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# Triage processes in primary, secondary, and tertiary health care facilities in the Kathmandu Valley, Nepal: a mixed-methods study

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## Abstract

**Background** In healthcare facilities, an efficient triage system is critical to optimize patient care. The main objective of this study was to explore the triage processes and practices in three different tiers of healthcare facilities in the Kathmandu Valley, Nepal.

**Methods** A mixed-methods approach in this study comprised observations and interviews in ten healthcare settings across primary care centers (PHC;  $n=6$ ), secondary care centers (SHC;  $n=3$ ), and tertiary care hospital ( $n=1$ ). Data were collected from June to November 2023. Semi-structured interviews were conducted among patients ( $n=30$ ) including survey questionnaires among 144 healthcare workers (HCWs) focused on triage. The qualitative data were analyzed using Interpretative Phenomenological Analysis and quantitative data were analyzed to explore the median score on the consistent practice of triage based on the Likert scale.

**Results** PHCs had designated space for triage with less equipped emergency services and outpatient departments (OPDs) and received severely ill patients rarely. Although prioritizing critical patients and prompt care was part of the services, there was a lack of triage protocols with more than half of the HCWs (56.3%; 36/64) from the tertiary hospital reporting the availability of triage guidelines compared to SHCs (28.1%; 9/32) and PHCs (6.3%; 3/48). The majority of HCWs from the tertiary level recognized triage's effectiveness in reducing time lag, and prioritizing patients. Tertiary level had the consistent use of triage (94%; 60/64) compared to only around two-thirds in SHCs (66%; 19/29) and PHCs (62%; 28/45). Patients often attended PHC services for routine check-ups and were motivated by health insurance, affordability, free medicines, referral cards, and proximity. In the SHC, there was a well-equipped emergency department (ED) with specific guidelines, but its use was infrequent. Patients were unaware of the triage process and its utility. In all settings, while most HCWs had a basic knowledge of triage, some were not confident due to limited exposure to the triage process and training. Many HCWs reported the need for triage-related training and its consistent implementation.

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**Conclusions** Consistent utilization of triage protocols, coupled with improved infrastructure, resource allocation, and training for healthcare workers is critical for the optimization of triage processes in healthcare settings in the Kathmandu Valley, Nepal.

**Keywords** Primary care, Triage, Secondary care, Emergency care

## Contributions to the literature

- There is a major paucity of literature exploring triage knowledge, attitude and practice among healthcare workers and patients in Nepal.
- The study highlights the current level of knowledge, practice and limitations faced by three tiers of health care facilities in the Kathmandu Valley, Nepal.
- The findings from this study will serve as a knowledge base for what triage is, and the current scenario of triage in health care facilities in Nepal. The findings will inform health care facilities and policies to reform the triage process and improve emergency services.

## Background

The healthcare system operates across multiple tiers, resembling a pyramid, with primary care serving as the initial point of contact for most patients, followed by secondary, and tertiary care, each offering increasing levels of specialization and technical complexity at higher costs [1]. Primary healthcare (PHC) is a crucial health service that manages health conditions at the community level, streamlining the health services at higher-level health facilities [2]. This approach is aligned with the principles outlined in the Alma-Ata Declaration of 1978, which underscores the importance of PHC as a foundation for achieving health for all [3, 4]. Secondary healthcare (SHC) involves specialized treatment for referred patients by healthcare professionals, addressing severe or complex health conditions [5]. Tertiary health care is a specialized level of medical treatment which can offer highly advanced and sustained medical services, including complex diagnostics and clinical procedures, administered by specialists in modern facilities [6].

Establishing effective emergency care services and effective triage procedures can significantly reduce deaths and improve injury outcomes [7, 8]. Triage is the critical element of emergency healthcare management which aims to prioritize patients based on the urgency of their medical needs [9]. However, many LMIC settings struggle with inadequate resources, leading to poor management of initial triage and emergency care, when needed. The knowledge and practice of triage among healthcare workers are nascent in LMICs [10, 11]. The absence of an

effective triage system can lead to a risk of chaos, strain on existing resources, and delayed care for critically ill patients [12]. In the context of Nepal, there are only a few specialists trained in emergency medicine. Thus, emergency care is primarily administered by healthcare providers who lack formal training in emergency medicine [13].

Triage should be an integral element in all tiers of the healthcare system including primary healthcare facilities. Triage in primary care, often facilitated by community care nurses ensures prompt direction of patients to appropriate care areas, yet the knowledge and practice related to triage are often lacking among these frontline healthcare workers [14]. It is crucial to implement a triage system to accurately categorize patients for treatment priority and optimization of services [15].

In our prior study in a tertiary care hospital in Nepal, we identified significant challenges, such as resource constraints and inconsistencies in triage practices [16]. Another study conducted among seven tertiary hospitals in Nepal revealed that while almost all hospitals had a triage system in place, a formal protocol for guiding emergency care, including triage, was lacking [17]. Several triage systems have been created and validated to aid healthcare providers in making precise triage decisions, nonetheless, most triage systems are implemented in advanced healthcare centers in Nepal [18, 19]. There are research gaps on how triage is practised in different tiers of healthcare settings. The main objective of this study was to explore the triage processes and practices within three different tiers of health services in Nepal.

## Methods

### Study design and setting

This was a mixed-methods research that combined qualitative and quantitative approaches and followed a qualquant sequential methodology whereby the quantitative questionnaire was guided by the prior qualitative work conducted at the tertiary care hospital [16]. The study was conducted from June to November 2023 in the outpatient departments (OPDs) of primary and secondary healthcare settings and a tertiary care emergency department in Kathmandu Valley, Nepal.

