THE EUROPEAN SOCIETY OF MEDICINE
Medical Research Archives, Volume 13 Issue 9

RESEARCH ARTICLE

Overcoming Barriers to Nursing and Community Health Worker Education in Papua New Guinea: Challenges and Strategies

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OPEN ACCESS

PUBLISHED
30 September 2025

CITATION
Rumsey, M., Kililo, M., et al., 2025. Overcoming Barriers to Nursing and Community Health Worker Education in Papua New Guinea: Challenges and Strategies. Medical Research Archives, [online] 13(9). https://doi.org/10.18103/mra.v13i9.6878

DOI
https://doi.org/10.18103/mra.v13i9.6878

ISSN
2375-1924

ABSTRACT

Background: Papua New Guinea (PNG) faces significant challenges in healthcare delivery and workforce development. Quality education for nurses and community health workers is crucial for strengthening the health system, especially public health.

Aims: This research aimed to identify persistent barriers to teaching and learning in nursing and health worker schools in PNG and strategies to overcome them. It builds on previous studies and incorporates recent findings on educators' continuing professional development needs.

Methods: Researchers used mixed methods, including surveys of 217 faculty members from 34 education institutions, as well as qualitative feedback from nursing school principals. Data were analysed using descriptive statistics and thematic analysis. Researchers compared the current findings and those from a 2013 baseline study.

Results: The study identified several key barriers to improving health professional education. Technological challenges are pervasive, with limited internet access and a lack of adequate information technology severely constraining educational activities. Infrastructure deficits, including inadequate classroom spaces, insufficient clinical skills laboratories and absence of up-to-date libraries were also highlighted as significant issues. Financial constraints exacerbate these challenges as inconsistent funding undermines the ability of schools to maintain resources and operate effectively. Comparative analysis indicated that staff shortages and limited opportunities for professional development persist, with a decline in the proportion of faculty possessing formal teaching qualifications.

Despite challenges, schools are using innovative strategies to address these barriers. Partnerships with local organisations and health authorities have been instrumental in supporting educational initiatives. Schools have also engaged in resource-sharing arrangements to maximise available materials, particularly in clinical training, with increasing focus on faculty development. Continuing professional development was recognised as essential for enhancing teaching quality and adapting to the evolving educational landscape.

Conclusion: While efforts have been made to expand and strengthen health professional education in PNG, significant challenges related to technological, infrastructural, financial, and human resources remain. Addressing these challenges to support public health requires sustained coordinated efforts from multiple stakeholders, including systematic professional development programs to improve the quality of educators, crucial for enhancing education for future nurses and community health workers in PNG.

Keywords: Nursing education, community health workers, Papua New Guinea.

Introduction

Papua New Guinea (PNG) faces persistent health workforce shortages and skills gaps that undermine equitable, high-quality public health and primary health care[1]. Although improving, life expectancy is low: 60 years for men and 65 for women, with communicable diseases accounting for around half of all deaths and increasing rates of non-communicable disease. Mortality of infants and children under 5 is the highest in the Pacific region and maternal mortality remains at 171 per 100,000 live births[1].

Nurses and community health workers (CHWs) constitute the backbone of PNG's service delivery, including in remote and rural areas where approximately 85–90% of the population lives[1,2]. Because of these factors PNG faces substantial health challenges exacerbated by widespread inequity, challenging geography, lack of infrastructure and shortfall in the healthcare workforce[3]. The impact of the global shortage of health professionals[4,5] is particularly marked in PNG. For instance, while there are 37.1 nurses for every 10,000 people worldwide, there are fewer than 10 nurses per 10,000 in Pacific island nations and only 5.1 nurses per 10,000 in PNG[6]. Yet, nurses, midwives and CHWs are particularly critical in PNG's health system, constituting nearly 90% of all registered health workers (nurses 46.2%; midwives: 2.0%; and CHWs 40.9%, compared with 10.9% for doctors, dentists, physiotherapists and pharmacists combined)[7]. The World Health Organization lists PNG among countries facing the most pressing health workforce challenges in relation to achieving universal health coverage[8], requiring substantial investment and support[9].

