs of pregnant women. This is so because the education of health workers often changes their beliefs about 'appropriate' nutrition. Their increased status as a health worker influences the way they provide health education and their communication style with the community. When the health worker feels 'higher status' than the women; their communication style is more directive than friendly.

Cadres who share the cultural beliefs and values of the village women are more effective in this way than health care providers from other places. However, as revealed in this study, their effectiveness is constrained by their limited education and poor literacy skills. Their improved knowledge and understanding of community development as a result of the intervention did allow them to increase general awareness about nutrition for pregnant women in their villages.

Within health services in Indonesia, culture inhibits freedom of women are afraid to speak up about their health. The same finding was reported by Ali (2001) in Malaysia. She attributes the lack of power of rural Malaysian and other Asian pregnant women in the medical system to a number of factors. The internal hierarchy of the medical system along with historical and cultural factors all contrive to make village women the most powerless. First, Malay culture is very hierarchical and due to a long period of colonial administration

many Malaysians feel inferior and have low self esteem in relation to those perceived to have superior ‘knowledge’ and ‘power’. Second is the influence of Islam that focuses mainly on the leadership role of men, and finally Malay adat (Malay custom) that expects people with low education, low socio-economic status and unskilled workers to respect those with high education, professional workers, and elders. Thus there are a number of factors that all contribute to women’s lowly position.

This situation is very much the same in Indonesia. Ali describes the importance of ‘adat’ or custom. Adat Melayu usually expects people with lower education, unskilled workers and the young to respect those with education, professional workers and elder. They, as well as women are not allowed to express their true feelings and concerns (Ali 2001).

This study confirms some of Ali’s findings from nearby Malaysia. Adult women in rural areas today are still strongly influenced by elders who have minimal formal education and no medical knowledge. This influence is passed on to the younger generations, most of whom still accept what is taught without question, even where their health is concerned. The women try to avoid confrontation by respecting these people and accepting what they say. Within the family context in both Ali’s study and this research, men are supposed to be superior to women, thus their status is higher than women (Ali 2001).

Another study by Burk (1995) reports similar findings within a very different culture in relation to the importance of family (Burk 1995). They found that the Mexican American socialization process is centred on the concept of family. Family is valued as an interdependent and cooperative network of individuals who are closely connected for the good of the family as a whole. Individuals are expected to show loyalty and support and to fulfil role obligations in the family. In return, they receive emotional and material support from the family. As in Indonesia, help and advice are usually required from within the family system first, and important decisions are made as a group. A pregnant woman may want several immediate or extended family members present during her prenatal care visits or during her intrapartum experience to ensure family support and involvement and their opinions will govern her response to health care (Burk 1995).

Another useful finding in this Indonesian study, reported here, is that although health providers and community and religious leaders have authoritative knowledge and power over pregnant women this was a contested domain (WHFWP 2001A, Swasono 1998). Community and religious leaders wanted to maintain power in the villages, with all villagers, including pregnant women and village midwives, following their directions. The village midwives however believed that their authoritative knowledge in health should direct all villagers, including pregnant women and community leaders. These conflicts of power between community leaders, mother-in-law and village midwives have the potential to undermine all health programs, for example the woman who was not permitted to take her iron supplements by her mother-in-law. In order to avoid this it is very important that village midwives are aware of the situation and learn to work effectively with community leaders to give any health initiatives the best chance of succeeding.

The influence of gender

A report by the United Nations in 1991, claims that malnutrition in pregnant women is the major direct cause of high maternal mortality in developing countries and that discrimination against women is a contributory factor (United Nations 1991). In many developing societies, where girls and women are considered inferior to boys and men, they are often given smaller amounts of food, as well as less protein-rich and iron-rich food than boys and men (Shen 1999).

Women's low status in Indonesia and other developing countries, especially in rural areas, makes the situation doubly difficult. The difficulties were revealed in many ways in this research. For example one pregnant woman was very anaemic and pale because her intake of protein and iron rich food was minimal although in her backyard her husband breeds plenty of chickens. Her husband has never allowed her to eat the chicken or even the eggs, but she never protested. She just keeps silent and follows her husbands' direction even though she now knows this is not good for her health.

As previously discussed, a pregnant woman will usually follow the instructions of her mother/mother-in-law and husband to avoid certain foods. The woman

would listen to and practice the recommendations given to her by her mother/mother-in-law, her husband and also her neighbours. For a woman living with her in-laws, the mother-in-law was the most influential and took good care of her daughter-in-law so that she would have a healthy baby. For example, she would make sure that she ate the 'proper foods', and rested. Unfortunately the 'proper foods' were not necessarily the most nutritious. Gutierrez (1999) reported similar results in a program with pregnant adolescent women in Mexico. This observation suggests that village midwives and cadres should target mother-in-laws to help change their beliefs and knowledge and support better nutrition in pregnant women.

Wickrama (2002)found that gender has an effect on social status and health. Women's low social status has a negative impact on their health. This in turn affects the health and well being of a community. Healthy women improve human and economic resources, skills, and income. Furthermore they found that women's status also influences their access to health messages and information, services, and care. Their status influences their control over intrahousehold resources and food. These findings were confirmed in the present research. The findings in this thesis show that health promotion could be more effective if programs could be implemented with husbands or mothers as well as the mother-in-law of pregnant women.

One of the interesting findings of this study seems to underline women's low status and relates to nutrition. The two most powerful factors that contributed to the 'good' food practices during pregnancy in all eight villages were focused on the unborn baby and not directly on the pregnant woman. Pregnant women were concerned about the well being of the baby and the mothers and/or mother-in-laws were concerned to take care of the pregnant woman for the baby's benefit. The family support system is also strong and endeavours to ensure that the woman is taking care of her baby. Despite this focus on the well being of the baby there are aspects of the culture, which work against achieving this desired outcome. For example, in the context of Indonesians culture, women often eat last, taking the left over food only after her husband and children have eaten (Utomo 1993). This practice does have a direct negative effect on women's health and therefore the unborn baby. The results of this

study confirm that this practice persists in some areas of Indonesia and furthermore that it has an adverse impact on women's (and babies) nutritional status.

The influence of religion

Ali (2001) describes woman's power in her research about antenatal care in Malaysia. She claims, that Malay women, and most Asian women, have feelings of modesty and shyness that relates their lack of power (Ali 2001). This, according to Ali, is influenced by the Islamic religion. This focuses on the role of men as the authority figure and women as subordinate, submissive and passive.

The teaching of Islam does not make one gender superior to the other, but does make men more responsible for protecting women, in fact 'man and women are protectors of one another'[15],[16]. Many of the surah in the Al Qur'an has cited both men and women have the same rights in most issues of their daily lives including speech, marriages, sexuality and family planning[17]. As Ali states 'a more fundamentalist interpretation of Al Qur'an in many Muslim countries prevented women from becoming active participants in getting their rights to seek health' (Ali 2001). Work by Byford (1999) in PNG shows this is neither restricted to Asian countries nor the Muslim religion and Melanesian women behave similarly.

In a number of countries women suffer social, cultural and religious restriction. While women in the developed countries can speak more openly, women in less developed countries have to use their power in "subtle and non threatening ways" and secretly. In this research there were some examples where women appear to subvert the culture in order to maintain their health and the health of their baby, when they have knowledge that stimulates them to do so. For example one woman in the intervention village said that she is not allow to eat calamari (fish) but when her parents and husband are not around, she would eat it.

