Healthcare in Low-resource Settings



eISSN: 2281-7824
https://www.pagepressjournals.org/index.php/hls/index

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Healthc Low-resour S 2026 [Online ahead of print]

To cite this Article:
Ajayeb AH, Jallad MA, Ghawadra SF, Awwad K. **Knowledge and perception of rapid response teams among nurses, physicians, and hospital administrators in Palestinian hospitals: a cross-sectional study.** *Healthc Low-resour S* doi: 10.4081/hls.2026.14604

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Submitted: 23 October 2025
Accepted: 17 October 2026
Early access: 10 November 2026

Knowledge and perception of rapid response teams among nurses, physicians, and hospital administrators in Palestinian hospitals: a cross-sectional study

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Key words: rapid response team, knowledge, perception, Palestinian hospitals.

Abstract

This study assessed the level of knowledge and perception of Rapid Response Teams (RRTs) among nurses, physicians, and hospital administrators in Palestinian hospitals. Enhancing patient safety and care quality remains a key concern for healthcare organizations. The RRT is a relatively new concept proven to reduce hospital-wide and intensive care unit mortality, as well as cardiopulmonary arrests. A descriptive cross-sectional survey was conducted among 331 participants—nurses, physicians, and hospital administrators—from government and teaching hospitals in Palestine. Data were collected using a self-administered questionnaire to evaluate knowledge and perception of RRTs and the factors influencing them. Over half of the respondents (57.4%) demonstrated good knowledge, while 32.0% had moderate knowledge. A good perception level was found in 70.4% of participants. Most agreed that RRTs effectively manage emergencies when staffed by qualified personnel. Higher knowledge levels were associated with poor infrastructure ($p<0.05$) and greater workload ($p=0.006$). Longer working hours ($p=0.014$) and staff shortage ($p=0.043$) were associated with higher perception, and

hospital administrators reported higher perception than nurses and physicians (p=0.014). Overall, nurses, physicians, and administrators in Palestinian hospitals showed a good level of knowledge and a positive perception of RRTs. Knowledge was higher among older, more educated participants and those reporting poor infrastructure or a heavier workload, while perception was higher among those reporting longer working hours or staff shortages, and among hospital administrators. Because the design was descriptive, these associations are exploratory and need confirmation in future research.

Introduction

A Rapid Response Team (RRT) consists of a group of clinicians who provide a rapid response to hospital patients showing objective or subjective signs of clinical deterioration.[1] Identifying these patients may prevent adverse clinical outcomes, including cardiac arrest and death.[2] An RRT is not the same as a code blue team.[3] The goal of an RRT is to intervene before the onset of injury, respiratory arrest, or cardiac arrest, whereas the code blue team is a specially trained and equipped team of physicians, nurses, and technicians that are available to provide advanced cardiac life support when called by an emergency code.[4,5]

A study conducted in Saudi Arabia used a prospective cohort design to evaluate the effectiveness of RRTs on mortality, cardiopulmonary arrests, and ICU admissions in tertiary private hospitals. Non-ICU nurses activated RRTs more often than physicians did (69% vs. 31%). ICU admissions fell from 44.65 to 20.70 per 1000 hospital admissions, the mortality rate fell from 7.8 to 2.8 per 1000 admissions, and the cardiopulmonary arrest rate fell from 10.53 to 2.58 per 1000 admissions after RRTs were implemented. Cardiovascular and respiratory failure were the leading causes of RRT activation, and nurses' concern for the patient accounted for 11.29% of RRT calls.[6]

Retrospective studies also suggest that RRTs may help reduce the hospital CPR rate. This was evident in their analysis, which found that among 14 tertiary institutions, those that used RRTs had a significantly lower CPR rate over three years (P = 0.009), while hospitals without an RRT saw no change over the same period (P = 0.854). Government university hospitals also had a lower prevalence of cardiac arrests than private university hospitals.[7,8]

In addition, studies in Saudi Arabia and the United States showed that the utilization of RRTs significantly reduced the cardiac arrest rate, hospital length of stay per 1000 admissions, and transfers to the ICU.[9,10] Another literature review showed that the effect of RRTs in decreasing mortality and non-ICU cardiac arrest rates, was moderate and that it would take a long time to properly assess the effect of RRTs, which necessitates a total change in the safety culture of health institutions.[11]

