Preparedness for Practice of Health Professionals in Papua New Guinea: a Cross-sectional Survey of Nurses and Community Health Workers.

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Abstract

Introduction

Papua New Guinea (PNG) experiences widespread health inequity and shortage of health professionals, exacerbated by poverty, isolation, gender-based violence and limited infrastructure, transport and accessible services. Nurses and community health workers (CHW) represent 72% of health workforce. However, health professional education programs are outdated and not aligned with national health priorities. We aimed to explore the adequacy of current curricula for nurses and CHWs by examining graduate competencies and preparedness for practice.

Methods

Cross-sectional study with four cohorts: 1) 130 new nurse graduates, 2) 75 nurses who supervised them, 3) 105 new CHW graduates and 4) 65 CHW supervisors. We surveyed perceptions of recent graduates' clinical competence and compared graduates' and supervisors' ratings using chi-squared analysis.

Results

Graduates and supervisors differed significantly in perceptions of graduate competency, for both nurses and CHWs. Despite asserting their competence, graduates identified skills gaps and needs for additional learning support after graduation, including national priority areas (pregnancy, maternal-child health, infection control, emergency health management).

Conclusion

This study among health professionals in PNG, a country with very limited data on human resources for health, found gaps in graduate preparedness for practice, offering insights into skill deficits that should be addressed in upcoming curriculum review.

Keywords

Community health workers, curriculum, nurses, nursing education, Papua New Guinea, survey.

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Preparedness for practice of health professionals in Papua New Guinea: a cross-sectional survey of nurses and community health workers.

Introduction

This study reviews the effectiveness of preparatory programs for nurses and community health workers (CHWs) in Papua New Guinea (PNG), a nation of 10 million people in the Western Pacific region [1]. Current curricula for these essential health professionals were developed in the early 2000s. Since then, national health needs have changed dramatically: non-communicable diseases and communicable infections have increased substantially, and health inequalities persist [2, 3]. The COVID-19 pandemic placed further pressure on limited resources [2], highlighting the urgency of strengthening the numbers and quality of health workers within the system.

The research sought to examine perceptions of graduates and supervisors from the Diploma of General Nursing (DGN) and Certificate in Community Health Work (CHW) programs in PNG about graduates' preparedness for practice. The survey reported here complemented a desktop literature review analysing gaps in current health professional education [4], in the context of priorities identified in the PNG *National Health Plan 2021-2030* (NHP) [2]. This research informs a larger project to revise curricula for DGN and CHW programs within PNG higher education institutions.

Papua New Guinea's population experiences serious health inequity and adverse health outcomes compared to other nations in the Asia-Pacific region [4]. An estimated 40% live in poverty [5] with approximately 90% of the population living in rural areas [6]. There are over 800 languages and vast cultural diversity across many provinces [7]. PNG has one of the world's most dispersed and isolated populations. Healthcare access is limited by lack of infrastructure, transport and accessible health services [8]. Life

expectancy at birth is approximately 66 years [9], with a 17-year variation across provinces [2]. Population literacy rates are low: 2015 estimates found only 63.4% of adults able to read and write [10]. National population growth is 2.8-3% annually [1], yet health sector funding has nearly halved since 2011 [2]. There are high rates of infant and maternal mortality, and of communicable diseases especially tuberculosis, malaria, HIV and other sexually transmitted infections [6]. Over two-thirds of PNG's women are categorised as experiencing gender-based violence [5]. The NHP key priorities include maternal and neonatal health; childhood and adolescent health; men's health and wellbeing; communicable diseases; non-communicable diseases; disability; mental health; substance abuse; safety and quality of healthcare; and emergency and disaster response [2].

PNG has a decentralised healthcare system based on primary health care principles [11]. It is organised into seven tiers: aid posts, community health posts, health centres, district hospitals, provincial hospitals, regional hospitals and national referral hospitals [12]. The largest cadre of PNG's regulated health workforce are CHWs (39.6%), nurses (32.4%) (totalling 72%), and midwives (12%); 75% are female [13]. However, the density of health workers is very low by international standards: 0.7 doctors and 5.3 nurses per 10,000 population [2], far below the 45 doctors, nurses and midwives per 10,000 population recommended by WHO to meet health needs by 2030 [14]. Further, the health workforce is ageing with high turnover due to poor working conditions, limited infrastructure, inadequate clinical and technical skills training [15].