The PNG government's *National Health Plan 2021-2030* emphasises the importance of strengthening basic education for nurses and CHWs to improve the healthcare system and achieve universal health coverage[10]. Modelling by the World Bank called for increased health professional training, both pre-service and in-service, to address the country's severe workforce shortfall[11]. However, despite some increases in enrolment in nursing schools[1], shortages in both the quality and quantity of health professional educators persist, raising concerns about the capacity of health professional education systems to produce graduates to meet these challenges in public health and other health services[12-14].

Previous studies found that less than half the educators in CHW and nursing schools hold formal qualifications in teaching or learning[12,13]. Despite expanded training programs, rapid growth in the number of health professional education facilities has not been matched by an increase in well-prepared educators and resources, impeding the quality of educational outcomes[15].

This study examines the current state of health professional education in PNG, identifying barriers to effective teaching and learning, and exploring strategies to overcome them, including continuing professional development for educators. It builds on baseline assessments conducted in 2013 to identify changes over the previous decade and discusses the impact on workforce capacity to address public health challenges.

Methods

The research employed a mixed-methods approach, integrating quantitative and qualitative data collection and analysis to provide a comprehensive understanding of barriers and strategies related to health professional education in PNG. The quantitative component involved structured surveys of faculty members and principals in education institutions; qualitative components included open-ended survey questions and follow-up discussions with participants during training workshops. This mixed-methods design allowed for triangulation of data, enhancing the validity of the findings by combining numerical data with rich, contextual qualitative insights[16].

PARTICIPANTS AND RECRUITMENT

The study comprised two surveys among educators at accredited education institutions nationally, including all 17 nursing schools and 17 of the 19 CHW training institutes at the time. The first survey was conducted among school principals (Principals'

Survey); the second among faculty and educators at each school (Faculty Survey). The sampling strategy was designed to capture a representative cross-section of institutions, to gain insights into the variability in resources, challenges, and educational practices across the country. Using email contact details supplied by the National Department of Health, we invited principals of education institutions to participate in the survey and to distribute surveys to faculty staff. Surveys were also distributed at a professional development workshop for educators in June 2023.

School principals also attended follow-up workshops where they provided qualitative feedback. The principals of all the country's nursing and CHW education institutions were invited; 31 (20 females 11 males) attended. These discussions provided deeper insights into the challenges and strategies identified in the survey, allowing for more nuanced understanding of issues[17]. The qualitative data were valuable in capturing the lived experiences of educators in resource-constrained environments, providing context to the quantitative findings.

DATA COLLECTION

The structured instruments for both surveys were adapted from tools used in previous health education studies in PNG[12,13]. The Faculty Survey, administered between June and September 2023, included questions on sociodemographic characteristics, qualifications and experience, teaching practices and confidence, and perceived barriers to professional development. It also included a modified version of the Activities and Competencies of Nurse Educators scale[18]. In addition, the Principals' Survey addressed institutional characteristics: programs taught, staffing, resource requirements and participants' perceptions of teaching and learning, and of graduate attributes. Surveys were distributed in both electronic and paper formats, with weekly reminders sent to maximise response rate.

Small focus group discussions were conducted with Principals by the meeting facilitator and Monitoring Evaluation Research and Learning adviser in Port Moresby, PNG on 3 June 2024. Discussion topics included priorities for improvement within their respective education facilities, and for implementation of the new revised curriculums. Notes from the small groups were discussed as a larger group and top priorities agreed through consensus.

DATA ANALYSIS

Quantitative data were cleaned and analysed using SPSS v28, focusing on identifying the prevalence and distribution of key barriers across institutions. Data were summarised using descriptive statistics, while inferential statistics were applied where relevant to explore variations in responses between different participant characteristics[19].

Qualitative data, comprising responses to open-ended questions in the surveys and workshop discussions, were analysed thematically. This involved coding the data into meaningful categories and identifying recurring themes[17] related to barriers, strategies, and professional development needs. Coding utilised NVivo software, enabling systematic organisation and retrieval of data for analysis. By triangulating the quantitative and qualitative data, the study was able to validate findings and provide a comprehensive understanding of the barriers to nursing and CHW education[16].

