Journal of the
Bahrain Medical Society

AlSada et al., J Bahrain Med Soc. 2026;38(1):1-17

ORIGINAL ARTICLE

Knowledge, Attitude, and Practice of Triage among Nurses in Primary Healthcare Centers of Bahrain: A Cross-Sectional Study

Dhabya Abdulaziz AlSada[1*], Eman Merza AlSalman[2], Fatima Hasan AlNooh[2], Mooza Khalid AlThawadi[1], Nawal abbas Habib[3]

[1]Family Physician, Primary Healthcare Centers, Kingdom of Bahrain
[2]Consultant Family Physician, Primary Healthcare Centers, Kingdom of Bahrain
[3]Nurse Supervisor, Primary Healthcare Centers, Kingdom of Bahrain

***Corresponding author:**
Dr. Dhabya Abdulaziz AlSada, Family Physician, Primary Healthcare Centers, Kingdom of Bahrain. E-mail: dhabya.alsada88@gmail.com

Received date: January 15, 2026; **Accepted date:** March 30, 2026; **Published date:** March 31, 2026

Abstract

Background: Primary healthcare centers (PHCs) in Bahrain are the first point of contact for patients with urgent and non-urgent concerns. Effective triage ensures timely prioritization, safe patient flow, and optimal use of resources in high-volume primary care settings. Evidence on triage preparedness among PHC nurses remains limited.

Objectives: To assess triage-related knowledge, attitudes, and practices among nurses in PHCs in Bahrain and identify factors associated with triage competence.

Methods: A cross-sectional study was conducted from July 1 to July 31, 2021, across 27 government PHCs in Bahrain. An online self-administered questionnaire targeting nurses in treatment rooms, including diabetic nurses, mother and child health nurses, and nursing supervisors. Nurses from private facilities, COVID-19 pool, mobile units, and temporary hospital placements were excluded. Data were analyzed using SPSS, and associations between triage competence and demographic and professional characteristics were examined.

Results: Among 555 nurses, most were aware of a triage protocol (96.9%) and knew how to access its manual (88.3%). Only 5.2% attended formal triage training, while 1.4% held related certifications. Although 74.2% found the manual easy to use, only 25.8% were very confident in their ability to apply it. Triage was mainly performed for urgent complaints (91%) and for no-appointment cases (90.6%). Professional titles, years of experience, and triage training were significantly associated with higher knowledge and confidence.

Conclusion: Despite high awareness of triage protocols, gaps in formal training and confidence persist among PHC nurses in Bahrain. Structured triage education and standardized implementation are recommended to enhance triage safety and quality.

Keywords: Triage, Primary Healthcare, Knowledge, Nurses, Bahrain

Introduction

Primary healthcare is the cornerstone of health services in the Kingdom of Bahrain and serves as the first point of contact for patients with urgent and non-urgent conditions. Triage plays a critical role in patient outcomes by sorting patients according to medical need and prioritizing those requiring immediate care based on clinical severity and urgency.[1] Triage is a process used to determine the severity of illness or injury and to prioritize patients according to their need for medical care.[2] It aims to ensure that the timing of care and resource allocation correspond to the degree of illness or injury, and nurses' triage knowledge is a key determinant of effective triage implementation.[2]

International evidence highlights persistent gaps in nurses' triage knowledge and skills. A study from Tanzania reported that 33% of nurses lacked adequate knowledge of triage, while 13% continued to report insufficient knowledge despite having attended workshops, 52% failed to allocate patients to appropriate triage categories, and 58% were unaware of waiting time limits.[3] A study in Pakistan similarly reported low triage knowledge among emergency nurses, reflecting inadequate training programs. [4] A hospital-based study in Sudan also found inadequate triage knowledge among nurses and emphasized the need for ongoing training and evaluation.[2] Even in higher-performing settings, gaps may persist; in Saudi Arabia, emergency department nurses demonstrated generally good triage knowledge and practice, yet important knowledge deficits and incorrect triage practices were still identified, supporting the need for further education and training.[5]

In Bahrain, a study on the Nurse Triage Initiative in primary care demonstrated that effective triage improves communication, confidence, and service efficiency, reduces consultations for minor complaints, and ensures access to appropriate care. However, reported barriers included nurses' capabilities, patient preferences and satisfaction, and limitations in electronic triage systems.[6] The modified Manchester Triage System is currently implemented in primary healthcare centers for urgent presentations and walk-in patients. Expansion of 24-hour services from three to nine centers increased patient volume and service demand.

Despite these developments, evidence on triage competence in Bahraini primary healthcare remains limited. An audit conducted in July 2021 revealed inconsistent triaging practices among nurses within and across health centers, indicating potential variability in knowledge, confidence, and application of triage protocols. While triage competencies have been extensively studied in emergency departments, they remain under-studied in primary healthcare settings, particularly in the Gulf region. Moreover, existing literature shows inconsistent findings regarding the influence of demographic and professional factors, such as years of experience, professional title, and training, on triage competence. To date, no national-level study has comprehensively examined triage-related knowledge, attitudes, and practices among nurses in Bahraini primary healthcare centers.

This study aimed to assess nurses' knowledge, attitudes, and practices regarding triage in primary healthcare centers (PHCs) in Bahrain and to explore factors associated with triage competence.

Materials and Methods

This cross-sectional study was conducted among primary health care nurses in the Kingdom of Bahrain from July 1 to July 31, 2021. All primary healthcare centers were enrolled, yielding a total of 27 centers. A sample size of 236 primary care nurses was calculated using an online calculator, based on a 95% confidence interval (CI), a 5% margin of error, and the fact that a total of 608 nurses were working in government primary health centers in Bahrain.[7] Inclusion criteria for the study comprised nurses covering the treatment room, including diabetic nurses, mother and child health (MCH) nurses, and the nursing supervisors, working in government primary health care centers, irrespective of the number of years of experience. Nurses working in private health centers, nurses from COVID-19 pool, governmental hospital nurses covering shortage in health centers during COVID-19 pandemic and mobile unit service nurses were excluded from

the study. Verbal consent was obtained from the nurses, and participation in the questionnaire was considered agreement to be enrolled in the study. This research was approved by the Primary Healthcare Center Research Committee (Approval No.: PHCRC/TOR/0009/2022).