The qualitative method included direct observations ( $n=30$ ) of the triage process and in-depth interviews

**Table 1** Socio-demographic characteristics of the patients (N=30)

Identification Number	Age category (Year)	Sex	Qualification	District
<b>Patients (Lubhoo PHC)</b>				
Pt_010001	30–40	M	Lower Secondary	Lalitpur
Pt_010002	20–30	M	Higher Secondary	Lalitpur
Pt_010003	50–60	F	Informal education	Lalitpur
Pt_010004	60–70	M	Lower Secondary	Lalitpur
Pt_010005	60–70	M	Informal education	Lalitpur
Pt_010006	30–40	F	Higher Secondary	Lalitpur
Pt_010007	60–70	M	Lower Secondary	Lalitpur
Pt_010008	30–40	F	Informal education	Lalitpur
Pt_010009	30–40	F	Lower Secondary	Lalitpur
Pt_0100010	20–30	F	Higher Secondary	Lalitpur
Pt_0100011	30–40	F	Higher Secondary	Lalitpur
Pt_0100012	20–30	F	Higher Secondary	Lalitpur
Pt_0100013	50–60	F	Informal education	Lalitpur
Pt_0100014	40–50	F	Lower Secondary	Lalitpur
Pt_0100015	50–60	F	Informal education	Lalitpur
<b>Patients (Tokha SHC)</b>				
Pt_020001	30–40	F	Lower Secondary	Kathmandu
Pt_020002	40–50	M	Lower Secondary	Kathmandu
Pt_020003	60–70	F	Informal education	Kathmandu
Pt_020004	50–60	F	Lower Secondary	Kathmandu
Pt_020005	60–70	F	Can't read or write	Kathmandu
Pt_020006	20–30	M	Lower Secondary	Kathmandu
Pt_020007	40–50	F	Higher Secondary	Kathmandu
Pt_020008	30–40	M	Higher Secondary	Kathmandu
Pt_020009	50–60	F	Informal education	Kathmandu
Pt_0200010	60–70	F	Can't read or write	Kathmandu
Pt_0200011	40–50	F	Informal education	Kathmandu
Pt_0200012	20–30	M	Lower Secondary	Kathmandu
Pt_0200013	50–60	M	Can't read or write	Kathmandu
Pt_0200014	50–60	M	Lower Secondary	Kathmandu
Pt_0200015	40–50	M	Lower Secondary	Kathmandu

Pt Patient, M Male, F Female

(IDIs) with adult patients ( $n=30$ ) in the two healthcare settings (Lubhoo PHC and Tokha SHC) (Table 1). In addition, a quantitative Knowledge Attitude and Practice (KAP) survey questionnaire was used to gather information from HCWs. A total of 144 HCWs were approached to participate in this survey from various tiers of health services that included six PHCs ( $n=48$ ), three SHCs ( $n=32$ ), and one tertiary hospital ( $n=64$ ) within Kathmandu Valley, Nepal.

The researchers developed an interview guide (Additional file 1) to conduct IDIs and a questionnaire (Additional file 2) to perform KAP surveys. The IDI guide and KAP questionnaire were piloted with the study team,

patients, and HCWs to ensure they were clear and pertinent to the study themes.

#### Participant recruitment

In this study, 30 IDIs were conducted with patients purposefully chosen from the EDs and OPDs. The selection of patients was guided by HCWs. The researchers and patients had no previous contact. Patients under 18 and those unwilling to participate were excluded. To ensure a diverse range of perspectives, interviews considered the patients' severity of illness, location, gender, ethnicity, and background. All the interviews were conducted in Nepali language and were audio-recorded and translated into English.

Researchers also directly observed the triage process, in addition to informal conversations with both patients and HCWs to enhance their notes. Regular communication with HCWs verified accurate documentation of events, including the triage process, available resources, and infrastructure. Thirty observation notes were collected that captured a diverse range of patients' journeys from their arrival to the point of examination, triage practices, coordination among HCWs, and the overall situation in the ED and OPD. The direct observations of the triage process entailed an observation of the general services, patients' interactions with the health services/workers, queue maintenance, triage processes and did not preclude the participants who were also interviewed at Lubhoo PHC and Tokha SHC.

A quantitative KAP survey was conducted with HCWs that included medical officers, staff nurses, health assistants, and other staff to assess their understanding and existing triage practice. The standard questionnaire tool was used among the same categories of healthcare workers across the primary, secondary and tertiary health care facilities. We aimed to compare the KAP among healthcare workers across the three tiers of health facilities based on our research question and statistical analysis plan. The KAP questionnaire consisted of 34 questions and was divided into Section-I: Socio-demographic information; Section-II: Knowledge of triage process; Section-III: Attitude to triage process; and Section-IV: Practice on triage process. The questions were selected based on the previous literature and discussion among the authors guided by the previous qualitative study [16] that informed the variables of interest. The first set of questions underwent piloting among researchers and a few HCWs and were adapted for clarity and comprehension. Based on the feedback and suggestions, the questionnaire was revised and finalized before being used at the research sites. Survey questionnaire data was entered in open data kit (ODK) platform-based electronic case record forms.

#### Data analysis

The transcripts and observation notes were consolidated into Microsoft Word and Excel spreadsheets which were analyzed using Interpretative Phenomenological Analysis (IPA) [20]. Through an examination of the excerpts, a set of emerging themes were identified, which were further discussed among investigators and expert social scientists. The qualitative method has been reported as per the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Additional file 3) [21].

