Critical Care Nursing in Papua New Guinea

Ged WILLIAMS, RN, BN, LLM, MHA, FACN, FACHSM, FAAN,[a] Rose JASPERS, RN, MACN,[b] Veronica WOHUINANGU, RN,[c] Svatka MICIK, RN, PhD, MN,[d] and Adrian DE LUCA, CN, BN, GradDip. NSc(Cardiac)[e]

Objective: *To explore and understand the current context of critical care nursing in Papua New Guinea (PNG).* ***Method:*** *A three day fact finding mission and consulation process with leaders of critical care and health services in PNG.* ***Results:*** *Although challenged by limited resources and healthcare infrastructure there is a determination among local health care providers to growth and improve the provision of critical care services from the major hospitals of PNG. The PNG Critical Care Nurses Society (PNG CCNS) was officially formed in March 2020, providing hope and optimism for a renewed emphasis on this important speciality in PNG.* ***Conclusion:*** *The authors and the PNG CCNS recommend the establishment of active and supportive partnerships with other critical care leaders of the world to help guide future developments in PNG.*

Keywords: critical care nursing, Papua New Guinea, resource limited countries, professional nursing practice, nursing associations

INTRODUCTION

Papua New Guinea in Context

Papua New Guinea (PNG) is located in the south west of the Pacific Ocean to the north of Australia and to the east of Indonesia. It became a sovereign nation in 1975 following administration under the Australian Government since 1949. Governance is through a Westminster-style structure with a legislative branch, whose members are elected for 5-year terms. Politically PNG is made up of 22 provinces across four geographical regions. Port Moresby is the capital city of PNG and major secondary cities that have sizeable hospitals are found in Lae, Goroka, Mt Hagen/-Mendi, Madang, Popondetta, Rabaul, and Alotau, to name a few (Figure 1).

The constitution enshrines the country as a Christian nation with strong links to many Christian service organizations including universities and health services.

Economically PNG is considered a low middle-income country (World Bank, 2020). The majority of the population live in rural settings although there is significant growth in major cities, the largest being Port Moresby. However, PNG's growth and development remains dependent on Official Development Assistance and Australia is the PNG's largest bilateral donor (Grundy et al., 2019).

[a]*Founding Chair, World Federation of Critical Care Nurses. Adjunct Professor of Nursing, Griffith University, Australia. E-mail: ged_williams@hotmail.com*

[b]*President, Australian College of Critical Care Nurses (Victoria Branch). Lecturer, Monash University, Melbourne, Australia*

[c]*President, Papua New Guinea Critical Care Nursing Society. Nursing Coordinator, Critical Care, Port Moresby General Hospital*

[d]*Coordinator PNG Missions, Open Heart International, Nurse Unit Manager, Intensive Care Unit, Royal Adelaide Hospital, Australia*

[e]*Educator PNG Missions, Open Heart International, Associate Nurse Unit Manager, Intensive Care Unit, Royal Adelaide Hospital, Australia*

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Figure 1. Map of Papua New Guinea (Wikipedia).

Gender can impact social, educational, and health-related outcomes, so it is significant to also note that PNG was ranked 161 out of 189 countries on the United Nation's Gender Inequality Index in 2018 (United Nations Development Reports, 2019). Other critical demographic and social measures of PNG are summarized in Table 1.

A Brief History of Health Care and Critical Care in PNG

Health care in PNG has historically been challenged by many factors including a lack of health facility infrastructure, funding, governance issues, poverty, and health literacy to name a few. The Australian Government contributes up to 20% of PNG's domestic health budgets and aligns with the PNG's National Health Plan: 2010–2020 with a particular emphasis on improving health security and child health outcomes (Department of Foreign Affairs and Trade, 2020).

The PNG National Health Plan 2011–2020 is the first of the 10-year national health care plans that align with the Health Vision 2050 (Government of PNG, 2010). This document provides a comprehensive and robust vision for the health system. As previously stated, there is a strong emphasis on primary and community health priorities including infectious disease control (Tuberculosis and HIV in particular), maternal and child health as well as expanding and strengthening existing infrastructure.

Critical care has not had a strong profile as primary health care needs have been more pressing and less expensive to implement (Duke, 1999; Thomason, 1993). In addition, the health care workforce has been characterized by the World Health Organization (WHO) Global Health Workforce Alliance as:

- An aging workforce
- Low numbers of critical cadres, such as midwives and community health workers
- A de-motivated workforce due to poor working conditions including low wages and poor physical infrastructure
- Insufficient training capacity to produce the number of health workers to meet population needs
- Maldistribution of specialist clinical and technical skills, where 30% of skilled health professionals occupy administrative and management positions (WHO, 2020)

Nevertheless, intensive care units (ICUs) and services have been in place since the early 1970s at Port Moresby General Hospital (PMGH) but less so in many other parts of the country.

