DOI: https://doi.org/10.54393/pjhs.v7i8.3883

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 7, Issue 08 (August 2026)

Original Article

OPEN ACCESS

Knowledge, Skills, and Attitudes of Recent Medical Graduates Regarding the Management of Poisoning Cases

Saima Manzoor[1], Zubia Iqbal[2], Maria Safdar[3], Nasir Abbas[2], Amna Zafar[4] and Muhammad Asif[5*]

[1]Department of Forensic Medicine and Toxicology, Fatima Memorial Hospital College of Medicine and Dentistry, Lahore, Pakistan
[2]Department of Forensic Medicine, Ameer-ud-Din Medical College, Postgraduate Medical Institute, Lahore General Hospital, Lahore, Pakistan
[3]Department of Forensic Medicine, Combined Military Hospital Kharian Medical College, Kharian, Pakistan
[4]Department of Forensic Medicine, Akhtar Saeed Medical College, Rawalpindi, Pakistan
[5]Department of Forensic Medicine, Sialkot Medical College, Sialkot, Pakistan

ARTICLE INFO

Keywords:
Poisoning, Emergency Management, Medical Graduates, Competence, Toxicology Education

How to Cite:
Manzoor, S., Iqbal, Z., Safdar, M., Abbas, N., Zafar, A., & Asif, M. (2026). Knowledge, Skills, and Attitudes of Recent Medical Graduates Regarding the Management of Poisoning Cases: Recent Medical Graduates Regarding the Management of Poisoning Cases. Pakistan Journal of Health Sciences, 7(8), 40-44. https://doi.org/10.54393/pjhs.v7i8.3883

***Corresponding Author:**
Muhammad Asif
Department of Forensic Medicine, Sialkot Medical College, Sialkot, Pakistan
sincerwithu@gmail.com

Received Date: 26th January, 2026
1st Revision Received: 3rd March, 2026
2nd Revision Received: 24th March, 2026
3rd Revision Received: 9th April, 2026
Acceptance Date: 11th April, 2026
Published Date: 31st August, 2026

ABSTRACT

Poisoning remains a major cause of emergency department visits and preventable mortality, particularly in low- and middle-income countries. Newly graduated medical officers are frequently the first responders in poisoning emergencies. **Objectives:** To evaluate the knowledge, skills, and attitudes of recent medical graduates regarding the diagnosis, management, and medico-legal responsibilities associated with poisoning cases. **Methods:** An analytical cross-sectional study was conducted among 201 recent MBBS graduates working in tertiary care teaching hospitals in Lahore, Pakistan. A structured, pilot-tested questionnaire assessed knowledge using multiple-choice and scenario-based questions, skills through structured clinical scenarios, and attitudes using Likert-scale items. Data were analyzed using SPSS version 26.0. Independent t-tests, chi-square tests, Pearson correlation, and multiple linear regression were applied. A p-value ≤0.050 was considered statistically significant. **Results:** Graduates who completed an emergency department rotation demonstrated significantly higher knowledge scores than those without such training. Greater exposure to poisoning cases was associated with improved practical skills, and a moderate positive correlation was observed between the number of poisoning cases managed and overall competence. Emergency rotation and clinical exposure independently predicted competence after adjustment for demographic variables. Major competence gaps were identified in toxidrome recognition, decontamination sequencing, airway protection, corrosive poisoning management, and medico-legal documentation. **Conclusions:** Recent medical graduates possess moderate theoretical knowledge but demonstrate important deficiencies in practical and medico-legal competencies. Structured emergency rotations and simulation-based toxicology training are essential to improve preparedness for poisoning management.

