



IMPLEMENTATION OF TRIAGE DURING THE COVID PANDEMIC AT SHALAMAR HOSPITAL LAHORE, PAKISTAN

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Abstract

Objective:

To measure the extent of triage policies being implemented by the selected hospital staff for sorting the patients at the first point of reporting.

Methodology:

It is a descriptive cross-sectional study, it will be conducted online in the form of a questionnaire which will be circulated by using different networking sites i.e. Gmail and Whatsapp to healthcare workers of Shalamar Hospital working in the ER department. Data will be collected from Medical Officers, House Officers and from Post Graduate Residents of Shalamar Hospital Lahore. All other medical staff who are not directly related to the sorting of triage in COVID patients i.e. nurses, paramedics, senior consultants, general practitioners, doctors of other specialities are not included in the study. The questions will be focused on the implementation and problems faced during implementation of triage during the pandemic. The data will be kept in password protected computers of investigators only. The official statistician of SMDC will be requested to analyze the data. The data will be entered and analyzed on SPSS v.19.

Statistical analysis:

We have used IBM spss 21 for data analysis. Descriptive statistics were carried out on data with mean \pm SD and frequency trends noted. Frequency trends were noted for various variables relating to triage implementation e.g. triage implementation and reduction of burden on scarce sources. Percentage was calculated for responses by HCWs to our questionnaire. Associations were measured by chi square test which yielded P value.

Results:

Mean age of healthcare workers was 22.41. Demographically 49% males and 51% females. 18% MOs and 31% PGRs were involved. Doctors who agreed to the question that triage was helpful were

96%, increased surge capacity has helped implementation of triage were 71%, telephonic triage was helpful in reducing nosocomial spread of disease were 81%, doctors agreed on treating patients on survival probability if resources are running out were 77% and 63% doctors agreed on this that Shalamar Hospital is following WHO provided criteria of triage.

Conclusion:

This study has evaluated the protocols and implementation of triage during COVID-19 pandemic in Shalamar Medical Hospital. It has also assessed telephonic based screening and triage services in the health care system with regard to COVID-19 pandemic.

Effective and intensive screening by the history of contact risk, symptoms and careful use of hospital resources based on patient's survival probability are significant strategies in preventing transmission of disease and saving lives of patients. Telephone based medical services have the potential to greatly improve triage efficiency and prevent unnecessary visits to the hospital.

Keywords: Triage, COVID-19, Pandemic

INTRODUCTION

According to the Oxford Dictionary¹, the word Triage (from the French word *Trier*) is the "assignment of degrees of urgency to wounds or illness to decide the order of treatment of a large number of patients or casualties." Triage², ideally consists of Sorting, Prioritizing, Allocating Resources/Rationing (only used during Disaster Management, not before)

Its three categories are primary, secondary, and tertiary triage which are practical manifestations of the aforementioned steps, primary being on the field, secondary when the patient is rushed to the Emergency Room(ER), & Tertiary when the patient leaves or is shifted from the ER to the Intensive Care Unit(ICU) or Operation Room(OR). In times of scarce resources, the physician is plagued with the problem of "Under-" or "Over-" triage, resulting in untimely management of seriously ill patients or over-prioritizing of situations that don't call for it, respectively.

In a country such as Pakistan with the 5th largest population in the world, and only 0.71 ICU beds per 100,000 people & 1473 ventilators³, the significance of triage has been magnified thousand fold. With patients outnumbering the ER beds available, to ventilators running short even at Private Hospitals, & the masses having to acquire oxygen cylinders for personal use, the COVID crisis has exacerbated the need for ethical decision-making at hospitals, at all times.

Our Centre of Biomedical Ethics (CBEC)⁴ has set some rules & regulations, inspired by international perspectives⁵⁻⁸, to help front-line workers navigate the current pandemic - common to all are, the policy of "first come, first served" shall not be exercised, ICU beds shall be allocated to COVID & non-COVID patients indiscriminately, the principles of Equity, Justice, Beneficence/Non-Maleficence, & Instrumental Value shall be foremost in the decision-making process.

Decisions may have to be taken keeping in mind the age of the patient, the probability of survival, & the expected outcome; i.e medical experience suggests that the elderly have poorer outcomes than their younger counterparts, patients with comorbidities have lesser chances of survival. Lastly, irretrievable decisions such as discontinuing end-of-life support shall not be thrust on a single doctor, rather a triage team of doctors unrelated to the given patient's treatment shall be the deciding factor, ideally maintaining complete transparency with the patients & their families.

In accordance with such guidelines, telemedicine⁹ & adapted triage algorithms¹⁰ have been proposed. They include a telephonic & an "in-office" triage, which help evaluating the general complaints of the patient, and any practices (such as traveling) which may increase the risk of contracting COVID. Moreover, a second in-person route helps to identify symptoms which the patient may have developed just before the doctor's visit, helping categorise all patients on the basis of clinical appearance, vital signs assessment, associated comorbidities, and thereby deferring them to Aerosolized Infection Isolation Rooms, for chest X-ray/CT, or even discharging straightaway for home management.