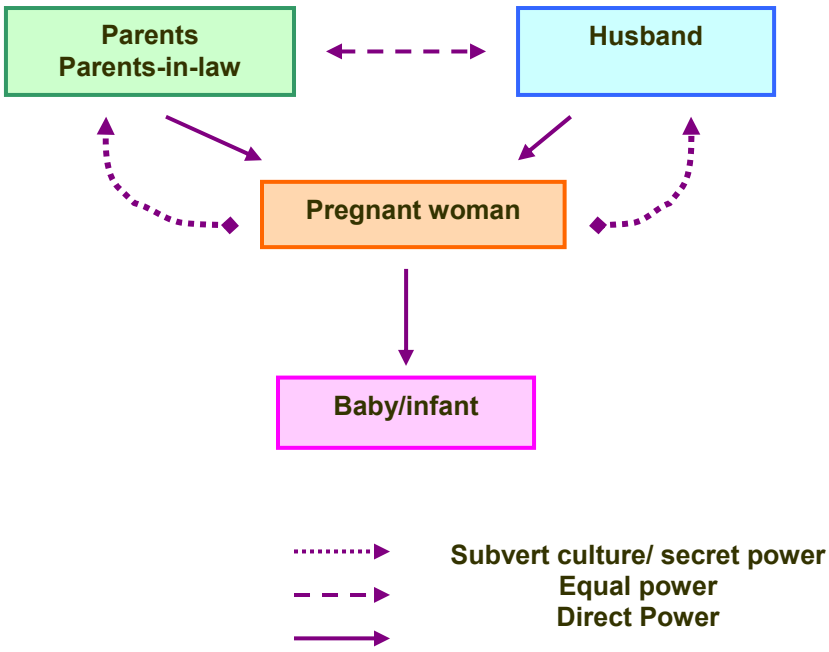
---

[15] Surat/surah in Islam is a statement in the Holy Al Qur'an
[16] Al-Tauba verse71
[17] Surah Al-Ahzab verse 33-35; surah Al-Baqarah verse 233; and surah An-Nissa verse 3

Another example is the family planning practice where women, choose contraception to assert control over decisions concerning childbearing (Wickrama 2002). In some countries such as Solomon Islands, Samoa and Papua New Guinea, where men claim the right to control wives' fertility; women will secretly retain control over their fertility by asking the nurse for contraceptive injections (Barclay 2003). This is one way for women to claim some authority in a system that renders them powerless as no one else in the family needs to know she has received this injection.

The influence and power of family on pregnant women and the ability of some women in this study to subvert this is shown in the diagram below:

Figure 21: Influence of power on the pregnant woman



It may be this process of subversion is a first 'safe' step for women as they work out how to apply knowledge for their own benefit and that of their baby without causing confrontation within the family.

Impact of poverty

Poverty is one of the major causes of malnutrition (Pinstrup-Andersen 2000). It has a major impact on pregnant women. Women in this study could not afford to buy good food. Available evidence indicates that more than 70% of

participants both in intervention villages and control villages are falling below the poverty line of under $100 AUD/month or $1.50 AUD/day. This situation makes nutrition problems worse and more complicated. This contributes to many women who were found to be anaemic with low weight gain and BMI in this study.

In summary, as shown in this section, poverty (cannot afford to buy food) and culture (gender patterns and women's' status in the family) will inhibit or prevent pregnant women's access to good food. The impact of these issues cannot be easily ameliorated by cadres or village midwives especially if these health care providers lack adequate education. This is compounded because the nurses who trained as village midwives seemed not to be interested in providing nutrition education to pregnant women. They would rather focus their attention on daily work like providing medication and other health services in which they were more competent rather than providing midwifery services.

Knowledge and Behaviour of Village Midwives and Cadres in Relation to Nutrition for Pregnancy

A number of issues need to be considered when evaluating the quality of information and care given to pregnant women at the village level. These include the midwives' knowledge about nutrition, the shortage of time they have interacting with women and the possibility that the information they provide, their lack of weighing scales, as well as physical assessment they perform in clinical practice, may not be reported and or recorded.

Educational levels issues

The data on midwives' knowledge and education shows that there were differences in midwives' basic education level between the comparison and intervention villages. The education system for midwives in Indonesia has been complex and changed over time. For example PPB A was a midwifery program following a three-year nursing course with the entry point at junior high school. One year extra training was given in midwifery. All midwives who were trained this program had to work in the village, therefore they are referred to as village midwives or Bidan di Desa (BdD). The PPB B was an education

program for teaching midwifery in which a graduate from academy of nursing (with an entry point at senior high school) has undertaken an extra one year training in midwifery. The PPB C was an education program for midwives who studied midwifery only for three years, the entry point of this program was from junior high school. This program is no longer offered in some places in Indonesia but is still tuaght in the remote areas such as Irian Jaya, Nusa Tenggara Timur etc. These graduates also had to work in the village after graduating.

The DIII midwifery program takes only students who graduated from the senior high school who enrol directly in the midwifery program. The DIII is now recognized by the Ministry of Health as the only route to becoming a midwife.

Midwives in the comparison villages had higher basic education than in the intervention villages (three midwives in comparison villages held the DIII midwifery certificate and another has PPBA certificate). In the intervention villages, only one village midwife had received better, than the now unacceptable, basic preparation. This midwife was PPB/B qualified and currently studies in the Faculty of Public Health. This situation may have contributed to some of the unexpected results of this study discussed later in this chapter.

It was found that the basic education of the cadres who work in the villages is very low. They have only had primary school education and short-term, limited training as village health workers. As such, they are not competent to provide clinical care to the pregnant women or nutrition education. However, their cultural approach to the pregnant woman and community is better when compared to the midwives. Therefore, it is important that cadres also be selected from people with knowledge and who in turn can impart this knowledge to pregnant women.

Another issue that may have influenced the results was the ability of some midwives to speak the local dialect. As shown in the demographic data, only half of the village midwives in this study could speak Banten dialect (two village midwives in intervention group and two from comparison group). There

is no doubt that the ability of the village midwife or cadre to communicate with women in a local dialect increases the possibility of effective communication.

Midwives nutritional knowledge

The nutrition questionnaire asked for information about the midwives' continuing education in nutrition. Most of the midwives recalled little detail and this suggested that input had been limited. However most of the village midwives completing the questionnaire were aware of their responsibility to improve the nutritional status of women in their areas. Most of them provide the nutritional support in their practice by conducting a nutrition assessment, nutrition consultation, iron supplementation distribution and monitoring of their nutritional status. The attitude of village midwives in promoting nutrition for pregnancy improved after intervention in both intervention and comparison villages. Despite this, when questioned about midwives' activities to promote nutrition in pregnancy, most village midwives in both groups did not respond consistently in monitoring nutritional status. In this study there was a discrepancy between what midwives said, what they did and what they documented in their assessment of nutritional status of pregnant women. After the intervention, a greater number of midwives both in the intervention and comparison villages stated in the questionnaires that they weighed and recorded upper arm circumference of every pregnant woman in order to monitor their nutritional condition. The midwives response in the non-intervention villages seems to be related to their improved base education and knowledge and the Hawthorne effect discussed. All midwives from all villages stated after the intervention, that they weighed women more than once. There was no evidence however, during observation and documentation, that these measurements were repeated for any woman. This highlighted a discrepancy between what the midwives said they did and what they were observed to do.