Participant sociodemographic information was summarized for each level of healthcare. Differences between groups were evaluated using a Kruskal–Wallis test for

continuous variables, a Chi-squared test for categorical variables, and a Fisher's Exact test for categorical variables where at least one cell count was less than five. The data collected through the KAP questionnaire underwent descriptive analysis with one of the variables: question # 31 '*consistent use of triage at OPD or ER*' treated as an outcome variable (Additional file 2). Consistent use of triage in our questionnaire explored the regularity of following the triage guideline (process) based on the responses. All other variables were treated as independent variables. The median score of the outcome variable was used to evaluate the adoption of triage at the assessed study sites (PHCs, SHCs and a tertiary care hospital) except questions #30, 32 and 33 whose Likert scores were presented descriptively. The high median score meant a high likelihood of consistent use of triage and vice versa, and the association between independent variables and consistent triage use score were analyzed for statistical significance using Mann Whitney U and Kruskal Wallis tests. All statistical tests were two-sided at an alpha value equivalent to 0.05, and all *p*-values were adjusted for multiple comparisons using the Benjamini–Hochberg method. Data were analyzed using *R* software, version 4.3.1 (The *R* Foundation for Statistical Computing, Vienna, Austria).

#### Results

There was a designated but less equipped emergency services and OPD in PHCs which received severely ill patients less frequently. A common practice existed to prioritize critical patients and provide prompt care, but there was a lack of formal triage protocol with just more than half of the HCWs (56.3%; 36/64) from tertiary healthcare facility reporting availability of triage guidelines compared to SHCs (28.1%; 9/32) and PHCs (6.3%; 3/48). The majority of HCWs from tertiary level recognized triage's effectiveness in preventing time lag (tertiary=84.4%; 54/64, SHC=65.6%; 21/32, PHC=50%; 24/48), categorizing severity (tertiary=95.3%; 61/64, SHC=75%; 24/32, PHC=77.1%; 37/48), and prioritizing patients (tertiary=93.8%; 60/64, SHC=75%; 24/32, PHC=77.1%; 37/48). At the tertiary level, most respondents reported the consistent use of triage (94%; 60/64) compared to only around two-thirds in SHCs (66%; 19/29) and PHCs (62%; 28/45). Patients often attended PHC services for routine check-ups only. PHC attendance was motivated by health insurance, referral cards, affordability, free medicines, and proximity. At the same time, in the SHCs, there was a well-equipped ED with specific guidelines, but its use was compromised by consistency. Unfortunately, patients were unaware of what triage was and how it was utilized while most HCWs had a basic knowledge of triage, some were not confident due

to limited exposure to the triage process and insufficient training. Therefore, most HCWs expressed a positive attitude towards triage needs and its proper implementation.

**Knowledge, attitude and practice related to triage among HCWs**

Among a total of 144 participants, there was a slightly

**Table 2** Socio-demographic characteristics of HCWs for Primary vs Secondary vs Tertiary level (N = 144)

Variable	N (%)	Mean (± Std Dev)	N (%)	Mean (± Std Dev <sup>1</sup> )	N (%)	Mean (± Std Dev)	P-value <sup>2</sup>
<i>Facility Level</i>	Primary level		Secondary level		Tertiary level		
<b>Age</b>	48	32 (±6.9)	32	30 (±4.9)	64	29 (±4.3)	0.14
<b>Age Category</b>	48		32		64		0.223
18—25 years	4 (8%)		4 (12%)		10 (16%)		
26—45 years	41 (85%)		28 (88%)		54 (84%)		
46—60 years	3 (6%)		0 (0%)		0 (0%)		
<b>Gender</b>	48		32		64		0.879
Female	29 (60%)		19 (59%)		41 (64%)		
Male	19 (40%)		13 (41%)		23 (36%)		
<b>Highest Education Level</b>	48		32		64		<b>0.011*</b>
Certificate	13 (27%)		10 (31%)		5 (8%)		
Graduate	31 (65%)		18 (56%)		55 (86%)		
Post Graduate	4 (8%)		4 (12%)		4 (6%)		
<b>Professional Category</b>	48		32		64		<b>0.001**</b>
Health Assistant	8 (17%)		6 (19%)		2 (3%)		
Medical	21 (44%)		12 (38%)		25 (39%)		
Medical Assistant	3 (6%)		0 (0%)		0 (0%)		
Nursing	12 (25%)		12 (38%)		37 (58%)		
Other	4 (8%)		2 (6%)		0 (0%)		
<b>Current Role</b>	48		32		64		0.122
Healthcare	42 (88%)		31 (97%)		62 (97%)		
Healthcare / Administrative	1 (2%)		0 (0%)		0 (0%)		
Healthcare / Managerial	1 (2%)		1 (3%)		1 (2%)		
Healthcare / Managerial / Administrative	4 (8%)		0 (0%)		0 (0%)		
Managerial	0 (0%)		0 (0%)		1 (2%)		
<b>Duration of Experience in Healthcare (Months)</b>	48	110 (±96)	32	65 (±56)	64	72 (±64)	0.122
<b>Duration of Experience in Healthcare (Category)</b>	48		32		64		0.18
1 year or less	8 (17%)		6 (19%)		16 (25%)		
1—5 years	12 (25%)		14 (44%)		19 (30%)		
5—10 years	11 (23%)		9 (28%)		17 (27%)		
> 10 years	17 (35%)		3 (9%)		12 (19%)		
<b>Do you have experience in OPD or ER care?</b>	48		32		64		0.088
Yes	48 (100%)		30 (94%)		64 (100%)		
No	0 (0%)		2 (6%)		0 (0%)		
<b>Duration of Experience in OPD or ER care (Months)</b>	48	58 (±70)	30	30 (±38)	64	46 (±49)	0.38
<b>Duration of Experience in OPD or ER care (Category)</b>	48		30		64		0.133
1 year or less	20 (42%)		12 (40%)		25 (39%)		
1—5 years	12 (25%)		16 (53%)		21 (33%)		
5—10 years	9 (19%)		1 (3%)		12 (19%)		
> 10 years	7 (15%)		1 (3%)		6 (9%)		