INTRODUCTION

Poisoning remains a significant global public health concern and contributes substantially to morbidity and mortality worldwide. According to the World Health Organization, acute poisoning accounts for hundreds of thousands of deaths annually, with the greatest burden occurring in low- and middle-income countries where access to antidotes, regulatory oversight of toxic substances, and trained emergency care providers is often limited [1, 2]. In South Asia, including Pakistan, poisoning is a frequent cause of emergency department presentations and preventable deaths [3, 4]. Commonly encountered agents include pesticides, pharmaceuticals, corrosive substances, and household chemicals. These exposures are often intentional or accidental and require prompt recognition and management in emergency settings [3, 5]. Delays in airway stabilization, decontamination, or antidote administration may result in severe complications or death [5, 6]. Recent medical graduates, particularly house

DOI: https://doi.org/10.54393/pjhs.v7i8.3883

officers, are often the first physicians responsible for the initial evaluation and management of poisoning cases. Effective care requires early identification of toxidromes, stabilization of airway, breathing, and circulation, appropriate decontamination measures, timely antidote administration, and vigilant monitoring for complications [6, 7]. However, multiple studies have demonstrated that junior doctors frequently lack adequate practical experience and confidence in managing poisoning emergencies during early clinical practice [6–8]. In addition to clinical management, poisoning cases carry important medico-legal responsibilities, including documentation, evidence preservation, and legal reporting. Newly graduated doctors often report insufficient training and limited confidence in fulfilling these obligations [8–10]. Evidence suggests that structured emergency medicine exposure and focused toxicology education improve clinical competence and professional confidence among junior physicians [9, 11]. Despite inclusion of toxicology in undergraduate curricula, hands-on exposure and formal medico-legal training remain limited in many medical institutions in Pakistan [10, 12].

Given the frontline role of recent graduates in emergency care, evaluating their knowledge, skills, and attitudes toward poisoning management is essential to identify deficiencies and guide educational reform. This study aimed to assess these competencies and determine factors associated with preparedness for poisoning emergencies. This study aims to assess the knowledge, skills, and attitudes of recent medical graduates regarding the diagnosis, management, and medico-legal responsibilities related to poisoning cases.

METHODS

An analytical cross-sectional study was conducted in tertiary care teaching hospitals in Lahore, Pakistan, from 16 December 2025 to 16 January 2026. Ethical approval was obtained from the Ethical Review Committee of Ameer-ud-Din Medical College / PGMI, Lahore General Hospital, Lahore, Pakistan (Approval No. AMC/PGMI/LGH/Article/Research No/2025/ERC/73; dated 4th December 2025). Written informed consent was obtained from all participants. The study included 201 recent MBBS graduates who had completed their degree within the previous two years and were working in clinical departments. Sample size was calculated using Cochran's formula, and non-probability convenience sampling was employed. Sample size was calculated as $n = Z^2 * p * (1-p)/d^2$, where Z = 1.96 (Z-value for 95% confidence level), p = 0.5 (Estimated proportion), d = 0.05 (Margin of error), and n = 300 (Population size). Finite Population Correction: $n_{adj} = n / 1 + (n-1)/N$. The final sample size was 200 participants. Data were collected using a structured questionnaire. Knowledge and skills assessment were based on structured multiple-choice questions and scenario-based evaluations, adapted from previous studies on junior doctors' toxicology competence. Attitudes were measured using a Likert-scale questionnaire validated in similar populations. Knowledge was assessed through multiple-choice and scenario-based questions covering poisoning types, toxidrome recognition, decontamination principles, and antidote use. Skills were evaluated using structured clinical scenarios assessing airway management, antidote administration, corrosive poisoning handling, and medico-legal procedures. Skills assessment was scenario-based and not purely self-reported. Attitudes were measured using Likert-scale items evaluating ethical responsibility, reporting behavior, and professional confidence. The questionnaire was pilot-tested on 20 recent graduates not included in the final analysis, and internal consistency was acceptable (Cronbach's alpha = 0.78).

Data were analyzed using SPSS version 26.0. Descriptive statistics were expressed as mean ± standard deviation or frequency (%). Independent t-tests, chi-square tests, Pearson correlation, and multiple linear regression were applied. A p-value ≤ 0.050 was considered statistically significant.