The researcher observed that scales and callipers were not available in every Posyandu, which meant that village midwives could not weigh or measure the upper arm of all pregnant women in the clinic as they stated they had done. This has important implications for the use of weight as nutritional assessment. The most frequently cited reasons that health workers gave for weighing were related to nutrition, but two midwives, one of these from the intervention

villages, still had difficulty answering the questions. Once again this suggested that many midwives did not recognize weighing as an important strategy for nutritional assessment and monitoring. The absence of scales provided for their use did not help them in this regard. However, a range of criteria for nutritional assessment, other than weight gain, were reported by midwives. Some have been recognized and reported as nutrition clinicians, e.g. physical appearance and normal dietary intake (Hirsch 1991; Perry 1997A).

Evidence in this study indicated that the majority of midwives felt that if they thought a patient was not receiving adequate nutrition they would explore further for possible reasons. Despite receiving an intervention program, one village midwife from an intervention village still gave a wrong answer. Only a small number of midwives stated that they would refer to other health services for further examination of poor nutritional status, even if iron supplementation and adequate nutrition have been insufficient to get improvement. The data shows the midwives, even after intervention, were uncertain about how to put this into practice.

The village midwives who did not receive the intervention program still had better nutritional knowledge than the village midwives with intervention. With wide limits for acceptable responses no more than half of the midwives in intervention villages, even after the intervention, made reasonable suggestions for the energy requirements of pregnant women, nutritional requirements, iron sources, and protein sources as the main important component in nutrition. Many questions were answered with ‘I don’t know’ and apparent guesses with a wide range of answers.

All the village midwives, across both intervention and non-intervention villages identified they lacked nutrition knowledge, and requested more nutritional education. Despite four of them receiving the intervention designed to strengthen their knowledge, it appears these village midwives (all who received low level professional education) had a poor prior knowledge of nutrition requirements in pregnancy and a short education program in nutrition could not bring this up to acceptable levels. Midwives need more education on nutrition in pregnancy in preparation for clinical practice but also to be

supported with equipment, support and encouragement with good record keeping and access to referral services for serious problem.

Of even more interest is the significant difference in patterns of data obtained from the intervention and comparison villages. In the intervention villages, it was expected that health providers' perception, and attitude would change and knowledge of nutrition would increase. This actually happened to a far greater extent in the comparison group in which no intervention occurred. This could be explained by a Hawthorne effect[18] in the comparison villages that the difference derived from the repeated questionnaire distributed to village midwives who had better basic education stimulated a change in their perception and attitude. The Hawthorne effect worked, according to (Holden 2000), because all the village midwives in both the intervention and non intervention villages increased their awareness because they were participating in a research study and altered their behaviour as the attention to them had increased.

It appeared that by simply undertaking the questionnaires, the DIII midwives without the program intervention revised their knowledge and improved their scores on retest. The DIII midwifery graduates also were observed to be more effective in providing care. More change was detected after the intervention in the non-intervention villages. All the midwives seemed more aware about the importance of their roles in improving the nutrition status of pregnant women. Being aware of the study, and participation in the collection of baseline data seems to have stimulated the better-educated midwives in the comparison villages to remember the importance of nutrition and use their knowledge and skills more in their routine practice. This may also be that these midwives already had an understanding of the importance of the midwife role in nutrition and health promotion.

[18] Hawthorne effect is defined as unwanted effect of the experimental operations themselves, the confounding that occurs if experimenters fail to realise how the consequences of subjects' performance affect what subjects do' (Parsons 1974).

Behaviour of village midwives and cadres

Results showed the intervention did appear to produce a marked improvement in the communication and behaviour of village midwives and cadres with pregnant women in the intervention villages.

A similar study conducted in the Bogor and Tangerang districts in Indonesia (Husaini 2001) tested a new strategy to improve the nutritional behaviour of pregnant and lactating women. Researchers found that following the intervention cadres were confident to listen to their client's complaints, flexible, and friendly, and thus had a better ability to communicate with mothers. Researchers also found that more women received health information after intervention in both groups. There was a change in women's health behaviour after the intervention, most notably an increase in the number of women breastfeeding their babies in both groups.

There are similarities between Husaini's (2001) study and this Indonesian research. In both studies the aim was to improve the nutrition of pregnant women with an intervention aimed at the providers of health care. Both Husaini's study and this study found a significant change in the behaviour and communication of health care providers with women in their villages after intervention.

In the present study, twelve months after the intervention, changes were maintained in the ability of village midwives and cadres' to communicate with women in the intervention villages. Village midwives were more assertive, listened better, were friendlier and more active in their interactions with women. Cadres were more involved in the conversations with pregnant women and encouraged women to take their iron supplements. They provided information about nutrition through the Arisan and community meetings or in the *Posyandu*. Cadres also informed community leader's wives about nutrition so that the wives could talk with their husbands about these issues. The effort of cadres to influence the community leader's wife through Arisan was a suitable and effective strategy especially in the rural areas where people follow the community or religious leaders speech or direction. Such programs perhaps could be extended further and focused more on mothers and mother-in-law. Griffith (2002) states that communication plays a large and central role in

successful iron supplementation programs (Griffiths 2002). He describes the key program factors in ensuring the effect of communication on compliance include the following:

- Individual counselling (with counselling, almost all women, (80%) are willing to take iron supplements);
- Training in interpersonal communications;
- Addressing the common danger points for dropping out of supplementation programs; and
- Finding a way to remind women to take pills every day (Griffiths 2002).

Pelto (1989) described that the nutrition educators often depend on surveys to inform the program facilitators of peoples' attitudes and practices. A survey provides some information in these areas, but fails to relate this to other environmental factors. Consequently the programs do not achieve their goals. If the nutrition intervention is based on good ethnographic investigation, a better understanding of the complexity of factors affecting nutritional status can be obtained and a more realistic nutrition education plan for modifying food behaviour will result (Pelto 1989).

Rizvi, in 1989, recommends that effective nutrition education messages can only be developed and communicated effectively if:

- Careful diagnosis of the factors affecting food behaviour and malnutrition is made; and
- Nutrition education messages recommend changes in food intake that are affordable and culturally sensitive (Rizvi 1989).

Knowledge and Attitude of Pregnant Women to Nutrition and Iron Supplementation

Nutrition

The culturally permitted and affordable diet for pregnant women in the research areas lacked many of the nutrients deemed essential for pregnant women. There were many examples of how the current diet negatively

impacted on the nutritional status of pregnant women. For example, approximately one quarter of the women indicated that they limited their food intake during pregnancy. These women believed that if they consumed less food than usual during pregnancy that the baby would be smaller and birth would therefore be easier. Another example is the cultural taboo for pregnant women to eat fish. This in itself, does not necessarily have an negative impact on nutritional status however because women cannot afford to buy meat the net result is that their protein intake is greatly reduced and this does have a negative impact. The negative impact of this dietary pattern seems to be confirmed by high proportion of low BMI level, high anaemia levels and poor weight gain during pregnancy across all eight villages.

Iron supplementation

Although some women did comply with iron supplementation after the intervention, iron compliance remained low and most women did not consume iron supplements regularly even after the intervention. In front of midwives the pregnant woman promised to take the supplements but when they arrived home they threw the supplements away. In this study about 30% of the women did not take iron supplements regularly because they thought iron caused bigger babies and thus difficult deliveries. This finding is echoed in Galloway's (1994) study in Thailand.

Pregnant women in intervention villages who did take the iron supplements post intervention said that the midwife gave them information about the benefits for them and their baby, how to take the supplement and possible side effects of the supplement. As one woman said: *"I feel nauseous to take it but I think its benefit to my health, so I try to take it"*. Village midwives also tried to use another approach with pregnant women by improving their communication style, visiting the pregnant women at home and reinforcing with women that it was important to take iron regularly with appropriate information.

