

Does Interprofessional Education Improve Safety and Outcomes for the Assessment of Fetal Welfare?

Helen Cooke

Submitted to the University of Technology, Sydney
In fulfilment of requirements for the degree of
Doctor of Philosophy

2016

Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor 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.

Helen Cooke

29th February 2016

Acknowledgements

Today draws to close one of my life's most amazing and experiential journeys. It is not a journey that you take alone and so many family and friends have played a part in the construction of this doctoral work. Too many to mention and I don't want to miss anyone, to all of you I owe a huge debt of gratitude. Your thoughts, wishes, words of encouragement and support have given me the strength to continue.

This work has not been easy, and as for many PhD students work and life have taken over at many times. Significant life events have happened that I personally need to acknowledge. A few new family members, Miles, Zilla and Izealia-Rose who I know in my heart have had safer births because of this work. Some sad goodbyes to family and dear friends, particularly my mother in law Eileen, who saw my journey start, encouraged me along the way and sadly was unable to share with me this final conclusion.

To my mum, I love you and apologise that this work has distracted me at times when in the final years of your life you have needed support far greater than I may have been able to give. Thank you for your understanding, unwavering support and belief in my ability to do this, and most of all your love that shines on me always. For my dad, I am sorry you have not been around to see so many of my life achievements. Time has been too long between smiles and for so many years you have been gone. Everyday I feel your presence, looking over my right shoulder and pushing me hard to succeed.

Maralyn and Warwick as my supervisors I thank you so much for your support. Warwick, I thank you for your support with the development and implementation of FONT. I appreciate your guidance and encouragement with this research. Your wisdom and statistical mind have helped me to understand and at times look a little intelligent. I also want to thank your statistical partner in crime Andrew Bisits who helped with statistical advice while we sorted through the state data. A very special thank you to Pat Brodie who read my final work and provided wise words at a complex time to help bring my thesis to a close. Thank you so much Pat for all your support.

Maralyn, you have closely stood by me over the past 8 years offering guidance, wisdom and the brightest mind. You have led and guided this work offering advice and support whenever I have asked. In the darkest and hardest times of the past few months you have continued to encourage me to see this through to the end. Yes Maralyn, it has been a long and difficult labour and at 8 cms you were there, like a great midwife you encouraged and supported me to find the strength to finally birth this thesis. I will be forever grateful for your support and I will never be able to thank you enough for all you have done.

I am forever indebted to the FONT trainers who so willingly and openly shared with me their insights, thoughts, beliefs, and incredibly personal stories. I hope my writing pays due respect to them all and protects them personally. This research has provided me with great insight into the workings of the maternity care team. I believe that the insights gained will provide useful information to enhance teamwork and communication for the future. I have developed a strong belief and commitment to

IPE as the process that can achieve this. We all know its name, we all attend the training, some of us teach it and are very proud to do so and a small number of us develop it and make it work. Whatever part you have played in my powerful life journey I say a huge thank you, for your support and dedication to our very own state wide maternity education program FONT.

Through it all some very special family members have sat in the background patiently waiting for their late dinner, attention and loving pats. Thankyou Dave (RIP beautiful boy), Dudley and Huckleberry for your unwavering love and devotion. You make our lives enriched by your presence.

Finally, no life journey of this length happens alone and beside me every day has been my best friend and love Douglas Cooke. Doug you have endured every tear, every scream and every frustration. Your wise words of support in the early stages of my methodology development I will remember always, 'If it was easy, everyone would have a PhD'. You were so right and this piece of work is also your achievement. I would never have been able to achieve this without you. Thank you for your love, support, encouragement and enduring belief in my ability to do this even in my darkest moments. *'I am strong when I am on your shoulders; you raise me up to more than I can be'*. I love you and dedicate this thesis to you.

Peer Reviewed Publications and Conference Presentations

Cooke, H., Foureur, M., Kinnear, A., Bisits, A. & Giles, W. 2010, 'The development and initiation of the NSW Department of Health interprofessional Fetal welfare Obstetric emergency Neonatal resuscitation Training project', *Aust N Z J Obstet Gynaecol*, vol. 50, no. 4, pp. 334-9.

Conference Presentations

Cooke, H., Foureur, M. & Giles, W.(2015) Fetal welfare, Obstetric emergency, Neonatal resuscitation Training (FONT). Perinatal Society of Australia and New Zealand (PSANZ) Annual Congress, Melbourne, 2015

Cooke, H., Foureur, M. & Giles, W.(2014) Communication and teamwork is enhanced through IPE. International Confederation of Midwives (ICM) Triennial Conference, Prague 2014.

