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Assessment of Knowledge and Practices of Patient Privacy and Confidentiality among Undergraduate Nursing Students in Karachi, Pakistan

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Abstract

Background: Patient privacy and confidentiality are fundamental ethical, legal, and professional obligations in nursing practice. Nursing students are expected to uphold these principles during clinical training; however, inadequate knowledge and poor adherence to confidentiality practices may compromise patient trust and the quality of healthcare delivery.

Objective: This study aimed to assess the knowledge and self-reported practices regarding patient privacy and confidentiality among undergraduate nursing students in Karachi, Pakistan, and to examine the relationship between knowledge and practice.

Methods: A descriptive cross-sectional study was conducted among 181 undergraduate nursing students in Karachi, Pakistan. Data were collected using a structured, self-administered questionnaire adapted from a previously validated instrument after obtaining permission from the original authors (1). comprising 20 items, including 10 knowledge (awareness) items and 10 practice items, along with participants' demographic characteristics. Data were entered and analyzed using IBM SPSS Statistics version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' characteristics and questionnaire responses. Internal consistency of the questionnaire was assessed using Cronbach's alpha. Composite knowledge, practice, and total scores were calculated, and Pearson's correlation coefficient was used to examine the relationship between knowledge and practice scores. An independent-samples Welch's t-test was performed to compare total scores by gender. Statistical significance was set at $p < 0.05$.

Results: Results: A total of 181 undergraduate nursing students participated in the study. The mean awareness score was 17.04 ± 3.33, and the mean practice score was 17.44 ± 3.99. Most participants demonstrated poor awareness and poor self-reported practices regarding patient privacy and confidentiality, with 95.6% classified as having poor practice. A statistically significant moderate positive correlation was observed between awareness and practice ($r = 0.44$, $p < 0.001$). No significant difference in total scores was found between male and female participants ($p = 0.058$). The overall questionnaire demonstrated good internal consistency (Cronbach's $\alpha = 0.795$).

Conclusion: Undergraduate nursing students demonstrated inadequate knowledge and poor self-reported practices regarding patient privacy and confidentiality. Although better knowledge was associated with improved practice, the findings suggest that knowledge alone is insufficient to ensure ethical behavior. Integrating comprehensive ethics education, confidentiality training, and simulation based learning, and reinforced clinical supervision into undergraduate nursing curricula is recommended to strengthen students' competence in protecting patient privacy and confidentiality.

Keywords: Patient confidentiality; Patient privacy; Nursing ethics.

INTRODUCTION & BACKGROUND:

Privacy and confidentiality, though related, are distinct concepts in nursing practice. Privacy refers to a patient's right to control access to their body, personal space, and information, while confidentiality concerns the patient's right to assume that their personal and health information will be guarded, kept safe, and shared only with staff directly involved in their care (2). In practice, confidentiality means restricting access to personal information from unauthorized persons and processes, except at authorized times and in an authorized manner, and it implies that privileged communication between patient and provider cannot be disclosed without the patient's consent (3).

These principles are not new; they are embedded in professional codes of ethics, institutional policy, and, in many countries, statutory law (such as HIPAA in the United States or the Data Protection Act framework in the UK) (4). However, ongoing advances in technology electronic health records, medical databases, telehealth, and social media have increased the risk of both intentional and unintentional breaches of privacy, making the topic increasingly relevant to everyday clinical practice rather than a purely theoretical concern (5). Nurses occupy a unique position in the healthcare system, they typically spend more direct time with patients than any other provider, handle sensitive information routinely, and are often the first point of contact for personal disclosures. This makes confidentiality central to nursing ethics for several reasons.

Patient confidentiality is a fundamental principle of nursing practice that strengthens the patient provider relationship by fostering trust and encouraging open communication (6). When patients are confident that their personal and health information will remain private, they are more likely to disclose accurate and complete information, enabling healthcare professionals to provide safe, effective, and patient-

centered care. In contrast, concerns about inappropriate disclosure of confidential information may discourage patients from seeking healthcare services or lead them to withhold essential details, potentially compromising diagnosis, treatment, and health outcomes (7). Nurses have both professional and legal responsibilities to maintain patient confidentiality, as it is required by nursing practice standards, ethical codes, and regulatory frameworks. Breaches of confidentiality may result in disciplinary action, legal consequences, and loss of professional credibility.