AIM

This article aims to summarize the key findings from a joint fact-finding exercise undertaken by representatives of the Australian College of Critical Care Nurses (ACCCN) and World Federation of Critical Care Nurses (WFCCN) with colleagues in PNG and to better understand the current situation and to raise the profile of critical care nursing in PNG.

TABLE 1. Comparisons of PNG Demographics With Other Country Neighbors (Central Intelligence Agency, 2020)

Characteristics	Papua New Guinea	Indonesia	Australia
World Bank Ranking	Low middle income	High middle income	High income
Land Area (sq kms)	452,860	1,811,569	7,682,300
Population	7,259,456	267,026,366	25,466,459
Population Over 65	4.64%	7.82%	15.88%
Birth rate (births/1,000)	22.5	15.4	12.4
Death rate (death/1,000)	6.7	6.6	6.9
Infant mortality (death/1,000 live births)	33.2	20.4	3.1
Maternal mortality (death/100,000 live births)	145	177	6
Life expectancy	67.8	73.7	82.7
Health expenditure (% GDP)	2%	3.1%	9.3%
Obesity (adult)	21.3%	6.9%	29%
Literacy (%)	64.2%	95.7%	99%
Children <5 years, underweight	27.8%	19.9%	N/A
GDP per capita (USD)	$3,700	$12,400	$50,400
Total fertility rate (children/woman)	2.84	2.04	1.74
Internet users (% population)	9.6%	25.4%	88.2%

Inspiration

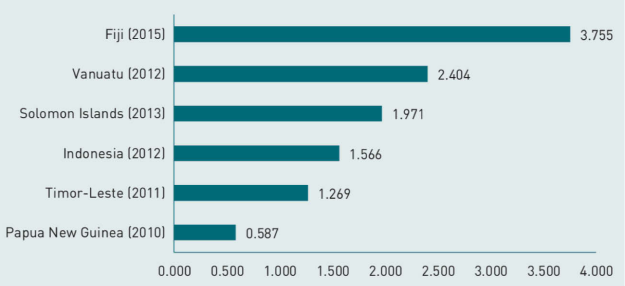
In October 2019, representatives of the (interim) PNG Critical Care Nursing Society (PNG CCNS) approached the Founding Chair of the WFCCN (GW) at the World Congress of Intensive Care in Melbourne Australia and requested a meeting to explore how they and their colleagues could become more active in the WFCCN. Having had a long history of trying to engage critical care clinicians in PNG with ACCCN and WFCCN, GW suggested a collaborative visit of representatives from WFCCN and ACCCN to PNG to better understand their current situation and needs. GW Ged Williams and RJ Rose Jaspers represented WFCCN and ACCCN respectively and timed their visit (19–22 February 2020) to coincide with SM Svatka Mikic and ADL Adrian DeLuca and their colleagues from Open Heart International (OHI) who had planned to undertake a mission to PNG at this time. Due to time and cost constraints the visiting team was based in Port Moresby for the period of the visit.

APPROACH

To gain an understanding of the current state of critical care nursing practice and potential for growth and development, the following planned approach was used:

- Representatives of ACCCN and WFCCN visit accessible hospitals (two) that are currently providing critical care services to understand the clinical context, capabilities, and constraints.
- Align the visit with the presence of the OHI team from Australia being in PNG to gain first hand insights into their experience and knowledge of developments in PNG.
- Meet critical care clinicians (doctors, nurses, and others) including members of the (interim) PNG CCNS to understand their needs and aspirations for their profession.
- Visit University of PNG and meet with leaders and academics to understand educa-

Figure 2. Physicians, nurses, and midwives per 1,000 population, selected countries (taken from Grundy et al., 2019).



tional processes used to develop specialist critical care nurses.

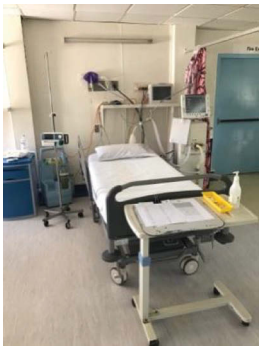
- Meet key health decision makers to understand how they perceive critical care services in the context of the total health care system.
- Explore and recommend practical ways to contribute further to the development of critical care in PNG.
- Subsequent to the visit a follow up of any critical information via e-mail to ensure accuracy of the facts to complete the full report to the stakeholders (and this publication).