Cooke, H., Foureur, M. & Giles, W (2013) Fetal welfare, Obstetric emergency, Neonatal resuscitation Training (FONT) Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG), Annual Congress Sydney 2013

Cooke, H., Foureur, M. & Giles, W (2013) Fetal welfare, Obstetric emergency, Neonatal resuscitation Training (FONT) Northern Sydney Local Health District Nursing and Midwifery Research and Innovative Practice Conference, Sydney 2013

Cooke, H., Foureur, M. & Giles, W.(2013) Interprofessional Education in maternity clinical practice: is this the way of the future? Australian College of Midwives (ACM) Bi-Annual Conference, Hobart 2013

Cooke, H., Foureur, M. & Giles, W.(2013) Fetal welfare, Obstetric emergency, Neonatal resuscitation Training (FONT): Five years on, where are we now? Australian College of Midwives (ACM) NSW Branch Conference, Tweed Heads (2013)

Cooke, H., Foureur, M. & Giles, W.(2012) Communication and teamwork is enhanced through IPE, Australasian Interprofessional Practice and Education Network (AIPPEN), Annual Conference , Newcastle, 2012

Cooke, H., Foureur, M. & Giles, W.(2012) IPE improves learning and clinical outcomes in Fetal Welfare, Australasian Interprofessional Practice and Education Network (AIPPEN), Annual Conference , Newcastle, 2012

Poster Presentations

Cooke, H., Foureur, M. & Giles, W.(2012) Fetal Welfare IPE Improves Learning and Clinical Outcomes Poster, Australian College of Midwives (ACM) Bi-Annual Conference Hobart, 2013

TABLE OF CONTENTS

Certificate of Original Authorship	ii
Acknowledgements	iii
Peer Reviewed Publications and Conference Presentations	vi
Conference Presentations	vi
Poster Presentations	vii
TABLE OF CONTENTS	viii
List of Tables	xiii
List of Figures	xv
List of Abbreviations	xvi
Abstract	xviii
1. Introduction and background to the study	1
Introduction	1
The research question	1
Background to NSW Maternity Care and Culture	2
Identifying Risk	5
Maternity Care Safety	5
Adverse Clinical Incidents.....	6
Understanding Perinatal Death Rates	7
Causes of Perinatal Death	7
Development of FONT	8
Deciding on an educational framework	8
Further support for an educational intervention.....	10
FONT: Fetal Welfare Assessment and Interprofessional Education.....	12
Aims of FONT	12
My role in FONT.....	12
Development of a Project Plan.....	12
Stage One.....	13
Stage Two.....	13
Stage Three	15
FONT Risk Assessment	15
Risk Assessment – first step	15
Second step	16
Third step	17
Threats to success	18
FONT Implementation	18
Training	18
Summary	19
Outline of the thesis.....	21
Chapter two.....	21
Chapter three	21
Chapter four	22
Chapter five.....	22

Chapter six	23
Chapter seven	23
Chapter eight	24
Chapter nine	24
Chapter ten	25
2. Complexities and inconsistencies in interpreting electronic fetal heart monitoring	26
Introduction	26
The history of electronic FHR monitoring	26
EFM as a screening test	28
Interpretation of the FHR pattern: Clinicians Inter-observer reliability	28
EFM Guidelines: insufficient consensus	33
EFM and Clinical Safety	34
Guideline Development	36
EFM Education	40
Summary	41
3. Interprofessional Education: A discussion of the literature	45
Introduction	45
Searching the IPE literature	46
The Series: A systematic review of IPE literature	48
What is IPE?	49
The origins of IPE	50
Why do we need IPE?	50
Principles of IPE	51
Should IPE focus on undergraduate students or postgraduates?	52
Undergraduate IPE	52
Postgraduate IPE	54
What outcomes to measure?	55
Evaluating IPE: contributions of theory	56
IPE Evaluation Frameworks	57
The 3P Framework	58
The Kirkpatrick Education Evaluation Framework	60
Barriers to IPE Development	64
Culture of the workplace	65
Power Differentials Undermine Collaboration	67
Narrowing the focus: IPE programs in maternity care	68
Undergraduate Maternity IPE studies	68
Postgraduate Fetal Welfare IPE studies	70
PRactical Obstetric Multi-Professional Training (PROMPT)	70
Summary	78
4. Study Design and Methods	80
Introduction	80
The research question	80
Justification for a Pragmatic Mixed Methods Study Design	81
Randomised Controlled Trial (RCT)	81
Multi-Methods or Mixed Methods	82
Mixed Methods	83