Nurses in PNG are qualified after completing DGN and registration with the PNG Nursing Council. Sixteen teaching institutions in PNG offer 3-year DGN courses, comprising 2200 theoretical and 2000 clinical hours. Some nursing schools also offer 4-year bachelor's degrees and post-registration courses. The current DGN curriculum was

reviewed in 1995 after being upgraded from a Certificate program. Community Health Workers complete a Certificate IV of CHW and are registered through the Medical Board. The curriculum was developed in 2004, consisting of 49 modules presented over 3430 hours. CHW programs are offered at 19 training institutes. Despite strengths in linking content to PNG population health needs and to developing competencies, both DGN and CHW curricula are outdated and do not align with the NHP; both have been evaluated as being loaded with content [4].

Changes at the education level are central to strengthening health systems and for achieving Sustainable Development Goals [16]. Quality educators are pivotal, but audits have found serious shortages of nursing educators in PNG [16, 17]. Recent growth in the number of schools offering DGN and CHW qualifications has not been matched by a concomitant increase in well-prepared educators. Only 50% of nurse educators hold an education qualification, leading to lower quality teaching and graduate outcomes [4]. Shortages of skilled and qualified educators are compounded by outdated curricula, leading to significant concerns about the quality of graduates. Moreover, there are few opportunities for continuing professional development. No previous studies have explored PNG healthcare workers' preparedness for practice.

Therefore, this study sought to explore whether the DGN and CHW curricula meet PNG's current and future health needs by examining graduate competency and preparedness from the perspective of both graduates and their supervisors. A National Curriculum Steering Group representing professional associations, government departments, health services and universities oversaw the research.

Methods

Aim

This study aimed to explore the adequacy of nursing and CHW curricula, by examining the competency of recent DGN and CHW graduates, and their identified skills gaps.

Design

This cross-sectional study used paper-based surveys on graduate competency to explore the perspectives of nurses and CHWs graduates and supervisors. The survey was developed by staff of the PNG National Department of Health (NDoH). The WHO Collaborating Centre for Nursing, Midwifery and Health Development at the University of Technology Sydney (WHOCCUTS) collaborated in data management and analysis.

Ethics

The PNG Medical Research Advisory Committee granted ethical clearance (MRA#22.61). Permission was also sought from participating provincial health authority provinces and the responsible church agencies. Participants gave consent before participation. All data were fully anonymised prior to analysis.

Setting

The survey was conducted in health services in eight provinces of PNG, two in each of the four regions, ensuring representation from urban and rural areas. Settings included provincial hospitals, district hospitals, health centres, community health and aid posts. The provinces were: East New Britain (pilot study), East Sepik, Gulf, Madang, New Ireland, Oro (Northern), Simbu and Western Highlands.

Participants

The study included four cohorts: CHW graduates, CHW clinical supervisors, DGN graduates and nurse clinical supervisors. Graduates were limited to those who graduated 2015-2020, currently employed in one of the provinces. Clinical supervisors were senior nurses or CHWs who supervised, mentored, or coached graduates.

Survey instruments

An expert group developed the questionnaires specifically for the study, based on PNG competency standards for nurses and CHWs [18]. Competency statements (nurse participants: n=20 statements; CHW: n=23) were broad and addressed professional and ethical practice, critical thinking, communication, management and leadership, care management, public health, health promotion, and partnership with community and services, rated on a 5-point Likert-style scales (strongly agree to strongly disagree). Following pilot-testing in one province with an indicative population from the four cohorts, some questions were re-worded for clarity. A further open-ended question asked graduates to indicate up to five skills they learnt (or required assistance to learn) following graduation. Supervisors indicated skills they assisted graduates learn in the workplace.

