

# Assessment of student nurses' knowledge of pressure ulcers and their associated factors

**Background and objectives:** Improving nursing students' knowledge of pressure ulcers (PUs) requires educators to have basic information about their current level of knowledge. This study aimed to determine Iranian nursing students' knowledge about PUs and their contributing factors. **Methods:** Students (mean age: 24.1 years) who had completed at least two semesters at Nursing and Midwifery Faculty of Qazvin University of Medical Sciences, Iran, were invited to complete Pieper's nursing knowledge questionnaires, a 41-item tool that explores knowledge about PU onset, characteristics and prevention measures. Correct responses to >90% of the questions about PU onset, PU characteristics and PU prevention measures demonstrated sufficient knowledge. **Results:** The 91 participants had completed an average of 5.5 academic semesters. Thirty-five had participated in a PU workshop before and 68 stated that they were familiar with PU protocols. Sixty-six participants stated that more training relating to PUs was needed. On average, students correctly answered 77.3% questionnaire items. There was a significant positive correlation between students' mean knowledge score and age ( $P=0.004$ , relative risk [rr]=0.299) and the number of academic semesters completed ( $P=0.253$ , rr=0.016). Students familiar with PU protocols scored significantly higher than other students ( $P=0.001$ ). **Conclusion:** Iranian nursing students had a moderate knowledge about PUs. Level of PU knowledge is influenced by factors such as level of education, age and familiarity with protocols.

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A pressure ulcer (PU) results from damage to the skin and/or underlying soft tissue, usually over a bony prominence, and is caused by excessive pressure on that area (National Pressure Ulcer Advisory Panel et al, 2014). The main causes of pressure ulceration can be divided into internal and external factors. The most common factors in PU development are immobility, loss of consciousness, urinary and/or bowel incontinence, excessive skin moisture, ageing, pharmaceutical treatment and inappropriate use of medical equipment (Lindgren et al, 2004; Cakmak et al, 2009; Iranmanesh et al, 2012a; 2012b; Bauer et al, 2016; de Albuquerque et al, 2018). Many hospitalised patients still suffer from pressure damage, despite preventative actions by healthcare providers and the use of new technology (Shokati Ahmadabad et al, 2016).

PUs increase the incidence of disability and mortality in hospitalised patients and increase healthcare costs (Bauer et al, 2016). Prevention is, therefore, preferable to treatment, and healthcare providers should adopt appropriate preventative strategies (Sawant and Shinde, 2017). Soban et al (2017) described various strategies used by hospitals and organisations, such as providing personnel with instructions on PU prevention, to reduce the incidence of PUs. Nurses play a key role in PU prevention (Sawant and Shinde, 2017), so it is important they provide appropriate care (Iranmanesh et al, 2011; Rafiei et al, 2014).

Previous studies indicate that nurses often have insufficient knowledge about the prevention and treatment of PUs (Iranmanesh et al, 2011; Qaddumi and Khawaldeh, 2014; Lawrence et al, 2015). One reason for this may be improper or

inadequate education while they were students. Assessing nursing students' knowledge about PUs and determining areas that need to be improved is important, as some teaching hospitals in developing countries — including Iran — use students to care for patients due to a lack of qualified nurses. The authors designed and carried out a study of Iranian nursing students' knowledge about PUs and the associated factors that contribute to them.

### Methods

This descriptive and analytical study was conducted in 2017 and 2018 at the Nursing and Midwifery Faculty of Qazvin University of Medical Sciences in Iran. This faculty, which opened nearly 35 years ago, teaches bachelor's degree and master's students. The 4-year bachelor's course consists of eight semesters: the first semester is completely theoretical; practical, hospital-based units start from the second semester.

The study population consisted of bachelor's degree nursing students who had completed at least three academic semesters. At the time of the study, about 130 undergraduate students were in their third to eighth semesters and were, therefore, eligible to participate.

### Ethical considerations

The present study was approved by Qazvin University of Medical Sciences and all phases were supervised by the university's Research and Technology Department. The aims and methods of the study were explained to students before they agreed to participate. Participants were asked to complete an informed consent form. They were informed they could withdraw from the study at any time without any detriment to their studies and that their questionnaire scores would not influence the results of their studies.