FINDINGS

Current Critical Care Services

The National Health Plan 2011–2020 proposed that four specialist hospitals be established, with one located in each region within PNG (Government of PNG, 2010). The plan states these Specialist Regional Hospitals are to have "a multi-faceted role as a national specialist hospital (for example, provision of oncology services for the country), as a provincial hospital catering to its individual province, and as a regional hospital catering to the needs for complex treatment of patients from its individual region." The plan also correctly acknowledges the manpower constraints within PNG (specifically that of specialist medical officers and specialist nurses) compared to other countries in the region (see Figure 2).

Figure 3. Standard bed set up at Port Moresby General Hospital Intensive Care Unit.



Although there are not specific references to intensive care services in the National Health Care Plan 2010–2020, it is anticipated to be included in subsequent plans.

Observations at PMGH:

- The general ICU is air conditioned and has seven beds with a pool of ventilators, monitors, and infusion devices (see Figure 3 for standard bed setup). It is an open unit, in that the primary physician retains clinical management control of the patient while in ICU. Medical coverage is by registrar and consultant on-call, six to seven nurses on the morning shift, reducing to five to six and four to five nurses on the late and night shifts, respectively.

- In addition, there is a three-bed cardiac ICU that is air-conditioned and equipped with ventilators, physiologic monitoring, and infusion devices
- The step-down area adjacent to the general ICU has overflow and high dependency care and is not air-conditioned.
- The surgical ward area (180 beds approx.) has a high dependency area and a burns area but is not equipped with ventilators.
- There is a new ICU/Coronary Care Unit (CCU) and cardiac catheter lab in the final

stages of commissioning but were not available for use at the time of the visit.
- PMGH is the only Level 7 Specialist hospital (highest classification of all specialist hospitals) in PNG and is expected to expand ICU services as well as many other specialist services such as surgery, oncology/hematology, emergency/trauma in line with the National Health Plan.

Information gained from other sites

- Hospitals such as those in Lae, Goroka, Mt Hagen, Rabaul are expected to have ICU services and some have already commenced building such services.
- Angau Memorial Hospital (Lae) has a 6-bed ICU and is expanding to a 12-bed facility but did not have a complete plan for equipment and staff to fully commission the expansion at the time of the visit.
- Other Specialist Regional Hospitals are expected to be challenged by equipment and human resource requirements as well.
- There is a need for increased numbers of skilled ICU nurses to support these planned developments.
- In the wards, increased staffing is required to manage the patient numbers and their acuity. The nurses believe that in time an ICU Outreach Nurse/Rapid Response Team service, available to the general wards, would: (a) improve recognition and management of deteriorating patients and ward patient outcomes generally, and; (2) reduce unnecessary admissions to ICU.

Nursing Education, Training, and Specialization

The author team met with senior members of the health faculties at the University of Papua New Guinea (UPNG) to inform this section. The requirements necessary to become a registered nurse in PNG is a Diploma of Nursing. This program requires 3 years full-time study at a recognized University. There are six university schools of nursing providing the Diploma of Nursing program in PNG. In addition, there is a 4-year Bachelor of Nursing offered by Pacific Adventist University that also leads to registration as a nurse.

The UPNG offers a post-registration Bachelor of Clinical Nursing—Critical Care with three primary specialization streams: in Perioperative, Emergency, and Intensive Care. Prerequisite for enrolment in these courses is Diploma in Nursing and 3–5 years working in the specialty.

Course structure of the Bachelor of Clinical Nursing—Critical Care:

- One-year duration
- 44 weeks full time (5 days/week lectures) to deliver theory
- Exam at completion of theory delivery
- After exam: 8 weeks of clinical placement in the specialty including clinical assessment component
- Payment to enroll comes from both employing institution and the student. The student component is currently K13,680 (K = Kina, $4000 USD). The average nursing salary in PNG is around K4000/month ($1150 USD).

Issues identified by meeting participants with regard the Bachelor of Clinical Nursing—Critical Care:

- Intake into the Bachelor of Clinical Nursing—Critical Care is capped at 30 (i.e., 10 for each specialty stream—Intensive Care, Emergency, Perioperative)
- UPNG is the only nursing school that offers post-registration studies in specialties other than Midwifery
- There is no specific textbook requirements
- The University libraries have a single database (Hinari) for access to biomedical and health science journals.
- Internet capability and availability is variable and expensive, there is limited use of online resources in formal education

Figure 4. Basic and limited simulation equipment at UPNG.