Data was collected using a validated questionnaire. The questionnaire was developed based on a review of relevant literature and existing triage assessment tools. Content validity was assessed through expert review by senior family physicians and nursing supervisors working in primary healthcare. The questionnaire was piloted with 23 nurses to assess its clarity, relevance, and feasibility, and minor modifications were made based on the feedback. Internal consistency was evaluated using Cronbach's alpha, which yielded 0.8, indicating acceptable reliability.

The finalized questionnaire consisted of 18 items, including 10 questions covering participants' demographic and professional characteristics (including training background), and 8 triage-related questions that were structured into three domains: knowledge (4 questions), attitude (3 questions), and practice (1 question), as detailed below. The questionnaire was distributed online through SurveyMonkey among nurses working in the 27 PHCs.

Domain	Question
knowledge	Does your health center have a triage protocol in place?
	Does your health center have a specific room for triage?
	On a given day (shift), is there a specific person assigned to perform triage?
	Do you know how to access the triage manual?
Attitude	Do you think the current triage manual is easy to use?
	How confident are you with the triage manual?
	Do you think you need more training on patient triage?
Practice	When do you usually triage patients?

Statistical Analysis:

SPSS 26 was used for data entry and analysis. Frequencies and percentages were computed for the categorical variables. Means and standard deviations were computed for the quantitative variables. The chi-square test was used to determine whether there is a significant association between two categorical variables. An ANOVA test was used to determine whether there is a significant difference in mean score between more than two groups. In both statistical tests, a P-value < 0.05 was statistically considered significant.

Results

Although an initial sample size of 236 nurses was calculated, the study aimed to achieve comprehensive coverage by approaching nearly all eligible nurses. In total, 555 staff nurses were invited, and all completed the survey, yielding a 100% response rate. Consequently, the final study sample included the full group of respondents rather than a calculated subset.

Most of the respondents were female (90.8%, n=504) (Table 1). About one-third (29.5%) had 1–5 years of experience in the nursing profession, of whom 40.1% had 1–5 years of experience at their current facility. Only 5.2% of respondents attended the triage training course, and only 1.4% successfully completed it with an official certificate.

The majority of respondents (96.9%, n=538), are aware that there is a triage protocol in place in their health centers, and 64% (n=359) answered that they have a specified room for triaging.

More than half of the nurses (n=321, 57.8%) reported that there is always a specific person assigned to triage each day, whereas 225 nurses (40.5%) stated that there is no specific person assigned to triage each day.

Most of the participants know how to access the triage manual (n=490, 88.2%). Moreover, 412 nurses (74.2%) find it easy to use.

Most respondents feel they need more training on patient triage (72.2%, n=401). Urgent complaints and appointment unavailability are considered the main reasons for patient triage (90.9% and 90.6%, respectively) (Table 1).

Table 1: Demographic characteristics of nurses and basic triage awareness and training status

Variable	Category	Nursing supervisor	MCH nurse	General nurse	Total
		Count (%)	Count (%)	Count (%)	Count (%)
Gender	Female	21 (95.5%)	53 (98.1%)	430 (89.8%)	504 (90.8%)
	Male	1 (4.5%)	1 (1.9%)	49 (10.2%)	51 (9.2%)
Experience years grouping in the profession	<1 year	0 (0.0%)	0 (0.0%)	69 (14.4%)	69 (12.4%)
	1-5 years	2 (9.1%)	2 (3.7%)	160 (33.4%)	164 (29.5%)
	6-10 years	2 (9.1%)	17 (31.5%)	86 (18.0%)	105 (18.9%)
	11-15 years	8 (36.4%)	12 (22.2%)	53 (11.1%)	73 (13.2%)
	>15 years	10 (45.5%)	23 (42.6%)	111 (23.2%)	144 (25.9%)
Experience years grouping in current facility	<1 year	0 (0.0%)	4 (7.4%)	92 (19.2%)	96 (17.3%)
	1-5 years	9 (40.9%)	15 (27.8%)	199 (41.5%)	223 (40.2%)
	6-10 years	6 (27.3%)	22 (40.7%)	104 (21.7%)	132 (23.8%)
	11-15 years	5 (22.7%)	9 (16.7%)	41 (8.6%)	55 (9.9%)
	>15 years	2 (9.1%)	4 (7.4%)	43 (9.0%)	49 (8.8%)
Did you attend any formal training?	No training	16 (72.7%)	51 (94.4%)	451 (94.2%)	518 (93.3%)
	Triage training	5 (22.7%)	3 (5.6%)	21 (4.4%)	29 (5.2%)
	Triage certificate	1 (4.5%)	0 (0.0%)	7 (1.5%)	8 (1.4%)
Does your health center have a triage protocol in place?	No	2 (9.1%)	1 (1.9%)	5 (1.0%)	8 (1.4%)
	Yes	20 (90.9%)	49 (90.7%)	469 (97.9%)	538 (96.9%)
	I don't know	0 (0.0%)	4 (7.4%)	5 (1.0%)	9 (1.6%)
Does your health center have a specific room for triage?	No	10 (45.5%)	32 (59.3%)	151 (31.5%)	193 (34.8%)
	Yes	12 (54.5%)	21 (38.9%)	326 (68.1%)	359 (64.7%)
	I don't know	0 (0.0%)	1 (1.9%)	2 (0.4%)	3 (0.5%)
On a given day (shift), is there a specific person assigned to do the triage?	No	7 (31.8%)	28 (51.9%)	190 (39.7%)	225 (40.5%)
	Yes	15 (68.2%)	20 (37.0%)	286 (59.7%)	321 (57.8%)
	I don't know	0 (0.0%)	6 (11.1%)	3 (0.6%)	9 (1.6%)
Do you know how to access the triage manual?	No	1 (4.5%)	16 (29.6%)	48 (10.0%)	65 (11.7%)
	Yes	21 (95.5%)	38 (70.4%)	431 (90.0%)	490 (88.3%)
Do you think the current triage manual is easy to use?	No	3 (13.6%)	4 (7.4%)	49 (10.2%)	56 (10.1%)
	Yes	18 (81.8%)	27 (50.0%)	367 (76.6%)	412 (74.2%)
	Not applicable	1 (4.5%)	23 (42.6%)	63 (13.2%)	87 (15.7%)
How confident are you with the triage manual?	Not confident at all	0 (0.0%)	0 (0.0%)	4 (0.8%)	4 (0.7%)
	Not confident	0 (0.0%)	1 (1.9%)	11 (2.3%)	12 (2.2%)
	Neutral	4 (18.2%)	14 (25.9%)	158 (33.0%)	176 (31.7%)
	Somewhat confident	6 (27.3%)	15 (27.8%)	128 (26.7%)	149 (26.8%)
	Very confident	10 (45.5%)	7 (13.0%)	126 (26.3%)	143 (25.8%)
	Not applicable	2 (9.1%)	17 (31.5%)	52 (10.9%)	71 (12.8%)
Do you think you need more training on patients' Triage?	No	10 (45.5%)	10 (18.5%)	134 (28.0%)	154 (27.7%)
	Yes	12 (54.5%)	44 (81.5%)	345 (72.0%)	401 (72.3%)
When do you usually triage patients?	For all patients attending the health center	1 (4.5%)	1 (1.9%)	39 (8.1%)	41 (7.4%)
	Never	0 (0.0%)	1 (1.9%)	1 (0.2%)	2 (0.4%)
	When the patient comes with an urgent complaint	22 (100.0%)	48 (88.9%)	435 (90.8%)	505 (91.0%)
	When there are no available appointments	21 (95.5%)	52 (96.3%)	430 (89.8%)	503 (90.6%)