This did not make enough difference to most women. Physical distance to the clinic, economic constraints (cost of travel and/or the iron supplements) and inconvenience of clinic hours all affect utilization of health services and utilisation of the clinic in the intervention villages was low. Mora (2002)

describes that the experience from many countries shows that systematic counselling of methods to prevent side effects can enhances compliance (Mora 2002). For example schoolgirls and other community health volunteers can be used successfully to distribute supplements (India) and traditional birth attendants (Indonesia) can be instructed to become effective supplement distributors (Mora 2002).

Impact of the Research on Nutrition and Iron Supplementation Program

This last section addresses whether the health promotion technique used in this research study had any impact on the nutritional status and iron supplementation of pregnant women. The result of this research strongly confirms the statement of Tones (2000) who emphasized that:

- Epidemiological indicators (e.g. mortality and morbidity) should never be used to assess health promotion programs. A considerable time lag may exist between input and epidemiological output.
- A number of intermediate indicators (e.g. knowledge, beliefs, skills etc.) should be used to assess the various components of a program and to allow process/illuminative evaluation of finding on, for example, nutrition questionnaires
- For some particular health promotion models, intermediate indicators will serve as outcome indicators (Tones 2000).

The evidence of empowerment might provide an intermediate indicator of success, for example subverting culture and gender, by eating in secret, may be an example of women using knowledge to their benefit and therefore taking more control but in a culturally safe way. Similarly the improved communication behaviour and attitudes of village midwives and cadres toward pregnant women showed that training in communication produced some positive results.

The effect of strategies on the nutritional status of pregnant women

The results demonstrated that there was no reduction in the percentage of pregnant women with anaemia in the intervention villages. In the comparison

villages however, the percentage of pregnant women with anaemia reduced from 60% to 46% even though this area did not receive any intervention. Both groups presented earlier show; there was a decrease in anaemia in trimester one women though the overall percentage of pregnant women with anaemia remained the same even after the intervention. The women in the trimester one had little contact with midwives. Therefore the differences observed in the trimester one are unlikely to have been related to the intervention.

Overall there was no change in the proportion of BMI levels in each group amongst pregnant women in both intervention and comparison villages in Stage 3. Though there was a slight decrease in the proportion of poor BMI in two of the intervention villages the impact of the study on BMI levels amongst pregnant women in the intervention area was not effective. The change in two villages cannot be assumed to be an effect of intervention. It is unlikely that the intervention had sufficient time to reduce the percentage of low BMI. Probably, any differences seen were due to natural correction within the population.

There was no reduction in the proportion of poor weight gain among pregnant women after intervention. In one intervention village the proportion of poor weight gain increased and in another village the proportion of poor weight gain remained the same as before intervention. The situation was the same in the comparison villages where there was no intervention. Paradoxically the impact of the study in relation to weight gain proportion was more effective in comparison villages. In three comparison villages the proportion of poor weight gain reduced even without any intervention. The researcher assumes that increasing attention of more knowledgeable health providers to the importance of nutrition influenced this result. This seems to be explainable by the better quality of education and practice of midwives in these villages who were reminded of nutritional aspects of for pregnant women by completing the questionnaires. This in turn appeared to help them to improve their practice.

The impact of the intervention on the nutritional status of pregnant women was not effective. This is likely to be because of the time and logistical constraints, and the basic education of the target group. The intervention was not able to influence the community health in the long term in the intervention villages.

However, the paradoxical findings and ethnographic data point are important findings from this small study that may have relevance across Indonesia. These are the importance of:

- Improving education of village midwives and focusing on midwifery science and promoting health; and
- Understanding culture and working with culture to improve the nutritional status of pregnant women in rural Indonesia.

The effect of strategies to increase compliance with iron supplementation

Data from developing countries are limited, but studies indicate that the strategies used elsewhere to increase compliance have minimal effect. For example, Utomo (1993) found in their research study of maternal anaemia in Indramayu in Indonesia that an extensive and expensive communication effort to promote oral iron supplements to women in rural Indonesia had almost no effect (Utomo 1993). Reported compliance was little better than that achieved by an inexpensive system to improve the availability of the supplements at the village level. Compliance in the Indonesian study was so low that little improvement in individuals' haematological status could be expected and this was shown in their results. Charoenlarp (1988) reported that supervision of iron distribution had no impact on the effectiveness of iron supplementation in Thailand, whereas supervision did increase the use of high-dose iron supplementation in Burma (Charoenlarp 1988)). Viterii (1997) states that while iron supplementation of pregnant women is a common strategy to control iron deficiency in most of the developing world, unfortunately supplementation has proven to be ineffective (Viteri 1997). The most important reason for its lack of effectiveness is poor adherence and rejection of the daily intake of large doses of iron required because of undesirable side effects.

Attention has to be given to promote increased demand for iron supplements by systematic dissemination of specific messages to the population about the importance of iron to healthy pregnant women and infants. This includes working with community leaders, also improving interpersonal communication skills among health providers.

It is also important to consider that fortification of basic foods such as noodles may be a better route to increase iron intake (Kosen et-al 1998).

This investigation has also produced another important finding in regard to midwifery services. As shown in the research, village midwives were very busy giving immunizations for children under the age of 5, and also treating sick people. They also had to organize other services such as the sanitation service and run Post Obat Desa (POD). The village midwives who were poorly educated did not seem to understand or value their midwifery responsibilities as highly as the Diploma III graduated midwives in the comparison villages. This may be because of their very limited midwifery education program of only one year. This means the PPBA and PPBB midwives put more emphasis on their nursing practices, perhaps because they were more confident and knowledgeable in this role. The policy of the Indonesia Government in the decentralisation of many of central government responsibilities to districts will have impact on midwifery services and education but this was yet to be felt at the time this research was undertaken.

Concluding comments

The basic educational level of the village midwives and cadres directly influence their knowledge, attitude and behaviour regarding nutrition during pregnancy. These were not amenable to change in a brief workshop intervention. There was only small change in the nutritional intake of pregnant women in their village. The influence of socio- cultural beliefs and the women's lack of power in controlling their own dietary intake should be better understood by the health workers in order to improve their performance in their clinical practice. It was however possible to improve the quality amount of communication about nutritional issues and provide better support and knowledge for women to take iron supplementations.

Chapter 11: Conclusions and Recommendations

At the outset, the main purpose of this study was to understand the effectiveness of village midwives and cadres in improving nutritional status of pregnant women in a rural area of Banten province in Indonesia. This was explored within a conceptual framework from health promotion. Important issues related to nutrition in pregnancy, in Indonesia have been discussed in this thesis according to the research questions.

Question 1: Addressed how socio/cultural, beliefs influenced women's eating patterns and consumption of micronutrients. The position of a pregnant woman is low in the authoritative knowledge hierarchy in the health care system and the broader community. Most people around them are considered to be more knowledgeable about the pregnancy than they are, have more power to determine what they can and cannot eat and drink, and what they can and cannot do on a day-to-day basis. Women were not given free choices in what food they wanted or knew they should eat. However, some women tried to get better food and consume a healthier diet by subverting the culture and the authority of husbands and mothers-in-law and eating nutritious food in secret. This happened after they received appropriate information from health providers and knew that they should eat differently.

Question 2: Studied village midwives' and cadres' understanding of how they could work better within their culture and how this in turn, impacts on their communication and practice in relation to nutrition. Some changes after the intervention were evident with midwives building better rapport and providing more information and support to pregnant women. Village midwives also tried to use another approach with pregnant women by improving their communication style, visiting the pregnant women at home and reinforcing to women the importance of taking iron supplements regularly with appropriate information. Cadres also talked more about nutrition in community meetings and in the 'Arisan'.