Interestingly, a Chinese retrospective cohort study conducted in a tertiary Joint Commission International (JCI) accredited hospital, found that RRTs were associated with a 40% reduction in the overall hospital mortality from 2.95 to 1.77 per 1000 non-obstetric patients (P=0.001). Moreover, the

increase in RRT activations significantly correlated with the decrease in the in-hospital mortalities (P=0.025).[12]

Qualitative studies found that nursing leaders and executives from 15 hospitals in the United States had a positive perception of RRT efficiency, particularly in reducing the incidence of CPR and ICU admissions. RRTs also improved the clinical staff's compliance with safety principles, professional communication, and critical care management, in addition to providing evidence-based care.[13-15]

The evidence reviewed above on the impact and perception of RRTs, however, comes largely from health systems in which an RRT is already operating; it does not by itself indicate how professionals who work without an equivalent system understand or view one.

None of the hospitals in Palestine, including JCI-accredited institutions, have a formal rapid response team, and, thus, the general knowledge and perception of RRTs have not been assessed locally in Palestine.[16] Since staff in these hospitals have no direct experience with an operational RRT, what they know and how they see it is shaped mainly by their professional training and by exposure to related systems such as the code blue team. Measuring that baseline is still worthwhile, because it shows what nurses, physicians, and administrators bring to the table before any formal RRT is introduced. Therefore, this study assesses the level of knowledge and perception among nurses, physicians, and hospital administrators of RRTs in Palestinian hospitals.

Materials and Methods

Study design

The design is a descriptive cross-sectional survey that provides detailed information concerning the knowledge and perception of RRTs among nurses, physicians, and hospital administrators, and enriches the understanding of circumstances that affect their perception and knowledge.

The setting of the study

The sample was recruited from nurses, physicians, and administrators working at An-Najah National University Hospital (NNUH) and Istishari Arab Hospital. These two hospitals were chosen because they are among the largest JCI-accredited tertiary referral centres in the West Bank, with high patient volumes, a varied case-mix, and an established resuscitation and quality-improvement culture. A code blue team is not the same as an RRT, but it is this broader organisational setting, not the code blue team by itself, that makes staff at these hospitals a suitable population for studying baseline knowledge and perception of RRTs before any such system is formally introduced.

Study population

The target population included all nurses, physicians, and health care administrators working in An-Najah National University (NNUH) and Istishari Arab Hospitals with an active code blue team in West

Bank/Palestine. The study population was 750 comprising nurses, physicians, and hospital administrators.

All nurses, physicians, and hospital administrators working in An Najah University Hospital and Istishari Arab Hospital at the time of data collection were included in this study. Hospital administrators not related to medical fields, such as human resources administrators, and financial administrators were excluded from the study.

Study sample

A purposive convenience sample was used to recruit the desired number of participants who were exposed to the code blue team and code blue team policy at An Najah university and Istishari Arab Hospitals.

Sample size calculation

The sample size was calculated using the Taro Yamane formula (1976) N/ 1+N*(e) ^{2} with a confidence interval of 95% and e = precision level of 0.05 (17). The appropriate sample size was 260 and 20% (52) was added to allow for questionnaires that might come back incomplete or not at all, rather than for attrition, giving a minimum target sample of 312.

Instrument of the study

The instrument used in this study was a self-administered, paper-based questionnaire, chosen because it gave easy access to a large number of participants at minimum cost. The questionnaire, originally titled "Nurses' Knowledge and Perceptions of Rapid Response Teams," was adopted from a previously validated survey[18] developed in Finland. Because it came from a different cultural and health-care context, it was reviewed by a panel of bilingual nursing and emergency-care experts for content relevance and clarity, then pilot-tested locally before use; its internal consistency in this sample is reported below. It assesses staff understanding of the purpose, function, and effectiveness of RRTs, and their perception of the teams' impact on patient outcomes and clinical practice. Knowledge and perception levels were categorised using Bloom's cut-off points: good for a score of 80% or above (80–100%), moderate for 60–79%, and poor for below 60%.[19]

The questionnaire was divided into three parts.

In the first part demographic data, such as gender and age, years of experience, and educational level – represented by diploma, bachelor's degree, master's degree or, PhD – were collected.