<sup>1</sup> Std Dev Standard Deviation

<sup>2</sup> P-values are adjusted as stated in the methodology. Asterisks indicate significance as follows: \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

higher proportion of female HCWs across all healthcare settings (PHC=60%; 29/48, SHC=59%; 19/32, tertiary=64%; 41/64) (Table 2). Tertiary facility had a higher percentage of HCWs with graduate or postgraduate degrees compared to primary and secondary facilities ( $p=0.011$ ). Nurses were more prevalent at tertiary facility (58% of HCWs) compared to other professional categories ( $p=0.001$ ). Experience related to healthcare and emergency care also varied across facility levels, with a higher percentage of HCWs in PHCs (15%) having over 10 years of relevant experience in OPD/ER. However, there was no significant difference in OPD/ER-related experience among HCWs across facility levels ( $p=0.133$ ).

The majority of HCWs (95.8%; 138/144) were aware of triage, with a slight difference between primary (93.8%; 45/48) and tertiary (100%; 64/64) levels ( $p<0.001$ ) (Table 3). The majority of HCWs from tertiary level recognized triage's effectiveness in preventing time lag (tertiary=84.4%; 54/64, SHC=65.6%; 21/32, PHC=50%; 24/48), categorizing severity (tertiary=95.3%; 61/64, SHC=75%; 24/32, PHC=77.1%; 37/48), and prioritizing patients (tertiary=93.8%; 60/64, SHC=75%; 24/32, PHC=77.1%; 37/48) with significantly higher median score for consistent use of triage in tertiary care centre (median score=4) compared to SHC and PHC (median score=3) ( $p<0.001$ ).

Most participants across healthcare settings perceived the usefulness (PHC=87.5%; 42/48, SHC=90.6%; 29/32 and tertiary care centre=100%; 64/64) of the triage procedure. Only a third of HCWs reported the presence of triage guidelines at their workstation. Just more than half of the HCWs (56.3%; 36/64) from tertiary healthcare facility reported availability of triage guidelines compared to SHCs (28.1%; 9/32) and PHCs (6.3%; 3/48). Almost half of the HCWs (45.8%; 30/66) perceived the need to improve training and supervision among staff. Most respondents from all tiers of health services felt the need to use triage (Tertiary=100%; 64/64, SHC=97%; 28/29, and PHC=84%; 38/45) in their OPD or ER (Fig. 1a).

At the tertiary level, most respondents reported the consistent use of triage (94%; 60/64) compared to only around two-thirds in SHCs (66%; 19/29) and PHCs (62%; 28/45) (Fig. 1b). The use of triage at any frequency was also similar across the healthcare settings (Fig. 1c). The majority of HCWs from the tertiary care hospital (92%; 59/64) recognized the necessity to improve the existing triage processes compared to SHCs (89%; 26/29) and PHCs (89%; 40/45) (Fig. 1d).

#### Characteristics of triage in three tiers of healthcare settings

The services provided at the six PHCs, three SHCs, and one tertiary hospital differed in scope and organization.

While all facilities offered emergency services and an OPD, each type of facility varied in its resources and approach to patient care.

In PHCs, the ED provided care to patients with moderate to severe conditions needing urgent attention, while the OPD mainly handled mild to moderate cases for consultations and routine check-ups. OPD patients waited in a designated area until called in order of arrival, without prioritization based on illness severity. Although formal triage protocols or color-coded zones were absent, some HCWs could informally identify critical patients and give them priority care. PHCs had limited staffing, equipment, and a narrower range of services compared to SHCs and the tertiary hospital.

SHCs had additional resources such as monitors to observe vital signs, oxygen supplies, essential medicines, and color-coded waste bins. Some SHCs organized beds by urgency levels—yellow-coded for moderate, red-coded for high, and green-coded for low urgency—yet triage criteria were not consistently followed, and HCWs sometimes treated patients by convenience rather than urgency. This resulted in inconsistent triage practices across different SHCs.

In the tertiary hospital, triage was a formalized part of emergency care, with color-coded criteria displayed at the ED entrance and consistently followed by HCWs [16]. However, no specific training on triage was provided. The large volume of patients created space and equipment constraints, sometimes requiring patients to share beds. Despite these challenges, triage was routinely implemented, though further improvements were recommended for enhanced efficiency.

#### Triage process

In PHCs, the waiting area outside was filled with patients and their companions. The waiting lounge hosted a few chairs for patients and their companions to wait for the queue, nonetheless, the queue maintained by chairs was frequently evaded to enter the room. This behavior primarily stemmed from the lack of a system that could have called the token numbers for patients who attempted to maintain the queue. The lack of queue maintenance overlooked the severity of the patients compromising their need for immediate care based on the severity.

*One thing I dislike about this place is I stay in line for hours and the person who comes after me goes inside by jumping the queue. This happens everywhere, even at this hospital. People come to the hospital when they're unwell, but some patients get in ahead of us without waiting their turn.*