Data collection

The pilot study in East New Britain commenced in October 2021 (n=115 respondents). Data collection in the remaining seven provinces occurred between December 2021 and February 2022. During this time there were complex health, safety and logistical issues due to the COVID-19 outbreak across PNG.

Researchers recruited participants by word-of-mouth or directly through provincial health authorities. Participants completed surveys on paper questionnaires which were placed in sealed envelopes and collected in-person by researchers.

Data analysis

WHOCCUTS staff supported the NDoH Research team with data organisation, analysis and visualisation. Pilot survey data were excluded. Quantitative data from the seven provinces were combined and tallied in Excel spreadsheets for each of the four cohorts. Researchers compared the responses of graduates and their supervisors on each competency statement, for both nurses and CHWs, using chi-squared (χ^2) analysis calculated in Excel. The original alpha level was set at 0.05. Given the risk of Type 1 errors in repeated comparisons from unmatched samples, we applied a Bonferroni correction to determine the critical value for statistical significance. The revised p-value was therefore $p<.0025$ for nurses and $p<.0022$ for CHW. The analysis excluded missing data and 'not applicable' responses.

Qualitative data from open-ended questions were given identifiers indicating participant type and province, then transferred to NVivo (Lumivero) for inductive content analysis [19]. Data were reviewed by participant type, collated into similar conceptual categories, and then counted to create prioritised lists. This analytic approach aimed to move from the specific information provided by participants to general categories of skills graduates were required to learn following graduation [20]. This analysis provided insight into the effectiveness of existing curricula in preparing practice-ready graduates and enabled additional interpretation of quantitative data.

Results

Survey participants

A total of 375 participants responded to the final survey. Table 1 indicates the province and category of participants, as well as year of graduation (for graduates) and work setting.

TABLE 1

Perspectives on graduate nurse competence

Quantitative analysis highlights the contrasting perspectives of nursing graduates and supervisors on the competency statements surveyed (Table 2). There were significant differences across all but one statement between graduate nurses' perceptions and those of supervisors. Graduates consistently rated their competence more highly than did their supervisors.

TABLE 2

While the differences between graduates and supervisors showed statistical significance for nearly all statements, the discrepancy was particularly wide for competencies such as cleaning and storing equipment (over 95% of graduates agreed or strongly agreed they were competent, compared with one-third of supervisors), monitoring child health (98% graduates agreed vs 41% supervisors), using patient data for improving patient care (95% graduates agreed vs 39% supervisors) and communication skills (98% graduates agreed vs 57% supervisors).

In qualitative analysis, 117 nurse graduates listed 456 clinical skills that they were required to learn in their clinical workplace but were not taught during their DGN program; 52 nurse supervisors provided 232 clinical skills they had assisted graduates to learn post-graduation.

Several clinical skill deficits were identified by both graduates and their supervisors in the top 10 skills list, albeit with different rankings (Table 3). However, unlike graduates, nurse supervisors also identified lack of preparedness in infection prevention and control,

documentation, patient assessment, and neonatal and newborn care. Unlike supervisors, nurse graduates identified laboratory testing, equipment management, wound care and medication management in their top 10 skill deficits (Table 3).

In their responses to the open-ended questions, both graduates and supervisors identified procedure-related nursing skills as the most frequent area of clinical practice requiring support following graduation from the DGN. Nurse graduates had a broad list including inserting and managing invasive devices (e.g. indwelling and supra-pubic catheters, nasogastric tubes, cannulation and under-water seal drains); managing oxygen therapy; colostomy care; blood transfusions; managing fractures and traction; managing critically ill patients including intubation. They also identified assessment (e.g. blood glucose levels, oxygen saturations); performing or assisting diagnostic tests (lumbar puncture, fine-needle biopsies, abdominal taps) as priority areas. Nurse supervisors identified fewer procedures requiring support post-graduation: managing nasogastric tubes, urinary indwelling catheters, suction, blood transfusions and under-water seal drains; wound management including suturing; and managing fluid balance.