Professional title and knowledge, attitude and practice of triage

Professional title was found to significantly influence triage knowledge and attitude, particularly regarding the perceived ease of using the triage manual and the level of confidence (P-value < 0.005). However, it had no significant effect on triage practice, specifically regarding the reasons nurses usually triage patients (Table 2).

Table 2: Association of professional title with triage knowledge, attitudes, and practice

Variable	Category	Professional title				P-Value
		Nursing supervisor	MCH nurse	General nurse	Total	
		Count (%)	Count (%)	Count (%)	Count (%)	
Gender	Female	21 (95.5%)	53 (98.1%)	430 (89.8%)	504 (90.8%)	0.084
	Male	1 (4.5%)	1 (1.9%)	49 (10.2%)	51 (9.2%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Experience years grouping in the profession	<1 year	0 (0.0%)	0 (0.0%)	69 (14.4%)	69 (12.4%)	0.000*
	1-5 years	2 (9.1%)	2 (3.7%)	160 (33.4%)	164 (29.5%)	
	6-10 years	2 (9.1%)	17 (31.5%)	86 (18.0%)	105 (18.9%)	
	11-15 years	8 (36.4%)	12 (22.2%)	53 (11.1%)	73 (13.2%)	
	>15 years	10 (45.5%)	23 (42.6%)	111 (23.2%)	144 (25.9%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Experience years grouping in current facility	<1 year	0 (0.0%)	4 (7.4%)	92 (19.2%)	96 (17.3%)	0.002*
	1-5 years	9 (40.9%)	15 (27.8%)	199 (41.5%)	223 (40.2%)	
	6-10 years	6 (27.3%)	22 (40.7%)	104 (21.7%)	132 (23.8%)	
	11-15 years	5 (22.7%)	9 (16.7%)	41 (8.6%)	55 (9.9%)	
	>15 years	2 (9.1%)	4 (7.4%)	43 (9.0%)	49 (8.8%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Did you attend any formal training?	No training	16 (72.7%)	51 (94.4%)	451 (94.2%)	518 (93.3%)	0.010*
	Triage training	5 (22.7%)	3 (5.6%)	21 (4.4%)	29 (5.2%)	
	Triage certificate	1 (4.5%)	0 (0.0%)	7 (1.5%)	8 (1.4%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Does your health center have a triage protocol in place?	No	2 (9.1%)	1 (1.9%)	5 (1.0%)	8 (1.4%)	0.003*
	Yes	20 (90.9%)	49 (90.7%)	469 (97.9%)	538 (96.9%)	
	I don't know	0 (0.0%)	4 (7.4%)	5 (1.0%)	9 (1.6%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Does your health center have a specific room for triage?	No	10 (45.5%)	32 (59.3%)	151 (31.5%)	193 (34.8%)	0.000*
	Yes	12 (54.5%)	21 (38.9%)	326 (68.1%)	359 (64.7%)	
	I don't know	0 (0.0%)	1 (1.9%)	2 (0.4%)	3 (0.5%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
On a given day (shift), is there a specific person assigned to do the triage?	No	7 (31.8%)	28 (51.9%)	190 (39.7%)	225 (40.5%)	0.000*
	Yes	15 (68.2%)	20 (37.0%)	286 (59.7%)	321 (57.8%)	
	I don't know	0 (0.0%)	6 (11.1%)	3 (0.6%)	9 (1.6%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	