- The current curriculum is over 5 years old
- Clinical component within the bachelor qualification is too short to facilitate transition of knowledge to practice.
- The infrastructure (UPNG and PMGH training equipment and space) is insufficient to facilitate simulation training, but both institutions have plans to modernize the clinical laboratory facilities (Figure 4 provides an example of the simulation equipment available).

There are no other higher degree studies available in nursing in PNG, that is, the bachelor programs are the highest academic nursing programs available at present. The other post-registration bachelor degree programs provided by UPNG are in Midwifery, Mental Health, Community Health, Nursing Management, and Nursing Education.

Although there are opportunities in Australia and New Zealand for post-registration studies, meeting participants described barriers to studying in these countries. Significantly, the requirement to complete the International English Language Testing System (IELTS) for admission is 6.5 which is both difficult and expensive. However, some nurses are encouraged and supported to undertake post-registration studies in Asia. Furthermore, many have participated in "immersion" learning experiences in critical care areas overseas. These have been observational only, due to professional regulatory requirements. Moreover, OHI has recently sponsored two critical care nurses to attend a multidisciplinary, accredited Cardiac Surgery Advanced Life Support course in Adelaide, Australia (2019) and the World Congress of Intensive Care in Melbourne, Australia (2019). Finally, ACCCN and Australian and New Zealand Intensive Care Society (ANZICS) have also contributed by sponsoring two critical care nurses to attend the abovementioned World Congress.

Clinical Practice and Scope of Nurses Working in Critical Care

Professional nursing registration, education, and clinical practice standards are governed by the Papua New Guinea Nursing Council (PNGNC). The PNGNC has published Nursing Competency Standards in 2002 (PNGNC, 2002), as well as other standards for midwifery and community nursing but not for specialties such as critical care.

All nurses working at PMGH should be basic life support (BLS) and advanced cardiac life support (ACLS) trained in critical care areas as per hospital management expectations. Clinical practice for ICU nurses includes management of airways, ventilation, and inotropes in intensive care. However, challenges exist with variable clinical skill and expertise between nurses and variation in equipment availability limits clinical practice (e.g., lack of working ventilators). There is minimal multidisciplinary management, for example, the ICU does not have dedicated physiotherapy and pharmacists are not active on the unit which hampers progressive practice and collaborative problem solving.

Nurses also identified that learning was mostly "traditional," that is, learning from predecessors, rather than from current evidence-based practice. More contemporary practices such as early mobilization of long-term ventilated patients is not happening although in theory is possible. Our team were able to guide nurses to sit a long-term

care patient out of bed and mobilize back to bed while on location, sparking a very valuable and hopefully sustainable discussion about such simple practices that can be incorporated into future practice.

PMGH hosts a twice-yearly OHI program that flies in a team of 10–12 clinicians to support the provision of open-heart surgery, mostly from Australia (Figure 5 provides a sense of the operating room environment at PMGH during an OHI coordinated procedure). This program has been in place for over 25 years. In early times the visiting team provided much of the care, necessitating a much larger team. Since then, the focus has progressively been on upskilling and empowering the local PNG nurses and doctors to take more of the responsibility for each element of care. Surgical, Anesthesia and ICU medical care has strengthened significantly through these efforts. Nursing skills and confidence has also grown significantly, and is supported by: the creation of clinical pathways for the care of children post cardiac surgery; twice yearly two-day theoretical and clinical upskilling programs; post-mission multidisciplinary symposiums; small-scale PMGH/OHI research studies, and; OHI and ANZICS developing countries' sponsorship to support conference attendance. However, the transient nature of the OHI visits poses ongoing challenges to maintain the high level of skill, competence, and confidence in between visits. Nevertheless, the progress has been commendable and is continuing.

Professional Development Needs and Aspirations of Critical Care Clinicians

A professional forum was facilitated by the leadership of the (interim) PNG CCNS on 21 February 2020 at the PMGH. The four representatives from WFCCN, ACCCN, and OHI and approximately 15 nurse leaders from across Port Moresby and 3 from other provinces were present (Figure 6—photo of meeting participants).

Key findings:

Figure 5. OHI Team in OR supervising local clinicians in pediatric open-heart surgical case at PMGH.

Figure 6. WFCCN/ACCCN Representatives, OHI Nursing leads, and members of PNG CCNS (21 February 2020).