RESULTS

The sample size was 201, and all participants responded. Males constituted 88 (44%) of the sample, while 113 (56%) were females. The mean age of the respondents was 25 ± 1.2 years. Regarding institutional background, 119 (59%) graduates were from government medical colleges and 82 (41%) were from private institutions. During their in-house employment, 127 (63%) participants had completed a formal emergency department rotation, whereas 74 (37%) had not (Table 1).

Table 1: Demographic Characteristics of Participants

Characteristics	n (%) / Mean ± SD
Gender	
Male	88 (44%)
Female	113 (56%)
Age (years)	25 ± 1.2
Type of Institution	
Government	119 (59%)
Private	82 (41%)
Emergency Rotation Completed	
Yes	127 (63%)
No	74 (37%)

The mean knowledge score was 19 ± 4 out of 30, indicating a relatively low level of conceptual understanding. Graduates who had completed an emergency rotation achieved significantly higher knowledge scores (20.5 ± 3.7) than those who had not (15.8 ± 4.0) (t = 6.41, p=0.001). Domain-

DOI: https://doi.org/10.54393/pjhs.v7i8.3883

wise analysis revealed good knowledge of common types of poisoning (73%) and indications for antidotes such as atropine and naloxone (69%). However, deficits were observed in the identification of toxidromes (41%), contraindications of gastric lavage and activated charcoal (37%), and monitoring for complications (34%) (Table 2).

Table 2: Knowledge, Skills, and Attitude Scores of Participants

Parameters	Mean ± SD / n (%)	Significant Findings
Knowledge Score (Out of 30)	19 ± 4	Higher with emergency rotation: 20.5 ± 3.7 vs 15.8 ± 4.0 (p=0.001)
Knowledge Domains (% Correct)	–	Common poisoning: 73%; Antidotes: 69%; Toxidromes: 41%; Contraindications: 37%; Monitoring: 34%
Skills Score (Out of 25)	17.2 ± 4.5	Higher with >5 poisoning cases: 19.2 ± 3.8 vs 14.7 ± 4.6 (p=0.003)
Skills Gaps (% Correct)	–	Airway protection: 47%; Corrosive ingestion: 38%; Decontamination sequence: 40%; Medico-legal documentation: 40%
Attitude Score (Out of 40)	29 ± 5	Government: 29.0 ± 4.5 vs Private: 24.2 ± 5.0 (p=0.020); 71% support reporting; 50% confident in documentation

The mean skills score was 17.2 ± 4.5 out of 25. Participants who managed more than five poisoning cases during training demonstrated significantly higher skills scores (19.2 ± 3.8) than those with low or no exposure (14.7 ± 4.6) (p=0.003). Major competence gaps were observed in airway protection of unconscious patients (47%), care of corrosive ingestion (38%), sequencing of decontamination procedures (40%), and medico-legal documentation and sample preservation (40%). The overall attitude score was 29 ± 5 out of 40, reflecting a generally favorable professional attitude. Government graduates had significantly higher attitude scores (29.0 ± 4.5) than private graduates (24.2 ± 5.0) (p=0.002). Although 71% of participants believed that poisoning cases should always be documented as medico-legal cases, only 50% expressed confidence in accurately completing medico-legal documentation. Chi-square analysis demonstrated a significant association between emergency rotation completion and adequate knowledge levels ($\chi^2 = 11.8$, p=0.001), as well as between exposure to poisoning cases and skills adequacy ($\chi^2 = 9.6$, p=0.002). Pearson correlation analysis revealed a moderate positive relationship between the number of poisoning cases managed and overall competence (r = 0.41, p<0.001). Multiple regression analysis further showed that emergency rotation was a significant predictor of competence (β = 0.38, p=0.001) (Table 3).