ETHICS

Ethical approval was obtained from the University of Technology Sydney Human Research Ethics Committee (ETH22-7167) and the Papua New Guinea Medical Research Advisory Committee (MRAC #22.61). Participants received an information sheet explaining the study's purpose, the voluntary nature of participation, and the process in place to ensure confidentiality. Participants were free to withdraw at any time and submission of a completed survey constituted consent to participate[20].

Results

PARTICIPANT CHARACTERISTICS

A total of 217 participants completed the Faculty Survey. Responses were received from all but two

of the country's 22 provinces. Table 1 summarises participants' demographic characteristics. The majority were female and had worked in their academic role for 10 years or less.

Table 1: Participant characteristics – Faculty survey

Characteristics	All participants (n=217)	
	n	%
Gender		
Male	72	33.2
Female	144	66.4
Missing	1	0.5
Age		
21 to 30	8	3.7
31 to 40	62	28.5
41 to 50	79	36.5
51 to 60	58	26.8
61 and over	10	4.6
Programs taught[a]		
Nursing	140	64.5
Midwifery	21	9.7
Community Health Worker	87	40.1
Position title		
Principal or Dean	27	12.4
Deputy Principal	23	10.6
Senior Lecturer	43	19.8
Lecturer	31	14.3
Senior Tutor	10	4.6
Tutor	41	18.9
Clinical Tutor	31	14.3
Clinical Supervisor	11	5.1
Employment experience		
Less than 1 year	21	9.7
1 to 10 years	146	67.3
11 to 20 years	34	15.7
More than 20 years	15	6.9
Employment status		
Permanent	183	84.3
Temporary	3	1.4
Contract	31	14.3
Working patterns		
Full-time	211	97.2
Part-time	1	0.5
Casual	3	1.4

[a]Participants could tick more than one response

INSTITUTIONAL CHARACTERISTICS

Forty-four Principals or Deputy Principals completed the Principals' Survey. Of these, 72.7% were female and 63.6% had been in their current position for 10 years or less. Principals reported on the characteristics of their universities or institutes: half reported 100 students or fewer.

Table 2 indicates the admission requirements for health professional programs; most required prospective students to have at least 11 years of schooling. Nearly all programs assessed competence in mathematics, science and literacy relevant to students' chosen programs.

Table 2: Admission requirements by type of institution – Principals' Survey

Years of Schooling	Nursing Programs[a]		Midwifery Programs[a]		Community Health Worker Programs[a]	
	n	%	n	%	n	%
9 to 10 years	2	9.5	-	-	3	13.0
11 to 12 years	9	42.9	2	22.2	12	52.2
> 12 years	10	47.6	7	77.8	8	34.9
Maths and Science						
Yes	19	95.0	9	100	24	96.0
No	1	5.0	0	0	1	4.0
Literacy						
Yes	18	90.0	9	90.0	24	96.0
No	2	10.0	1	10.0	1	4.0

[a] Some respondents did not answer all questions.

Principals described minimum qualifications required for teaching staff. The most common requirement was a Diploma in Teaching or Health Education (82.3% of institutions), followed by a relevant bachelor's degrees (70.6%); 35.2% required both. Nine institutions mentioned Masters degrees as either a requirement or a preference. Some also mentioned specific requirements for a teaching certificate or other teaching qualification. Additionally, many institutions required clinical experience, ranging from three to 15 years, especially for staff supervising students in clinical settings. However, results from the Faculty Survey (below) indicate that these requirements are not being met.

INSTITUTIONAL BARRIERS TO HEALTH PROFESSIONAL EDUCATION

The Principals' Survey identified several barriers that continue to impact the quality of education in nursing and CHW institutions across PNG. Technological challenges remain significant, with limited internet access and inadequate information technology (IT) equipment hampering teaching and learning, especially e-learning modes, and research activities. Only 59% of schools reported having internet access for students and staff, with just 41% having IT support to maintain software and hardware. The lack of printing capability within an institute was highlighted as problematic as, in its absence, high costs were incurred. Frequent power outages further disrupted the use of technological resources for research and e-learning[21].

