KNOWLEDGE, PRACTICE AND PERCEPTION OF TRIAGE BY STAFF OF THE EMERGENCY DEPARTMENT OF HO TEACHING HOSPITAL

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Abstract

Objective: This study sought to assess the knowledge, practice, and perception of triage by Emergency Department (ED) doctors and nurses of a new teaching hospital in Ghana.

Methodology: This was a cross-sectional study. Data was collected using a structured self-filled questionnaire which had sections on socio-demographic information of participants, knowledge, practice, and perception of triage. Descriptive statistics and bivariate analysis of the results was done using Microsoft Excel and Statistical Package for Social Sciences version 25, respectively.

Results: Eighty-three ED staff participated in this study; 56 nurses and 27 doctors. Sixty-four participants had at least moderate level of knowledge of South African Triage Scale (SATS). Their level of knowledge had statistically significant associations with their work experience ($p = 0.032$) and frequency of triaging ($p = 0.000$). Forty-nine participants had at least moderate level of triage practice skill. Their scores had statistically significant associations with their level of triage knowledge ($p = 0.011$) and frequency of triaging ($p = 0.001$). Majority of participants agreed that triaging is important in reducing waiting times (89%) and improving communication (92%).

Conclusion: The positive correlation between frequency of triaging and both knowledge and practice of triaging attests to the common notion that practice makes perfect. Regular on-the-job training may result in improvement in this skill. Participation by ED doctors should be encouraged.

Key words: *triaging, South African Triage Scale, knowledge, practice, perception*

Introduction

Triage is the cornerstone of organisation of care in EDs. It is a term used to describe the sorting of patients for treatment priority in EDs.[1] Through this process, the healthcare provider is able to distinguish between patients that are critically ill and need immediate interventions and those seeking care but do not require prompt attention.[2] This affects the rest of the patient's evaluation at the ED, since subsequent management steps depend on initial triage assessment.

There are several ED triage tools available for use.[3] The South African Triage Scale (SATS), however, has been shown to improve the efficiency of resource limited EDs,[4–6] and is an extensively studied triage scale in low-and middle-income countries (LMICs) across Africa and Asia.[6] The suitability of the South African Triage Scale SATS for LMICs has made it recommended for use in all EDs in Ghana.[7] There is also published literature describing its efficient use in health facilities in the country.[8,9]

Evaluation of triage capabilities is important for several reasons. Limited triage training can result in inconsistent triage assignments which can endanger patients with emergencies.[6] Earlier studies on triage in LMICs demonstrated low level of knowledge among nurses and this was attributed to inadequate nursing curriculum content on triaging.[10,11] A general deficiency of knowledge on triage has also been reported among doctors. This was also attributed to lack of training exercise at the undergraduate level.[12]

A typical triage room in a Ghanaian health facility is manned by nurses. Since they are the first health worker that a patient encounters when presenting to the ED, they must have the ability to make accurate clinical decisions about patient prioritisation and their need for intervention.[13] Similarly, because doctors in the ED will be acting on information from the triage nurses, they must also have a good understanding of triage to better manage patients. From our literature search, the few studies on triaging done in Ghana were generally set in the middle and northern part of the country. Also, many of the published literature on triaging commonly focus on the nursing staff, leaving out the doctors. The objective of this study is to assess the present condition of nurses in terms of their knowledge, practice, and perception of triaging, while also evaluating the effective use of triage by doctors.

Materials and Methods

Study design, setting and population

This was a cross-sectional study conducted at the ED of Ho Teaching Hospital (HTH) from 5th to 30th July 2021. The ED has an annual attendance of over 7000 and consists of a triage unit, a resuscitation area, an area for minor procedures, a plaster room, and a 'transient' ward. It operates on a 24-hour basis and has

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a bed capacity of 22. The staff of the ED comprise 6 doctors (including an emergency physician specialist) that are permanently in the ED. In addition to these, various team doctors run their duty schedules daily. Residents, medical officers, and house officers are also assigned to the ED on a rotational basis. The ED also has a total of 81 nurses (including 2 emergency nurse specialists) that run shifts in the department. It attends to both walk-in patients and referrals from peripheral facilities. Patients that present to the ED are triaged using the SATS. Participants in the study included nurses and doctors that worked in the ED during the study period and had given their informed consent to participate in this study. ED staff that were on leave (study, maternity, and annual leave) during the data collection period were exempted from this study.All the ED nurses, as described above, were enrolled in the study due to the small population size. For the doctors, convenient sampling was employed because a considerable number work on rotational basis at the ED.