Individual studies and corresponding design methods	85
FONT Evaluation Framework.....	89
Study 1 – Train-the-trainer, Pre and Post-Test survey of FONT/IPE	90
Study Design.....	90
Aim.....	90
Ethical Considerations	91
Development of the Pre-Post-Tests	91
Data Collection.....	96
Data Analysis	97
Assessing Satisfaction with the Education Day.....	97
Study 2: Survey evaluation of attitudes towards and impact of FONT/IPE	99
Study Design.....	99
Aim.....	99
Sample.....	99
Ethical Considerations	99
Development of the Survey Tool	100
Limitations of Surveys	101
Data Collection.....	103
Data Analysis	103
Study 3: In-depth Exploration of the impact of FONT/IPE in the workplace	104
Study Design.....	104
Aim.....	104
Participants	104
Ethical Considerations	105
Data Collection.....	106
Data analysis.....	107
Study 4 Comparative Cohort study of Maternity Clinical Outcomes	110
Study Design.....	110
Aim.....	110
Sampling Frame and Sample.....	110
Data Collection.....	111
Limitations of this study.....	117
Ethical Considerations	118
Summary	118
5. Study 1: Findings in the Pre and Post-test of Fetal Heart Rate Pattern	
Interpretation	120
Introduction.....	120
Publication of this study	121
Pre and Post-test results	121
Survey Response Rates	122
Normal FHR pattern results	122
Pathological FHR pattern results.....	124
Use of Appropriate Language and the link to clinical care	125
Normal FHR Pattern – describing decelerations	126
Normal FHR Pattern - Management Options	129
Pathological FHR Pattern – describing decelerations	131
Pathological FHR Pattern - Management options	133

Summary	138
6. Study 2: Exploration of the impact of FONT/IPE on collaboration, communication and teamwork.....	142
Survey Distribution and Response Rate	142
Continuing to teach FONT/IPE	144
Reasons why clinicians stopped teaching FONT	145
Likert Rated Questions and Responses	148
Educational Development and Individual Skills	148
Content of FONT/IPE	149
Personal Outcomes.....	151
Interprofessional Relationships.....	155
Can IPE work?	155
Can IPE work?	156
Influence of small group work	156
Will IPE work?	157
Will IPE work for the future?.....	158
Communication and collegiality.....	158
FONT translated into clinical practice.....	158
Professional Ability	159
Educational Outcomes.....	161
Common guidelines and education	162
Confident to provide education.....	162
Open Ended Question Comments	163
Cultural Change	163
Medical staff participation.....	164
Managerial Support.....	165
Need for formal evaluation of knowledge	165
Impact on Clinical Outcomes	166
Limitations of this study	166
Summary	167
7. Study 3 - Findings from the Interviews	169
Demographic Details of Interview participants	169
Description of interviews	171
Presentation of Findings	171
Professional Engagement with IPE.....	173
Power Gained and Power Lost	175
Knowledge deficits	177
Knowledge gained.....	180
Confidence.....	183
Medical staff.....	183
Midwives	184
Confidence gained	185
Teamwork	187
Overcoming fear/resistance to the education	188
Change	192
Resistance to change.....	192
Moving forward with change	195

Communication and working together	197
Not part of the team	197
Improving communication for the rest of the team	199
Leadership and Commitment moving forward	203
Limitation of the Study	205
Summary	205
8. Study 4 - Findings in Pre-Post FONT/IPE Clinical Outcomes.....	207
Introduction	207
Data Limitations	208
Findings	210
IIMS Findings	210
Increased reporting of critical events	212
NSW Perinatal Data Collection (PDC) (NSW Mothers and Babies Report)	
Findings	212
Neonatal Intensive Care Unit System (NICUS) Findings	217
FONT Attendance data	218
Summary	219
9. Results and Discussion	222
Introduction	222
FONT risk assessment and mitigation strategies	223
Barr/Kirkpatrick Education Evaluation Framework	225
Reaction	227
Modification of attitudes and perceptions	227
Acquisition of knowledge and skills	228
Behavioural change of clinicians	228
Changes in organisational culture	230
Benefits to women and babies	231
Summary of the Linked Findings	232
Creating Cultural Change	234
IPE and the Power Interplay	235
Exploring Power Relationships	236
Exercise of power as <i>Demarcationary and Dual</i> closure strategies	239
Perceptions of Power	240
Knowledge deficits and knowledge gained	241
Cultural Change	243
Increasing participation and engagement in IPE	244
Summary	246
10. Conclusions and Recommendations.....	248
Introduction	248
The influence of power on engagement with IPE	248
Interprofessionalism	249
Human Social Behaviour	250
SCARF® : A brain based model of neuroleadership	252
Leadership	256
Rationale and recommendations for the inclusion of the RESPECT framework	
.....	257
RESPECT	259