Table 3: Association Between Training Factors and Competence

Factor Assessed	Statistical Test	Test Value	Significance
Emergency rotation and Knowledge adequacy	Chi-square	$\chi^2(1) = 11.8$	p=0.001
Exposure to poisoning cases and Skills adequacy	Chi-square	$\chi^2(1) = 9.6$	p=0.002
Number of poisoning cases and Overall competence	Pearson correlation	r = 0.41	p<0.001
Emergency rotation (predictor of competence)	Multiple regression	β = 0.38	p=0.001

After controlling demographic variables (age, gender, type of institution, and year of graduation), a multiple linear regression analysis was performed to determine if training-related characteristics independently predicted total competence. 22% of the competence variance was explained by the entire model, which was statistically significant (p<0.001) ($R^2 = 0.22$, adjusted $R^2 = 0.20$). Overall competency was found to be significantly predicted by emergency rotation (β = 0.38, p=0.001, 95% CI: 0.15–0.61). There was also a strong positive correlation between exposure to poisoning cases (β = 0.24, p=0.012, 95% CI: 0.05–0.43). A statistically significant independent effect was not shown by any of the demographic variables. Independent samples t-tests revealed significant differences in knowledge, skills, and attitude scores between groups based on training exposure and institutional background (Table 4).

Table 4: Independent Samples t-Test Results

Comparisons	Group 1, (Mean ± SD)	Group 2, (Mean ± SD)	t-value	p-value	Interpretation
Knowledge Score	Emergency rotation: 20.5 ± 3.7	No rotation: 15.8 ± 4.0	6.41	0.001	Significant
Skills Score	>5 Cases: 19.2 ± 3.8	≤5 cases: 14.7 ± 4.6	–	0.003	Significant
Attitude Score	Government: 29.0 ± 4.5	Private: 24.2 ± 5.0	–	0.002	Significant

Scatter plot showing the positive linear relationship between the number of poisoning cases managed and overall competence score, with the regression line indicating increasing competence with greater clinical exposure (r = 0.41, p<0.001) (Figure 1).

DOI: https://doi.org/10.54393/pjhs.v7i8.3883

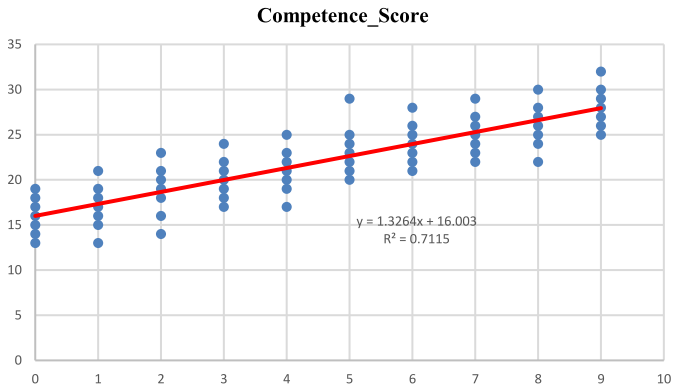

Figure 1: Positive Linear Relationship Between the Number of Poisoning Cases Managed and Overall Competence Score

DISCUSSION

This study evaluated the preparedness of recent medical graduates in managing poisoning cases and identified training-related factors influencing overall competence. Although theoretical knowledge was moderate, significant gaps were identified in practical skills and medico-legal readiness. Graduates who completed Department of Emergency rotations demonstrated superior knowledge, supporting previous findings that structured emergency exposure enhances understanding of poisoning management [13, 14]. Clinical exposure was a strong determinant of skills competence, with increased case experience correlating positively with overall competence. Similar associations between experiential learning and improved emergency care performance have been reported in comparable healthcare settings [15, 16]. Despite reasonable awareness of common poisons and antidotes, deficiencies in toxidrome recognition, airway protection, and decontamination protocols were evident. These findings mirror earlier studies demonstrating inadequate practical training in toxicology among junior doctors [14–17]. Medico-legal documentation emerged as one of the weakest competence domains, consistent with previous reports of limited medico-legal awareness and confidence among early-career physicians [18]. Attitudes toward professional responsibility were generally positive, particularly among graduates from government institutions, possibly reflecting greater exposure to emergency and medico-legal cases. However, positive attitudes alone did not translate into adequate competence, reinforcing the need for structured, skills-based training [16–18]. Regression analysis confirmed that emergency rotation completion and poisoning case exposure independently predicted competence, regardless of demographic factors. These findings align with evidence demonstrating that supervised emergency training and targeted educational interventions significantly improve preparedness among junior physicians [19, 20].