### Data collection

Data were collected over approximately 4 months. Researchers applied to the faculty's education section for a list of eligible students. Questionnaires were distributed and data collected from bachelor students in the fourth to sixth grades during theoretical classes. Questionnaires were distributed among seventh and eighth grade students within the hospital environment where they were receiving training. Researchers were present in both instances to answer any questions participants had relating to questionnaire items. Completed questionnaires, which were anonymised, were collected in special packages and the necessary steps were taken to analyse them, namely, entering the information into SPSS software (Statistical Package for the Social Sciences 21).

The Persian version of Pieper's nursing knowledge questionnaire, which includes 41 items, was used to assess student knowledge in this study (Pieper and Mott, 1995). It has demonstrated good validity and reliability (Rafiei et al, 2014). The answers to each questionnaire item were either 'true' or 'false'. The items focused on three areas of knowledge relating to PUs:

- Onset (questions 1, 6, 9, 20, 33 and 38)
- Characteristics (questions 31 and 32)
- Prevention measures (the remaining questions).

If a student correctly responded to >90% of the questions relating to onset and prevention, it was considered that he or she had sufficient knowledge about those areas. This measure was not appropriate for PU characteristics, as there were only two items. Correct answers to more than 90% of questions across the three sections was considered good knowledge on behalf of the participant.

A researcher-made checklist was used to collect demographic information about the students. The items on this checklist were checked and confirmed by an expert.

### Data analysis

Data were collected using SPSS-21 and analysed using descriptive-analytical statistics. For this purpose, mean, standard deviation, Pearson correlation and independent t-test were used.

## Results

### Demographics

Ninety-one students participated in this study. They had a mean age of 24.1 years (SD: 3.5 years) and had completed an average of 5.5 academic semesters (SD: 1.6). Just over half (52.7%) were female. Thirty-five students had participated in a PU workshop before and 68 stated that they were familiar with PU protocols. Sixty-six participants stated that more training about PUs was needed.

### Knowledge about PUs

On average, students correctly answered 77.3% of the items in the questionnaire. There was a significant positive correlation between students' mean knowledge score and age ( $P=0.004$ , relative risk [rr]=0.299) and their mean knowledge score and number of academic semesters completed ( $P=0.253$ ,  $rr=0.016$ ). Although male students' mean knowledge score was slightly higher than that of female students, the difference was not statistically significant ( $P=0.163$ ). Independent t-test showed that the mean knowledge score for students who had participated in a PU workshop was non-significantly higher than other students ( $P=0.502$ ).

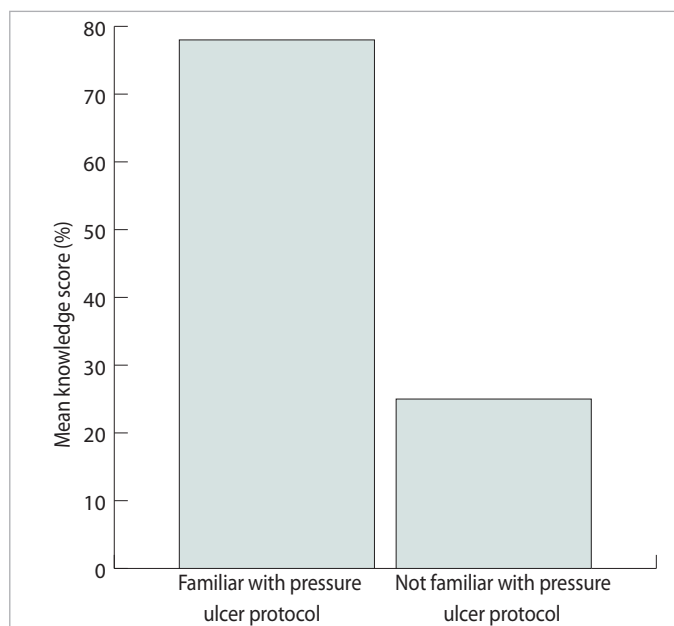


Figure 1. Level of knowledge in relation to protocol awareness.

The mean knowledge score of students familiar with PU protocols was significantly higher than students unfamiliar with such protocols ( $P=0.001$ ) [Figure 1].

On average, students correctly answered 79.1% of the 33 questions relating to preventive measures. Over 90% of students correctly answered 16 questions. Pearson correlation showed a significant positive association between mean PU prevention knowledge score and age ( $P=0.035$ ,  $rr=0.221$ ). There was also a significant correlation with the number of academic semesters completed ( $P=0.023$ ,  $rr=0.235$ ). Male students' knowledge of prevention was found to be slightly higher than female students on the t-test ( $P=0.142$ ).

