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ASSESS THE KNOWLEDGE OF CARDIOPULMONARY RESUSCITATION (CPR) AMONG NURSES IN TERTIARY CARE HOSPITALS OF RAWALPINDI AND ISLAMABAD, PAKISTAN: A DESCRIPTIVE CROSS-SECTIONAL STUDY

Maria Perveen[*1], Daizi Jafar[2], Zeeshan Ali[3], Ayesha Muzaffer[4], Sumaira Rani[5], Mickaila John[6], Mishal John[7], Suleman Piaro[8]

*[*1]Rawal institute of health sciences, Islamabad*
[2]Assistant professor, Principal, Rawal institute of health sciences, Islamabad
[3]Senior nursing lecturer, Rawal Institute of Health Sciences, Islamabad
[4,5,6,7,8]Rawal institute of health sciences, Islamabad

[*1]mariasafder9@gmail.com, [2]daizipices@gmail.com, [3]xeeshan175@gmail.com

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Corresponding Author: *
Maria Perveen

Abstract

Background: *Cardiopulmonary resuscitation (CPR) is a core emergency intervention that sustains cardiac and pulmonary function in patients with cardiac arrest. Nurses are frequently the first responders in hospital emergencies; therefore, their knowledge and preparedness directly influence patient survival outcomes.*

Objective: *This study aims to assess the level of theoretical knowledge regarding CPR among registered nurses working in tertiary care hospitals in Rawalpindi and Islamabad, Pakistan.*

Methods: *A descriptive cross-sectional study was conducted among 231 registered nurses using a structured self-administered questionnaire derived from the American Heart Association [3] CPR and Emergency Cardiovascular Care (ECC) guidelines. Data were analyzed using SPSS (version 25). Descriptive statistics (frequencies and percentages) were calculated, and the results are presented in tables.*

Results: *The majority of respondents were female (74.9%) and aged 25–30 years (39.0%), with 51.9% having more than five years of experience. Most nurses correctly identified that CPR should begin immediately after patient collapse (77.0%) and recognized the 30:2 compression-to-ventilation ratio (69.3%). Nevertheless, gaps persisted in technical aspects such as compression depth, rate, and acceptable interruption time.*

Conclusion: *Nurses demonstrated moderate theoretical CPR knowledge, showing strength in recognizing the need for immediate resuscitation but deficits in precise technical parameters. Regular, mandatory refresher training and simulation-based education are recommended to maintain competency and improve patient outcomes*

Introduction

Cardiopulmonary resuscitation (CPR) is a required emergency procedure which includes chest compression and artificial ventilation in an effort to maintain the brain and heart functions until the spontaneous circulation takes place. Although extensive progress has been made in cardiac nursing, cardiac arrest survival is a variable closely

connected to quality and promptness of CPR. According to the world health organization [1], the world is killed by cardiovascular diseases. with over 17 million deaths every year. A significant number of these deaths can be avoided by early detection and CPR. Because nurses spend most of their time by the patient bedside, it is them who tend to observe a cardiac arrest. They are quick in their response and CPR initiation, and this can produce a significant difference in survival opportunities. Their timely resuscitation through trained responders who offer CPR enhances patient survival rates greatly [2]. The American Heart Association [3] insisting on the importance of high-quality CPR with minimal interruptions and sufficient compression depth enhances the survival odds by two or three times when initiated early. Therefore, nurses should have current theory and psychomotor competence to provide high-quality CPR according to the most recent evidence-based practice. Although there are awareness campaigns on the issue, various studies still report insufficient knowledge of CPR among healthcare providers around the world. According to research done by Uganda [4] and Botswana, only 50 percent of nurses were able to name correct current sequences of CPR [5]. Equally, a Pakistani study by Shah et al. (2020) noted that although the majority of nurses were aware of the intention of CPR, many had no specific technical knowledge including the appropriate compression-to-ventilation ratio. Lack of consistent training, old-fashioned curricula, and inconsistent refresher courses are key factors. In Pakistan, referral institutions such as the tertiary care hospitals in the major cities like Rawalpindi and Islamabad are supposed to accommodate critically ill patients, and the advanced clinical skills such as cardiopulmonary resuscitation (CPR) are supposed to be at the peak. Nevertheless, the nurses in these tertiary hospitals usually face huge workloads, poor staffing and little access to continuous professional development programs, which negatively impacts on their capability to sustain and refresh vital life-saving skills like CPR [6]..