*Pt\_020007, 40-50 years, female*

**Table 3** Knowledge, attitude, and practice related to triage for Primary vs Secondary vs Tertiary level (N = 144)

Characteristics	Number (%)			Consistent use of triage at OPD or ER Median (Mean) <sup>1</sup>				P-value <sup>2</sup>
	Total (N = 144)	Primary (N = 48)	Secondary (N = 32)	Tertiary (N = 64)	Primary	Secondary	Tertiary	
<b>Section II: Knowledge of triage process</b>								
<b>Q9. Have you heard of triage or screening of patients?</b>								
Yes	138 (95.8%)	45 (93.8%)	29 (90.6%)	64 (100%)	3 (2.53)	3 (2.86)	4 (3.95)	< 0.001***
No	6 (4.2%)	3 (6.2%)	3 (9.4%)	-	-	-	-	-
<b>Q11. Can you mention the type of source?</b>								
Book chapter	77 (53.5%)	25 (52.1%)	-	18 (56.2%)	3 (2.12)	3 (2.83)	4 (3.71)	< 0.001***
Other	61 (42.3%)	20 (41.7%)	-	11 (34.4%)	3 (3.05)	3 (2.91)	4 (4.23)	0.001**
Not Applicable	6 (4.2%)	3 (6.2%)	-	3 (9.4%)	-	-	-	-
<b>Q16. Triage can save life by<sup>3</sup></b>								
Preventing time lag	99 (68.8%)	24 (50.0%)	-	54 (84.4%)	3 (2.33)	3 (3.0)	4 (3.96)	< 0.001***
Categorizing the severity	122 (84.7%)	37 (77.1%)	-	61 (95.3%)	3 (2.62)	3 (2.92)	4 (3.95)	< 0.001***
Allowing selective prioritization	121 (84.0%)	37 (77.1%)	-	60 (93.8%)	3 (2.51)	3 (2.75)	4 (3.98)	< 0.001***
Other	44 (30.6%)	11 (22.9%)	-	25 (39.1%)	2 (2.36)	3 (3.0)	4 (4.12)	0.001***
<b>Section III: Attitude on triage process</b>								
<b>Q18. Do you think triage process is helpful in OPD or ER setting?</b>								
Yes	135 (93.8)	42 (87.5)	-	64 (100)	3 (2.55)	3 (2.86)	4 (3.95)	< 0.001***
No	3 (2.1)	3 (6.3)	-	-	2 (2.33)	-	-	-
Not Applicable	6 (4.2)	3 (6.2)	-	3 (9.4)	-	-	-	-
<b>Section IV: Practice on triage process</b>								
<b>Q25. Do you have a triage guideline at your OPD or ER?</b>								
Yes	48 (33.3)	3 (6.3)	-	36 (56.3)	3 (3.33)	4 (3.44)	4 (3.89)	.4
No	90 (62.5)	42 (87.5)	-	28 (43.7)	3 (2.48)	3 (2.6)	4 (4.04)	< 0.001***
Not Applicable	6 (4.2)	3 (6.2)	-	-	-	-	-	-
<b>Q34. What aspect of triage would you like to improve?<sup>5</sup></b>								
Improved training and supervision among staff	66 (45.8)	28 (58.3)	-	23 (35.9)	3 (3.0)	3 (2.87)	4 (3.70)	0.103
Other	126 (87.5)	37 (77.1)	-	63 (98.4)	3 (3.05)	3 (3.0)	4 (3.94)	< 0.001***

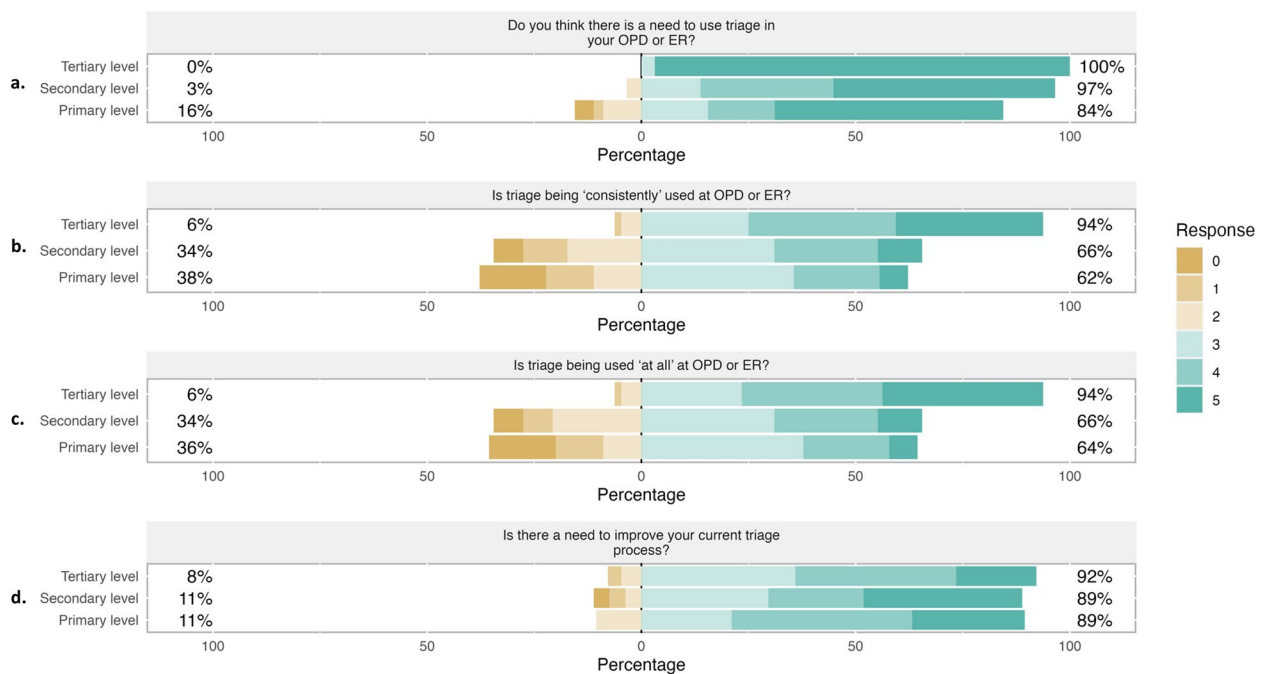
<sup>1</sup> Median and mean as calculated from Likert Scale responses to the question of Consistent use of triage at OPD or ER within question subgroups across primary, secondary, and tertiary care levels