Question 3: Investigated whether there was a change in women's nutritional behaviour or consumption of micronutrients after they talked with the trained village midwife. After the intervention, iron compliance remained low and most women did not consume iron supplements regularly for various reasons.

Although some pregnant women in the intervention villages who did take the iron supplements said that the midwife gave them appropriate information about the supplement, and they tried to comply with the iron supplementation for her baby's benefit, this did not make much difference in all but a few cases. Physical distance to the Posyandu, economic constraints (cost of travel to the clinic) and inconvenience of clinic hours all affect utilization of health services. However, some of the intervention pregnant women who were attended by the midwives who had received the intervention were more likely to say that the information caused them to think about changing health behaviours and dietary intake.

Question 4: Studied the influence of a brief intervention in community development and communication for village midwives and cadres in the nutritional behaviour and status of pregnant women. Observational data showed there were differences of the communication style, approaches used by village midwives and cadres especially in the intervention village after the intervention to encourage women to take good nutrition and iron supplements during pregnancy. Changing the behaviour and approach of village midwives and cadres' in relation to nutrition education also changed the behaviour of pregnant women to some extent. Poverty and culture prevent the pregnant women accessing better food.

The impact of the intervention on the nutritional status of pregnant women was not effective. Because of the time and logistical constraints, the intervention was not able to influence the community health in the long term in the intervention villages. However, the nutritional survey of the pregnant women showed that two villages in the intervention group had improved the nutritional status. Surprisingly the comparison villages that did not get the intervention program improved their performance with results showing most of the nutrition variables were better than in Stage 1.

Question 5: Explored whether village midwives and cadres can be better prepared to become effective agents in reducing anaemia. The result of this study showed that the village midwives in the comparison villages performed better than the intervention villages. This could be explained by a Hawthorne effect of the study. The village midwives who have better basic education in

the comparison villages were aware of the research study and this altered their behaviour as more attention was paid to them, only through collection of baseline measures. In addition, the survey by questionnaire that was distributed to village midwives stimulated a change in their perception and attitude in the clinical practice. These issues, may result in further deterioration of knowledge, attitude and behaviour of rural health providers and appears not surprisingly to be strongly influence by their basic professional education. The 'better-educated' worker performed differently but those without a DIII level of education or limited schooling could still be influential and change their behaviour and attitude to pregnant women.

It is clear that socio-cultural beliefs within the community are vitally important. Each of these issues is important in any health system or health promotion attempt to improve pregnant women's health, especially to improve their nutritional status.

To maintain the sustainability of this intervention, in-service education can have a positive effect and should be continued over time to remind rural health workers of the importance of adequate nutrition for pregnancy. In conclusion, too few of the village midwives educated below DIII were properly equipped with knowledge, communication skills, technical equipment or time to be as effective as they could be as agents for improved nutrition in pregnancy. A brief community development intervention cannot remediate this, though it did, even in this group, improve the effectiveness of their communication with women and their weighing and measures of haemoglobin.

Recommendations

The study found some evidence, despite its limitations, that could be overcome in the Government of Indonesia program implementation to reduce anaemia in pregnancy. It also has implications for the education of nurses and midwives and their continuing education. There are also implications for further research as well as professional organizations and further researcher. Recommendations that come from the research are detailed below:

1. Professional organisations: This study found that the village midwives educated below DIII have low capability to communicate with clients, and low

knowledge of anaemia in pregnancy and skill in communication and time management. However the 'in service education' did have a positive effect on improving communication skills even in the non DIII educated midwives.

2. The professional organisation for midwives IBI (Ikatan Bidan Indonesia) has power to influence their members to improve their professional knowledge and skills, through either formal or informal education, and could support or offer a similar program for their members. The interaction of health provider and client and how to communicate effectively with client and community within a socio cultural framework are most effective in community interventions and these can be addresses in in-service education.

3. Local district health offices: To maintain the sustainability of this intervention, the local district health office as government body could conduct the in service education program for the village midwives in the district. This should especially focus on improving their knowledge and skills in communication, community development and nutrition for pregnancy within a socio cultural approaches and improved time management. This program should be continued over time to remind rural health worker of the important adequate nutrition for pregnancy.

4. Researchers: This study produced a descriptive analysis that is not able to prove statistically the results after intervention. Subsequent research with strong methodology and inferential analysis are needed to do this. Further research using in qualitative methods to explore the socio culture influence related to health behaviour of the health providers as well as the community would be valuable, particularly exploring how mother-in-law could be an ally in improving the diet and eating behaviour within the family. The role of mothers-in-law in supporting iron supplementation also needs further work. Further research qualitative methods could be focused on 'sub-culture power/secret power' used by women to improve their health status and also improving the role of community and religious leader in supporting iron supplementation and women's' nutrition.

5. Education of Health Professionals: The professionals involved in health promotion in the community are mostly midwives and nurses. These two groups of health professionals have to work as grass roots level in the

community. They therefore implement community-based interventions that must address socio-cultural influences to be effective. This requires more than basic education. Education programs at DIII level in midwifery as well as for nurses working in the community, for example in the Posyandu, are needed.

The DIII midwifery education program will graduate better-educated midwives who in turn will contribute to reducing infant mortality and maternal mortality rates. At the same time the DIII nurses in the community based program will be more effective because they can think more critically about socio cultural influences. The interaction between health providers and clients are an important contribution to changing to healthy behaviour therefore effective communication between client and community member must be included in any curriculum that educates health professionals.

References

Aaronson, L.S. (1989). The Relationship Between Weight Gain and Nutrition in Pregnancy. Nursing Research 38(4): 223-227.

Abel, R., Rajaratnam,J., Kalaimani,A., Kirubakaran,S. (2000). Can Iron Status be Improved in each of the Three Trimesters? A community-based study. European Journal of Clinical Nutrition 54(6): 490-493.

AbuSabha, R. (1998). Effective nutrition education for behaviour change, The Pennsylvania State University, University Park, PA. 2000.

Ali, A. (2001). Antenatal Care in Malaysia: Maintaining traditional practice alongside western medicine. Public Health. Dunedin, New Zealand, University of Otago: 339.

Allen, L.H. (2000). Anaemia and Iron Deficiency: Effects on pregnancy outcome. American Journal of Clinical Nutrition 71(Supplement 5) 1280s-1284s.

Andersen, J.E., Valyasevi, A. (Eds). (1983). Effective communication in nutrition in Primary Health Care. The Asian Regional Workshop.1983, Bangkok. Thailand., Tokyo: United Nations University Press.

Anyanwu, C.N. (1988). The technique of participatory research in community development. Community Development Journal 23(1): 11–15.

Barclay, L. (2003). Subvert Culture in Family Planning in the Solomon Islands, Samoa and Papua New Guinea. Setyowati. Sydney.

Baruth, S. (1998). Anaemia in Pregnancy, Tenth Moon Doula Service. 2000.

Berer, M.& Ravindran, T. (1999). Safe Motherhood Initiatives: Critical Issues. Oxford, Blackwell Science.

Berman, P.A. (1984). Village Health Workers in Java, Indonesia: Coverage and equity. Social Science and Medicine 19(4): 411-422.

Brabin, B., Hakimi, M., Pelletier, D. (2001). An Analysis of Anaemia and Pregnancy-related Maternal Mortality. Journal of Nutrition 131(2S): S604-S615.