- The PNG CCNS Constitution has been submitted to the Investment Promotion Authority (IPA). It was formally approved in March 2020.
- Mrs. Veronica Wohuinangu, Interim President provided a summary of the strengths, weaknesses, and threats to critical care nursing in PNG.

Of most concern to the members presentwere:

- Access to education, training, and upskilling opportunities. This requirement is at multiple levels—university programs at master's degree level, nationally recognized skills competency development programs and local hospital in service education and competency-based skills development such as ACLS, trauma courses, and so on.
- Recognition of the specialist skills and contribution provided as a critical care nurse. This could include certification or registration as a specialist critical care nurse and pay and benefits enhancement as a retention factor.
- The need for both human and material resource system(s) that match supply with demand.
- There were concerns raised by some nurses that Wi-Fi access is difficult which makes access to contemporary educational materials difficult. However, we were informed by senior hospital management that a National Broadband Network was being put in place that should address this issue.

There was a strong sense of excitement and motivation at the prospect of officially forming their own professional society with very little support from outside and in particular the new possibility of establishing relationships with ACCCN and WFCCN.

DISCUSSION

Critical care is a relatively new and small element to the national health care system in PNG, yet for those citizens with life-threatening conditions the service is vital.

The efforts of OHI to provide safe and effective open-heart surgery to PNG citizens and to upskill PNG health care professionals is commendable and highly important in pioneering advanced critical care practice in country.

There is a small but determined community of critical care professionals working together in PNG with an enormous passion and drive to want to build the capacity and capability of the critical care service and the staff who deliver critical care services in PNG. In addition, there is an acute need in the general wards of the hospitals to have access to ICU outreach-type services to help them recognize and respond to patients at risk of further deterioration.

The emergence of the PNG CCNS is a giant step forward to recognize the need for greater collaborative efforts among nurses (and other health professionals) to take control of their own learning and development needs where able, nevertheless they will need assistance and must lobby for that assistance if it is to materialize.

We met sympathetic hospital administrators who wish to see greater opportunities for advancement of many clinical specialities and realize the importance of a robust critical care service to underpin the safety of advanced specialization in the acute hospital setting, suggesting there is scope and hope for more progressive reform and improvement in developing critical care services.

We know that both ACCCN and WFCCN are open to providing support and guidance to our colleagues in PNG and are reviewing the report of the visit to explore opportunities that can be pursued collaboratively to help empower local nurses to address many of the identified needs (ACCCN, 2020). In addition, we were informed by our medical colleagues in Australia and New Zealand that they have a strong and active commitment to help clinicians and especially in neighboring low and middle-income countries such as PNG. Furthermore, they are particularly open to multidisciplinary training and development recognizing that this is the only way forward in a hurry!

We hope the full report and this publication will stimulate attention and interest in the current health situation in PNG and the importance of building a stronger and more capable

critical care service. By engaging experienced and supportive individuals and health care societies from Australia and elsewhere the possibilities are endless.

Limitations

There are many limitations to this study, and it does not purport to be comprehensive nor accurate in all aspects. The full report and this publication are based on the best information we were able to gather in the time frame and resources available. Significant limitations included but are not limited to:

- The WFCCN and ACCCN representatives had only 3 days in country with no prior professional experience or exposure to clinical practice in PNG.
- The sample of participants in the consultation meetings held in Port Moresby is likely to have been biased. Our PNG hosts did their best to be inclusive of as many other interested parties and persons. We expect there are many others who would like to have had input into the discussions.
- Despite the efforts of clinical managers and leaders, we were unable to meet with Department of Health officials during the time in country.
- ICU/Critical Care Services is a relatively new priority for PNG government and very little official planning or guidance was able to be found. There is no direct reference to ICU/Critical Care Services in the PNG National Health Plan 2011–2020.
- Given that the visit took place over a short time frame and was arranged at relatively short notice, many facts and documents had to be followed up after leaving the country which has resulted in gaps in information.

Despite these limitations, the authors acknowledge the importance of giving voice and visibility to the PNG critical care nursing situation and add to what limited literature exists.

CONCLUSION

Critical care is a relatively new and developing specialty in PNG, a country that has significant economic, social, and political challenges. Nevertheless, there is a palpable sense of hope and optimism for critical care services to grow and mature with support and guidance from colleagues in more experienced and developed health care systems.

The WFCCN, ACCCN, and other organizations and stakeholders have an important role to play in providing guidance, support, and mentorship to the emerging leaders of critical care in PNG. Such efforts will save many lives and ensure a more capable and prosperous community.

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