



National audit of critical care resources in South Africa – nursing profile

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Objectives. (i) To determine the profile and number of nurses working in South African intensive care units (ICUs) and high care units (HCUs); (ii) to determine the number of beds in ICU and HCUs in South Africa; and (iii) to determine the ratio of nurses to ICU/HC beds.

Design and setting. A descriptive, non-interventive, observational study design was used. An audit of all public and private sector ICU and HCUs in South Africa was undertaken.

Results. A 100% was sample obtained; 74.8% of the ICU nursing managers were ICU-trained nurses with an average of 12.8 years of ICU experience. Only 25.6% of nurses working in ICU were ICU trained. The majority were registered nurses (49.2%), while 21.4% were semi-professional nurses. Private

sector nurses represented 50.3% of all nurses. Some 42.8% of the professional nurses had 0 - 5 years of experience and 28.7% had 5 - 10 years. The groups 10 - 15 and 15 - 20 years represented 16.1% and 6.6% respectively. Only 5.7% nurses had 20 and more years' experience. In the units that used agency staff the ratio of permanent to agency nursing staff for the month of June 2003 was 64.5% versus 35.5%. In total there are 4 168 ICU and HC beds in South Africa that are serviced by 4 584 professional nurses. The nurse:bed ratio is 1.1 nurses per ICU/HC bed.

Conclusions. This study demonstrates that ICU nursing in South Africa faces the challenge of an acute shortage of trained and experienced nurses. Our nurses are tired, often not healthy, and are plagued by discontent and low morale.

Nurses are the backbone of any health care system. The quality of nursing directly affects patient outcomes, i.e. morbidity and mortality, adverse events and total cost of care.¹ The Department of National Health and the national nursing regulatory body, the South African Nursing Council, have acknowledged that there is an acute shortage of nurses and specifically of ICU-trained nurses, but the magnitude of this problem has not been quantified. An audit describing the nursing workforce objectively is an essential first step in an attempt to clearly define the extent of the problem.

Following widespread dissatisfaction among its members, the Critical Care Society of Southern Africa (CCSSA) commissioned the South African Human Science Research Council in the late 1980s to undertake a study to investigate problem areas in ICU nursing in South Africa.² The study identified a low morale and a desperate shortage of ICU nurses. Unfortunately no steps were taken by health care providers to deal with the deficiency.

For this reason, a national ICU audit was commissioned by the CCSSA in 2003. The purpose of the study was to identify hospitals with and without ICU facilities and to determine the national distribution of units, the nature of medical and

nursing staff support, the extent to which these units were compliant with South African Bureau of Standards and CCSSA standards and lastly to identify referral patterns between hospitals. This paper addresses the profile of nurses in ICU and high care facilities in SA.

Methodology

The audit was undertaken in 2004 - 2005. Approval to conduct the audit was obtained from the ethics committees of eight universities, the department of National Health, the respective provincial health departments, the Surgeon-General of the South African Defence Force, and the respective private hospital groups. Approval was thereafter obtained from the respective hospital management before proceeding with the study. This part of the audit was conducted as part of an 11-page questionnaire that was completed by one or more of the following persons: nurse unit manager; medical director; or ICU nursing service manager.

The methodology followed is detailed in a separate paper.³

The objective was to determine the profile and number of nurses working in South African ICUs and HCUs (Table I). A further objective of the audit was to determine the number of beds in ICU and HCUs in South Africa and we used these data to determine the ratio of nurses to ICU/HC beds. Descriptive data analysis was used.

Results

A 100% (448/448) sample of all ICU and HCUs in both the public and private sector was obtained.*

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Table I. Nursing-related data collected

Nursing manager:
• Qualifications
• Years of ICU experience
For each permanent employed nursing staff member (June 2003):
• Qualifications
• Years of ICU experience
For each agency nursing staff member (June 2003):
• Qualifications
• Years of ICU experience
Number of permanent/agency nursing staff working in the unit on a daily basis in June 2003

The majority (74.8%, 335/448) of the ICU nursing managers were ICU-trained nurses with an average of 12.8 years of ICU experience.

Only 25.6% (1 490/5 821) of nurses working in ICU were ICU-trained and of this group, 3.8% (223/5 821) were trained as neonatal ICU nurses. Of the remaining nurses, the majority were registered nurses (49.2%, 2 865/5 821) while 21.4% (1 243/5 821) were semi-professional nurses (Fig. 1). Private sector nurses represented 50.3% (2 930/5 821) of all nurses.

Some 42.8% (1 961/4 578) of the professional nurses (registered nurses, ICU and neonatal trained nurses) had 0 - 5 years of experience (Fig. 2). The second highest group (28.7%, 1 316/4 578) had 5 - 10 years of experience. The groups with 10 - 15 and 15 - 20 years of experience represented 16.1% (739/4 578) and 6.6% (303/4 578) respectively. The smallest group (5.7%, 259/4 578) comprised professional nurses with 20 and more years of ICU experience.