In the second part the responders were asked about work factors, comprising workplace area divided into private or educational hospital, and nature of work – nurse, physician, or hospital administrator – and the presence of the following: shift work (*i.e.*, rotating or night-shift schedules), inadequate resources, poor infrastructure, long working hours, workload and shortage of staff. The participants

answered those questions by selecting "Yes" to indicate the presence of the problem and "No" to indicate the absence of the problem.

Third part was adapted from the rapid response system staff knowledge and satisfaction survey, which was developed by the Australian Commission on Safety and Quality in Health Care to provide acute care facilities to evaluate staff perceptions of the rapid response system. The survey was designed to assess inhibitors of effective activation and use of rapid response systems, the benefit of applying a rapid response team, and its key role in managing clinically deteriorated patients.

The pilot study was conducted on 10% of the total sample size, which was 31 participants, who were excluded from the main study. The Cronbach's alpha was 0.82 for knowledge and 0.86 for perception.

Data collection

A paper-based questionnaire with a cover letter was submitted to the chief nursing officers and quality officers of both hospitals, who then distributed it to eligible nurses, physicians, and hospital administrators in their departments. The cover letter included the study title, purpose, and significance, as well as the author address and contact information. The explanation also revealed that participation in the survey was voluntary and that the participants could withdraw from the survey at any time without penalty. The collected data was kept in a safe-locked external hard drive to maintain confidentiality.

Data analysis

The data collected from the survey was checked for errors and incompleteness, then coded, cleaned, inserted, and analysed using the IBM Statistical Package for the Social Sciences program version 26.0 (SPSS).

The total score for each dimension was computed, and percentages were then calculated for each dimension. Normality of the score distributions was checked using the Kolmogorov–Smirnov test and histograms and Q–Q plots. Since the scores were not normally distributed, we used non-parametric tests: the Mann–Whitney U and Kruskal–Wallis H tests for differences in knowledge and perception scores across demographic and work-factor groups, and Spearman's rank correlation for the relationship between knowledge and perception. Data are presented as median and Interquartile Range (IQR) for numerical variables and as frequencies with percentages for categorical variables, with statistical significance set at $p < 0.05$. Given the descriptive cross-sectional design, these are exploratory results, not confirmatory ones.

Results

Demographic data

Of the 331 questionnaires returned (95% response rate), most respondents were nurses (65.6%), followed by physicians (31.1%) and a small number of hospital administrators (3.3%). Most were aged 20–30 years (67.4%), with slightly more female nurses (54.4%) than male (45.6%). Over half worked in private hospitals (51.1%). Clinical experience ranged from 1–5 years for 60.1% of participants, 6–10 years for 27.5%, and over 14 years for 4.5%, with a mean of 5.88 ± 4.12 years. Most held a Bachelor's degree (79.5%), while PhD, Master's, and Diploma holders were under 20% each (Table 1).

Work factors

Most participants reported a high workload (79.8%) and long working hours (53.5%). In addition, 47.1% reported a staff shortage, 36.6% reported inadequate resources, and 25.1% reported poor infrastructure in their hospitals (Table 2).

Knowledge and perception score about RRTs

The median knowledge score was 83.33 (IQR 66.67–91.67). Table 3 shows that 190 respondents (57.4%) had a good level of knowledge, 106 (32.0%) had moderate knowledge, and 35 (10.6%) had poor knowledge of RRTs. The median perception score was 88.89 (IQR 77.78–88.89), with scores ranging from 50 to 100. A good perception level was found in 233 participants (70.4%), while 73 (22.1%) had moderate and 25 (7.6%) had poor perception of RRTs (Table 3).

At the item level, most participants (75.5%) correctly identified RRTs as a team of healthcare providers that responds to hospitalized patients with early signs of deterioration outside intensive care units. However, 59.2% still agreed that CPR (code blue) teams are similar to and replace RRTs, which shows that many respondents confuse the two services. Most participants also agreed that RRTs should be available in every hospital and can strengthen teamwork, staff education, and the management of clinical deterioration.