Do you know how to access the triage manual?	No	1 (4.5%)	16 (29.6%)	48 (10.0%)	65 (11.7%)	0.000*
	Yes	21 (95.5%)	38 (70.4%)	431 (90.0%)	490 (88.3%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Do you think the current triage manual is easy to use?	No	3 (13.6%)	4 (7.4%)	49 (10.2%)	56 (10.1%)	0.000*
	Yes	18 (81.8%)	27 (50.0%)	367 (76.6%)	412 (74.2%)	
	Not applicable	1 (4.5%)	23 (42.6%)	63 (13.2%)	87 (15.7%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
How confident are you with the triage manual?	Not confident at all	0 (0.0%)	0 (0.0%)	4 (0.8%)	4 (0.7%)	0.003*
	Not confident	0 (0.0%)	1 (1.9%)	11 (2.3%)	12 (2.2%)	
	Neutral	4 (18.2%)	14 (25.9%)	158 (33.0%)	176 (31.7%)	
	Somewhat confident	6 (27.3%)	15 (27.8%)	128 (26.7%)	149 (26.8%)	
	Very confident	10 (45.5%)	7 (13.0%)	126 (26.3%)	143 (25.8%)	
	Not applicable	2 (9.1%)	17 (31.5%)	52 (10.9%)	71 (12.8%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
Do you think you need more training on patients' triage?	No	10 (45.5%)	10 (18.5%)	134 (28.0%)	154 (27.7%)	0.056
	Yes	12 (54.5%)	44 (81.5%)	345 (72.0%)	401 (72.3%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	
When do you usually triage patients?	For all patients attending the health center	1 (4.5%)	1 (1.9%)	39 (8.1%)	41 (7.4%)	0.136
	Never	0 (0.0%)	1 (1.9%)	1 (0.2%)	2 (0.4%)	
	When the patient comes with an urgent complaint	22 (100.0%)	48 (88.9%)	435 (90.8%)	505 (91.0%)	
	When there are no available appointments	21 (95.5%)	52 (96.3%)	430 (89.8%)	503 (90.6%)	
	Total	22 (100.0%)	54 (100.0%)	479 (100.0%)	555 (100.0%)	

Years of experience in the profession with knowledge, attitude, and practice of triage

Years of professional experience were significantly associated with knowledge of the assignment of a specific person to daily triage duties (P-value < 0.0000). In addition, confidence in using the triage manual and the reasons for triaging patients (P-value 0.001 and 0.000, respectively) were also significantly associated with years of experience. However, no significant association was observed between years of experience and knowledge of the presence of a triage protocol, the availability of a specific triage room, access to the triage manual, or the perceived ease of using it (Table 3).

Table 3: Association of years of professional experience with triage knowledge, attitudes, and practices

Variable	Category	Experience years in the profession						P-Value
		<1 Year	1-5 years	6-10 years	11-15 years	>15 years	Total	
		Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	
Gender	Female	**53 (76.8%)**	**147 (89.6%)**	**99 (94.3%)**	**64 (87.7%)**	**141 (97.9%)**	**504 (90.8%)**	0.000*
	Male	16 (23.2%)	17 (10.4%)	6 (5.7%)	9 (12.3%)	3 (2.1%)	51 9.2%	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Professional title	Nursing supervisor	0 (0.0%)	2 (1.2%)	2 (1.9%)	8 (11.0%)	10 (6.9%)	22 (4.0%)	0.000*
	MCH nurse	0 (0.0%)	2 (1.2%)	17 (16.2%)	12 (16.4%)	23 (16.0%)	54 (9.7%)	
	General nurse	69 (100.0%)	160 (97.6%)	86 (81.9%)	53 (72.6%)	111 (77.1%)	479 (86.3%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Experience years grouping in current facility	<1 year	69 (100.0%)	14 (8.5%)	5 (4.8%)	5 (6.8%)	3 (2.1%)	96 (17.3%)	0.000*
	1-5 years	0 (0.0%)	149 (90.9%)	43 (41.0%)	20 (27.4%)	11 (7.6%)	223 (40.2%)	
	6-10 years	0 (0.0%)	1 (0.6%)	57 (54.3%)	33 (45.2%)	41 (28.5%)	132 (23.8%)	
	11-15 years	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (20.5%)	40 (27.8%)	55 (9.9%)	
	>15 years	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	49 (34.0%)	49 (8.8%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Did you attend any formal training?	No training	67 (97.1%)	154 (93.9%)	97 (92.4%)	69 (94.5%)	131 (91.0%)	518 (93.3%)	0.679
	Triage training	2 (2.9%)	8 (4.9%)	7 (6.7%)	4 (5.5%)	8 (5.6%)	29 (5.2%)	
	Triage certificate	0 (0.0%)	2 (1.2%)	1 (1.0%)	0 (0.0%)	5 (3.5%)	8 (1.4%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Does your health center have a triage protocol in place?	No	0 (0.0%)	1 (0.6%)	3 (2.9%)	2 (2.7%)	2 (1.4%)	8 (1.4%)	0.337
	Yes	68 (98.6%)	162 (98.8%)	101 (96.2%)	68 (93.2%)	139 (96.5%)	538 (96.9%)	
	I don't know	1 (1.4%)	1 (0.6%)	1 (1.0%)	3 (4.1%)	3 (2.1%)	9 (1.6%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	

Does your health center have a specific room for triage?	No	19 (27.5%)	63 (38.4%)	38 (36.2%)	28 (38.4%)	45 (31.3%)	193 (34.8%)	0.693
	Yes	50 (72.5%)	100 (61.0%)	66 (62.9%)	45 (61.6%)	98 (68.1%)	359 (64.7%)	
	I don't know	0 (0.0%)	1 (0.6%)	1 (1.0%)	0 (0.0%)	1 (0.7%)	3 (0.5%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
On a given day (shift), is there a specific person assigned to do the triage?	No	28 (40.6%)	77 (47.0%)	50 (47.6%)	34 (46.6%)	36 (25.0%)	225 (40.5%)	0.000*
	Yes	41 (59.4%)	87 (53.0%)	54 (51.4%)	36 (49.3%)	103 (71.5%)	321 (57.8%)	
	I don't know	0 (0.0%)	0 (0.0%)	1 (1.0%)	3 (4.1%)	5 (3.5%)	9 (1.6%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Do you know how to access the triage manual?	No	9 (13.0%)	18 (11.0%)	8 (7.6%)	11 (15.1%)	19 (13.2%)	65 (11.7%)	0.557
	Yes	60 (87.0%)	146 (89.0%)	97 (92.4%)	62 (84.9%)	125 (86.8%)	490 (88.3%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
Do you think the current triage manual is easy to use?	No	5 (7.2%)	19 (11.6%)	11 (10.5%)	9 (12.3%)	12 (8.3%)	56 (10.1%)	0.842
	Yes	55 (79.7%)	121 (73.8%)	80 (76.2%)	51 (69.9%)	105 (72.9%)	412 (74.2%)	
	Not applicable	9 (13.0%)	24 (14.6%)	14 (13.3%)	13 (17.8%)	27 (18.8%)	87 (15.7%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
How confident are you with the triage manual?	Not confident at all	1 (1.4%)	1 (0.6%)	1 (1.0%)	1 (1.4%)	0 (0.0%)	4 (0.7%)	0.001*
	Not confident	0 (0.0%)	5 (3.0%)	4 (3.8%)	0 (0.0%)	3 (2.1%)	12 (2.2%)	
	Neutral	35 (50.7%)	57 (34.8%)	37 (35.2%)	15 (20.5%)	32 (22.2%)	176 (31.7%)	
	Somewhat confident	15 (21.7%)	50 (30.5%)	29 (27.6%)	23 (31.5%)	32 (22.2%)	149 (26.8%)	
	Very confident	9 (13.0%)	30 (18.3%)	26 (24.8%)	22 (30.1%)	56 (38.9%)	143 (25.8%)	
	Not applicable	9 (13.0%)	21 (12.8%)	8 (7.6%)	12 (16.4%)	21 (14.6%)	71 (12.8%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	