Breslow, L. (1999). From Disease Prevention to Health Promotion. Journal of American Medical Association 281(11).

Bucher, H., Guyatt, G., Cook, R., et al (1996). Effect of Calcium Supplementation on Pregnancy-induced Hypertension and Preeclampsia. Journal of American Medical Association 275: 1113-1117.

Burk, M., Wieser, Peggy C., Keegan, L. (1995). Cultural Beliefs and Health Behaviours of Pregnant Mexican-American Women: Implications for primary care. Advances in Nursing Science 17(4): 37-52.

Buysse, V., Wesley, P. (1999). Community Development Approaches for Early Intervention. Topics in Early Childhood Special Education 19(4): 236-243.

Byford, J. (1999). Dealing with death beginning with birth. Department of Anthropology. Canberra, The Australian University: 331.

Carmichael, S., Abrams, B., et-al. (1997). The Pattern of Maternal Weight Gain in Women with Good Pregnancy Outcomes. American Journal of Public Health 87(12): 1984-1989.

Caulfield, L., Zalaveta, N., Shankar, A., Merialdi, M. (1998). Potential Contribution of Maternal Zinc Supplementation During Pregnancy to Maternal and Child Survival. American Journal of Clinical Nutrition 68(suppl): 499-508.

Chappell, L., Seed, P., Briley, A. (1999). Effect of Antioxidants on the Occurrence of Preeclampsia in Women at Increased Risk: A randomised trial. Lancet 354: 810-816.

Charoenlarp, P., Dhanamitta, S., Kaewvichit, R. et al. (1988). A WHO Collaborative Study on Iron Supplementation in Burma and in Thailand. American Journal of Clinical Nutrition 47: 280-297.

Christian, P. (2002). Maternal Nutrition, Health and Survival. Nutrition Reviews 60(5): S59-S63.

Cook, J. (1995). Iron Supplementation: Is less better? Lancet 346(8975): 587.

Cook, J., Reedy, M., (1995). Efficacy of Weekly Compared to Daily Iron Supplementation. American Journal of Clinical Nutrition 62: 117-120.

Cooke, M. (1998). Barriers to Systematic Provision of Smoking Cessation Education During Pregnancy. Communty Medicine. Sydney, New South Wales University.

Day, L. (1998). Iron Supplementation in Pregnancy: Can it be justified? British Journal of Midwifery 6(3): 180-183.

De Laine, M. (1997). Ethnography Theory and Applications in Health Research. Sydney, MacLennan and Petty.

Dekker, G., de Vries, J., Doelitzsch, P., Huijgens, P., von Blomberg, B., Jakobs C. et al. (1995). Underlying Disorders Associated with Severe Early-onset Preeclampsia. American Journal of Obsterics and Gynaecology 173: 1042-1048.

Denzin, N., Lincoln, Y. (Eds). (1994). Handbook of Qualitative Research. New Delhi, Sage Publication.

Departemen Kesehatan, R.I. (1999). Posyandu, Polindes, Pos Obat Desa dan Pos Upaya Kesehatan Kerja, Poskesehatan.htm. 2002.

Department of Reproductive Health and Research (1999).Making Pregnancy Safer in Indonesia Geneva. World Health Organization.

Direktorat Bina Gizi Masyarakat, D. (1998). Pedoman Penanggulangan Anemia Gizi untuk Remaja dan Wanita Usia Subur. Petunjuk Pelaksanaan Bagi Pengelola Program dan Petugas Penyuluhan. Jakarta, Departemen Kesehatan RI.

Dong, M., McGown, E., Schwenneker, B., Sauberlich, H. (1980). Thiamin, Riboflavin and Vitamin B6 Contents of Selected Foods as Served. J ournal of American Diet Association 76: 156-160.

Donnay, F. (2000). Maternal Survival in Developing Countries: What has been done, what can be achieved in the next decade. International Journal of Gynaecology and Obstetrics 70(1): 89-97.

Dowdy, Y. (1999). The Anaemias. www.hsc.wvu.edu/som/pathology/anemias.htm. 2001.

Edmundson, S., Edmundson, W. (1992). Anaemia, midcoast.com.au. 2000.

Fahmida, U. (1997). Comparison of Compliance with Iron Tablet Ingestion Among Fertile Age Women When Distributed Through Health Workers or Religious Leaders. SEAMEO- TROPMED Center Indonesia. Jakarta, University of Indonesia.

Feldman, E. (2000). Role of Nutrition in Primary Care. Nutrition 16(7-8): 649-651.

Fisher, B. (1999). Community Development, User Involvement and Primary Health Care. British Medical Journal 318(7186): 749-751.

Fitrah, E., Yuniar, R., Susilowati, H. (2000). Kebutuhan ibu hamil akan tablet besi untuk pencegahan anemi. Penelitian Gizi dan Makanan 23: 92-98.

Galloway, R., McGuire, J. (1994). Determinant of Compliance with Iron Supplementation: Supplies, side effect, or psychology. Social Science and Medicine 39(3): 381-391.

Gandasoebrata, R. (2001). Penuntun Laboratorium Klinik. Jakarta, Dian Rakyat.

Gennaro, S., Dugyi, E., Doud, J., Kershbaumer, R. (2002). Health Promotion for Childbearing Women in Rubanda, Uganda. Journal of Perinatal and Neonatal Nursing 16(3): 39-50.

Givens, S.& Moore, M. (1995). Status Report on Maternal and Child Health Indicators 8-18, Journal of Perinatal and Neonatal Nursing 9(11): 8-18.

Godfrey et-al, K., Robinson, S., Barker, D.J.P., Osmond, C., Cox, V. (1996). Maternal Nutrition in Early and Late Pregnancy in Relation to Placental and Fetal Growth. British Medical Journal 312(7028): 410-414.

Green, L.& Kreuter, M. (1991). Health Promotion Planning. An educational and environmental approach - 2nd Edition. London, Mayfield Publishing Company.

Green, L., Kreuter, M. (1999). Health Education's Contribution to Public Health in the Twentieth Century: A glimpse through health promotion's rear-view mirror. Annual Review of Public Health 20: 67-80.

Green, L., Kreuter, M. (1999). Health Promotion Planning: An educational and ecological approach - 3rd Edition. Mountain View, CA, Mayfield.

Green, N. (2002). Folic Acid Supplementation and Prevention of Birth Defects. Journal of Nutrition 132(8S): S2356-S2360.

Griffiths, M. (2002). Communication Strategies to Optimise Commitments and Investments in Iron Programming. Journal of Nutrition 132(4S): S834-S838.

Gutierrez, Y. (1999). Cultural Factors Affecting Diet and Pregnancy: Outcome of Mexican American adolescents. Journal of Adolescent Health 25(3): 227-237.

Hadijono, R., Pramono, S., Soeyono, A. (1999). Reproductive Health in Indonesia. Semarang Indonesia, Department of Obstetrics and Gyneacology , Faculty of Medicine, University Diponegoro, Semarang. 2000.

Hakimi, M., Dibley, M., Suryono, A. et al. (1999). Impact of Vitamin A and Zinc Supplements on Maternal Postpartum Infections in Rural Central Java, Indonesia Durban, South Africa.

Hally, S. (1998). Nutrition in Reproductive Health. Journal of Nurse-Midwifery 43(6): 459-470.

Hammersley, M., Atkinson, P. (1997). Ethnography Principles in Practice. London, Routledge.

Henderson, C., Jones, K. (1997). Essential Midwifery. London, Mosby.