<sup>2</sup> P-values to identify differences between care levels are adjusted as stated in the methodology. Asterisks indicate significance as follows: \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

<sup>3</sup> Participants were able to select multiple answers. The 'Other' category includes responses of 'Calming patients'; 'Supporting ward allocation'; 'Don't know'; and 'Other'

<sup>4</sup> Hypothesis test was omitted due to low cell counts (< 5 observations), which compromises the reliability of the p-values

<sup>5</sup> Participants were able to select multiple answers. The 'Other' category includes responses of 'Implementation'; 'Evaluation'; 'Sensitization'; 'Don't know'; and 'Other'



**Fig. 1** Likert scale showing none (0) to strong agreement (5) on questions related to the triage. **1a.** Need to use triage in the OPD or ER. **1b.** Triage being consistently used at OPD or ER. **1c.** Triage being used 'at all' at OPD or ER. **1d.** Need to improve the current triage process

At the SHCs, the patients arrived at the hospital's counter, provided details about their health condition, and received an OPD ticket. Subsequently, they went to the waiting area outside the OPD and waited for approximately 15–30 min before receiving a consultation with a medical doctor. If the condition appeared severe, the patient was instructed to head directly to the ED, where HCWs attended them. The patients were assigned to beds within the ED. It was noticed that even the patients who did not seem to be in severe condition were placed in beds designated for critical cases, with less emphasis on color-coding. Their vital signs were checked, and medical histories were obtained from the patients or patient parties. Medical officers then assessed and treated the patient, which involved procedures such as X-rays, medication administration, and blood tests. Following the diagnosis and initial management, the medical officers determined whether hospital admission was necessary, depending on the patient's condition. Throughout the process, HCWs continued to deliver quality healthcare to the patients. However, the one managing the emergency cases was found to be familiar with the triage process but some HCWs were unclear about its meaning and utility. This lack of clarity was attributed to insufficient exposure to triage practices, inadequate training, and a lack of discussions among HCWs.

At the PHCs, patients arrived at the hospital's counter, shared details about their health concerns, and were

provided with an OPD ticket. Afterwards, they joined the waiting line outside the OPD. There was no formal queue management system (e.g., using electronic token numbers). Patients had to endure long waiting times, typically for around 30–60 min, before being able to consult with a medical doctor.

Critical patient cases were relatively rare at the PHC, although immediate attention was offered to such cases. They were allocated to the ED, and HCWs attended them promptly, with medical officers from the OPD being called in without delay. Nonetheless, at PHCs, there was no provision to admit patients for extended care.

### Resources and services

Although the healthcare services provided at the facilities were generally satisfactory, several challenges were found that required immediate attention. There was a notable absence of crucial medicines and a significant shortage of HCWs at the PHCs, leading patients to explore alternative options in higher-level hospitals. The lack of HCWs in PHCs, especially nurses, highlighted the clear need for more staff in these primary healthcare settings. Patients also experienced inconvenience when they were only examined at these facilities to receive medications elsewhere.

The prominent absence of essential triage equipment, including color-coded items, a triage logbook, and manuals was observed. Several challenges were pronounced in

PHCs, where essential diagnostic tests such as multiple blood tests, X-rays, and ultrasonography, as well as the availability of essential medicines and specialist care, were distinctly absent.

*The quality of services here is satisfactory, but the unavailability of medicines is a challenge. While video X-ray services are offered at this facility, the lack of a doctor responsible for performing the procedure is a concern. If essential services like these are not offered, it might be more practical to consider private hospitals. It is difficult for us to do the check-up here and get the medicine from somewhere else.*

*Pt\_0200015, 40-50 years, male*

*Thyroid testing isn't available here, so I have to come to this hospital for a referral and then go to TUTH for the test. It's quite inconvenient and involves a lot of back-and-forth. Having all the services in one place would make things much more convenient.*

*Pt\_020007, 40-50 years, female*

Nevertheless, the SHC had different sections (designated rooms/space) for outpatient care, and each section had different specialists such as orthopedics, gynecologists, dentists, pediatricians, among others. This setup ensured that people could easily access various medical experts for their specific health needs at the SHC.

### Treatment seeking behavior

Many patients who came to these healthcare centers were residents of the nearby areas and were already acquainted with the services provided at these facilities. The common symptoms of patients in OPD/ED were fever, cough, cold, back pain, knee pain, headache, and stomachache. Some patients visited for regular follow-ups for blood pressure and diabetes, and a few others came for the dressing of surgical wounds and suture removal (based on the recommendations by the tertiary care center). The estimated travel time for patients to reach the healthcare setting was about 10–20 min, and they knew about the facility through neighbors, Female Community Health Volunteers (FCHVs), local pharmacies and clinics, and relatives. The decision to seek treatment was made by the patients, or their husbands or brothers. They chose these settings because of the proximity of their residence, affordability, convenience, eligibility for health insurance claims, provision of referral cards, and free medications, as well as a desire to avoid long queues and crowded conditions in other healthcare settings.

*We've done the health insurance, and this hospital is within our insurance coverage, so we visit it for our checkups.*

*Pt\_0200011, 40-50 years, female*

The available modes of transportation included walking, using a bike or scooter, taking a local vehicle, or taking a taxi. However, financial constraints posed a significant challenge for patients to attend the health centers. In addition, some female patients were reluctant to be admitted due to the responsibilities of taking care of their families.