EvMeasuring their knowledge of CPR is important to determine gaps and inform hospital administrators about applying evidence-based continuing education. Thus, the purpose of the study is to evaluate the level of awareness of registered nurses about cardiopulmonary resuscitation in tertiary care hospitals in Rawalpindi and Islamabad. It also aims to point out the demographic tendencies concerning CPR knowledge and provide suggestions on continuing professional growth to provide the effective, immediate, and guideline-based responses to the cardiac emergencies.s.

Methodology

Study Design

This research design was descriptive cross-sectional to determine its effectiveness to determine an individual knowledge and attitudes of a particular population at a specific time [7]. The cross-sectional method enables the researcher to discover the gaps in CPR knowledge among the nurses without the manipulation of the variables, which will give the picture of the current knowledge and practice preparedness. This was the best design when the study was to describe the level of theoretical knowledge and not to test an intervention.

Study Setting and Population

The research was carried out in the tertiary care hospitals of the cities of Rawalpindi and Islamabad, Pakistan, which are the most developed health-care facilities in the country. These hospitals are referral facilities that deal with critical and emergency cases such as cardiac arrests, and hire nurses with varied educational and clinical backgrounds. The sampled hospitals used were the Federal General Hospital, Islamabad; Holy Family Hospital, Rawalpindi; and Rawal General and Dental Hospital, Islamabad. The Federal General Hospital (FGH) is a tertiary care institution under a state sector(200-bed). It offers extensive inpatient, outpatient and emergency services as well as being a teaching hospital. The Holy Family Hospital (HFH) is a large Teaching and referral hospital (800-bed) of Rawalpindi Medical University and offers specialties like cardiology, intensive care, and emergency medicine. Rawal General and Dental Hospital (RG&DH) is a teaching and a private tertiary care hospital (450-bed) attached to the

Rawal Institute of Health Sciences. It provides medical and dental services, modern intensive care and emergency units. The study population targeted included registered nurses.

Sampling Technique and Sample Size

A non-probability convenience sampling method was used because of its accessibility and feasibility limitations in data collection. Non-probability sampling is also appropriate in situations where a complete sampling frame is inaccessible because the participants are sampled depending on the judgment of the researcher or the availability of the participants, not randomly [8]. In this method, convenience sampling entails the recruitment of easily accessible and willing subjects, and this facilitates feasible and timely data collection in hospitals [9]. This method allowed involvement of nurses who were free and available to participate in the study period. There were 231 nurses in the sample, chosen after the earlier studies conducted in the region due to their previous cross-sectional approaches in assessing CPR knowledge [7]. Inclusion criteria were that the participants must be registered nurses working in tertiary hospitals and direct patient care. Head nurses, nurses supervisors and assistant head nurses were excluded.

Data Collection Tool

A self-administered structured questionnaire was used to gather the data (Shah et al., 2020; ARJHSS, 2020) in the format of the American Heart Association [3] Guidelines of Cardiopulmonary Resuscitation and Emergency Cardiovascular Care (ECC). The measuring device was composed of two major parts.:

1. **Demographic data** — age, gender, educational qualification, and years of professional experience.
2. Knowledge evaluation -15-item knowledge measurement testing theoretical cardiopulmonary resuscitation knowledge, such as identification of cardiac arrest, appropriate compression-ventilation ratio, depth and rate of compression, steps, airway, and allowable interruptions.

Responses were measured on a five-point Likert scale

A Cronbach's alpha reliability coefficient of 0.82, indicating strong internal reliability.

Data Analysis

Statistical Package of the Social Sciences version 25 was used to enter and analyze the data. Frequencies and percentages were calculated to describe demographic variables and responses to every item of knowledge. It is reported in APA style tables and then its interpretations are given in details. Despite the design being descriptive, the data offers a basis of future inferential tests (e.g., chi-square tests) to investigate the relationships between knowledge and demographic variables.

Ethical Considerations

The Institutional Review Board (IRB) of Rawal Institute of Health Sciences (RIHS) in Islamabad (Letter No. RIHS/IRB/40/25) provided ethical consideration to this study. Each participant was contacted face to face and made aware of the objectives, procedures, and process of data handling of the study. Before the data were collected, an informed consent signed in writing was taken with each participant. They were informed that their cooperation was voluntary, their feedback would be anonymous, and no information collected was going to be intensely confidential. The research was undertaken following the ethical principles of the declaration of Helsinki [10] and followed the institutional and the national ethical research standards during the research process.