Infrastructure deficits were prominent, impacting the delivery of practical, hands-on training essential for health professional education. Many schools lacked adequate classroom space, staff and student accommodation, clinical skills or simulation laboratories, and library resources. Furthermore, only 55% had access to 'student services', such as counselling; 23% of schools reported having no library, and those with libraries often had outdated or insufficient materials[3]. Principals reported shortages of textbooks, clinical teaching aids and instruments, and no simulation equipment to support practical learning. A critical need identified was for essential equipment such as blood pressure machines, stethoscopes and anatomical models to facilitate hands-on learning and clinical practice. The need for improved clinical training facilities in remote areas, highlighted a decade earlier in the 2013 study[12,13], remains an outstanding concern.

Financial constraints were another critical barrier, with inconsistent and insufficient government funding affecting schools' ability to maintain and improve resources and general operations of the training institutions. Staff shortages arise due to the delays in the recruitment process which is carried out

centrally at the national level. This financial instability also impacts the long-term planning needed to address infrastructural and technological deficits[22].

HUMAN RESOURCES BARRIERS

The lack of qualified educators was another continuing challenge. Some principals reported high vacancy rates for teaching faculty largely resulting from salary discrepancies and delayed recruitment processes: the surveys identified a mean vacancy rate of 32% in nursing schools (range: 0 to 73.7%) and 25% in CHW institutes (range: 11% to 40%). Short-staffing places pressure on existing staff in terms of extra workload and reduced morale.

The educational characteristics of the sample (Table 3) indicates that the majority have a bachelor degree as their highest qualification. Further, only 30% of faculty members reported having post-basic qualifications in teaching and learning, down from 50% in 2013; 18% had no post-registration qualifications at all – despite the requirements stated by Principals in their survey responses. This decline is concerning as it directly impacts the quality of teaching and the preparedness of graduates to meet healthcare demands[15].

Table 3: Participant educational characteristics – Faculty Survey

Characteristics	All participants (n=217)	
	n	%
Highest Qualification		
Certificate	12	5.5
Diploma	60	27.6
Bachelor	97	44.7
Graduate Certificate/Diploma	11	5.1
Masters	34	15.7
Doctorate	3	1.4
Registration[a]		
Nurse	167	77
Midwife	73	33.6
Community Health Worker	51	23.5
Post Registration Qualifications		
Yes	177	81.6
No	40	18.4
Post Registration Qualification		
Critical Care / Emergency	15	6.9
Medical Nursing	2	0.9
Research	4	1.8
Surgical Nursing	1	0.5
Peri-operative Nursing	4	1.8
Midwifery	71	32.7
Mental Health	3	1.4
Child and Family Health	26	12
Public health	18	8.3
Community health	6	2.8
Leadership and Management	12	5.5
Education	64	29.5
Highest qualification		
Certificate	12	5.5
Diploma	60	27.6
Graduate Certificate/Diploma	11	5.1
Bachelor Degree	97	44.7
Masters Degree	34	15.7
Doctorate	3	1.4

Principals generally indicated confidence in their academic staff's ability to achieve program outcomes for both educational and clinical objectives. While most felt confident in educational capabilities, they reported lower confidence in pedagogic skills in less traditional teaching methods such as e-learning, new technologies, clinical reasoning methods or using clinical learning laboratories. Similarly, the Faculty Survey identified lower confidence levels among teaching staff regarding innovative teaching and learning approaches, for example, using PowerPoint and encouraging students to develop critical thinking and reasoning skills, than in traditional methods such as lectures.

Limited opportunities for professional development further exacerbate this issue, as many educators lack the necessary qualifications and ongoing training to improve or update their teaching practices. Academic staff reported a need for training in new teaching methods and using e-learning technologies, essential to implementing new curricula and supporting education programs for health workers. They also reported limited confidence in developing undergraduate and postgraduate curricula. Qualitative data indicated that staff required networking opportunities, advanced qualifications, specialised training in management or specific health fields, and further professional development in leadership, IT skills, strategic planning and counselling. Barriers to attending professional development activities include timing and location of events, funding constraints, workload, staff shortages or difficulty obtaining leave to attend; some respondents reported that institutions focus on developing younger staff without consideration of the learning needs of more long-standing faculty.