Factors associated with knowledge and perception levels of RRTs

Knowledge and perception scores were positively correlated (Spearman's $r = 0.774$, $p < 0.001$): participants with higher knowledge tended to report a more favourable perception. Knowledge was higher among older participants ($p = 0.013$), those with higher educational qualifications ($p = 0.008$), and those reporting poor infrastructure ($p = 0.024$) or a heavier workload ($p = 0.006$). Perception was higher among participants reporting longer working hours ($p = 0.014$) or staff shortage ($p = 0.043$), and it differed by professional role ($p = 0.014$), with administrators reporting the highest perception,

followed by nurses and physicians (Table 4). No other comparisons reached significance ($p > 0.05$), including knowledge or perception by gender, years of experience, hospital type, shift work, or inadequate resources. Given the descriptive design and the predominance of nurses in the sample, these results should be read as exploratory rather than confirmatory, and the non-significant comparisons may simply reflect limited power to detect subgroup differences.

Discussion

Most participants correctly described what an RRT is, yet more than half (59.2%) still equated CPR (code blue) teams with RRTs. This is not surprising in a setting with no formal RRT, where staff knowledge comes mainly from training and from related systems such as the code blue team, rather than from working alongside an actual rapid response team.

The findings of this study were in agreement with many studies. In one study, the majority of the nurses believed that RRTs could prevent cardiac arrest and intervene efficiently in impaired patients.[20] The literature suggests that physicians, not just nurses, may see RRTs as a valuable backup for acutely ill patients outside the ICU.[13,21] Because nurses made up most of this sample, however, conclusions about physicians and administrators should be drawn cautiously. Their presence is a benefit to unstable patients as well as to the nurses in need of clinician support.[22] Moreover, it was deemed valuable that anyone could activate RRTs.[11]

Another finding merits further discussion. Among the participants of this study, those who were 40 years or older showed a higher level of knowledge about RRTs than the other age groups. This was mirrored by the finding that the level of knowledge is associated with higher educational degrees, and, hence, staff who held a diploma certificate had a lower level of knowledge. This might be explained by the increased exposure to informational resources about RRTs over time. However, one study showed the opposite result in that no significant differences in nurse satisfaction by level of education was found.[18]

A few of these results are worth unpacking. Staff who reported poor infrastructure or a heavier workload also scored higher on knowledge, which may simply mean that staff dealing with more strain on the ground see more clinical deterioration and end up seeking out more information on solutions like RRTs. In the same way, staff working longer hours or facing a staff shortage reported higher perception scores, plausibly because they feel the gap an RRT would fill more directly. Administrators' higher perception scores likely reflect their vantage point: RRTs are usually framed as a quality and safety intervention, which is exactly the language administrators work in day to day. None of this can be confirmed here, since the hospitals studied do not run an RRT; these are working explanations that would need testing once such a system is in place.

When and why to call the RRT? In this study, a minority of the participants reported that they would call the RRT if the management by the doctor failed or when there was no response. A similar result

was found in previous studies.[13] More than half of the participants in this study agreed that they would activate the RRT if the management by nurses was insufficient.

The participants believe that RRTs should be present in every hospital, and that the RRTs would teach the nurses how to manage sick patients better, encourage effective teamwork and effectively manage patient deterioration as well as reduce mortality in hospitals. Moreover, the participants agreed that the presence of RRTs justifies collective decisions and practices, and creates a new teaching body of knowledge.

Implications for practice

Even without an operational RRT, these findings point to concrete steps for these hospitals to consider ahead of any future implementation. The overlap between how staff describe RRTs and code blue teams suggests that pre-implementation training should address this distinction explicitly, rather than assume it is already clear from exposure to the code blue system. The higher perception scores among staff reporting longer working hours and staff shortage suggest that frontline staff already recognize where a structured deterioration-response system would help, which could support engagement during a future rollout. Administrators' more favorable perception, framed in quality-and-safety terms, suggests that organizational buy-in may be less of a barrier than staff-level preparedness, so implementation planning may benefit from directing early training and communication toward nurses and physicians rather than assuming uniform readiness across roles.

Limitations

Despite the relatively good sample size and being the first study in this population to report the level of knowledge and perception of RRTs, it would be more powerful and reflective to increase the sample size and to cover more diverse demographic data. This should include but not be limited to specialty, as well as the possibility of the participant having worked outside Palestine, or in a hospital that has already introduced RRTs.

Conducting this study to examine the perception and knowledge of RRTs in hospitals that have not yet introduced such a system makes it difficult to compare the results with other studies where the participants have engaged in the process of a rapid response system.