Do you think you need more training on patients' triage?	No	13 (18.8%)	40 (24.4%)	28 (26.7%)	26 (35.6%)	47 (32.6%)	154 (27.7%)	0.104
	Yes	56 (81.2%)	124 (75.6%)	77 (73.3%)	47 (64.4%)	97 (67.4%)	401 (72.3%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	
When do you usually triage patients?	For all patients attending the health center	3 (4.3%)	12 (7.3%)	6 (5.7%)	5 (6.8%)	15 (10.4%)	41 (7.4%)	0.000*
	Never	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.4%)	2 (0.4%)	
	When the patient comes with an urgent complaint	67 (97.1%)	152 (92.7%)	98 (93.3%)	68 (93.2%)	120 (83.3%)	505 (91.0%)	
	When there are no available appoint-ments	52 (75.4%)	155 (94.5%)	96 (91.4%)	69 (94.5%)	131 (91.0%)	503 (90.6%)	
	Total	69 (100.0%)	164 (100.0%)	105 (100.0%)	73 (100.0%)	144 (100.0%)	555 (100.0%)	

Years of experience in the current facilities with knowledge, attitude, and practice of triage

Similar findings were observed regarding the statistical significance of years of experience in the current facility with the previously mentioned variables. Additionally, awareness of the designated triage room and the perception of needing more training in triaging patients were significantly associated with years of experience at the current facility (P = 0.047 and P = 0.013, respectively). However, no significant association was found between years of experience at the current facility and knowledge of the presence of a triage protocol, access to the triage manual, or the perceived ease of using it (Table 4).

Table 4: Association of years of experience in current facility with triage knowledge, attitudes, and practices

Variable	Category	Experience years grouping in current facility						P-Value
		<1 year	1-5 years	6-10 years	11-15 years	>15 years	Total	
		Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	
Gender	Female	73 (76.0%)	206 (92.4%)	122 (92.4%)	55 (100.0%)	48 (98.0%)	504 (90.8%)	0.000*
	Male	23 (24.0%)	17 (7.6%)	10 (7.6%)	0 (0.0%)	1 (2.0%)	51 (9.2%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Professional title	Nursing supervisor	0 (0.0%)	9 (4.0%)	6 (4.5%)	5 (9.1%)	2 (4.1%)	22 (4.0%)	0.002*
	MCH nurses	4 (4.2%)	15 (6.7%)	22 (16.7%)	9 (16.4%)	4 (8.2%)	54 (9.7%)	
	General nurse	92 (95.8%)	199 (89.2%)	104 (78.8%)	41 (74.5%)	43 (87.8%)	479 (86.3%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Experience years grouping in the profession	<1 year	69 (71.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	69 (12.4%)	0.000*
	1-5 years	14 (14.6%)	149 (66.8%)	1 (0.8%)	0 (0.0%)	0 (0.0%)	164 (29.5%)	
	6-10 years	5 (5.2%)	43 (19.3%)	57 (43.2%)	0 (0.0%)	0 (0.0%)	105 (18.9%)	
	11-15 years	5 (5.2%)	20 (9.0%)	33 (25.0%)	15 (27.3%)	0 (0.0%)	73 (13.2%)	
	>15 years	3 (3.1%)	11 (4.9%)	41 (31.1%)	40 (72.7%)	49 (100.0%)	144 (25.9%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Did you attend any formal training?	No training	93 (96.9%)	207 (92.8%)	123 (93.2%)	53 (96.4%)	42 (85.7%)	518 (93.3%)	0.281
	Triage training	3 (3.1%)	13 (5.8%)	7 (5.3%)	2 (3.6%)	4 (8.2%)	29 (5.2%)	
	Triage certificate	0 (0.0%)	3 (1.3%)	2 (1.5%)	0 (0.0%)	3 (6.1%)	8 (1.4%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	