Therefore, nurses must implement practical safeguards to protect patient information in all forms, including verbal, written, and electronic records, while ensuring privacy during examinations, consultations, documentation, and all aspects of patient care. Taken together, this positions privacy and confidentiality not as administrative formalities but as core determinants of care quality, patient safety, and the therapeutic relationship.

International research shows that knowledge and practice around confidentiality among nurses and other health professionals is inconsistent, even where formal policies exist. A large cross-sectional study of health professionals found that about 60% demonstrated good knowledge of patient confidentiality, but only around half held a favorable attitude toward it, with training in medical ethics and direct patient contact emerging as significant predictors of better knowledge and more favorable attitudes (8).

Studies conducted across different countries consistently demonstrate a gap between nurses' knowledge of patient confidentiality and its application in clinical practice. In Jordan, a cross-sectional survey involving 800 nurses found that although most participant’s demonstrated appropriate practices related to data security, deficiencies remained in the appropriate access, sharing, and transfer of patient information, highlighting the need for continued education and stronger institutional policies (9).

Similarly, research conducted in among nursing interns reported significant shortcomings in confidentiality-related practices (10). Earlier studies cited within this research revealed that only 42% of nursing interns adequately covered patients' bodies during nursing procedures, while merely 28% refrained from disclosing confidential patient information to family members or other unauthorized individuals(11) . Furthermore, qualitative research conducted in intensive care units identified inconsistent perceptions of privacy among healthcare professionals and patients, with participants expressing differing views regarding the scope of privacy, the adequacy of privacy protection, and responses to privacy violations (12).

Within Asia, similar trends have been observed. A nationwide survey conducted in Vietnam reported that approximately 39% of nurses disclosed patient information in ways that were inconsistent with accepted confidentiality standards, indicating persistent gaps in professional practice despite structured healthcare environments. Cultural influences also play an important role in shaping perceptions of privacy (13). Research has shown that patients from many Eastern societies primarily associate privacy with bodily exposure, creating unique challenges for nurses, particularly during cross-gender care. Additionally, a study conducted in South Korea demonstrated that nursing professionalism and nursing informatics competency significantly influenced nursing students' perceptions of patient privacy protection (12). These findings suggest that confidentiality related behaviors are influenced not only by institutional regulations but also by professional identity, education, and technological competence.

In Pakistan, research examining patient confidentiality remains relatively limited and has primarily focused on patients' perceptions rather than nurses' knowledge and practices. A notable study conducted in a tertiary care hospital in Karachi surveyed 571

emergency department patients and found that maintaining privacy and confidentiality was particularly challenging in overcrowded emergency settings. The study emphasized that patients considered confidentiality essential for establishing trust and promoting effective communication with healthcare providers (14). Other qualitative studies conducted in Pakistan have highlighted the influence of cultural and gender-related factors on nurse-patient interactions (15).

Consequently, there remains a clear gap in the literature regarding the level of knowledge, attitudes, and practices related to patient confidentiality among Pakistani nurses. There is also limited evidence regarding the influence of demographic characteristics, educational background, professional experience, and institutional factors on confidentiality practices. Addressing this gap is essential for informing nursing education, strengthening hospital policies, improving ethical nursing practice, and ultimately enhancing patient trust, privacy, and quality of healthcare delivery in Pakistan.

Objectives of the study

1. To assess the knowledge and practices regarding patient privacy and confidentiality among undergraduate nursing students in Karachi, Pakistan.
2. To examine the relationship between knowledge and practices regarding patient privacy and confidentiality among undergraduate nursing students.

Research Questions

1. What are the levels of knowledge and practices regarding patient privacy and confidentiality among undergraduate nursing students in Karachi, Pakistan?
2. Is there a relationship between knowledge and practices regarding patient privacy and confidentiality among undergraduate nursing students?