Agency staff was used in two of the nine provinces in the public sector and in the majority (91.2%) of the units in the

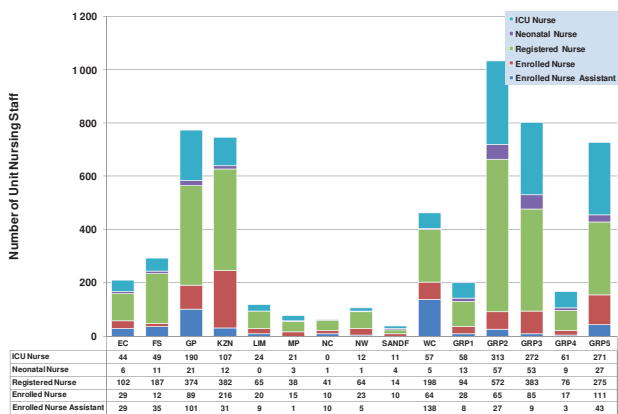


Fig. 1. Profile of nurses working in ICU: training.

*Public hospital results are reported by province with the South African Defence Force shown separately. Private hospital results are reported as groups representing respectively the three largest private hospital groups, the smaller hospital groups combined and the independent private hospitals combined. The results of the private hospital groups are presented in a blinded random order to ensure anonymity.

private sector. In the units that did use agency staff the ratio of permanent to agency nursing staff for the month of June 2003 was 64.5% permanent staff and 35.5% agency staff (Fig. 3). Detailed information on the profile (training and years of experience) of agency nurses was unavailable.

In total there are 4 168 ICU and high care beds in South Africa that are serviced by 4 584 professional nurses. The nurse:bed ratio is therefore 1.1 nurses per ICU/high care bed (Fig. 4). There is no difference in this ratio between the public and private sectors. Conversely, in the public sector there were fewer (0.3) ICU trained nurses per ICU/high care bed compared with 0.5 ICU trained nurses per ICU/high care bed in the private sector.

Discussion

The South African Nursing Council maintains a register of nurses in South Africa, which gathers information pertaining to the qualifications of nurses but does not track whether these nurses are practising and if so, where they are practising. It is known, but not documented, that a substantial percentage of ICU registered nurses, often practise in other nursing areas

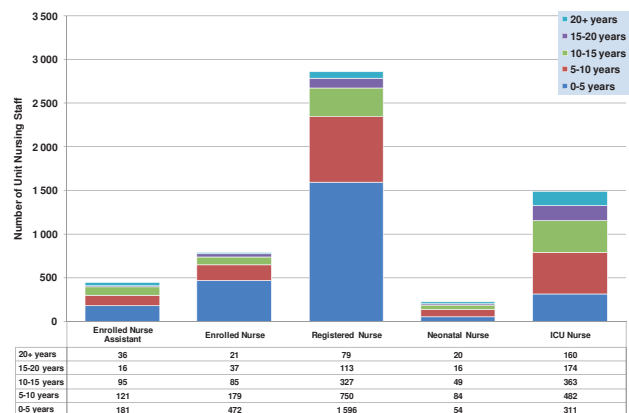


Fig. 2. Profile of nurses working in ICU: years of experience.

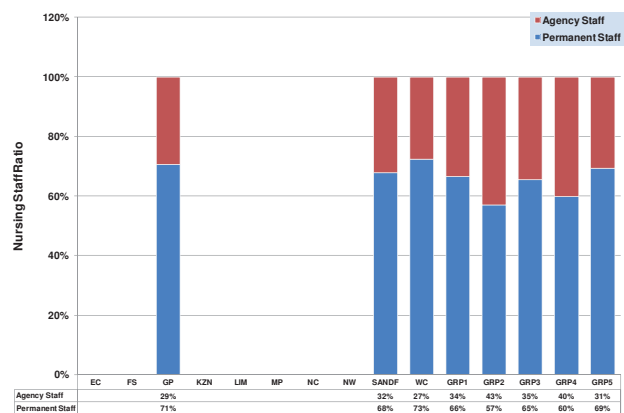


Fig. 3. Nursing staff ratio June 2003.

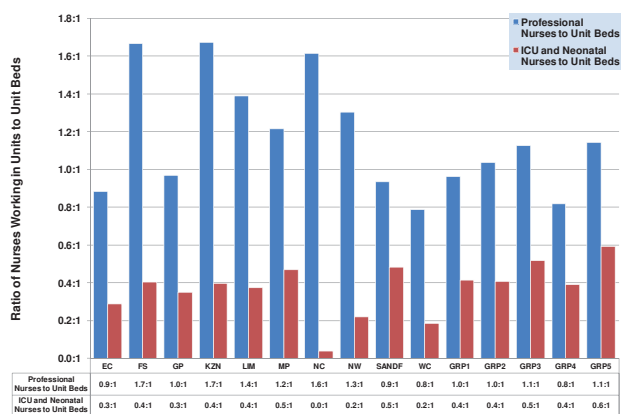


Fig. 4. Ratio of nurses working in units to unit beds.

such as nursing management and education, or leave nursing altogether.