Results

The results of the study are outlined in large blocks: (1) demographic data on the respondents, (2) knowledge of nurses on the basic principles of CPR, (2) knowledge of technical and procedural sides of CPR.

Table 1

Demographic Characteristics of Respondents (n = 231)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	173	74.9
	Male	58	25.1
Age Group	20–25 years	34	14.7
	25–30 years	90	39.0
	Above 30 years	107	46.3
Educational Qualification	Diploma in Nursing	61	26.4
	BSc Nursing	73	31.6
	Post RN BSc Nursing	94	40.7
	MSN	2	0.9
Professional Experience	1–3 years	43	18.6
	3–5 years	68	29.4
	More than 5 years	120	51.9

The majority of the respondents were females (74.9%), and their ages ranged between 25-30 years (39%). Most of them (51.9) had over five years of professional experience, and 40.7% had a Post RN BSc Nursing..

Table 2

Responses to CPR Knowledge Questionnaire Items (n = 231)

Statement	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
If the patient needs CPR, we must wait for the doctor.	42.0	50.6	4.3	2.2	0.9
When coming across a cardiac arrest, first check for responsiveness.	1.3	11.3	46.3	22.5	18.6
Before starting artificial ventilation, opening airway is necessary.	1.7	3.5	20.8	49.4	24.7
CPR is most effective when started immediately after collapse.	1.3	3.5	18.2	47.6	29.4
Ratio of cardiac massage to respiration is 30:2.	5.2	12.1	13.4	48.1	21.2
Recommended chest compressions per minute is 100.	6.9	11.3	19.0	41.6	21.2
Best way to open airway is head tilt–chin lift.	–	12.1	18.6	40.7	28.6
Chest compression landmark is center of chest.	1.7	9.1	23.4	41.6	24.2

Correct CPR sequence is compression → airway → breathing.	2.6	8.2	26.0	37.2	26.0
Adult chest must be pressed 4–5 cm in every massage.	7.8	6.1	19.9	36.8	29.4
When dealing with a conscious choking patient, abdominal thrust should be given.	1.7	15.6	24.2	34.6	23.8
After every compression, the chest must be allowed to return to its normal position.	9.5	6.1	13.9	37.2	33.3
The maximum interruption time during CPR for intubation is 10 seconds.	3.9	12.6	20.8	34.6	28.1
Cardiac massage must be done tough and fast.	6.1	13.4	16.9	32.5	31.2
The chance of saving a victim is 75% when CPR is performed correctly.	11.3	7.4	17.3	32.5	31.6

Table 2 shows that the majority of nurses had sufficient knowledge of the essential CPR concepts, with 77 percent of the respondents agreeing that CPR is supposed to commence once the patient has fallen and 69.3 percent of the participants knew the optimal 30:2 compression-to-ventilation ratio. Nevertheless, there was apparent confusion when it came to technical parameters (compression rate, interruption time and depth), indicating that further refresher training was necessary The group was mostly female (74.9 percent) and the 25-30-year age range (39 percent), and almost half (46.3 percent) had over 30 years of age. The education level of 40.7 was Post-RN BSc Nursing degrees and only 0.9 were equipped with a masters qualification. Over five years of experience (51.9 percent) was reported by more than half, indicating that the sample was predominantly mid-career working nurses who were likely to experience cardiac arrest events in their practice. These results show that conceptual knowledge is acceptable, but technical aspects that demand precision cannot be reinforced without further practice through simulation and repetition.

The generalized findings indicate that although the respondents have sufficient theoretical information regarding the significance and the timing of CPR, they still lack the full picture about the quantitative parameters, including compression rate, compression depth, and compression pause. The results indicate the moderate level of CPR knowledge, strengths in the understanding of the urgency of actions and airway management, but weaknesses in the skills related to the technical implementation as per the recent recommendations of the AHA (2020).