Data collection and analysis

A printed-out, self-administered questionnaire developed by the authors served as the data collection tool for this study. It was based on existing literature on the research topic and was structured into 4 sections. The first section included socio-demographic characteristics of participants such as work experience and level of education. The second section assessed their knowledge of the SATS colour codes and corresponding waiting times. The third section assessed their practice of triage using 3 case-based scenarios, along with the use of a SATS chart to assist in categorising patients. The final section evaluated the perception of triage by the participants by assessing their response to statements about triage and the SATS. Data was collected from each participant using the designed questionnaire after obtaining informed consent. Clarification needed on any question was duly given. Discussion among participants was discouraged to determine each respondent's own level of knowledge. Completed questionnaires were collected and entered into a Microsoft Excel spreadsheet for analysis**.** The data collected was cleaned, coded, and analysed using the Statistical Package for Social Sciences (SPSS) version 25. Microsoft Excel was also used to draw graphs, tables, and pie charts for data presentation. The Spearman rank-order correlation coefficient was used to determine the association between the independent and dependent variables.

Ethical Consideration

Ethical clearance was obtained from the University of Health and Allied Sciences Research Ethical Committee (UHAS-REC A.12[167]20-21) prior to execution of the study.

Results
Socio-demographic characteristics of ED staff

A total of 83 ED staff (consisting of 56 nurses and 27 doctors) participated in the study. Response rates among

doctors and nurses were 90% and 69.1% respectively, with an overall response rate of 73.5%. More than half of participants were male (Table 1).

Table 1. Sociodemographic characteristics of ED staff

Variable	n (%)	Mean ± SD
Sex		
Male	54 (65.1)	-
Female	29 (34.9)	-
Age (years)		
		28 ± 3.19
General work Experience (years)		
<1	34 (41.0)	-
1 – 5	44 (53.0)	-
6 – 10	5 (6.0)	-
ED Work Experience (years)		
<1	48 (57.8)	-
1 – 5	32 (38.6)	-
6 – 10	3 (3.6)	-
Highest educational Level		
Certificate	6 (7.2)	-
Diploma	36 (43.4)	-
BSc	12 (14.5)	-
MSc	2 (2.4)	-
MBChB	27 (32.5)	-
Rank		
Rotation Nurse	8 (9.6)	-
Enrolled Nurse	6 (7.2)	-
Staff Nurse	27 (32.5)	-
Senior Staff Nurse	4 (4.8)	-
Nurse Officer	9 (10.8)	-
Nurse Specialist	2 (2.4)	-
House Officer	21 (25.3)	-
Medical Officer	4 (4.8)	-
Resident	2 (2.4)	-
n = frequency, SD = standard deviation		

The mean age was 28 years (standard deviation [SD] ± 3.19). The highest age recorded was 37 years and the lowest was 22 years. ED staff with less than 1 year of general work experience alone made up about 41% of all the participants. Furthermore, only 6% of participants had work experience of more than 5 years. Regarding ED work experience, more than half of participants (57.8%) had worked in the ED for less than 1 year, while only 3.6% of participants had more than 5 years working experience. Majority of ED nurses who took part in the study were diploma holders, making up 43.4% of participants. Fourteen nurses (16.9%) were degree holders, with 2 of these having master's degrees. The doctors all had the same level of education, which was the MBChB degree or its equivalent. Most of the nurses who participated in the study were staff nurses (27 out of the 56 nurses). On the other hand, House officers formed the majority of the doctors who participated in

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the study (21 of the 27 doctors). The rest were medical officers and residents. Fifty-four participants (65.1%) had never attended a triage workshop or in-service training. For the participants who attended triage workshops, 16 (19.3%), 10 (12.0%), 2 (2.4%) and 1 (1.2%) had attended one, two, three and four triage workshops, respectively.

Knowledge Of Triage Among ED Staff

This was described in three ways: their knowledge of the SATS colour categories, their knowledge of waiting times associated with each triage category, and their overall level of triage knowledge.