Heyman, D., Steketee R., Wirima J., McFarland D., Khoromana C., Campbell C. (1990). Antenatal Chloroquine Chemoprophylaxis in Malawi: Chloroquine resistance, compliance, protective efficacy and cost. Tropical Medicine and Hygiene 84(4): 496-498.

Hirsch, S., de Obaldia, N., Petermann, M., et al. (1991). Subjective Global Assessment of Nutritional Status: Further validation. Nutrition 7(1): 35-37.

Holden, J. (2000). Hawthorne Effects and Research into Professional Practice. Journal of Evaluation in Clinical Practice 7(1): 65–70.

Husaini, J., Yekti W., Salimar., (2001). Strategi Baru Penyuluhan Gizi-kesehatan Dalam meningkatkan perilaku sehat ibu selama hamil dan menyusui. Penelitian Gizi dan Makanan 24: 11-23.

Indonesia Department of Health (1998). Indonesian Health Profile. Jakarta, Pusat Data Kesehatan Dep, Krs.R.I.

Indonesia Department of Health (1999). Indonesian Health Profile. Jakarta, Pusat Data Kesehatan Dep, Kes.R.I.

Isreal, B., Checkoway, B., Schulz, A.,Zimmerman, M. (1994). Health Education and Community Empowerment: Conceptualising and measuring perceptions of individual, organisational and community control. Health Education Quarterly 21: 149-170.

Jerome, N. (1997). Culture Specific Strategies for Capturing Local Dietary Intake Patterns. American Journal of Clinical Nutrition 65(4): 1166-1167.

Jonsson, B., Hauge, B., Larsen, M.F., Hald, F. (1996). Zinc Supplementation During Pregnancy: A double blind randomised controlled trial. Acta Obstetric Gynaecology, Scandinavia 75: 725-729.

Jordan, B. (1978). Birth in Four Cultures: A crosscultural investigation of childbirth in the Yucatan, Holland, Sweden and the United States. Prospect Heights, IL, Waveland Press.

Jordan, B. (1997). Authoritative Knowledge and Its Construction. Childbirth and Authoritative Knowledge: Cross-cultural perspective. Davis-Floyd, R.E., Sargent, CF. London, University of California Press. Chapter 1: 55-79.

Jus'at, I., Achadi, E., Galloway, R., Dyanto, A et al (2000). Reaching Young Indonesian Women Through Marriage Registries: An innovative approach for anaemia control. The Journal of Nutrition 130(2S): 456-458.

Kodyat, B., Kosen, S., De Pee, S. (1998). Iron Deficiency in Indonesia: Current situation and intervention. Nutrition Research 18(12): 1953-1963.

Kolasa, K.&Weismiller, D. (1997). Nutrition During Pregnancy. American Family Physician 56(1): 205-211.

Kosen, S., Kodyat, B., Muhilal., Karyadi, D., Gross,R. (1998A). Suggested Actions for Iron Deficiency Control in Indonesia. Nursing Research 18(12): 165-197.

Levine, R., Hauth, J., Curet, L. (1997). Trial of Calcium to Prevent Preeclampsia. New England Journal of Medicine 337(69-76).

Li, V. (2001). Capacity Building to Improve Women's Health in Rural China. Social Science and Medicine 52(2): 279-292.

Martorell, R., Kettel, K, Schroeder, D. (1994). Reversibility of Stunting: Epidemiologic findings in children from developing countries. European Journal of Clinical Nutrition 48(1): 45-57.

Matsui, D. (1997). Drug Compliance in Paediatrics: Clinical and research issues. Paediatric Clinics of North America 44(1): 1-14.

Mikhail, M., Anyaegbunam, A., Garfinkel, D. et al. (1994). Preeclampsia and Antioxidant Nutrients: Decreased plasma levels of reduced ascorbic acid, a-tocopherol, and beta-carotene in women with preeclampsia. American Journal of Obstetrics and Gynaecology 171: 150-157.

Milman, N., Bergholt, T., Byg, K., Eriksen, L., Graudal, N. (1999). Iron Status and Iron Balance During Pregnancy: A critical reapprisal of iron supplementation. Federation of Scandinavian Societies of Obstetrics and Gynaecology. 78: 7749-7757.

Ministry of Health, Republic of Indonesia. (1994). Primary Health Care in Indonesia. Jakarta, Indonesia, Ministry of Health Republic of Indonesia.

Ministry of Health, R.o.I. (2000). Make Pregnancy a Blessing Let's Make It Safer. Jakarta, Department of Health Republic of Indonesia.

Minkler, M. (1990). Improving Health Through Community Organization. Health Education and Health Behaviour. Reimer, L.G. San Francisco, Jossey Bass: 257–287.

Moore, M., Riono, P., Pariani, Siti. (1991). Qualitative Investigation of Factors Influencing Use of Iron Folate Tablets by Pregnant Women in West Java: A summary finding. Arlington, VA, John Snow, Inc. 2000.

Mora, J. (2002). Iron Supplementation: Overcoming technical and practical barriers. Journal of Nutrition 132(4S): S853.

Ngoc Nga, D., Morrow, M. (2000). Nutrition in Pregnancy in Rural Vietnam: Poverty, self-sacrifice and fear of obstructed labour. Safe Motherhood Initiatives: critical issues. Berer, MR., T. London, Blackwell Science: 137 - 146.

O'Byrne, D. (2000). Promotion and Education. 5th Global Conference on Health Promotion Mexico.

Olson, R. (1989). World Food Production and Problems in Human Nutrition. Nutrition Today 24(1): 13-15.

Pappagalo, S.& Bull, D. (1996). Operational Problems of an Iron Supplementation Programme for Pregnant Women: An assessment of UNRWA experience. Bulletine of World Health Organization 74(1): 25-33.

Parmenter, K.& Wardle,J. (1999). Development of General Nutrition Knowledge Questionnaire for Adults. European Journal of Clinical Nutrition 53: 298 - 308.

Pelto, G., Pelto, P., Messer, E. (1989). Research Methods in Nutritional Anthropology. Tokyo, The United Nation University Press.

Pemerintah daerah propinsi Banten, I. (2003). indahsia.com Provincial Highlights, www.indahnesia.com/Indonesia/Files/Province/Province.php?code=_BAN_E&lang=en.

Perry, L. (1997A). Fishing for Understanding: Nurses knowledge and attitudes in relation to nutritional care. International Journal Nursing Study 34(6): 395-404.

Perry, L. (1997B). Nutrition: A hard nut to crack. An exploration of the knowledge, attitudes and activities of qualified nurses in relation to nutritional nursing care. Journal of Clinical Nursing 6(4): 315-324.

Pinstrup-Andersen, P. (2000). Food Policy Research for Developing Countries: Emerging issues and unfinished business. Food Policy 25(2): 125-141.

Pojda, J., Kelly, L. (2000). Nutrition Policy Paper: Low birthweight Geneva.United Nations Administrative Committee on Coordination Sub-Committee on Nutrition.

Purtilo, R., Haddad, A. (1996). Health Professional and Patient Interaction. Montreal, W.B. Saunders Company.

Puskesmans Rawu (2000). Laporan Kegiatan Tahunan Puskesmas Rawu Serang.

Puskesmas Cilegon (1999).Profil Kesehatan Kabupaten Cilegon Cilegon, Jawa Barat Indonesia.Health Department, District Office Serang West Java.

Puskesmas Serang Kota (2000). Laporan Kegiatan Tuhunan Puskesmas Serang.