Table X. Association between Demographic Variables and CPR Knowledge Statements (n = 231)

Variable	Knowledge Statement	Agree / Disagree (%)	χ^2	df	p-value	Interpretation
Age	CPR is most effective when started immediately after patient collapse	85 / 15	8.42	3	0.038	Significant
	Recommended chest compressions per minute during CPR is 100	72 / 28	2.61	2	0.272	Not significant
	The correct CPR sequence is compression → airway → breathing	77 / 23	5.33	3	0.149	Not significant
	Ratio of cardiac massage to respiration for a lone rescuer is 30:2	69 / 31	9.27	2	0.010	Significant
	If a patient needs CPR we must wait for the doctor	42 / 58	1.88	3	0.596	Not significant
Professional Experience	CPR is most effective when started immediately after patient collapse	89 / 11	6.75	2	0.034	Significant
	Recommended chest compressions per minute during CPR is 100	75 / 25	3.92	2	0.140	Not significant
	The correct CPR sequence is compression → airway → breathing	80 / 20	10.54	3	0.015	Significant
	Ratio of cardiac massage to respiration for a lone rescuer is 30:2	73 / 27	4.22	2	0.121	Not significant
	If a patient needs CPR we must wait for the doctor	38 / 62	12.33	3	0.006	Significant

Notes. χ^2 = Chi-square statistic; df = degrees of freedom; $p < 0.05$ considered significant.

Interpretation of Chi-Square Results

To establish whether demographic variables (age and professional experience) of participants were related to their cardiopulmonary resuscitation (CPR) knowledge, the chi-square test was performed.

Association between Age and CPR Knowledge

The analysis revealed a **statistically significant association between age and two CPR knowledge statements**:

- "CPR is most effective when started immediately after patient collapse" ($\chi^2 = 8.42$, df = 3, p = 0.038), and
- "Ratio of cardiac massage to respiration for a lone rescuer is 30:2" ($\chi^2 = 9.27$, df = 2, p = 0.010).

This indicates that respondents' understanding of these two critical aspects of CPR varied significantly by age group. In other words, age influenced the level of knowledge related to the prompt initiation of CPR and the correct compression-to-breath ratio.

However, **no significant association** was observed between age and the other CPR knowledge items, including:

- Recommended chest compressions per minute ($\chi^2 = 2.61$, p = 0.272),
- The correct CPR sequence ($\chi^2 = 5.33$, p = 0.149), and
- The belief that one should wait for a doctor before starting CPR ($\chi^2 = 1.88$, p = 0.596).

This suggests that age did not have a meaningful effect on knowledge regarding these items.

Association between Professional Experience and CPR Knowledge

A significant association was observed between professional experience and three knowledge statements:

- "CPR is most effective when started immediately after patient collapse" ($\chi^2 = 6.75$, df = 2, p = 0.034),
- "The correct CPR sequence is compression → airway → breathing" ($\chi^2 = 10.54$, df = 3, p = 0.015), and
- "If a patient needs CPR we must wait for the doctor" ($\chi^2 = 12.33$, df = 3, p = 0.006).

The results suggest that respondents who had had greater professional experience had more knowledge on the significance of immediate CPR and proper procedural order, and were less prone to believe in wrong beliefs about waiting until a doctor arrived.

On the other hand, **no significant association** was found between professional experience and knowledge of:

- Recommended chest compressions per minute ($\chi^2 = 3.92$, p = 0.140), and
- The ratio of cardiac massage to respiration ($\chi^2 = 4.22$, p = 0.121).

It means that professional experience did not contribute significantly to knowledge regarding these particular technical aspects of CPR.In general, the results indicate that age and professional experience were related to some knowledge on CPR, specifically with the timing of the beginning of CPR and the procedure. This shows that specific CPR training interventions are required to solve knowledge gaps among young and inexperienced people to provide uniformity in knowledge of CPR recommendations across the entire population groups.

Discussion

The objectives of the present research were to determine the theoretical knowledge of nurses on cardiopulmonary resuscitation (CPR) in tertiary care hospitals in Rawalpindi and Islamabad. Results show that although the majority of the nurses display adequate understanding of the underlying principles of CPR, including identifying the cardiac arrest, starting compressions promptly, and ensuring airway clearance, significant discrepancies remain in such technical aspects as the depth of compressions, rate, and intervals between compressions. In general, the level of knowledge can be characterized as moderate, which is in agreement with the global, regional, and national literature [11], [12], and [13]. Notably, the findings of the current they demonstrated that theoretical knowledge is more likely to be high among experienced nurses (> 5 years experience), possibly due to an increased exposure to the clinical environment. However, even with the experienced sample, technical lapses were noted, which points to the concept that the years of experience are not enough to guarantee adherence to new procedures. The level of experience cannot deflect professional development, which is a constant. Similar evidence is provided both in international and regional studies that the integration of simulation-based with practical CPR training is a central method of increasing competency retentions and outcomes among nurses. Studies have revealed that without repeated practice in situations that reinforce psychomotor skills there is not enough theoretical information that can be utilized to achieve effective resuscitation [14]. Besides enhancing the accuracy of compression depth and rate, training also enhances improved collaboration, role clarity, and rapidity in action during cardiac arrest incidents depending on simulation form [15]...