*They advised me to be admitted, but I faced a dilemma since there was no one available to look after my home or prepare meals during my hospital stay. Instead, I told the doctor that I would visit the hospital for treatment whenever they would call me. The doctor then agreed and gave me medications, and after seven days of taking them at home, my health improved.*

*Pt\_0200010, 60-70 years, female*

### Patient perceptions of services at healthcare centers

Patients often believed that their condition was the most critical compared to others and wanted their treatment to be prioritized. The perception-driven severity often jeopardized the immediate needs of other patients in more critical conditions.

*While waiting in line I felt that I was the most severe of them all.*

*Pt\_020006, 20-30 years, male*

None of the patients had any knowledge about the term "triage," its concept, or its relevance in a hospital setting. Even those who frequently visited the hospital were unfamiliar with it and never noticed any color coding or received information about it.

*I didn't know about triage and had never noticed it in other hospitals before. Now I understand it. If I get the chance, I'll explain it to others, and I'll remember it if I come across it in other hospitals.*

*Pt\_020006, 20-30 years, male*

Patients expressed overall satisfaction with the healthcare provided by HCWs. However, there were instances where admitted patients did not receive thorough explanations about their medical conditions, leaving them incognizant of why the HCWs recommended hospitalization. They desired a clear explanation from HCWs regarding the reasons for their admission.

*I'm taking the medicines they gave me, but I want the doctor to explain why they want me to stay in the hospital. All they did was look at my reports, say I have a disease, and tell me to get admitted*

*right away. I'm a homemaker, and I need to plan things before going to the hospital. I don't even know what my illness is, and I just want to understand the real reason behind it.*

*Pt\_020001, 30-40 years, female*

Many patients came to healthcare settings with the expectation of receiving free medications. However, they had noted that many of the medicines they needed were not in stock at the facility's dispensary, so they ended up purchasing them elsewhere. This placed an extra financial strain on them, contradicting their hopes for cost-free healthcare services.

*I wish the hospital had certain medicines. I only brought Rs 100 with me, but the doctor recommended thyroid, sugar, and uric acid tests. If I have any of these conditions, I would need to purchase medicines, which are not in stock here.*

*Pt\_010003, 30-40 years, female*

While there was a scope for enhancing the quality of services, patients expressed satisfaction with the improvements made in the care and treatment.

*Before, if my child's hand or leg was broken, we had to go to Patan Hospital for treatment. But now, we can get treated here, which is a great improvement in the service.*

*Pt\_0100011, 30-40 years, female*

## Discussion

HCWs across all healthcare settings demonstrated a high level of awareness related to triage. There were significant disparities related to triage-specific utility and effectiveness, including the presence of triage protocol at the workplace and its consistent use. All HCWs perceived the need for training and supervision to implement the triage process. Patients often attended PHC services for routine check-ups and were driven by cost savings (by health insurance), referral cards, free medicines, and proximity. At the same time, in the SHCs, there was a well-equipped ED with specific guidelines, but its use was compromised by consistency. The findings from this study underscore the need for improved infrastructure, better resource allocation, and enhanced training for HCWs to optimize triage processes in various healthcare settings in Nepal.

Patients were unaware of the triage process and its utility. While most HCWs had a basic knowledge of triage, some were not confident due to limited exposure to the triage process and insufficient training. The majority of HCWs expressed positive attitudes towards triage needs and its proper implementation. Health system-related

shortcomings such as shortages of HCWs, insufficient training and essential resources, hindered comprehensive care delivery. SHCs were relatively well-equipped compared to PHCs and had triage guidelines, their effective execution was lacking. Our findings have been echoed across other LMIC settings where key features that hindered the adoption of triage were found to be insufficient training, inconsistent use of triage protocols, a shortage of on-duty staff, the absence of triage guidelines, and inadequate administrative support [22–24].

To ensure patient safety in PHCs, where only 15% of HCWs had over 10 years of experience in OPD/ED, the triage process could be improved when conducted by experienced nurses with clear guidelines and expertise [25]. A similar study in a tertiary care ED in Turkey reported the deployment of experienced and trained nurses, supported by a digitalized system, and an adequate number of HCWs working in shifts could improve the accuracy of triage in the ED [26].

In Uganda, around 44% of health facilities had functional triage [27] partially echoing our study where only around two-thirds of PHCs and SHCs reported consistent use of triage, although the consistent practice of triage was reported significantly high (94%) in the tertiary care hospital. In the ED of primary and secondary hospitals, patients were assigned to any available beds without following color categorization. Consistent with our study, the adoption of a formal triage system was highly uncommon in Uganda [22]. Even in high-income settings, for example in primary care clinics in Tennessee, there was an inconsistent use of triage [28]. In a study of systemic triage in the ED of a Nepalese hospital, it was demonstrated that despite the ED staff documenting triage, the triage protocol was not consistently followed, and triage decisions relied solely on certain vital parameters. Moreover, patients were not categorized as precisely as outlined in the protocol and were placed in any available beds [23].

While HCWs handling emergency cases were acquainted with the triage process, there remained a level of uncertainty among HCWs regarding the term and its meaning. Insufficient knowledge and skills could compromise the effectiveness of the triage system, leading to an escalation of medical errors within hospitals [24]. An effective triage system is important in managing patient flow and resource allocation in a high-volume ED setting [29]. The challenges in emergency services include the management of human resources, infrastructure, and performance [30]. These challenges are compounded by the lack of clarity often stemming from limited exposure to triage practices, inadequate training, and insufficient communication among HCWs, and can be significantly addressed by delivering training which enhances the

understanding and proper application of a triage system among HCWs [31].

The global burden of acute illness and injury is most prevalent in LMICs, where a significant disparity exists between the availability and demand for emergency care resources [32]. In Saudi Arabia, with a relatively well-performing economy, many PHCs did not have adequately equipped ambulance vehicles, nearly half of them lacked a laboratory, and approximately one-third were without X-ray facilities. This lack of resources rendered these centers ill-prepared to handle emergency situations [33].