Two thirds (67.9%) of participants correctly answered all six questions relating to PU onset. More than 90% answered only one question incorrectly. Pearson correlation test showed a significant positive correlation between mean PU onset knowledge score and student age ( $P=0.29$ ,  $rr=0.228$ ), but there was no correlation with the number of academic semesters completed ( $P=0.172$ ). As with preventive measures, male students' knowledge of PU onset was not significantly higher than that of female students ( $P=0.519$ ).

In total, 85.1% of participants correctly answered both questions about PU characteristics. There was a significant positive correlation between mean knowledge score and student age ( $P=0.28$ ,  $rr=0.230$ ), but no correlation on length of study time ( $P=0.898$ ). There was no difference between male and

female students' knowledge of PU characteristics ( $P=0.649$ ).

## Discussion

Before planning to teach students about PUs, educators need to have basic information about the students' level of knowledge. This study found that students had a moderate overall level of PU knowledge, as they correctly answered an average of 77.3% of the questionnaire items. Several factors had an influence on knowledge: age, level of education and familiarity with PU protocols.

Nurses need sufficient knowledge to deliver appropriate care to patients. They learn a significant proportion of their knowledge when studying at nursing faculties, however, few studies have been performed that quantify nursing student knowledge. As in the current study, Rafiei et al (2014) used Pieper's nursing knowledge questionnaire to study Iranian students' knowledge about PUs. The 133 participants from two nursing faculties were senior nursing students (semesters seven and eight). Their level of knowledge was found to be lower than in the present study; participants correctly answered 67.1% of the 41 items and had lower scores for all three areas (onset: 77.8%; characteristics: 49.6%; and prevention measures: 69.5%). Simonetti et al (2015) used a similar instrument to study the knowledge of 742 nursing students from seven nursing faculties in Italy. They found that students had a lower level of PU knowledge than in the current study. Research conducted in Australia by Usher et al (2018) using a different instrument demonstrated that Australian nurses have insufficient knowledge about PUs.

There are likely two reasons for the difference in the findings of our study compared to the three studies (Rafiei et al, 2014; Simonetti et al, 2015; Usher et al, 2018):

- Two studies used a different instrument to measure knowledge, which may result in a different outcome
- Iranian healthcare planners have recently paid considerable attention to the problem of wounds, especially PUs. This has resulted in a significant increase in focus on wounds by health service providers.

The high incidence and prevalence of PUs is now considered a negative aspect of health services in Iran. Nursing educational systems have also paid particular attention to this problem in recent years, talking more about PUs and holding training workshops. For instance, during the 2017–18 academic year, in addition to holding classes about PUs as part of the educational curriculum, Qazvin Nursing and Midwifery Faculty held three major

academic seminars for nurses and nursing students. During this period, three master's dissertations and two research proposals on PUs were also approved and carried out. These activities indicate that PUs are receiving special attention in Iran, which will improve nursing students' knowledge. International events and new journals, such as *Wounds Middle East*, are also contributing to the knowledge of Iranian nursing students.

The present study showed that age, higher education and familiarity with PU protocols have positive effects on levels of knowledge. This finding reflects the results reported by Usher and colleagues (2018). They found that knowledge about compression ulcers was higher among students who had a higher level of education (Usher et al, 2018). It seems that students studying at higher levels are exposed to more complex clinical situations relating to PUs during their time on the wards. The need to treat such patients leads to an increased awareness of PU protocols, which ultimately improves student knowledge.

### Conclusion

PUs are costly to treat and have adverse effects on the patient. Appropriate training provides nursing students with adequate knowledge to correctly care for patients. This study found that nursing students' knowledge about PUs has significantly improved over the past few years from low to moderate. It seems that the strategies used to improve the nursing students' knowledge have been successful and can be used as a guide for educational systems. It is recommended that the performance of students be carefully studied in future to determine their levels of knowledge about PUs and its application in practice.

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### Acknowledgement

The Student Research Committee of Qazvin University of Medical Sciences approved the current research. The researchers thank the Research and Technology Department, the students participating in the study, and the faculty members and staff of Qazvin Nursing and Midwifery Faculty for their cooperation in this study.

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