Knowledge of SATS colour categories and associated waiting times

More than half of the respondents were able to correctly identify the colour categories. Specifically, 58 (69.9%) respondents were able to correctly identify red as emergent, 55 (66.3%) correctly recognised orange as very urgent, 62 (74.4%) identified yellow as urgent, 76 (91.6%) identified green as routine and 48 (57.8%) identified blue as dead. With respect to the associated waiting times, 72 (86.7%) participants were able to correctly recognise that red cases should be seen immediately; 59 (71.1%) participants correctly identified that orange cases should be attended to within ten minutes of presentation; 66 (79.5%) participants correctly noted that yellow should be attended to within an hour; and 67 (80.7%) of them correctly identified that the waiting time for green cases is four hours. Thirty-six participants attained the maximum score for knowledge of SATS colour and associated level of acuity; while fifty-two participants attained the maximum score for knowledge of waiting times associated with SATS colour codes. (Table 2)

Overall Triage Knowledge of ED Staff

The overall triage knowledge was calculated by adding the scores for knowledge of triage colour code and SATS waiting times. The total was then graded according to the criteria used by an Indonesian study[14], where less than 60% was graded as low level of knowledge, 60-80 % was moderate level of knowledge and more than 80% was high level of knowledge. Forty-six (55%) of respondents were thus considered to have high triage knowledge (scored more than 80%), 18 (22%) had moderate knowledge (scored 60-80%) and 19 (23%) had poor knowledge (scored less than 60%).

Practice Of Triage By ED Staff

This was done in two ways: the total score for the participants' practice of triage, and the percentage of cases which were either correctly triaged or not.

Triage Practice Score of ED Staff

The findings showed that 29 (35%) of the participants scored the maximum mark of 3 for practice of triage. Twenty participants scored 2, another 20 scored 1, and 14 (17%) scored 0 (Table 2). The method for assessing practice score was also adopted from the Indonesian

study referenced above. In this case, a score of less than 60% was interpreted as having low level of triage skill, a score of 60%-80% was interpreted as moderate skill and 80% was considered high skill. Applying the above criteria, 29 (35%) participants demonstrated high triage skill (scored more than 80%), 20 (24%) demonstrated moderate skill (scored 60-80%), and 34 (41%) had low triage practice skill (scored less than 60%).

Correct triage, Over-triage, and Under-triage Performance by the ED staff

About 59% of respondents correctly triaged the cases given, while 8% under-triaged, and about 33% over-triaged (Table 3).

Table 2. Distribution of scores on knowledge of SATS colour (based on level of acuity and waiting time) and practice of SATS.

Total score	Knowledge on SATS colour based on level of acuity	Knowledge of SATS colour based on waiting time	Triage practice score
	n (%)	n (%)	n (%)
0	2 (2.41)	2 (2.41)	14 (16.87)
1	11 (13.25)	12 (14.46)	20 (24.10)
2	12 (14.46)	7 (8.43)	20 (24.10)
3	4 (4.82)	10 (12.05)	29 (34.95)
4	18 (21.69)	52 (62.65)	N/A
5	36 (43.37)	N/A	N/A
Total	83 (100)	83 (100)	83 (100)
n = frequency			

Table 3. Under-triage and over-triage statistics for the ED staff

SATS Practice Scenario	Correctly triaged	
	n (%)	95% CI
Scenario 1	52 (62.7)	52-73
Scenario 2	52 (62.7)	52-73
Scenario 3	43 (51.8)	41-63
Average	49 (59.1)	48-70
	Under-triaged	
Scenario 1	16 (19.3)	11-28
Scenario 2	4 (4.8)	0-10
Scenario 3	0 (0.0)	-
Average	7 (8.0)	2-15
	Over-triaged	
Scenario 1	15 (18.1)	10-27
Scenario 2	27 (32.5)	22-43
Scenario 3	40 (48.2)	37-59
Average	27 (32.9)	22-43
n = frequency; CI = confidence interval		

Perception Of Triage By ED Staff

This section was assessed using the participants' responses to 7 statements concerning triage and the SATS. Responses were graded using a Likert scale of 1 (strongly disagree) to 5 (strongly agree).

Statement 1: Triage reduces the waiting times of very sick patients

A combined 74 participants agreed and strongly agreed to this statement, while 5 participants disagreed and strongly disagreed. The rest remained neutral.

Statement 2: Necessary First Aid measures are part of the ED nurse's duty

Eighty-one (98%) participants strongly agreed and agreed that necessary first aid measures are part of the ED nurse's duty. Only 2 participants disagreed and strongly disagreed.