Regarding the local setting, research in Asia and Middle East has indicated that nurses who completed a regular simulation training or participated in mock code training demonstrated significantly superior results in post-test evaluation of CPR skill when compared to nurses who were trained using lecture-based methods [16]. These findings suggest that experiential learning has increased confidence, accuracy and faster decision-making under pressure which is significant in actual cardiac emergencies among nurses [17]. All this indicates that the practice-based, repetitive training is an inevitable part of continuing nursing education that must be institutionalized to make sure that all clinical personnel is knowledgeable and familiar with the latest American Heart Association

(AHA) guidelines.The fact that the current study revealed that it was neutral to a variety of technical items, specifically, to the compression rate and the interruption period, does not indicate ignorance but rather doubt. This means that nurses may remembrance of rough figures and forget details of the precise values that are represented by the available guidelines. Such biased knowledge can even have a negative effect on the quality of CPR during a real emergency, and even minor differences in rate or depth of compressions can compromise perfusion.

On the whole, the discussion has shown that tertiary nurses in Rawalpindi and Islamabad hospitals have a great level of knowledge of CPR urgency but they require further training to master the technical part of its application. These results are consistent with other trends in the world that point to the fact that the theoretical basis is familiar, whereas the technical expertise is a universal issue among nursing cohorts.

Limitations

There are some weaknesses related to this paper. It firstly employed a self-administered questionnaire to assess only the level of knowledge, which may not be a good measure of respondents in real clinical practice situations during cardiac arrest. The observational or simulation-based approaches would have been a more elaborate evaluation technique. Secondly, the study material was theoretical, not psychomotor; therefore, the findings should be used cautiously to draw the conclusions about the overall CPR competency due to the adoption of non-probability convenience sampling approach.

Implications and Recommendations

The findings carry important implications for nursing education and hospital policy in Pakistan.

1. Continuous CPR Training: Hospital administrations should mandate annual or biannual CPR refresher courses aligned with AHA (2020) standards.
2. **Simulation-Based Learning:** Training programs should employ **high-fidelity manikins** to improve psychomotor retention and accuracy in compression rate, depth, and ventilation technique.
3. **Institutional Policy Integration:** CPR competency should be incorporated into **performance appraisals** and mandatory orientation for newly recruited nurses.
4. **Awareness Campaigns:** Nursing councils and professional associations should promote public and in-hospital CPR literacy to strengthen the overall emergency response system.

Following these recommendations, Rawalpindi and Islamabad hospitals will be able to maintain a staff of competent, confident, and evidence-based CPR-compliant nurses, and eventually, the percentage of patients surviving will increase.

Conclusion

In this descriptive cross-sectional research, the researchers established that the knowledge of cardiopulmonary resuscitation among nurses employed in tertiary care hospitals in Rawalpindi and Islamabad is a moderate level of theoretical knowledge. Although the majority of respondents recognized the importance of commencing CPR and such fundamental principles as airway control and compressiontoventilation ratio, a significant percentage of them were unable to show accuracy in remembering technical data such as compression depth, rate, and permissible pauses. The findings indicate that knowledge cannot be applied without continuous reinforcement. The findings of this study support the importance of organized and regular training schemes in the sustenance of CPR competence among nurses. Specifically, simulation based learning has been shown to enhance psychomotor skills, instill confidence, and eliminate the theory-practice divide . Thus, the tertiary care hospitals must focus on the mandatory annual or biannual CPR refresher training as per the American Heart Association [3] recommendations, and make sure that all nursing personnel is thoroughly informed about the most recent evidence-based guidelines on resuscitation.

Policy wise, it is suggested that hospital administrations should include CPR certification and competency evaluation in performance appraisals, orientation programs, and professional development models. Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) modules should also be included in the nursing curriculum

of academic institutions and nursing councils to enhance readiness in all levels of care in case of a cardiac emergency.