Literature Review:

Patient privacy and confidentiality are among the most important ethical responsibilities in nursing practice (16). They protect patients' dignity, promote trust between patients and healthcare providers, and ensure that personal health information is handled with respect and professionalism (17). Nurses are expected to maintain confidentiality in every aspect of patient care, making these principles essential components of nursing education. Undergraduate nursing students begin learning these concepts during their academic programs and are expected to apply them during clinical placements (18). As healthcare becomes increasingly digital, with widespread use of electronic health records and online communication, protecting patient information has become more challenging than ever (19). Consequently, nursing students must be well prepared to address ethical issues related to privacy and confidentiality before entering professional practice.

Privacy and confidentiality are closely related but have different meanings (20). Privacy refers to an individual's right to control access to their personal information, body, and personal space. Confidentiality, on the other hand, refers to the professional obligation of healthcare providers to protect patients' information from unauthorized disclosure (21). Both concepts are recognized as fundamental patient rights and are emphasized in professional nursing codes of ethics. When these rights are violated, patients may lose confidence in healthcare providers, withhold important health information, or experience emotional distress (22). Therefore, educating nursing students about these ethical responsibilities is essential for ensuring safe and patient-centered care.

Recent studies suggest that nursing students generally have a good understanding of privacy and confidentiality (23). However, several researchers have reported that possessing theoretical knowledge does not always result in appropriate clinical practice. During clinical placements, students may encounter situations in which maintaining

privacy is difficult because of overcrowded wards, limited private spaces, or insufficient supervision (24). A recent qualitative study from South Korea found that although nursing students appreciated the importance of protecting patient information, many experienced uncertainty when faced with ethical dilemmas during clinical practice (16). The authors recommended integrating practical ethics training and case-based discussions throughout nursing education to strengthen students' confidence and decision-making skills.

The increasing use of technology in healthcare has created new challenges in maintaining patient confidentiality. Electronic health records, mobile devices, and social media have improved communication and access to health information, but they have also increased the risk of accidental or intentional disclosure of confidential data (25). Nursing students often use smartphones and digital platforms during their education and clinical training, making it important for educational institutions to teach digital professionalism alongside traditional ethical principles (26).

Professional values also play a significant role in protecting patient privacy. Nursing students who develop a strong sense of professionalism are generally more committed to respecting patients' rights and maintaining confidentiality. Students who understand the ethical responsibilities of the nursing profession are more likely to recognize the importance of protecting confidential information, even in challenging clinical environments (16).

Another emerging concern is the use of social media by nursing students. While social media provides opportunities for education and professional networking, inappropriate sharing of patient-related information can result in serious ethical and legal consequences (16). Recent evidence indicates that some nursing students are unaware

that posting clinical experiences, photographs, or patient details online even without mentioning names may still violate confidentiality (27). As a result, many nursing schools have introduced policies and educational sessions on responsible social media use to promote professional behavior and reduce the risk of confidentiality breaches.

Several international studies have reported that nursing students generally demonstrate positive attitudes toward patient privacy but vary in their actual practices. Students often perform well on knowledge assessments but may experience difficulties when applying ethical principles in busy clinical settings. Factors such as clinical supervision, institutional policies, previous ethics education, and the learning environment have all been found to influence students' behavior. Researchers therefore recommend continuous ethics education throughout nursing programs rather than limiting instruction to a single course (28).

Research conducted among registered nurses provides similar findings. Studies from different countries have shown that nurses recognize privacy and confidentiality as essential components of quality nursing care. However, barriers such as staff shortages, heavy workloads, overcrowded hospital wards, and inadequate infrastructure sometimes make it difficult to fully protect patient privacy. These findings highlight the importance of preparing nursing students to recognize and manage ethical challenges before they enter the workforce (2).

In Pakistan, research on patient privacy and confidentiality remains relatively limited, particularly among undergraduate nursing students. Most available studies have focused on patients' perceptions or the practices of healthcare professionals working in hospitals rather than nursing students. As nursing education continues to expand and healthcare becomes increasingly technology-driven, there is a growing need to assess

whether nursing students possess adequate knowledge and awareness of privacy and confidentiality. Understanding students' strengths and knowledge gaps will help educators improve nursing curricula, strengthen ethics education, and better prepare future nurses for professional practice.