Unsurprisingly, COVID-19 management was identified by both cohorts; nurse supervisors also identified that infection control skills were lacking. Given that the pandemic began after participants had graduated, it is reasonable that all nurses, including graduates, experienced skill deficits managing COVID-19 patients.

TABLE 3

Unlike other respondents, two nurses highlighted that they had no clinical deficits when commencing as Registered Nurses, for example:

"There's none that are not learnt, all clinical skills have been taught at the Diploma Nursing curriculum and nothing is new to me in the clinical field" (Graduate Nurse #E21)

Not all nurse supervisors responded to this free-text field, possibly indicating agreement with the two graduates above. Two nurse supervisors, however, recommended competence-based examinations prior to registration, for example:

"I recommend that there must be a national exam from the nursing council like, before to assess their knowledge level of nursing. This is to upgrade the knowledge base in nursing in PNG" (Nurse Supervisor #W10).

Perspectives on graduate community health worker competence

Quantitative analysis examined the ratings of CHW graduates and their supervisors about the competencies surveyed (Table 4). As with the nursing cohorts, CHW graduates rated their competence considerably more highly than their supervisors did.

TABLE 4

While the differences between graduate CHWs and supervisors were statistically significant across all but five of 23 competencies, some discrepancies were particularly marked. Over 93% of recent graduates agreed or strongly agreed they were competent providing perinatal care; however, only 60% of CHW supervisors agreed. Similarly, graduates perceived greater competency in waste management (97% graduates agreed vs 64% supervisors) and identifying and addressing community health needs (85% graduates agreed vs 44% supervisors).

In qualitative analysis, 91 CHW graduates listed 392 skills or areas of practice requiring assistance from their clinical supervisor following graduation. CHW supervisors (n=53) recounted 219 procedures or areas of practice they have assisted CHW graduates to perform in the workplace. The procedures and areas of practice identified by CHW graduates and their supervisors largely overlapped (Table 5).

TABLE 5

The most commonly identified procedures requiring learning support were insertion and management of invasive devices (nasogastric tubes, indwelling urinary catheters, intravenous cannulation); management of blood transfusions, oxygen therapy, intravenous fluids, fractures, under-water seal drains; diagnostic tests (fine-needle biopsies, lumbar punctures, 12-lead electrocardiograms) and wound management. Table 5 indicates other areas of clinical practice and more generic skills that required additional assistance post-completion.

Discussion

Quantitative analysis highlighted that nurses graduating in the previous five years assessed their competence as significantly higher than supervisors did across all competence areas. CHW respondents demonstrated similar trends, with graduates rating their competence consistently more highly than their supervisors. Qualitative data identified skills and clinical areas where graduates required additional support after their preparatory programs. These results provide insight into preparedness for practice of Nurses and CHW graduates in PNG, from graduate and supervisor perspectives.

The discrepancy between graduates' and supervisors' assessment of competency is not new. Kajander-Unkari and colleagues [21] found differences between graduating nursing students' and mentors' assessment of competence in Finland. Self-assessment of competence has been widely used to assess graduate health workers' preparedness for practice, with mixed results [21]. Several tools assess nurse competence [22-25] and preparedness for practice [26, 27] but none have been validated for use in low- and middle-income countries (LMIC). A recent scoping review of reviews on nurses' practice readiness found that most research was conducted in high-resource countries [28]; very few have been conducted in LMIC and none in PNG or Pacific Island countries. There is no published literature on CHW preparedness for practice although WHO has declared this an important role in LMIC for achieving universal health coverage [29]. Pilang and colleagues [30] documented development of the CHW role in PNG, but no research on graduates' competency or practice-readiness has previously been published.

Assessment of preparedness for practice is complex. Graduates enter healthcare systems that are constantly changing, and they experience complex, unpredictable, and demanding work environments [31]. The PNG healthcare context makes human resources for health even more challenging. The very small workforce by international standards [15], lack of resources including access to electricity and running water [32] and complex population health needs all challenge transition to practice for both nursing and CHW roles. This is exacerbated by limited support for graduates on entry-to-practice and expectations that they are absolutely work-ready [33]. No continuing professional development is available in most provincial hospitals and smaller facilities. In many locations graduates work in isolation or under extreme workloads limiting their ability to consolidate skills [33], especially for CHWs who are frequently the only trained health worker in a remote community and are expected to work beyond their scope of practice due to task-shifting and lack of support services [7].