Does your health center have a triage protocol in place?	No	1 (1.0%)	4 (1.8%)	0 (0.0%)	2 (3.6%)	1 (2.0%)	8 (1.4%)	0.296
	Yes	94 (97.9%)	217 (97.3%)	129 (97.7%)	51 (92.7%)	47 (95.9%)	538 (96.9%)	
	I don't know	1 (1.0%)	2 (0.9%)	3 (2.3%)	2 (3.6%)	1 (2.0%)	9 (1.6%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Does your health center have a specific room for triage?	No	27 (28.1%)	96 (43.0%)	38 (28.8%)	17 (30.9%)	15 (30.6%)	193 (34.8%)	0.047*
	Yes	68 (70.8%)	125 (56.1%)	94 (71.2%)	38 (69.1%)	34 (69.4%)	359 (64.7%)	
	I don't know	1 (1.0%)	2 (0.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (0.5%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
On a given day (shift), is there a specific person Assigned to do the triage?	No	34 (35.4%)	115 (51.6%)	45 (34.1%)	16 (29.1%)	15 (30.6%)	225 (40.5%)	0.009*
	Yes	61 (63.5%)	104 (46.6%)	85 (64.4%)	38 (69.1%)	33 (67.3%)	321 (57.8%)	
	I don't know	1 (1.0%)	4 (1.8%)	2 (1.5%)	1 (1.8%)	1 (2.0%)	9 (1.6%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Do you know how to access the triage manual?	No	15 (15.6%)	26 (11.7%)	9 (6.8%)	8 (14.5%)	7 (14.3%)	65 (11.7%)	0.265
	Yes	81 (84.4%)	197 (88.3%)	123 (93.2%)	47 (85.5%)	42 (85.7%)	490 (88.3%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Do you think the current triage manual is easy to use?	No	5 (5.2%)	24 (10.8%)	17 (12.9%)	6 (10.9%)	4 (8.2%)	56 (10.1%)	0.256
	Yes	75 (78.1%)	160 (71.7%)	103 (78.0%)	37 (67.3%)	37 (75.5%)	412 (74.2%)	
	Not applicable	16 (16.7%)	39 (17.5%)	12 (9.1%)	12 (21.8%)	8 (16.3%)	87 (15.7%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	

How confident are you with the triage manual?	Not confident at all	1 (1.0%)	2 (0.9%)	1 (0.8%)	0 (0.0%)	0 (0.0%)	4 (0.7%)	0.006*
	Not confident	0 (0.0%)	8 (3.6%)	3 (2.3%)	1 (1.8%)	0 (0.0%)	12 (2.2%)	
	Neutral	43 (44.8%)	74 (33.2%)	35 (26.5%)	15 (27.3%)	9 (18.4%)	176 (31.7%)	
	Somewhat confident	19 (19.8%)	65 (29.1%)	43 (32.6%)	10 (18.2%)	12 (24.5%)	149 (26.8%)	
	Very confident	17 (17.7%)	45 (20.2%)	40 (30.3%)	21 (38.2%)	20 (40.8%)	143 (25.8%)	
	Not applicable	16 (16.7%)	29 (13.0%)	10 (7.6%)	8 (14.5%)	8 (16.3%)	71 (12.8%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
Do you think you need more training on patients' triage?	No	16 (16.7%)	63 (28.3%)	35 (26.5%)	23 (41.8%)	17 (34.7%)	154 (27.7%)	0.013*
	Yes	80 (83.3%)	160 (71.7%)	97 (73.5%)	32 (58.2%)	32 (65.3%)	401 (72.3%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	
When do you usually triage patients?	For all patients attending the health center	7 (7.3%)	13 (5.8%)	12 (9.1%)	3 (5.5%)	6 (12.2%)	41 (7.4%)	0.001*
	Never	0 (0.0%)	1 (0.4%)	1 (0.8%)	0 (0.0%)	0 (0.0%)	2 (0.4%)	
	When the patient comes with an urgent complaint	93 (96.9%)	205 (91.9%)	119 (90.2%)	47 (85.5%)	41 (83.7%)	505 (91.0%)	
	When there are no available appoint-ments	75 (78.1%)	212 (95.1%)	119 (90.2%)	53 (96.4%)	44 (89.8%)	503 (90.6%)	
	Total	96 (100.0%)	223 (100.0%)	132 (100.0%)	55 (100.0%)	49 (100.0%)	555 (100.0%)	

Triage training with knowledge, attitude, and practice of triage

Triage training was found to be statistically significant, with only the reasons for triaging patients and participants' confidence in using the triage manual showing significance (P-values 0.006 and 0.048, respectively) (Table 5).

Table 5: Association of triage training with triage knowledge, attitudes, and practices

Variable	Category	Did you attend any formal training?				P-Value
		No training	Triage training	Triage certificate	Total	
		Count (%)	Count (%)	Count (%)	Count (%)	
Gender	Female	472 (91.1%)	25 (86.2%)	7 (87.5%)	504 (90.8%)	0.366
	Male	46 (8.9%)	4 (13.8%)	1 (12.5%)	51 (9.2%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Professional title	Nursing supervisor	16 (3.1%)	5 (17.2%)	1 (12.5%)	22 (4.0%)	0.010*
	MCH nurse	51 (9.8%)	3 (10.3%)	0 (0.0%)	54 (9.7%)	
	General nurse	451 (87.1%)	21 (72.4%)	7 (87.5%)	479 (86.3%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Experience years grouping in the profession	<1 year	67 (12.9%)	2 (6.9%)	0 (0.0%)	69 (12.4%)	0.679
	1-5 years	154 (29.7%)	8 (27.6%)	2 (25.0%)	164 (29.5%)	
	6-10 years	97 (18.7%)	7 (24.1%)	1 (12.5%)	105 (18.9%)	
	11-15 years	69 (13.3%)	4 (13.8%)	0 (0.0%)	73 (13.2%)	
	>15 years	131 (25.3%)	8 (27.6%)	5 (62.5%)	144 (25.9%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Experience years grouping in current facility	<1 year	93 (18.0%)	3 (10.3%)	0 (0.0%)	96 (17.3%)	0.281
	1-5 years	207 (40.0%)	13 (44.8%)	3 (37.5%)	223 (40.2%)	
	6-10 years	123 (23.7%)	7 (24.1%)	2 (25.0%)	132 (23.8%)	
	11-15 years	53 (10.2%)	2 (6.9%)	0 (0.0%)	55 (9.9%)	
	>15 years	42 (8.1%)	4 (13.8%)	3 (37.5%)	49 (8.8%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Does your health center have a triage protocol in place?	No	8 (1.5%)	0 (0.0%)	0 (0.0%)	8 (1.4%)	0.869
	Yes	501 (96.7%)	29 (100.0%)	8 (100.0%)	538 (96.9%)	
	I don't know	9 (1.7%)	0 (0.0%)	0 (0.0%)	9 (1.6%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Does your health center have a specific room for triage?	No	185 (35.7%)	6 (20.7%)	2 (25.0%)	193 (34.8%)	0.358
	Yes	330 (63.7%)	23 (79.3%)	6 (75.0%)	359 (64.7%)	
	I don't know	3 (0.6%)	0 (0.0%)	0 (0.0%)	3 (0.5%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
On a given day (shift), is there a specific person assigned to do the triage?	No	211 (40.7%)	10 (34.5%)	4 (50.0%)	225 (40.5%)	0.828
	Yes	298 (57.5%)	19 (65.5%)	4 (50.0%)	321 (57.8%)	
	I don't know	9 (1.7%)	0 (0.0%)	0 (0.0%)	9 (1.6%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	