A few other limitations are worth noting. Because sampling was purposive and convenience-based, and limited to two hospitals, the findings apply mainly to the study participants rather than to healthcare professionals in Palestine more broadly. The sample was also mostly nurses, which limits how far conclusions about physicians and administrators can be pushed. The questionnaire itself was developed and validated in a different setting (Finland); reviewing it with local experts and piloting it locally helps, but this falls short of a full cultural validation. Categorizing knowledge and perception scores with Bloom's cut-off points, while common in this kind of study, can also mask real variability in the data. Finally, the study was not powered for subgroup comparisons, no post-hoc testing or adjustment for multiple comparisons followed the Kruskal–Wallis tests, and no multivariable analysis was done, so

the reported differences and correlations should be read as exploratory, and a non-significant result here does not mean there is truly no difference. We have otherwise followed the STROBE guidance for cross-sectional studies.

Recommendations

Further studies should separately assess nurses, physicians, and administrators using specialty-adapted tools to gain deeper insights into their knowledge and perceptions of RRTs. Future research should also include broader demographic and workplace factors, addressing barriers, activation criteria, team composition, and policies. A mixed-methods approach is recommended to capture participants' views, refine the tool, and support the foundation for implementing rapid response systems in Palestine. Moreover, integrating RRT concepts into nursing and medical curricula is essential to bridge academic and clinical gaps. Finally, developing official policies and protocols will ensure effective and sustainable RRT implementation in healthcare institutions.

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Table 1. Demographic characteristics of participants (N* =331).

Demographic Characteristic	**N* (%)**	**Mean (SD)**
Age (years)		29.45 (5.45)
20-30	223 (67.4)	
31-40	93 (28.1)	
>40	15 (4.5)	
Years of experience		5.88 (4.12)
1-5	199 (60.1)	
6-10	91 (27.5)	
11-14	26 (7.9)	
>14	15 (4.5)	
Gender		
Male	180 (54.4)	
Female	151 (45.6)	
Educational Level		
Diploma	21 (6.3)	
Bachelor's degree	263 (79.5)	
Master's degree	31 (9.4)	
PhD	16 (4.8)	
Work nature		
Nurse	217 (65.6)	
Physician	103 (31.1)	
Hospital Administrator	11 (3.3)	

Table 2. Work factor.

Work factor	***N* (%)***
Workplace	
Private Hospital	169 (51.1)
Teaching Hospital	162 (48.9)

Inadequate resources	
No	210 (63.4)
Yes	121 (36.6)
Long working hours	
Yes	177 (53.5)
No	154 (46.5)
Poor infrastructure	
Yes	83 (25.1)
No	248 (74.9)
Workload	
Yes	264 (79.8)
No	67 (20.2)
Shortage of staff	
Yes	156 (47.1)
No	175 (52.9)

Table 3. Level of knowledge and perception of RRTs.

Domain	**N***	**(%)**
Knowledge level	***Median (83.33)***	***(IQR 66.67–91.67)***
good	190	57.4
Moderate	106	32
poor	35	10.6
Perception level	***Median (88.89)***	***(IQR 77.78–88.89)***
Good	233	70.4
Moderate	73	22.1
Poor	25	7.6

Table 4. Differences in knowledge and perception levels of RRTs by demographic and work factors.

Characteristic	**Knowledge Level**		**Perception Level**	
	Median (Q1-Q3)	**P-value***	**Median (Q1-Q3)**	**P-value***
Gender				
Male	83.33 (66.67-91.67)	0.265[a]	88.89 (77.78- 94.44)	0.286[a]

Female	83.33 (75.00-91.67)		88.89 (77.78- 94.44)	
Age				
20-30	83.33(66.67-91.67)	0.013[b]	88.89 (75.00- 94.44)	0.205[b]
31-40	83.33 (66.67-91.67)		88.89 (77.78-94.44	
>40	91.67 (83.33-91.67)		88.89 (86.11- 91.67)	
Education				
Bachelor's degree	83.33 (66.67-91.67)	0.008[b]	88.89 (75.00 – 94.44)	0.062[b]
Diploma	75.00 (66.67-91.67)		86.11 (69.44- 91.67)	
Master's degree	83.33 (83.33-91.67)		91.67 (83.33- 94.44)	
PhD	83.33 (83.33-91.67)		88.89 (86.11 – 91.67)	
Years of experience				
1-5 years	83.33 (66.67-91.67)	0.074[b]	88.89 (72.22 – 94.44)	0.283[b]
6-10 years	83.33 (66.67-91.67)		88.89 (77.78 – 94.44)	
11-14 years	83.33 (75.00 - 91.67)		91.67 (82.63 – 94.44)	
>14 years	83.33 (83.33-91.67)		88.89 (83.33 – 91.67)	
Workplace				
Private Hospital	83.33 (66.67-91.67)	0.726[a]	88.89 (76.39- 94.44)	0.235[a]
Teaching Hospital	83.33 (66.67-91.67)		87.50 (77.78- 91.67)	
Shift work				
Yes	83.33 (66.67 – 91.67)	0.053[a]	88.89 (75.00 – 94.44)	0.145[a]
No	83.33 (75.00 – 91.67)		88.89 (83.33– 94.44)	