Like many other LMICs, Nepal too encountered substantial challenges and deficiencies in its emergency medical services. Limited resources, inadequate infrastructure, and insufficient healthcare funding contribute to less-than-optimal emergency response systems [16, 34]. Additionally, the main structural obstacles in the triage ward were insufficient and inappropriate physical space, along with a deficit in HCWs [30]. Triage implementation is predicated on health human resources, and unfortunately, efforts to improve healthcare human resources with training, employment, and retention priorities are still lacking and need more attention [35].

The availing of essential resources, enhancing triage processes, refining management protocols, and optimizing team coordination for patients could enhance the quality of care in EDs across Nepal. Triage tools designed for resource-rich settings may not always be suitable for LMICs, especially due to limitations related to workforce, resources, training, and disease patterns, particularly in SHCs and PHCs [10, 36–38]. South African Triage Scale is one such triage instrument devised specifically for resource-limited healthcare facilities, which has been widely adopted in and around Africa [39, 40]. The development and implementation of standardized triage protocols could be tailored to the specific needs and resources of healthcare centers, assuring that these protocols are regularly reviewed and updated following emerging medical knowledge and local healthcare needs. Nonetheless, providing comprehensive training for HCWs involved in triage, ensuring they are well-versed in the latest triage protocols, assessment techniques, and communication skills could be beneficial. The assessment and allocation of resources to support the triage process, including sufficient staffing, adequate equipment, and appropriate facilities could be beneficial. In addition, implementing digital tools that facilitate the efficient flow of information and reduce delays in the triage process is essential while raising awareness in the community about the significance of the triage system and promoting responsible utilization of PHC services.

### Strengths and limitations of the study

This study employs a mixed-methods approach—quantitative and qualitative research methods, providing a well-rounded understanding of the current triage practice. The inclusion of three tiers of healthcare services including PHCs, SHCs, and a tertiary hospital, provides a diverse sample that demonstrates a holistic purview of triage practices in Nepal. However, in this study, in-depth interviews with patients were conducted only at two healthcare facilities (Lubhoo Primary Health Center and Tokha Secondary Health Center), while in the tertiary hospital, information from healthcare workers was collected solely through the KAP survey questionnaire. The findings from the KAP questionnaire in general and specifically, ‘consistent use of triage’ reported in this study may have suffered from desirability and recall bias and thus require cautious interpretations. Thus the study findings may not represent the tertiary care hospitals in the entire Kathmandu Valley and the private health sector. Furthermore, these findings should not be generalized to the healthcare system across Nepal, as the conditions in the Kathmandu Valley differ significantly from those in other regions, particularly regarding healthcare access and resource allocation. The study may have suffered from recall and social desirability biases. Nonetheless, the interviews were triangulated by the researchers’ observation notes, which may have mitigated the biases.

### Conclusions

PHCs provided basic emergency and outpatient services but faced challenges due to limited resources and informal triage practices, impacting their ability to prioritize patient care effectively. SHCs offered a broader range of resources and were better equipped to handle varying levels of urgency; however, inconsistent adherence to triage protocols affected the quality of services. The HCWs in ED and/or OPD, especially in the tertiary care facility, had high awareness and implementation of triage with disparities in triage knowledge and its implementation remains a major challenge. The tertiary hospital delivered comprehensive emergency care with standardized triage processes, nonetheless, they struggled with high patient volumes with higher loads on health care workers which could compromise the quality of care despite established protocols. Despite facing challenges such as shortages of essential triage resources, limited access to advanced diagnostic tests, and constraints in specialist care availability, there is a significant acknowledgment among HCWs at all health facilities regarding the need for triage training and supervision. Addressing these challenges and improving the triage system by providing training for HCWs across all healthcare tiers is crucial to enhancing

patient satisfaction, particularly in PHCs where formal triage protocols are currently lacking.

#### Abbreviations

COREQ	Consolidated criteria for Reporting Qualitative research
ED	Emergency Department
FCHV	Female Community Healthcare Volunteer
HCWs	Healthcare Workers
IDI	In-Depth Interview
IPA	Interpretative Phenomenological Analysis
KAP	Knowledge, Attitude and Practice
LMIC	Low- and Middle-Income Countries
ODK	Open Data Kit
OPD	Outpatient Department
PHC	Primary Health Care
SHC	Secondary Health Care
WHO	World Health Organization

#### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12873-024-01139-y>.

Additional file 1: IDI guide; interview guides used to interview patients during the study.

Additional file 2: KAP survey questionnaire; questionnaire used to interview healthcare workers during the study.

Additional file 3: COREQ Checklist; checklist of COREQ requirements.

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#### Authors' contributions

DD, SD, and KKAT developed the project concept. LS, BA, and DD designed the study and contributed to the methodology. NA, AR, SS, RP, and MO contributed to the data collection and data management. BA, NA, AR, and MW analyzed and interpreted the data. DD, JS, LS, and BA coordinated the study. KKAT, MB, and RKM provided overall supervision to the project management. BA, NA, and AR wrote the first draft of the manuscript. DD, KKAT, SD, BA, and LS critically reviewed the manuscript. All authors read and approved the final manuscript.

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#### Data availability

The data used and/or analyzed in this study are available from the corresponding author upon reasonable request.

#### Declarations

##### Ethics approval and consent to participate

Ethics approval for this study was obtained from the Ethical Review Board, Nepal Health Research Council (NHRC), protocol number 270/2023, reference number 3065, 10th May 2023. The study was conducted according to the guidelines of the Declaration of Helsinki and all methods were carried out in accordance with relevant guidelines and regulations. All participants provided written informed consent prior to enrolment into the study.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

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