Statement 3: Documentation is highly essential in triage

Seventy-three (88%) respondents strongly agreed to this statement, while a combined 82 out of 83 participants agreed and strongly agreed.

Statement 4: The SATS improves communication between health workers

Seventy-six participants agreed and strongly agreed that the SATS improves communications between health workers. Six out of the 83 participants chose to remain neutral, and 1 participant disagreed.

Statement 5: The SATS is time-consuming

Forty-nine (59%) participants disagreed and strongly disagreed that the SATS is time consuming. About 24% of participants chose to remain neutral, while 14 (17%) respondents agreed and strongly agreed.

Statement 6: Triaging using the SATS is inconsistent and is greatly user dependent

Thirty-four (41%) participants chose to remain neutral on this statement, which was the most chosen single option for this item. A combined 35 (42%) respondents disagreed and strongly disagreed, while a combined 17% agreed and strongly agreed.

Statement 7: Staff at the ED should undergo training/workshops on triage

Seventy-six respondents strongly agreed that triage training should be organised for ED workers, and a combined 82 (99%) agreed and strongly agreed.

Bivariate Analysis

Factors associated with triage knowledge

Among all the factors analysed, there was a significant association between overall triage knowledge score and the general work experience, as well as with the frequency of triage by the respondents ($p < 0.05$) (Table 4).

Factors associated with triage practice score

There was also a significant association between the triage practice score and both frequency of triage, and triage knowledge score of respondents ($p < 0.05$) (Table 4).

Table 4. Factors associated with overall triage knowledge and practice skills among participants.

Variables	Overall triage knowledge		Triage practice skills	
	Spearman correlation coefficient	p (2-tailed)	Spearman correlation coefficient	p (2-tailed)
General Work Experience	0.236	0.032	0.022	0.847
ED Work Experience	0.201	0.068	0.072	0.520
Attendance of triage workshop	0.117	0.291	-0.014	0.902
Highest educational level (for nurses only)	-0.014	0.916	0.104	0.447
Frequency of Triaging	0.407	0.000	0.362	0.001
Overall triage knowledge	-	-	0.279	0.011

Discussion

This study aimed to improve on the current literature on the knowledge, practice, and perception of SATS. We noted that the ED staff generally had good level of knowledge and practice of triaging using the SATS even though they were relatively young and inexperienced. The mean age (± standard deviation) was 28 (± 3.19) years, and more than one-third had general work experience of less than a year. Furthermore, more than half of participants had less than one year work experience in the ED, a finding similar to a study conducted by Kerie et al. among nurses working in the ED.[15] Staff nurses made up the highest proportion of nurses that participated in this study. This was similar to findings from a study done among nurses in Indonesia[16]; however, that study had a lower proportion (5.6%) of bachelor's degree holders in nursing. Conversely, an Ethiopian study showed a higher proportion of about 74% of nurses having a bachelor's degree in nursing,[15] compared to 15% in our study. A reason for this disparity could be because that study involved multiple EDs in hospitals located in Adis Ababa, the capital city of Ethiopia, where a relatively high number of nursing degree holders would be expected. On the other hand, ours was conducted in a teaching hospital that was only recently upgraded from a regional hospital. Additionally, in Ghana, the establishment and accreditation of degree awarding institutions to grant nursing degrees by the Nurses and Midwives Council is a relatively recent development.[17,18] Only 2 out of the 56 nurses in our study had received specialty training in emergency medicine. This low level of specialist nurses

may impact the quality of emergency care delivered by the ED staff, including triaging of patients.[19]

Among the doctors, more than 70% of the participants were house officers. This may suggest that junior doctors were more directly involved in the care of ED patients as compared to senior doctors. It is worth noting that, convenient sampling was used in this study and could account for the non-proportionate representation of senior doctors. Also, like in all teaching hospitals, junior doctors are in the majority, and work under the supervision of the senior doctors. Nonetheless, this finding highlights the need for junior doctors to have good triage capabilities.[20] The low attendance of triage workshop could be attributable to the short work experience of a significant proportion of the ED staff. In addition, some units of the ED practiced triage more frequently than others; thus, workers in such units were more likely to attend triage workshops. That notwithstanding, an understanding of triaging among all health workers involved in emergency care is essential for better care delivery and decision making.[21]