Resources are even more constrained for the CHW institutes than for the schools of nursing. For example, CHW participants reported significantly lower internet access and significantly higher barriers to accessing professional development related to workload, funding, and the location of events compared to those teaching in nursing and/or midwifery programs.

GRADUATE ATTRIBUTES

Principals largely stated that graduates from their schools had the ability to practise in healthcare services (95.3% agreed or strongly agreed), meet population health needs (93.2%) and work within health teams (95.5%). Although the majority were positive, principals were less likely to agree that graduates had critical thinking skills (77.3%), leadership ability (81.8%) or knowledge of how to apply evidence-based practice in their work (81.8%).

CURRENT STRATEGIES

Education institutions demonstrate adaptability and resilience. Despite multiple challenges to health professional education, schools continue to teach and support students through flexible study programs and adaptive teaching methods. Participants identified several strategies used by schools to mitigate these barriers. Partnerships with community and church organisations and health authorities have been instrumental in providing support for educational initiatives, enabling schools to share resources and maximise the use of available materials, particularly in clinical training[12]. There is also a growing focus on faculty development within schools, with ongoing learning programs recognised as critical for improving teaching quality and adapting to the evolving educational landscape[23].

Discussion

These findings highlight the challenges that continue to affect the delivery of quality education in nursing and CHW institutions in PNG. Technological, infrastructural, financial, and human resource barriers identified in 2013[12,13] persist, indicating limited progress in addressing these fundamental issues and affecting the ability to attract well qualified educators to join existing faculty. Similar challenges in the adequacy of infrastructure and capacity of faculty have been reported in other low- and middle-income countries, critically affecting the education of future health professionals[24-26].

Additional constraints in PNG include poor English skills among both staff and students and lack of

familiarity with academic and research literacies that can hinder communication. This is not surprising given that there are over 800 distinct languages spoken in PNG[27]; nationally, less than half the population aged 10 years or over are literate in English[2] and fewer are fluent. Students and staff may speak multiple languages and rarely use English except in education and official communication, posing on-going challenges teaching, reading and writing in English. Such linguistic diversity suggests that supporting language and academic proficiency would enhance understanding and delivery of educational content.

Many PNG institutions continue to struggle with a lack of well-trained clinical tutors and educators which limits the capacity to meet the educational needs of the increasing number of students. Despite the stated requirements of the education institutions (reported by Principals), the decline in the proportion of faculty members with formal teaching qualifications is concerning as it directly affects the quality of education and the competency of graduates[15]. This is compounded by the high vacancy rates in faculty. Together these trends highlight a pressing need for strategies to train, recruit and retain qualified educators and to provide opportunities for in-service and lifelong learning.

Despite the principals' positive assessment of the competence of graduates in this survey, a study of clinicians supervising recent nursing and CHW graduates in PNG reported skills gaps and the need for additional learning support for their clinical practice[28]. This indicates the gap between current health professional education programs and graduates' readiness to join the health workforce and to contribute effectively to advancing population health outcomes in communities and health facilities.

The critical role of continuing professional development in improving the quality of education was evident in the study. The findings suggest that systematic programs are essential for enhancing the qualifications and skills of all educators, which in turn would improve the overall quality of nursing and CHW education nationally[23]. Establishing career pathways for nurses and midwives with flexible opportunities for continuing development without disrupting their roles would be advantageous. Targeting professional development activities to the specific needs of different groups within teaching faculty would be beneficial in enhancing effectiveness. Key themes were the need for: advanced qualifications in nursing; management training; and specialised skills such as IT training. These findings concur with a recent survey of midwifery faculty in the Asia Pacific region that identified their desire to strengthen their capacity in several key aspects of academic practice, including teaching using simulation, undertaking research, implementing curriculum, teaching contemporary clinical practice, using online learning management platforms and understanding the pedagogical implications of artificial intelligence[25].