RESPECT Framework	262
Reciprocity	262
Equality or fairness.....	263
Status.....	264
Patient/Woman/Person	264
Experience	265
Connection.....	266
Trust.....	267
Recommendations from this Research.....	269
Conclusion.....	270
Appendix 1 Fetal Welfare Education Day Timetable	273
Appendix 2 Severity Assessment Code Matrix	274
Appendix 3: Studies of IPE programs for Undergraduate Students....	275
Appendix 4: Studies of IPE for Postgraduates	282
Appendix 5: Systematic reviews/literature reviews/commentaries of IPE studies.....	287
Appendix 6 FONT Pre and Post-test.....	291
Appendix 7: Publication	294
Appendix 8 Ethics Approval.....	300
Appendix 9: FONT Train the trainer Questionnaire and Consent	301
Appendix 10: Ethics Approval for Additional Interviews.....	307
References	308

List of Tables

Table 1.1: Examples of Identified Risks to the Success of FONT and Risk Mitigation Strategies	17
Table 2.1: Comparison of Terminology in FHR Guidelines (1986-2009).....	43
Table 3.1: Kirkpatrick Education Evaluation Framework (Kirkpatrick 1994)	60
Table 3.2: Barr/Kirkpatrick, Educational Evaluation Framework (Barr et al. 2005)...	61
Table 3.3: Studies Focusing on the Application of IPE in Maternity Care Settings... 75	
Table 4.1: Overview of the four studies to evaluate the impact of the fetal welfare education program	87
Table 4.2: Barr/Kirkpatrick Educational Evaluation Framework and Linked FONT/IPE Evaluation Studies (Barr et al. 2005).....	89
Table 4.3: FHR Classification System used for FONT/IPE.....	92
Table 4.4: Classification categories for the FHR pattern	93

Table 4.5: Intrapartum clinical treatment and management guide (Royal College of Obstetrics and Gynaecology 2001)	93
Table 4.6:: The Six Phase Process of Qualitative Data Analysis	107
Table 5.1: Normal FHR pattern – Pre and Post-Test, Proportion Correct Responses	122
Table 5.2: Pathological FHR pattern- Pre and Post-Test, Proportion Correct Responses	124
Table 5.3: Normal FHR pattern – Pre and post-test “Deceleration” terminology ...	127
Table 5.4: Normal FHR pattern – Pre and post-test Management Terminology	130
Table 5.5: Pathological FHR pattern – Pre and post-test Deceleration terminology (Continues over two pages)	131
Table 5.6: Pathological FHR pattern – Pre and post-test Management	135
Table 5.7: Assessment of Potential Threats to Internal Validity	137
Table 6.1: Professional Grouping and Survey Response Rate	143
Table 6.2: Response rates according to birth rate per Unit N=123.....	143
Table 6.3 Currently Teaching FONT according to Professional Group	144
Table 6.4: Currently Teaching FONT according to hospital	145
Table 6.5: Likert Scaled Responses to statements concerning Content of the Education N=123.....	149
Table 6.6: Likert Scaled Responses to statements concerning Personal Outcomes (N=123)	151
Table 6.7: Likert rated Responses to statements regarding Interprofessional relationships – Can it work? N= 123.....	155
Table 6.8: Likert rated Responses to statements regarding Interprofessional relationships – Will it work? N = 123	157
Table 6.9: Likert rated Responses to statements regarding professional ability (N=123)	160
Table 6.10: Likert rated Responses to statements regarding educational outcomes (n=123).....	161
Table 7.1: Purposive Selection of Participants for interview	170
Table 7.2 – Time and length of interviews	171

Table 8.1: SAC 1 and 2 Fetal Welfare Events and Birth Rates (Source: IIMS Database, NSW Ministry of Health, 2011).....	211
Table 8.2: Comparison of NSW public and private hospital annual birth numbers, emergency caesarean section rates, Apgar Scores, neonatal death and stillbirth rates.	214
Table 8.3: Comparison of Selected Pre and Post-FONT Cohort clinical outcomes.	217
Table 9.1: Overview of the linked findings using the Barr/Kirkpatrick Educational Evaluation Framework.....	226
Table 9.2: Definitions of Professional Closure Strategies (Source: Baker, 2011 p99, adapted from Witz, 1992).	238
Table 10.1: RESPECT Principles and strategies- a guide for use in IPE	268