Using the criteria referenced earlier, 77% of participants had at least moderate overall knowledge about triage. This was in contrast with findings from studies in Pakistan and Tanzania where less than half of participants were knowledgeable about triage.[10,11] In terms of knowledge about waiting time associated with each colour code, about 75% of participants had at least moderate knowledge. These findings were in line with results from a study conducted in the Northern region of Ghana where more than half of participants were knowledgeable about the same parameters.[19] It is however, noteworthy that the proportion of participants with at least moderate overall triage knowledge in our study was significantly higher than that in the aforementioned study (77% versus 63%). The observed increase in triage knowledge could be attributed to better education on triaging concepts in the curriculum of health trainees.[17,18] Another possible explanation could be effective on-the-job training on triage.

Interestingly, we observed that there was no significant correlation between ED work experience, attendance of triage workshop and nurses' highest level of education versus either overall triage knowledge or triage practice skill. This finding was inconsistent with several studies.[15,22] We however, observed a weak positive correlation between general work experience and overall triage knowledge but not with triage skill practice. Even though we could not clearly explain the above incongruent findings, we noted that the frequency of triaging was associated with both overall triage knowledge and triage practice skill. This suggests that actual practice of triaging, not just working in the ED, improved triage knowledge and practice skill. This is consistent with an observational study involving 319 emergency nurses which noted a significant correlation between nurses perceived competency level and frequency in which they performed the clinical skills.[23]

About 59% of participants had at least moderate triage practice skill. This was comparable to findings from other studies[15,16] but was in contrast to a multi-hospital study conducted by Aloyce et al. in Tanzania.[11] This disparity could possibly be due to the fact that only the Tanzanian study employed the use of an observational checklist and triage equipment audit record in addition to the structured questionnaire. Therefore, triage skill was assessed differently in that study.

It was also important to assess the participants' skill at assigning the correct triage categories to cases since inappropriate triaging is associated with increased cost and unnecessary delays for patients who require prompt care.[24] In this study, about 33% over-triaged and 8% of participants under-triaged the clinical cases provided. While the value for over-triaged cases fell within the limit of 25-35% prescribed by the American College of Surgeons,[25] the under-triaged cases were slightly more than the 5% cut-off. In spite of this, these results were significantly better than the findings from a previous study in Ghana by Gyedu et al among senior house officers and final year medical students, where 49% of the senior house officers over-triaged and 53% under-triaged the scenarios provided.[26] A number of reasons could account for the seemingly better performance by participants in our study. First, there were significant differences in the composition of our study population. Unlike the Gyedu et al study which focused on senior house officers and senior medical students, our study population included both doctors and nurses with varied experiences. Secondly, only three case vignettes were given to participants in our study to triage, compared to 25 used in the aforementioned study.

Majority of participants agreed about the importance of triage in reducing waiting times, the need for documentation and first aid measures, and the improved communication that the SATS allows. Majority also disregarded the notion that the SATS is time-consuming. Furthermore, about 99% of participants agreed that more triage workshops should be organised. This generally aligned with the findings in previous studies.[19,27,28] However, only about 42% of participants believed that the SATS was consistent and not user dependent. This unfavourable sentiment was also highlighted in a Ugandan study among both doctors and nurses[28], and could be possibly due to poor training on the SATS, causing incorrect triaging which subsequently may lead to delayed care and poorer outcomes. It is therefore important for more effective training on triage to prevent this from happening.

Limitations

This was a single-centre study with a small study population and so results may not be generalisable. Secondly, only three case vignettes were used in assessing triage capabilities of participants. Even though, the vignettes were not externally validated in this study, they were developed from validated questionnaires used in published studies on the topic.

Thirdly, not all ED staff participated in the study. This could mean that there was disproportionate representation of participants, especially since the study did not use a probability sampling method. These notwithstanding, data from the study was put through standard analysis and therefore the findings are reliable.

Conclusion

Despite the generally young and relatively inexperienced ED staff, majority had good knowledge of triaging and at least moderate triage skills. The positive relationship between frequency of triaging and the knowledge and practice of triaging attested to the common notion that practice indeed makes perfect. Emergency department doctors should be encouraged to participate in training sessions on triage. Regular in-service training and on-the-job practice may also result in further improvement in this skill. And finally, continued education on triaging concepts in medical and nursing school curricula will further promote the understanding by the doctors who are important stakeholders in patient care in the ED.

Acknowledgement

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