Do you know how to access the triage manual?	No	62 (12.0%)	2 (6.9%)	1 (12.5%)	65 (11.7%)	0.741
	Yes	456 (88.0%)	27 (93.1%)	7 (87.5%)	490 (88.3%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Do you think the current triage manual is easy to use?	No	54 (10.4%)	0 (0.0%)	2 (25.0%)	56 (10.1%)	0.094
	Yes	384 (74.1%)	24 (82.8%)	4 (50.0%)	412 (74.2%)	
	Not applicable	80 (15.4%)	5 (17.2%)	2 (25.0%)	87 (15.7%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
How confident are you with the triage manual?	Not confident at all	3 (0.6%)	0 (0.0%)	1 (12.5%)	4 (0.7%)	0.048*
	Not confident	12 (2.3%)	0 (0.0%)	0 (0.0%)	12 (2.2%)	
	Neutral	171 (33.0%)	5 (17.2%)	0 (0.0%)	176 (31.7%)	
	Somewhat confident	138 (26.6%)	9 (31.0%)	2 (25.0%)	149 (26.8%)	
	Very confident	127 (24.5%)	12 (41.4%)	4 (50.0%)	143 (25.8%)	
	Not applicable	67 (12.9%)	3 (10.3%)	1 (12.5%)	71 (12.8%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
Do you think you need more training on patients' triage?	No	139 (26.8%)	11 (37.9%)	4 (50.0%)	154 (27.7%)	0.126
	Yes	379 (73.2%)	18 (62.1%)	4 (50.0%)	401 (72.3%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	
When do you usually triage patients?	For all patients attending the health center	36 (6.9%)	2 (6.9%)	3 (37.5%)	41 (7.4%)	0.006*
	Never	2 (0.4%)	0 (0.0%)	0 (0.0%)	2 (0.4%)	
	When the patient comes with an urgent complaint	473 (91.3%)	27 (93.1%)	5 (62.5%)	505 (91.0%)	
	When there are no available appointments	472 (91.1%)	24 (82.8%)	7 (87.5%)	503 (90.6%)	
	Total	518 (100.0%)	29 (100.0%)	8 (100.0%)	555 (100.0%)	

Discussion

This study provides the first comprehensive assessment of triage knowledge, attitudes, and practices among nurses in primary healthcare centers (PHCs) across the Kingdom of Bahrain. With responses from 555 nurses across all 27 PHCs, the findings offer a clear overview of triage readiness, highlight key challenges, and provide guidance for policy and practice improvements.

Knowledge: Awareness of triage protocols was high (96.9%), yet formal training was limited (5.2%), and only a small proportion of nurses held official triage certification (1.4%). Years of experience and professional title were positively associated with knowledge, consistent with studies from Pakistan, South Korea, and Ethiopia, where practical exposure and leadership roles enhanced triage competence.[8,9,10]

Attitudes: Although most nurses (74.2%) found the triage manual easy to use, only 25.8% reported being confident in their ability to apply it. Confidence was significantly associated with years of experience and prior triage training, highlighting a gap between knowledge and practical competence. This aligns with evidence indicating that factual knowledge alone does not guarantee accurate triage decision-making.[11,12]

As noted by Considine *et al*. (2007), "the premise of many triage education programs is that knowledge acquisition will improve triage decisions." Such programs often improve factual knowledge without altering clinical experience, yet they still enhance triage outcomes.[12] Factual knowledge appears to have a stronger impact on triage accuracy than years of emergency nursing experience alone.

In Addis Ababa, Ethiopia, emergency nurses' perceptions of triage were significantly influenced by knowledge (P = 0.017), experience (P = 0.023), and training (P = 0.041), with knowledge showing the strongest association with positive attitudes.[13] This underscores the importance of training not only to convey information but also to build confidence and decision-making consistency, which our results suggest are currently lacking. Simulation-based reinforcement may therefore be critical to improving triage competencies.

Practice: Triage in Bahrain's PHCs was primarily reactive, applied during urgent complaints or when appointments were unavailable, rather than following a systematic prioritization approach. A dedicated triage nurse was absent in 40.5% of shifts, and over one-third of centers lacked a triage room, which may compromise consistency and patient safety. Prior studies by Considine, Botti, and Thomas have shown that nursing experience positively correlates with triage accuracy, consistency, and confidence.[12] Similarly, studies from Indonesia have shown that nurses' triage knowledge is significantly associated with correct implementation of triage, supporting the importance of structured training and supervision.[14]

Although triage has been extensively studied in emergency departments, evidence from primary healthcare and ambulatory care settings remains limited.[15] Primary care triage involves mixed urgent and non-urgent demand, variable walk-in volumes, and constrained space and staffing, which may contribute to inconsistent implementation even when protocols exist.[15] This supports the need for context-specific triage training and operational standardization in PHCs.

In this study, no statistically significant association was found between gender and triage-related knowledge, attitudes, or practices. Although the nursing workforce in primary healthcare is predominantly female, this finding suggests that triage competence is more strongly influenced by professional training, clinical experience, and role responsibilities rather than gender. This aligns with findings from previous studies conducted in emergency care settings, which reported that gender does not significantly affect triage accuracy or decision-making. These results highlight that capacity-building initiatives should focus on standardized training and competency development across all staff, rather than targeting demographic subgroups.

Triage training and certification were associated with improved confidence and a better understanding of triage rationale. Nurses without formal training reported higher uncertainty and lower confidence. International studies conducted in the USA and Australia indicate that a substantial proportion of nurses in emergency departments lack formal triage training, despite recognizing its importance.[16,17] Our findings reinforce the urgent need to institutionalize structured triage education within professional development programs.