List of Figures

Figure 3.1: Literature Review 2003-2012 Flow Chart	47
Figure 3.2: Presage, Process and Product Framework (Reeves & Freeth 2006).....	59
Figure 4.1: FHR Pattern 1 Normal and Correct Action = cease monitoring	95
Figure 4.2: FHR Pattern 2 Pathological and Correct Action = immediate management required	95
Figure 4.3: Data collection Timelines	111
Figure 4.4 : IIMS Example of SAC 1 event reported as fetal death in utero	112
Figure 8.1: Perinatal deaths by PSANZ – PDC Classification (NSW Department of Health 2009).....	210
Figure 8.2: Perinatal deaths by PSANZ – PDC Classification 2006 -2010	213

List of Abbreviations

ACM – Australian College of Midwives

ACOG – American College of Obstetricians and Gynaecologists

AHS – Area Health Service

ALSO – Advanced Life Support in Obstetrics

CEC – Clinical Excellence Commission, NSW

CTG – Cardiotocography

DoH – Department of Health

EFM – Electronic Fetal Heart Rate Monitoring

FBS – Fetal Blood Sampling

FHR – Fetal Heart Rate

FIGO - Federation of International Gynecologists and Obstetricians

FONT – Fetal welfare, Obstetric emergency, Neonatal resuscitation Training

HIE - Hypoxic Ischaemic Encephalopathy

IA – Intermittent Auscultation

IIMS – Incident Information Management System

IPE – Interprofessional Education

ISBAR - Identify, Situation, Background, Assessment and Recommendation

LHD – Local Health District

MoH – Ministry of Health

NICE - National Institute of Clinical Exc

NICU – Neonatal Intensive Care Unit

NICUS – Neonatal Intensive Care Unit System

NIH – National Institute of Health (UK)

NSW – New South Wales

PDC – Perinatal Data Collection

RANZCOG - Royal Australian and New Zealand College of Obstetricians and
Gynaecologists

RCOG - Royal College of Obstetricians and Gynaecologists

WHO – World Health Authority

Abstract

The New South Wales (NSW) Fetal welfare, Obstetric emergency, Neonatal resuscitation, Training (FONT) program commenced in 2008 when 233 midwives and doctors were trained to teach FONT to all maternity clinicians in 80 maternity services across NSW. FONT aimed to improve knowledge, teamwork, communication and clinical outcomes in fetal welfare assessment and maternity emergency management. This thesis presents an evaluation of the fetal welfare component of the FONT program.

Study Aim: To evaluate a range of educational and clinical outcomes before and after the introduction of FONT/IPE.

Methods: A pragmatic, mixed methods study design using four quantitative and qualitative studies was used. The studies included: a pre and post knowledge test administered to 233 clinicians who attended the initial FONT/IPE train the trainer program in 2008; a subsequent purposely developed, 34 item, Likert-scaled questionnaire administered to these same trainers, one year later, to evaluate satisfaction and engagement with the ongoing delivery of FONT/IPE; individual, semi-structured and in-depth interviews with a purposive sample of the trainers and maternity service managers, to further explore FONT/IPE engagement and impact; and an evaluation of NSW state-wide, maternal and neonatal clinical outcomes associated with fetal welfare, before and after the implementation of FONT/IPE. The outcomes of the four studies were linked using the six levels of the “Barr/Kirkpatrick Educational Evaluation framework” (Barr et al. 2005).

Results: FONT/IPE increased clinicians' knowledge, skills and confidence in fetal welfare assessment, communication, escalation and advocacy and resulted in improved collegiality and clinical debate amongst most staff. There was evidence of resistance to changing the organisational culture by some senior medical staff with analysis of interviews revealing two major themes of either fear of power loss (on the part of medical staff) or power gained (on the part of midwives) through participation in the program. These themes were interpreted using a framework of professional closure strategies (Witz 1992) and insights provided by the science of neuro-leadership. There was an associated significant reduction in neonatal death rates ($p=0.038$) and a reduction in rates of Hypoxic Ischaemic Encephalopathy ($p=0.032$) when comparing data from four years before and four years after the implementation of FONT, however the clinical outcomes cannot be viewed as directly arising from the FONT/IPE intervention.

Conclusion: FONT/IPE and IPE programs generally, may be further enhanced using a framework of "RESPECT" (Reciprocity, Equality, Status, Patient/Woman, Experience, Connection and Trust) arising from this study, to overcome barriers to success.