Williams and Clark⁴ suggested in an Australian study that the ideal ratio is 6.7 nurses per ICU bed and 3.9 nurses per high dependency bed, provided that at least 50% of these nurses have an ICU qualification. According to these authors it is the ideal that 75% of the ICU nurse work force should have an ICU qualification. In the aftermath of the SARS epidemic, the Hong Kong hospital authority indicated that an ICU-trained component of at least 80% is required in order to be prepared for major incidents on the scale of a national epidemic.⁵ While we acknowledge that a ratio of 6.7 might be the gold standard and that this standard is not always achieved in other countries, this does emphasise the magnitude of the ICU nursing crisis in our country. Given the current ICU/high care bed supply and using an average of three nurses per bed the current national deficit is 7 920 nurses.

There is abundant evidence that nurse-staffing ratios directly influence patient mortality and morbidity and the cost-effective use of health care resources. Amaravadi *et al.*⁶ demonstrated that decreased nurse staffing at night is associated with postoperative complications, increased length of ICU stay and increased health care costs. Further decreased nurse-staffing levels were significantly associated with increased risk of complications in patients undergoing abdominal surgery.⁷ Tarnow-Mordi⁸ found that the three measures of ICU workload most strongly associated with mortality are peak occupancy, average nursing requirement per occupied bed shift and the ratio of occupied to appropriately staffed beds. There is also sufficient information to link nosocomial infections with nursing resources.⁹

The AACN's membership demographics revealed that 25% of their members have 21-plus years' experience and 20% have 0 - 5 years' experience.¹⁰ In South African ICUs, the converse is true; only 5.7% of nurses have 20-plus years' experience and 42.8% of nurses have 0 - 5 years' experience. In the ICU situation, it is crucial that nurses have the ability

to make accurate clinical judgements and to act on them. Morrison¹¹ suggests that nursing care without expertise may be considered a potentially harmful intrusion for the patient. They concluded in their study looking at the effects of nursing staff inexperience on the occurrence of adverse events that errors are more likely to occur when nursing inexperience is combined with staff shortages, poor supervision and lack of support staff.

Migration of nurses is often given as the reason for the acute shortage of nurses in South Africa. The National Nursing Association and Professional Union in South Africa (DENOSA) commissioned a report on nurse emigration in South Africa, published in 2001.¹² This report noted with caution the differences in emigration data collected by different institutions in South Africa, and the authors concluded it was not possible to determine the actual number of nurses leaving the country, or to which country they have moved.

The acute shortage of nurses, but especially of ICU-trained nurses is alarming. To further complicate the problem, a recent study conducted in two public sector hospitals in Gauteng found that the prevalence of HIV among nurses was 13.5%. The highest prevalence by age among 25 - 34-year-olds (15.9%), the age group of the majority of nurses working in ICU. A high proportion of the study sample had CD4 counts below 350 cells/ μ l.¹³ The results from this study are consistent with previous research of the HIV/AIDS epidemic among health care workers in South Africa. Shisana¹⁴ recommended that the Department of Health treat these findings as an emergency and act accordingly.

Various recent studies have shown that the knowledge of ICU nurses in South Africa in a number of clinical areas is lower than the acceptable standard. Two studies^{15,16} showed little difference between the knowledge of ICU-trained and non-trained nurses; there was also a poor correlation between knowledge levels and years of experience. In South Africa there is no ongoing process of accreditation for ICU educators or nurses practising in ICUs.

Generally, with slight variations, nurses work an official 40-hour week in ICU in SA. The national audit showed that agency staff represent about a third of the staff complement where agency staff is utilised. No research or evidence is available on agency nursing staff in SA, but what is generally known is that the use of agency staff has increased and that the majority of the agency nursing workforce comprises nursing staff permanently employed elsewhere who are moonlighting, often without their formal employer's official awareness or consent.

It is therefore believed that on average many nurses work more than the recommended 40 hours per week. What is not known is how much more. ICU nurses must be alert to subtle changes in their patients' condition, accurately perform clinical assessments and respond accordingly. Long working hours result in a decreased level of alertness and could lead to a commensurate increased probability of adverse events.¹⁷



Not only is the health and vigilance of the ICU nurses a concern, but the nurses working in South African ICUs have low morale. A qualitative study, which posed the question 'How do you find working in ICU?' had interesting results. The nurses described a dichotomous passionate nightmare of working in two worlds.¹⁸ Intra-personal experiences were very positive (passionate), but inter-personal experiences and working experiences and conditions were experienced as very negative (nightmare). A retention strategy that takes cognisance of these realities is essential to prevent further losses of this scarce resource.

Conclusion

It is crucial that the planning and structuring of an essential workforce such as ICU nursing be evidence based and that all the role players should be involved. This study clearly demonstrates that ICU nursing in South Africa faces the challenge of an acute shortage of trained and experienced nurses. Our nurses are tired, often not healthy, and plagued by discontent and low morale. Equally, the quality of the training and continuing medical education is dubious. There are no effective recruitment and retention strategies, with significant losses of nurses to migration and other career opportunities. An effective solution must embrace short-, medium- and long-term strategies and be broad enough to address all of these challenges.

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