An earlier study in PNG outlined challenges in professional education for midwives, including lack of clinical preceptorship and limited continuing education[29]. The researchers found that increased learning opportunities for midwifery educators strengthened their teaching capacity and the clinical experience of students, resulting in increased numbers of midwifery graduates and improved working environments and clinical skills among clinical staff. This illustrates the potential benefits of systematically strengthening teaching capacity across the country. Although this initiative contributed to a stronger midwifery workforce nationally, scaling up and sustaining these achievements requires leadership and ongoing funding commitments from the midwifery schools and government alongside the accreditation of midwifery curricula and regulation of new graduates[29].

Recent innovations through the Strengthening Health Workforce Education program conducted by the WHO Collaborating Centre on Nursing Midwifery & Health Development at the University of Technology Sydney (https://www.uts.edu.au/research/centres/who-collaborating-centre/what-we-do/education/strengthening-health-workforce-education-png;

https://www.uts.edu.au/research/centres/who-collaborating-centre/what-we-do/education/strengthening-health-workforce-education-in-png-stage-2) have been successful in building the teaching capacity of educators who took part. Data from the current study demonstrate that health professional educators who had participated in this program were significantly more confident in developing course curricula. However, further resources are essential to extend and sustain the progress of such initiatives. Staff exchange initiatives with overseas health education institutes and establishment of networks or forums for information-sharing would provide other opportunities for professional development, as long as such programs have sufficient time and resources to build and maintain meaningful relationships between participants and facilitators[30].

Infrastructural and funding deficiencies remain a critical barrier to health professional education and retention in PNG and innovative strategies may be needed to overcome them. For example, given the widespread lack of adequate library resources, the creation of e-libraries and access to online learning materials could facilitate health professional education. However, such e-learning capabilities remain limited at present by poor internet connectivity.

While local strategies such as partnerships and resource-sharing offer valuable insights into potential solutions, they are as yet insufficient to fully address the systemic barriers identified. A sustainable, coordinated, multi-stakeholder approach involving the government, educational institutions, health authorities and local organisations is necessary to overcome these challenges and improve the health professional education system in PNG[3].

LIMITATIONS

This research adds to the understanding of health professional education in a country with very limited data on human resources for health[1], providing information to assist workforce planning and management. However, the study has several important limitations. The reliance on self-reported data from faculty members and principals introduces the possibility of bias, as self-reports may reflect subjective perceptions or social desirability bias rather than objective realities, particularly regarding institutional resources and teaching practices[31]. The results may also have been affected by some participants' comprehension of this English-language survey.

The response rate, though substantial, was not uniform across all regions of PNG, with non-response from certain provinces potentially introducing regional bias into the findings. The cross-sectional design of the study captures a snapshot of the current state of nursing and CHW education but does not account for changes over time. Although comparisons were made with 2013 data, that study included a different sample of institutions. The study does not track the progression of individual institutions or educators, limiting the ability to fully understand the dynamics of change within the education system[32].

The qualitative data, while providing rich contextual insights, were analysed using thematic analysis, which involves a degree of subjectivity in interpreting responses[17]. Future research could benefit from longitudinal designs and more comprehensive data collection methods to provide a deeper understanding of the ongoing challenges and progress in PNG's health professional education system.

Conclusions

Significant technological, infrastructural, financial, and human resource barriers continue to impede nursing and CHW education in PNG. Only limited progress was noted from the baseline study undertaken in 2013, and some aspects showed deterioration, notably the proportion of educators with formal teaching qualifications. Addressing these issues requires sustained and coordinated efforts from all stakeholders, including government, educational institutions, and local organisations. The findings highlight the need for more consistent resourcing and for systematic postgraduate and other professional development programs to

improve the quality of educators, which is essential for the overall enhancement of nursing and CHW education. Programs such as Strengthening Health Workforce Education have demonstrated valuable advances in the skills and capacity of educators; they provide valuable models of continuing education for faculty specifically designed for meet needs in the PNG context. By systematically addressing these barriers, PNG can strengthen its health professional education system and better meet the country's public health and other healthcare needs.

Conflict of interest

The authors have no conflicts of interest to declare.

Funding statement

This study was funded by the Australian Government Department of Foreign Affairs and Trade, through the Strengthening Health Workforce Education program in PNG.

Acknowledgements

The authors are grateful to all the principals and staff of education institutions who participated in this study, for their time and insights.

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