This study has several limitations. Convenience sampling may limit generalizability, and skills were assessed through structured scenarios rather than direct bedside observation. Self-reported exposure to poisoning cases may introduce recall bias. Future multicenter studies incorporating objective structured clinical examinations and longitudinal follow-up are recommended.

CONCLUSIONS

Recent medical graduates demonstrate moderate theoretical knowledge of poisoning management but exhibit important deficiencies in practical skills and medico-legal readiness. Structured emergency department rotations, simulation-based toxicology training, and formal medico-legal education should be integrated into medical curricula to enhance preparedness and improve patient outcomes.

Authors' Contribution

Conceptualization: SM
Methodology: SM, MA
Formal analysis: NA, AZ
Writing and Drafting: ZI, MS
Review and Editing: SM, ZI, MS, NA, AZ, MA

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

REFERENCES

[1] World Health Organization. Prevention and Management of Cases of Poisoning. 2024.
[2] Weaver ND, Bertolacci GJ, Rosenblad E, Ghobai S, Cunningham M, Ikuta KS *et al.* Global, Regional, and National Burden of Suicide, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet Public Health. 2025 Mar; 10(3): e189-202.
[3] Gummin DD, Mowry JB, Beuhler MC, Spyker DA, Rivers LJ, Feldman R *et al.* 2023 annual report of the National Poison Data System®(NPDS) from America's Poison Centers®: 41st Annual Report. Clinical Toxicology. 2024 Dec; 62(12): 793-1027. doi: 10.1080/15563650.2024.2412423.
[4] Mottla ME, Bowler ME, Asgary R. Epidemiology, Risk Factors, and Strategies to Prevent and Manage Poisonings Due to Pharmaceuticals in Children in Low-Income and Low-Middle Income Countries: A Systematic Review. Journal of Global Health. 2023

DOI: https://doi.org/10.54393/pjhs.v7i8.3883

Dec; 13: 04173. doi: 10.7189/jogh.13.04173.

[5] Ghannoum M and Roberts DM. Management of Poisonings and Intoxications. Clinical Journal of the American Society of Nephrology. 2023 Sep; 18(9): 1210-21. doi: 10.2215/CJN.0000000000000057.

[6] Abebe AM, Kassaw MW, Shewangashaw NE. Assessment of Knowledge and Practice of Nurses on Initial Management of Acute Poisoning in Dessie Referral Hospital, Amhara Region, Ethiopia, 2018. BioMed Central Nursing. 2019 Nov; 18(1): 60. doi: 10.1186/s12912-019-0387-2.

[7] Elsakkar MG, Alabdulhadi RA, Alkazzaz GM, Jafar Al-Qteeb Z, Islam MA. Assessment of the Knowledge of Basic First Aid of Acute Poisoning Among Medical Students at Imam Abdulrahman bin Faisal University, KSA. Alexandria Journal of Medicine. 2023 Dec; 59(1): 20-7. doi: 10.1080/20905068.2023.2187538.

[8] Molan JA. First Aid Knowledge of Basrah Nursing College Students in Poisoning Cases. Acta Scientific Medical Sciences(ISSN: 2582-0931). 2023 Jun; 7(6).

[9] Marks CJ, Louw AJ, Couper I. Core Competencies Required by Toxicology Graduates to Function Effectively in a Poisons Information Centre: A Delphi Study. African Journal of Emergency Medicine. 2020 Dec; 10(4): 173-80. doi: 10.1016/j.afjem.2020.05.011.