Overall, the existing literature suggests that nursing students have satisfactory knowledge of patient privacy and confidentiality, but gaps remain between knowledge and real-world clinical practice. Ethical decision-making, professional values, digital literacy, institutional support, and clinical experience all influence students' ability to maintain patient confidentiality. Because evidence from Pakistan is still scarce, especially in Karachi, this study aims to assess the knowledge and awareness of privacy and confidentiality among undergraduate nursing students. The findings are expected to contribute to nursing education by identifying areas where additional training and curriculum development are needed to strengthen ethical nursing practice and improve patient care.

Theoretical Framework

The present study is guided by the Knowledge, Attitude, Practice (KAP) Model, which suggests that an individual's knowledge influences their attitudes, and these attitudes subsequently shape their practices or behaviors. In the context of this study, undergraduate nursing students with adequate knowledge of patient privacy and confidentiality are expected to develop positive attitudes toward protecting patients' rights, which in turn promotes appropriate practices during clinical training. The KAP model provides a suitable framework for examining the relationship between nursing students' knowledge, awareness, and practices regarding privacy and confidentiality and

supports the development of educational interventions aimed at strengthening ethical and professional nursing practice.

Methodology

Study Design and Setting

A cross-sectional study was conducted among undergraduate Nursing (GBSN) student enrolled in selected nursing institutions in Karachi, Pakistan. Data were collected from April 2026 to June 2026.

Study Population

The study population comprised undergraduate Generic BSN students enrolled in the selected institutions during the study period.

Inclusion and Exclusion Criteria

Students enrolled in undergraduate nursing program and willing to participate in the study were included. Students who declined participation, or submitted incomplete questionnaires were excluded from the study.

Sampling Technique and Sample Size

A purposive sampling technique was used to recruit participants. The sample size was calculated using Cochran's formula with a finite population correction. Assuming a 95% confidence level, a 5% margin of error, and a response distribution of 50%, the required sample size for a population of approximately 300 undergraduate nursing students was

calculated to be 169 participants. To ensure an adequate sample and compensate for potential non-response, the sample size was rounded up to 181 participants.

Data Collection Instrument

Data were collected using a structured, self-administered questionnaire adapted from previously validated instruments assessing knowledge and awareness related to patient privacy and confidentiality among healthcare professionals (1). It consisted of three sections. The first section collected socio-demographic information, including age, gender, academic year, and previous training related to patient privacy and confidentiality. The second section assessed participants' knowledge of privacy and confidentiality principles. The third section evaluated students' awareness toward maintaining patient privacy and confidentiality in clinical practice. Responses to the knowledge, awareness items were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (4)

Data Collection Procedure

Data were collected using a structured online questionnaire administered through Google Forms. The survey link was distributed to eligible undergraduate nursing students through institutional communication channels and social media platforms. Before accessing the questionnaire, participants were provided with an information sheet explaining the purpose of the study, voluntary nature of participation, confidentiality of responses, and their right to withdraw at any stage without any consequences. Electronic informed consent was obtained from all participants before they proceeded to complete the questionnaire.

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the relevant institution before data collection commenced Approval Date:

02/12/2025. No personally identifiable information was collected, and participants' anonymity and confidentiality were strictly maintained throughout the research process. The completed questionnaires were stored securely in a password-protected electronic database accessible only to the research team and were used solely for research purposes.

Table 1: Age Distribution of Participants (N-181)

Category	N	%
18 to 20	94	51.9%
20 to 22	72	39.8%
23 to 25	14	7.7%
Above 25	1	0.6%

The age distribution of the participants is presented in Table 1. More than half of the participants (51.9%, n = 94) were aged 18–20 years, followed by 39.8% (n = 72) aged 20–22 years. A smaller proportion (7.7%, n = 14) belonged to the 23–25 years age group, while only 0.6% (n = 1) were above 25 years. These findings indicate that the study population was predominantly composed of younger undergraduate nursing students.