Nurses and CHWs form the majority of PNG's health workforce, especially in rural areas; there are an estimated 3264 nurses and 4469 CHWs [15]. Developing and retaining a skilled healthcare workforce in this context requires ongoing education and preparation for practice. Recent policy changes have expanded Nursing and CHW Schools across all PNG's provinces, increasing graduate numbers. However, assessment of preparedness for practice is essential to evaluate the existing Nursing and CHW programs. Curriculum content should link theory and practice, to encourage deep approaches to learning. It should enable students to develop higher order skills including reasoning, problem-solving, critical thinking and creativity, and to understand the values and standards required for health professional practice. However, existing curricula in PNG have focused on teaching specific skills and techniques rather than higher order thinking, limiting graduates' capacity to adapt and apply clinical reasoning to new health challenges [4]. This is demonstrated by the deficits identified by participants in practice areas including NHP priorities and other dimensions of professional competence. Survey results show graduates' limited preparedness in important clinical areas such as maternal and neonatal health, infection control, child and adolescent health, response to climate-related and other emergencies, and health promotion. These areas of practice are central to achieving PNG's national health priorities.

Health and medical knowledge are changing so quickly that it is now impossible to teach students everything they need for their future practice. A fundamentally different approach to designing and delivering educational programs is vital to educate health practitioners of the future. Curricula should therefore be concerned with levels of knowledge where understanding is critical. Being able to "apply understanding" is an important learning outcome [34]. Nursing and CHW are practice-based disciplines requiring continuous interaction between theoretical and practical knowledge. DGN graduates will need to integrate judgement, clinical action and appraise effects. CHWs will need appropriate skills

to make independent assessments and plan care within community settings. Practitioners from both disciplines must effectively solve problems and analyse health concerns in constantly changing environments.

Preparatory education programs therefore need to provide opportunities to develop these skills [4]. New curricula in both Nursing and CHW programs should foster deep and strategic learning, enabling students to engage with subjects and develop skills for life-long learning. Design of learning activities and assessment are fundamental to encouraging these skills and are integral to curriculum effectiveness [4]. Skill development using competency-based assessments is a key component of curriculum review and renewal.

Strengths and limitations

This ambitious, labour-intensive study gathered information from a large sample of health professionals working in varied settings in an environment that challenged data collection. The higher than anticipated response rates indicate the commitment of researchers and participants. While addressing many practice areas, responses are self-reported (among graduates) or based on supervisors' reported observations. It was not possible for independent assessors to verify the competence reported and no validated tools suitable for the PNG context were available.

In comparisons between cohorts, there were minor differences in wording within questionnaires, potentially leading to some rating discrepancy. Further, it is not known whether supervisors' ratings refer directly to the individual graduates who participated in the survey or whether their perceptions were based on recent graduates in general.

Conclusion

This exploratory study evaluated recent nurse and CHW graduates' and their supervisors' perceptions of graduate competence and preparedness for practice in PNG. Graduates and

supervisors demonstrated significantly different views on how well prepared nurses and CHWs were for clinical practice. Supervisors generally considered that graduates were not practice-ready. Results highlight deficits in skills and practice that should be addressed in upcoming national curriculum review and renewal for both DGN and Certificate IV for CHW programs. This study has provided baseline data for assessing future healthcare graduate competencies in the PNG context and could be replicated in other LMIC. Future research should consider instrument validation of competence or preparedness-for-practice instruments in LMIC settings enabling international comparisons.

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Abbreviations

CHW	Community Health Worker
DGN	Diploma in General Nursing
LMIC	Low- and middle-income countries
NDoH	National Department of Health
NHP	National Health Plan
PNG	Papua New Guinea
WHO	World Health Organization

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