Shortage of staff				
Yes	83.33 (75.00 – 91.67)	0.112[a]	90.28 (80.56 – 94.44)	0.043[a]
No	83.33 (66.67-91.67)		86.11 (75.00 – 94.44)	
Inadequate resources				
Yes	83.33 (66.67-91.67)	0.279 [a]	88.89 (76.39 – 94.44)	0.860[a]
No	83.33 (75.00-91.67)		88.89 (77.78 – 94.44)	
Long working hours				
Yes	83.33 (75.00-91.67)	0.138[a]	88.89 (80.56 – 94.44)	0.014[a]
No	83.33 (66.67-91.67)		86.11 (72.22 – 91.67)	
Poor infrastructure				
Yes	83.33 (75.00-91.67)	0.024 [a]	86.11 (72.22 – 94.44)	0.223[a]
No	75.00 (66.67-91.67)		88.89 (77.78 – 94.44)	
Workload				
Yes	83.33 (75.00-91.67)	0.006[a]	88.89 (77.78 - 94.44)	0.101[a]
No	75.00 (66.67-83.33)		86.11 (75.00 - 91.67)	
Work Nature				
Nurse	83.33 (66.67-91.67)	0.254 [b]	88.89 (77.78 - 91.67)	0.014[b]
Physician	83.33 (66.67-91.67)		88.89 (69.44 – 94.44)	
Hospital Administrator	91.67 (75.00-91.67)		94.44 (88.89 – 97.22)	

[a] values were analysed using the Mann-Whitney test, [b] values were analysed using the Kruskal Wallis test, *Significance at $p< 0.05$.

Contributions: all authors listed have made substantial contributions to the manuscript to meet the authorship criteria according to the latest guidelines of the International Committee of Clinical Journal Editors. Ahmad Hasan Ajayeb and Mohammed Abdelraheem Jallad contributed to the conception and design of the study. Sajed Faisal Ghawadra and Mohammed Abdelraheem Jallad supervised data collection. Khalaf Awwad and Sajed Faisal Ghawadra organised the database and performed the statistical analyses. Khalaf Awwad, Sajed Faisal Ghawadra, Mohammed Abdelraheem Jallad interpreted the results. Ahmad Hasan Ajayeb, Mohammed Abdelraheem Jallad, Khalaf Awwad, and Sajed Faisal Ghawadra contributed to the first drafting of the manuscript. Ahmad Hasan Ajayeb and Khalaf Awwad edited the final revised version. All authors have read, reviewed, and agreed to the final version.

Conflict of interest: the authors did not have any conflict of interest in conducting this study.

Ethics approval and informed consent: ethics approval was obtained from the Institution Review Board of the Arab American University-Palestine (IRB-AAUP), with approval code No. 009/2024. All patients participating in this study signed a written informed consent form for participating in this study. Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

Availability of data and materials: the data supporting the findings of this study are not publicly available due to privacy or ethical restrictions. However, the data will be made available by the corresponding author upon reasonable request and without undue reservation.

Funding: none.

Generative artificial intelligence (AI) and AI-assisted technologies: during the preparation of this manuscript, the authors utilized Gemini (a generative AI developed by Google) solely to assist with language editing, grammatical refinement, and enhancing overall readability. The AI tool was not employed to generate, analyze, or interpret data, nor was it used to formulate scientific conclusions. All AI-assisted output was thoroughly reviewed, revised, and validated by the authors, who retain full responsibility for the accuracy, integrity, and originality of the final work.

Acknowledgments: the authors thank the nursing and administrative staff at Palestinian Hospitals for their cooperation during data collection.