Rahardjo, P. (2000). Indonesia: Posyandu managerial support for grassroots community delivery, USAID, Country Health Statistical Profile for Indonesia. 2000.

Ramachandran, P. (2002). Maternal Nutrition: Effect on fetal growth and outcome of pregnancy. Nutrition Reviews 60(5).

Reifsnider, E., Gill, S. (2000). Nutrition for the Childbearing Years. Journal of Obstetrics, Gynaecology and Neonatal Nursing 29(1): 43-55.

Restrepo, H. (2000). Building community capacity and empowerment of the individual. Key point on technical paper on the Fifth Global Conference on Health Promotion. Mexico: World Health Organization.

Rizvi, N. (1989). The Use of Ethnography in the Development and Communication of Messages for Modifying Food Behaviour in Bangkok, Thailand. Effective Communication for Nutrition in Primary Health Care. Tokyo, United Nations University Press.

Rollnick, S., Kinnersley, P., Stott, N., (1993). Methods of Helping Patients with Behaviour Change. British Medical Journal 307(6897): 188-190.

Royston, E., Armstrong, S., Ed. (1989). Preventing Maternal Deaths. Geneva, World Health Organization.

Ruslan, A. (1983). Nutrition Education and Behaviour Change Project: Indonesian nutrition improvement programme, Department of Health, Jakarta, Indonesia. 2000.

Schultink, W. & Dillon, D. (1998). Strategies to Alleviate Iron Deficiency Experiences from Indonesia. Nursing Research 18(12): 1943-1952.

Seibel, M. (1999). The Role of Nutrition and Nutritional Supplements in Women's Health: Modern Trends 579-591

Shen, C., Williamson, J. (1999). Maternal Mortality, Women's Status and Economic Dependency in Less Developed Countries: A cross-national analysis. Social Science and Medicine 49(2): 197-214.

Sloan, N., Jordan, E., Winikoff, B. (2002). Effects of Iron Supplementation on Maternal Haematological Status in Pregnancy. American Journal of Public Health 92(2): 288-292.

Spradley, J. (1979). Ethnography Interview. New York, Holt, Rinehart and Winston.

Sri Martuti & Saidin, S., Saidin., (1997). Profil kesehatan ibu hamil di propinsi Jawa Barat dan Nusa Tenggara Barat. Penelitian Gizi dan Makanan 20: 64-69.

Stephansson, O., Dickman, P. (2001). Maternal Weight, Pregnancy, Weight Gain and the Risk of Antepartum Stillbirth. American Journal of Obstetrics and Gynaecology 184(3): 463-470.

Steven, A., Gillam, S. (1998). Needs Assessment: From theory to practice. British Medical Journal 316: 1448-1452.

Stoltzfus, R., Reyfuss, M., Chwaya, H., Albonico, M. (1997). Hookworm Control as a Strategy to Prevent Iron Deficiency. Nutrition Reviews 55(6): 223-232.

Suharno et-al, D., West, C., Muhilal., Karyadi, D., Hautvast, J. (1993). Supplementation with Vitamin A and Iron for Nutritional Anaemia in Pregnant Women in West Java, Indonesia. Lancet 342(8883): 1325-1329.

Swasono, Meutia, F. Editor, (1998). Pregnancy, Delivery and Care of the Mother and Infant : The Culture Aspect, Jakarta: Unpublished document. The University of Indonesia

Tanumihardjo, S. (2002). Vitamin A and Iron Status are Improved by Vitamin A and Iron Supplementation in Pregnant Indonesian Women. Journal of Nutrition 132(7): 1909-1912.

Thurnham, D. (1993). Vitamin A, Iron and Haemopoiesis. Lancet 342(8883): 1312-1313.

Tinker, A. (2000). Women's Health: The unfinished agenda. International Journal of Gynaecology and Obstetrics 70(1): 149-158.

Tones, K. (2000). Evaluating Health Promotion: A tale of three errors. Patient Education and Counseling 39(2-3): 227-236.

UN-ACC/SCN (1997). Control and Prevention of IDA: Current status of programs Geneva.UN-ACC/SCN.

UN-ACC/SCN (2000).Low Birthweight UN-ACC/SCN.6 - 27

United Nations (1991).The World's Women 1970 to1990: Trends and Statistics New York.United Nations.

United Nations (1995).The World's Women 1995: Trends and Statistics New York.United Nations.

USA Institute of Medicine (2000). Effect of Gestational Weight Gain on Outcome in Singleton Pregnancy. Nutrition During Pregnancy. USA, National Academies Press: 176-435.

Utomo, B., Riono, P., Budiono, T. et al. (1993).Alleviation of Maternal Anaemia in Indramayu Regency, Indonesia Arlington, VA. John Snow Inc.

Van den Broek, N., Ntonya, C., Mhango, E., White, S. (1999). Diagnosing Anaemia in Pregnancy in Rural Clinics: Assessing the potential of the haemoglobin colour scale. Bulletin of the World Health Organization 77: 15.

Viteri, F. (1997). Iron Supplementation for the Control of Iron Deficiency in Populations at Risk. Nutrition Reviews 55(6): 195-209.

Wald, N., Law, M., Jordan, R. (1998). Folic Acid Food Fortification to Prevent Neural Tube Defects. Lancet 351: 834.

Way, S. (1991). Food for Asian Mothers-to-be. Nursing Times 87(49): 50-52.

WHFWP (2000A).Midwifery Strategy Paper (Milestone No.7) AusAID - Australian Agency for International Development.

WHFWP (2001A).Baseline Survey Findings. Volume 1 (Milestone No. 4) Sydney. AusAID Project.- Australian Agency for International Development.

WHFWP (2001B).Baseline Survey Findings. Volume 2 (Milestone No. 4) Sydney,. AusAID - Australian Agency for International Development.

WHO (1979). Protein and Energy Requirements: A joint FAO/WHO memorandum. Bulletin of World Health Organization 57(1): 65-79.

WHO (1986). Ottawa Charter for Health Promotion. First International Conference on Health Promotion, Ottawa, 21 November 1986, Ottawa Canada, WHO/HPR/HEP/95.1.

WHO (1994).Indicators and Strategies for Iron Deficiency and Anaemia Programmes Geneva, Switzerland.WHO/UNICEF/UNU.6-10

WHO (1996A).Control of Iron Deficiency Anaemia in South East Asia Salaya Thailand. WHO Regional Office for South East Asia.36

WHO (1998A).World Health Organisation Report Geneva.WHO.

WHO (1998B). Adelaide Recommendations on Healthy Public Policy. Second International Conference on Health Promotion, Adelaide, South Australia,, WHO.

WHO (2000A). Women of South East Asia. A health profile. New Delhi, Regional Officer of WHO South East Asia.

WHO (2000B). Health Promotion: Bridging the equity gap. Fifth Global Conference for Health Promotion, Mexico, WHO.

WHO Indonesia (2002). Making pregnancy safer in Indonesia, WHO. 2002.

WHO/RHR/00 (2000).Reproductive health during conflict and displacement Geneva. World Health Organization.

WHO-SEARO (2002A). Nutrition in South-East Asia Recommendation, WHO. 2002.

WHO-SEARO (2002B). Indonesia: Nutrition country profile, WHO-SEARO. 2003.

Wickrama, K., Lorenz, F. (2002). Women's Status, Fertility Decline and Women's Health in Developing Countries: Direct and indirect influences of social status on health. Rural Sociology 67(2): 255-277.

World Bank (1994). A New Agenda for Women's Health and Nutrition. Washington D.C., The International Bank for Reconstruction and Development/The World Bank.

Appendices