Table 2: Gender Distribution of Participants *(N-181)*

Category	N	%
Male	135	74.6%
Female	46	25.4%

The gender distribution of the participants showed that, the majority of participants were male (74.6%, n = 135), while 25.4% (n = 46) were female, indicating a predominantly male study population.

Table 3: Clinical Exposure of Participants *(N-181)*

Category	N	%
<1 Year	89	49.2%
1-2 Years	37	20.4%
>2 Years	30	16.6%
No experience	25	13.8%

The clinical exposure of the participants is presented in Table 3. Nearly half of the participants (49.2%, n = 89) had less than one year of clinical exposure, followed by 20.4% (n = 37) with 1–2 years and 16.6% (n = 30) with more than two years of exposure. Additionally, 13.8% (n = 25) reported no clinical exposure. These findings indicate that most participants had limited clinical exposure.

Scale Reliability (Cronbach's Alpha)

Internal consistency reliability was assessed using Cronbach's alpha for the Knowledge subscale, the Practice subscale, and the combined 20-item scale.

Scale	No. of Items	Cronbach's α	Interpretation
Knowledge (K1–K10)	10	0.682	Questionable/Acceptable
Practice (P1–P10)	10	0.75	Good
Combined (20 items)	20	0.795	Good

Internal consistency was assessed using Cronbach's alpha for the knowledge subscale, practice subscale, and the overall 20-item scale. The knowledge subscale demonstrated questionable to acceptable reliability (α = 0.682), while the practice subscale showed good internal consistency (α = 0.750). The combined 20-item scale also demonstrated good

overall reliability (α = 0.795), indicating that the questionnaire had satisfactory internal consistency for the study population.

Table 4: Knowledge score of Participants about privacy & confidentiality *(N-181)*

Item	Statement	Mean	SD
K1	Protecting privacy and observing this in the work environment are important for me	1.46	0.63
K2	I pay attention that in the work environment, patients' personal data are not overheard by people other than healthcare professionals	1.6	0.62
K3	Privacy is related to human rights	2.06	0.3
K4	Patient's trust in the doctor/nurse is harmed when they share information about the patient's private life with other people	1.8	0.79
K5	During physical treatment, parts of the body other than the treated part should be covered or concealed with proper clothes	1.61	0.67
K6	During the transfer of patients within the hospital, his/her privacy should not be breached	1.71	0.7
K7	Paying attention to patient privacy enhances patient's satisfaction	1.68	0.63
K8	Healthcare professionals should not be disturbed when the patient cared for is of a different gender	1.69	0.67

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Item	Statement	Mean	SD
K9	I feel uncomfortable when I hear a conversation related to a patient's status	1.8	0.7
K10	It is important that the patient's body is not seen by other patients/professionals during treatment	1.64	0.72

Table 4 presents the descriptive statistics for the 10 knowledge items. The mean scores ranged from 1.46 ± 0.63 to 2.06 ± 0.30. The highest mean score was observed for K3 (*Privacy is related to human rights*) (2.06 ± 0.30), followed by K4 and K9 (both 1.80, SD = 0.79 and 0.70, respectively). The lowest mean score was recorded for K1 (*Protecting privacy and observing this in the work environment are important for me*) (1.46 ± 0.63). Overall, the low mean scores across all knowledge items suggest limited awareness of patient confidentiality principles among the participants.

Table 5: Practices Score of patients confidentiality among undergraduate nursing students *(N-181)*

Item	Statement	Mean	SD
P1	The patient should be informed of any procedure/attempt related to him/her	1.68	0.7
P2	Patients may demand all kinds of information related to their health status, verbally or in writing	1.76	0.76
P3	Patients must receive health services in an environment suitable for confidentiality	1.7	0.66
P4	In any medical intervention, patient's consent must be obtained before services are provided	1.64	0.67

Item	Statement	Mean	SD
P5	Every relative has the right to the health records of his/her dying relative	1.82	0.76
P6	A patient's request for his/her medical history can be granted	1.75	0.68
P7	Patient consent is necessary before health information is released to a third party	1.78	0.71
P8	Staff can reveal the next of kin of a deceased patient to relatives for processing the death certificate	1.75	0.67
P9	A patient's condition may be discussed with people other than for treatment, learning, or research purposes	1.77	0.75
P10	Services of an untrained interpreter are dangerous to confidentiality	1.79	0.82