These results highlight the necessity for structured, ongoing triage training, including simulation-based exercises, alongside institutional support to enhance consistency, confidence, and patient safety. Standardized protocols should be reinforced through continuous professional development, monitoring, and evaluation of triage practices.

Conclusion

This study provides national-level evidence on triage knowledge, attitudes, and practices among nurses working in primary healthcare centers in Bahrain, addressing a gap in the existing literature that has largely focused on emergency department settings. In line with the study objectives, the findings demonstrate that while awareness of triage protocols is high, formal training, certification, and confidence in triage decision-making remain limited. This highlights a critical implementation gap between the availability of triage guidelines and their effective use in routine primary care practice. The results underscore the need for structured, mandatory triage training programs, the integration of triage competencies into continuing professional development, and organizational support to standardize triage practices across PHCs. Strengthening triage education and system-level support may improve patient prioritization, safety, and efficiency of care delivery in primary healthcare settings.

Future studies should assess the impact of these interventions on patient outcomes, triage accuracy, and nurse satisfaction, ideally using longitudinal follow-up and audit-based feedback to evaluate the sustainability of knowledge gains and behavioral changes. In addition, further research should explore the unique contextual features of triage in primary healthcare, such as mixed urgent and non-urgent demand, variable walk-in volumes, and staffing and infrastructure constraints, and how these factors influence triage consistency and patient safety.

Conflict of Interest

The authors declare no conflicts of interest. No funding was received for this study.

Acknowledgements

The authors would like to thank all nurses working in the primary healthcare centers who participated in this study.

References

1. Qureshi NA. Triage systems: A review of the literature with reference to Saudi Arabia. East Mediterr Health J. 2010;16(6):690-8. doi: 10.26719/2010.16.6.690.
2. Mukhtar HME, Fadlallah EA. Nurse's knowledge regarding triage system at emergency departments in public hospital at Khartoum State. In: Proceedings of Research for a 33rd International Conference; 2018 Oct 14-15; Jeddah, Saudi Arabia. p. 15-17.
3. Aloyce R, Leshabari S, Brysiewicz P. Assessment of knowledge and skills of triage amongst nurses working in the emergency centres in Dar es Salaam, Tanzania. Afr J Emerg Med. 2014;4(1):14-8. doi:10.1016/j.afjem.2013.04.009.
4. Ali SA, Taverner BCB, Ghani M, Kussor Z, Naz S. Knowledge of triage among nurses in emergency units. Biomedica. 2013;29(4):240-3. Available from: http://www.thebiomedicapk.com/articles/351.pdf
5. AlShatarat M, Rayan A, Eshah NF, Baqeas MH, Jaber MJ, ALBashtawy M. Triage knowledge and practice and associated factors among emergency department nurses. SAGE Open Nurs. 2022;8:23779608221130588. doi:10.1177/23779608221130588.
6. Al-Saweer A, Al-Sairafi S. Nurse triage initiative-improving the performance of primary care services. Bahrain Med Bull. 2006;28(4):1-4. Available from: https://www.bahrainmedicalbulletin.com/december_2006/Family_Physician_dec06.pdf
7. Calculator.net. Sample size calculator [Internet]. Calculator.net; 2024 [cited 2021 May 16]. Available from: https://www.calculator.net/sample-size-calculator.html
8. Duko B, Geja E, Oltaye Z, Belayneh F, Kedir A, Gebire M. Triage knowledge and skills among nurses in emergency units of specialized hospital in Hawassa, Ethiopia: cross sectional study. BMC Res Notes. 2019;12:21. doi:10.1186/s13104-019-4062-1.
9. Mushtaq S, Saddique H, Tasneem SS, Jabeen R. Knowledge and practice of emergency nurses regarding triage. Biol Clin Sci Res J.

2024;2024:1391. doi:10.54112/bcsrj.v2024i1.1391.

10. Hwang S, Shin S. Factors affecting triage competence among emergency room nurses: a cross-sectional study. J Clin Nurs. 2023;32(13-14):3589-3598. doi:10.1111/jocn.16441.
11. Aslanoğlu A, Ayyıldız M. Triage in the world and in Turkey and the triage knowledge levels of emergency ward nurses/Dünya ve Türkiye'de triyaj sistemleri ve acil servis hemşirelerinin triyaj bilgi düzeyleri. Saglik Bilimleri Derg. 2023;(2):316-322. doi:10.34108/eujhs.1159047.
12. Considine, Julie & Botti, Mari & Thomas, Shane. Do Knowledge and Experience Have Specific Roles in Triage Decision-making?. Academic Emergency Medicine. 2008;14:722 - 726. doi:10.1197/j.aem.2007.04.015.
13. Kerie S, Tilahun A, Mandesh A. Triage skill and associated factors among emergency nurses in Addis Ababa, Ethiopia 2017: a cross-sectional study. BMC Res Notes. 201810;11:658. doi:10.1186/s13104-018-3769-8.
14. Analizza IL, Febriyanti E, Odja N. Emergency nurses' knowledge and practices regarding triage. In: The International Virtual Conference on Nursing. KnE Life Sciences. 2022. p. 872-881. doi:10.18502/kls.v7i2.10388.
15. Park H, Shin DS, Wade C, Duong DB. Scoping review of nurse triage in primary care. BMC Nurs. 2025;24(1):1104. doi:10.1186/s12912-025-03740-3.
16. Purnell L. A survey of the qualifications, special training, and levels of personnel working emergency department triage. J Nurs Staff Dev. 1993;9(5):223-6.
17. Bahre W, Mengist B, Bitsa Y, Woldemariam GT, Kebede S, Wubete A, Halefom MA, Bantie AT. Triage knowledge, perceived skills, and associated factors among nurses working in adult emergency departments of selected public hospitals in Addis-Ababa, Ethiopia, 2023: multicenter cross-sectional study. Ann Med Surg (Lond). 2024;86(12):7029-7036. doi:10.1097/MS9.0000000000002703.