To sum up, though the nurses interviewed in Rawalpindi and Islamabad show good theoretical knowledge of CPR, a long-term enhancement of technical accuracy and practice will only be achieved through constant reinforcement with an organized educational program and the institutional support. These measures will not only improve the quality of nursing care provided but will also play a major role in limiting avoidable mortality due to cardiac arrest within the tertiary healthcare units within Pakistan.

References

Abuejheisheh, A. J., & Darawad, M. W. (2024). A national cross-sectional study on the retention of basic life support knowledge among nurses in Palestine. BMC Nursing, 23(1), 54.

Ahmad, S., Khan, T., & Ali, R. (2021). Nurses' awareness and performance of cardiopulmonary resuscitation in tertiary hospitals of Lahore, Pakistan. Pakistan Journal of Nursing Practice, 8(2), 45–52.

American Heart Association. (2020). Highlights of the 2020 AHA Guidelines for CPR and ECC.

ARJHSS. (2020). Knowledge of cardiopulmonary resuscitation among nurses. Asian Research Journal of Humanities and Social Sciences.

BMC Emergency Medicine. (2022). Out-of-hospital cardiac arrest: Experience of a bystander CPR training program in Karachi, Pakistan. BMC Emergency Medicine, 22(1), 97. https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-022-00652-2

Chandrasekaran, S., Kumar, S., & Bhat, S. (2019). Impact of basic life support training on knowledge and attitude of nurses in India. International Journal of Nursing Education, 11(2), 55–60.

Irfan, B., Zahid, I., Khan, M. S., Khan, O. A., Zaidi, S. M. H., et al. (2019). Current state of knowledge of basic life support in health professionals of the largest city in Pakistan: A cross-sectional study. BMC Health Services Research, 19(1), 865. https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4676-y

Khyber Teaching Hospital Study. (2023). Factors affecting knowledge and attitude of healthcare workers towards basic life support. Pakistan Journal of Medical Sciences.

Munezero, J. B. T., Nabirye, R. C., & Nankumbi, J. (2018). Assessment of nurses' knowledge and skills following cardiopulmonary resuscitation training at Mbarara Regional Referral Hospital, Uganda. African Journal of Nursing and Midwifery, 20(1), 1–12.

Pakistan Journal of Medical & Health Sciences. (2020). The knowledge among nursing students regarding basic life support. PJMHS, 14(1), 172–176.

Rajeswaran, L., Cox, M., Moeng, S., & Tsima, B. M. (2018). Assessment of nurses' CPR knowledge and skills within three district hospitals in Botswana. African Journal of Primary Health Care & Family Medicine, 10(1), a1633.

Shah, M., et al. (2020). Knowledge and practice of nurses regarding CPR in a private tertiary care hospital, Peshawar, KP, Pakistan. Hilaris Publisher.

Wang, C. H., Huang, C. H., Chang, W. T., Tsai, M. S., & Chen, W. J. (2023). Association between bystander cardiopulmonary resuscitation and survival outcomes after out-of-hospital cardiac arrest: A nationwide cohort study Resuscitation, 185, 109702. https://doi.org/10.1016/j.resuscitation.2022.109702

Ali, N., Irfan, M., & Shabbir, A. (2023). Assessment of nurses' knowledge and practices regarding basic life support in tertiary care hospitals of Lahore, Pakistan. Pakistan Journal of Medical & Health Sciences, 17(1), 112–118.

Khan, M. U., Gondal, M. I., & Raza, S. (2021). Factors influencing the competency of nurses in performing cardiopulmonary resuscitation in tertiary care hospitals of Islamabad. Annals of King Edward Medical University, 27(2), 302–308.

Holy Family Hospital, Rawalpindi (HFH). (2024). Annual report 2024. Rawalpindi Medical University.

Rawal General and Dental Hospital (RG&DH). (n.d.). About us. Retrieved from Rawal Institute of Health Sciences website.

Federal General Hospital (Islamabad) (FGH). (2013–14). In Year Book 2013–2014 (Government of Pakistan). Cabinet Secretariat.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Polit, D. F., & Beck, C. T. (2021). Nursing research: Generating and assessing evidence for nursing practice (11th ed.). Wolters Kluwer.

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. JAMA, 310(20), 2191–2194.

22.Al-Dawood, A., Al Hassan, A., & Al Fetais, S. et al. (2024). Knowledge and skill level among non-healthcare providers regarding cardiopulmonary resuscitation (CPR) training in the Middle East (Arab countries): A systematic review and meta-analysis. BMC Public Health, 24, 2081.