Table 5 presents the descriptive statistics for the 10 practice items. The mean scores ranged from 1.64 ± 0.67 to 1.82 ± 0.76. The highest mean score was observed for P5 (*Every relative has the right to the health records of his/her dying relative*) (1.82 ± 0.76), followed by P10 (1.79 ± 0.82) and P7 (1.78 ± 0.71). The lowest mean score was recorded for P4 (*Patient's consent must be obtained before any medical intervention*) (1.64 ± 0.67). Overall, the consistently low mean scores across the practice items indicate poor self-reported practices regarding patient confidentiality among the participants.

Table 6: Composite score of Participants about privacy & confidentiality *(N-181)*

Score	Mean	SD	Min	Max
Knowledge Score (sum K1–K10)	17.04	3.33	11	29

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Score	Mean	SD	Min	Max
Practice/Privacy Score (sum P1–P10)	17.44	3.99	10	30
Total Score (K + P)	34.48	6.23	21	55

The composite score analysis showed a mean knowledge score of 17.04 ± 3.33 (range: 11–29) and a mean practice score of 17.44 ± 3.99 (range: 10–30). The overall total score had a mean of 34.48 ± 6.23, with scores ranging from 21 to 55, reflecting generally low overall levels of knowledge and practice regarding patient confidentiality among the participants.

Relationship between Knowledge and Practice

Pearson's correlation analysis demonstrated a moderate positive correlation between knowledge and practice scores ($r = 0.44$, $p < 0.001$). This statistically significant finding indicates that participants with higher knowledge of patient confidentiality were more likely to report better confidentiality-related practices, although the moderate correlation suggests that factors beyond knowledge may also influence practice.

Groups Comparisons on Total Score

Table 7: Group Comparisons on Total Score of Participants about privacy & confidentiality *(N-181)*

Gender

Group	N	Mean	SD
Male	135	34.06	6.71
Female	46	35.72	4.37

The mean total score was 34.06 ± 6.71 among male participants and 35.72 ± 4.37 among female participants. An independent-samples Welch's t-test showed no statistically significant difference in total scores between males and females (t = -1.917, p = 0.058). Although female participants had a slightly higher mean score than males, the difference was not statistically significant.

Table 8: Group Comparisons on Total Score of Participants about privacy & confidentiality *(N-181)*

Clinical Experience

Experience Level	N	Mean	SD
No experience	25	36.28	4.27
<1 Year	89	34.19	7.09
1-2 Years	37	34.7	5.07
>2 Years	30	33.57	6.1

The mean total score was highest among participants with no clinical experience (36.28 ± 4.27), followed by those with 1–2 years (34.70 ± 5.07), less than 1 year (34.19 ± 7.09), and more than 2 years of experience (33.57 ± 6.10). Overall, participants without clinical experience had slightly higher mean scores than those with clinical experience.

Table 8: Group Comparisons on Total Score of Participants about privacy & confidentiality *(N-181)*

Comparison of Total Scores by Age Group

Age Group	N	Mean	SD
18 to 20	94	33.86	6.26
20 to 22	72	35.06	6.59

Age Group	N	Mean	SD
23 to 25	14	35.79	3.6
Above 25	1	33	n/a (n=1)

The mean total score increased slightly across the younger age groups, with participants aged 23–25 years recording the highest mean score (35.79 ± 3.60), followed by those aged 20–22 years (35.06 ± 6.59) and 18–20 years (33.86 ± 6.26). The single participant aged above 25 years had a total score of 33.00. Overall, older participants tended to have slightly higher mean scores than younger participants.

Discussion

The present study assessed the knowledge, awareness, and self-reported practices regarding patient privacy and confidentiality among undergraduate nursing students in Karachi, Pakistan. Overall, the findings revealed low levels of knowledge and poor self-reported practices, indicating important gaps in students' understanding and application of confidentiality principles. Although a moderate positive relationship was observed between knowledge and practice, the results suggest that knowledge alone is insufficient to ensure appropriate confidentiality-related behaviors.