[10] Muhammad S, Almani KF, Mughal UU, Khaskheli MS, Sultana R, Tabassum R *et al.* Prospective Cohort Study on the Characteristics of Acute Poisoning Patients at a Tertiary Care Hospital in Pakistan. British Medical Journal Open. 2025 Oct; 15(10): e099837. doi: 10.1136/bmjopen-2025-099837.

[11] Kumari K, Toppo MS, Alam MS, Toppo MS, Alam MS. Assessment of Knowledge and Awareness among Nurses of a Tertiary Care Hospital Regarding the Management of Acute Poisoning: A Cross-Sectional Study. Cureus. 2023 Mar; 15(3). doi: 10.7759/cureus.36781.

[12] Fathy Khatab R, Abd Elaty Ahmed O, Elsayed Mahdy N, Faltas Marzouk Faltas S. Practice of Nurses Caring for Patients with Acute Poisoning in Emergency Unit: Effect of Educational Guidelines. Egyptian Journal of Health Care. 2024 Jun; 15(2): 993-1002. doi: 10.21608/ejhc.2024.358753.

[13] Hande R, Agarwal NS, Ajmera V. Knowledge, Attitude and Practice (KAP) Study on Medicolegal Knowledge of Healthcare Professionals About Handling Poisoning Cases in Tertiary Care Centres in Madhya Pradesh. International Journal of Medical and Pharmaceutical Research. 2025 Nov; 6: 405-10.

[14] Motawei SM, Taref NN, Abou-ElWafa HS, El-Gilany AH, Bauomy ES. Knowledge, Attitudes, and Practices of Physicians and Nurses on the Initial Management of Acute Poisoning: A Cross-sectional Study. Egyptian Society of Clinical Toxicology Journal. 2025 Dec; 13(2): 70-83. doi: 10.21608/esctj.2025.433669.1102.

[15] Fatmawati E, Fitriana NF. The Effect of Health Education on Knowledge and Attitude in First Aid Food Poisoning in Students of SD N 1 Kutasari. Proceedings Series on Health and Medical Sciences. 2021; 2: 144-8. doi: 10.30595/pshms.v2i.237.

[16] Tassew SF, Feleke DG, Sisay Chane E, Birile TA, Amare AT, Dessalegn W *et al.* Knowledge, Attitude, and Practice of Nurses Working in South Gondar Zone Hospitals Toward Initial Management of Acute Poisoning, 2021. Pan African Medical Journal One Health. 2022 Apr; 7(32). doi: 10.11604/pamj-oh.2022.7.32.32311.

[17] Hatem AA and Muhammad TR. Impact of an Educational Program on Nurses' Knowledge of Poisoning Management: A Quasi-Experimental Study. Al-Mustaqbal Journal of Pharmaceutical and Medical Sciences. 2024; 2(3): 1. doi: 10.62846/3006-5909.1016.

[18] Adal O, Hiamanot Y, Zakir A, Regassa R, Gashaw A. Knowledge, Attitude, And Practice of Nurses Toward the Initial Management of Acute Poisoning in Public Hospitals of Bahir Dar City, Northwest Ethiopia 2022: Cross-Sectional Study. SAGE Open Nursing. 2023 Feb; 9: 23779608231157307. doi: 10.1177/23779608231157307.

[19] Venkateswarlu M, Reddy SR, Swarnalatha P, Rupesh KA, Chandrasekhar G, Vemula SL. A Knowledge, Attitude and Practices Study on Clinical Toxicology among Internees and Registered Medical Practitioners at a Tertiary Care Hospital. Indian Journal of Forensic Medicine and Toxicology. 2023 Jul; 17(3). doi: 10.37506/ijfmt.v17i3.19494.

[20] Paleakkara A. Awareness of Medico Legal Aspects of Clinical Practise and Common Medico Legal Issues among Medical Graduates. Indian Journal of Forensic Medicine and Toxicology. 2021 Jan; 15(1).