The overall knowledge score (17.04 ± 3.33) and practice score (17.44 ± 3.99) were relatively low, with the majority of participants classified as having poor knowledge and poor practice based on the predetermined cut-off values. These findings are concerning because maintaining patient privacy and confidentiality is a fundamental ethical and legal responsibility in nursing practice.

The observed deficiencies may reflect inadequate emphasis on confidentiality during undergraduate education, limited opportunities for practical application during

clinical placements, or insufficient reinforcement of professional ethics throughout nursing training.

Item-level analysis showed that participants demonstrated limited awareness across most confidentiality principles. Although the statement relating privacy to human rights achieved the highest mean score, responses to many essential concepts—including obtaining informed consent, protecting patient information, maintaining privacy during patient transfer, and safeguarding patients' dignity during clinical procedures—remained low. These findings indicate that students may possess some theoretical understanding of privacy but have difficulty recognizing and applying confidentiality principles in clinical situations.

Similarly, self-reported practice scores suggested poor adherence to confidentiality-related behaviors. Most students disagreed with statements related to informed consent, confidentiality during healthcare delivery, disclosure of patient information, and protection of medical records. Such findings raise concerns because undergraduate nursing students frequently interact with patients during clinical rotations, where inappropriate handling of confidential information may compromise patient trust and professional accountability.

A significant moderate positive correlation ($r = 0.44$, $p < 0.001$) was found between knowledge and practice, indicating that students with better knowledge generally reported better confidentiality practices. However, the strength of the relationship suggests that additional factors, such as clinical supervision, institutional policies, ethical role modeling, communication skills, and the learning environment, may also influence practice. Therefore, improving knowledge alone may not be sufficient to achieve desirable confidentiality practices.

No statistically significant difference in total scores was observed between male and female students, although female participants achieved slightly higher mean scores than males. Likewise, only small differences were observed across age groups and levels of clinical experience. Interestingly, participants without clinical experience demonstrated slightly higher overall scores than those with longer clinical exposure. This unexpected finding may indicate that clinical experience alone does not guarantee improved understanding or practice of confidentiality unless supported by structured teaching, effective mentorship, and consistent reinforcement of ethical standards during clinical placements.

Overall, the findings highlight the need to strengthen ethics and confidentiality education within undergraduate nursing curricula. Nursing institutions should incorporate competency-based learning, simulation exercises, case-based discussions, and regular training on patient privacy, informed consent, data protection, and professional ethics. Continuous assessment and supervision during clinical practice may further enhance students' ability to translate theoretical knowledge into ethical clinical practice. Improving nursing students' competence in patient confidentiality is essential for promoting patient trust, ensuring ethical healthcare delivery, and maintaining professional nursing standards.

Strengths

- This study provides recent evidence on the knowledge and self-reported practices regarding patient confidentiality among undergraduate nursing students in Karachi.
- A validated questionnaire with good overall reliability (Cronbach's α = 0.795) was used.
- The findings provide baseline data that can inform curriculum development and future educational interventions.

Limitations

- The cross-sectional design limits the ability to establish causal relationships.
- Data were collected through self-reported questionnaires, which may be subject to recall and social desirability bias.
- The study was conducted among undergraduate nursing students in Karachi, limiting the generalizability of the findings to other settings or healthcare professionals.

Weaknesses

- The study assessed self-reported practices rather than actual observed clinical practices.
- Potential confounding factors, such as previous ethics training and institutional policies, were not evaluated.
- The knowledge subscale demonstrated only acceptable internal consistency (Cronbach's $\alpha = 0.682$).

Recommendations

- Integrate comprehensive education on patient privacy and confidentiality into undergraduate nursing curricula.
- Conduct regular workshops, simulations, and ethics training to strengthen confidentiality-related knowledge and practice.
- Reinforce confidentiality principles during clinical placements through supervision and mentorship.
- Future studies should include multiple institutions, larger sample sizes, and longitudinal or observational designs to better evaluate confidentiality practices over time.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this study.

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