Up until recently, paramedics were handling primary triage in the field. However, given the need of the hour, Emergency Departments all over Pakistan are training specialized surgical & medical officers to constitute their respective Trauma Teams.¹¹

In order to provide effective health care to COVID patients in this pandemic, there is need to make sure that the triage policy provided is being followed efficiently. Only this can provide up-to-the-mark health care to the maximum number of people, otherwise there are high chances of the management order collapsing

This research aims to explore what triage policies are being followed at Shalamar Hospital Lahore, how it has helped smooth out the patient influx, any limitations observed in its application, and what suitable modifications have been adopted by the hospital for that purpose. Our study is going to add valuable statistical information regarding the implementation of triage policies being followed by a tertiary level private hospital within our setting, especially with respect to a pandemic. To measure the extent of triage policies being implemented by the selected hospital staff for sorting the patients at the first point of reporting. Is implementation of triage helpful in sorting out treatment priority of patients during the COVID pandemic?

LITERATURE REVIEW

Coronavirus 2019, an acute respiratory tract infection with variable clinical severity became a clinical challenge all around the world after the outbreak in Wuhan, China. A study was performed in songklanagarind hospital which is a 900 bed referred control in southern thailand. Nasopharyngeal swab specimens between 1st of march and 31st of may 2020 were enrolled, research was conducted between 334 patients 190 were female. Median age of study population was 35 years. Number of regular hospital entrances were limited for screening and triage care . High risk of covid -19 contact patients were redirected to follow relined routes to reduce patient crowding in specific areas. Screening questions and body temperature check ups were performed at hospital entry points. Final conclusion says effective and intensive screening along with predetermined patients journey to lessen their time in hospital is a significant strategy for reducing intrahospital transmission of covid -19 and other future air borne infection.¹³

Another research was done to assess the effect of implementation of covid -19 triage system in reducing nosocomial transmission of covid -19 during the test period - 662 patients were tested positive for SARS covid -19 during the admission to hospital a majority (86.5%) admitted with clinical features of covid-19 and tested positive within 7 days of admission (community acquired covid_19), remaining 87% patients were tested positive for covid -19 following more than seven days in hospital and therefore fit the criteria for probable or definite hospital associated covid-19 transmission. This study concludes while incidence of covid 19 remains low, clinical teams and bed management operations must develop locally appropriate systems to protect susceptible patients during admission to hospital using clinical expertise and point of care testing to rapidly identify and cohort patients with covid -19.¹⁴

Another Research conducted in 2019 suggested patient self-triage tools integrated into electronic health record systems have the potential to greatly improve triage efficiency and prevent unnecessary visits during the COVID-19 pandemic. This self-triage and self-scheduling tool was designed and implemented in under 2 weeks. During the first 16 days of use, it was completed 1129 times by 950 unique patients. Of completed sessions, 315 (28%) were by asymptomatic patients, and 814 (72%) were by symptomatic patients. Symptomatic patient triage dispositions were as follows: 193 emergent (24%), 193 urgent (24%), 99 nonurgent (12%), 329 self-care (40%). Sensitivity for detecting emergency-level care was 87.5% (95% CI 61.7-98.5%). The study concluded patient self-triage tools integrated into electronic health record systems have the potential to greatly improve triage efficiency and prevent unnecessary visits during the COVID-19 pandemic.¹⁵

Another study was done according to which effective allocation of resources has been a true challenge for hospitals during pandemic. The results of a study conducted to assess the effectiveness of telephone based screening in triage in covid -19 outbreak showed that before establishing a screening and triage system for patients in comprehensive healthcare centers, all patients were referred directly

to the hospital, while after the implementation of the program, a significant reduction in hospital visits was observed and a large number of patients undertook the care and triage services in comprehensive healthcare centers. A descriptive cross-sectional study conducted in two stages on 1,406,635 households during March/April 2020 in Ardabil province for screening and early detection of Covid-19 disease. In the first stage, conducted by trained healthcare providers through telephone, individuals suspected of Covid-19 were identified. In the second stage, the individuals were referred to the second level of service in comprehensive healthcare centers (16- or 24-h centers) for clinical evaluation by a physician. The results showed that before establishing a screening and triage system for patients in comprehensive healthcare centers, all patients were referred directly to the hospital, while after the implementation of the program, a significant reduction in hospital visits was observed.¹⁶

In a study conducted in Pakistan for assessing the role of triage in control and prevention of covid 19 a triage process for COVID-19 was established to guide patients through a 4-level triage process during their hospital visits. The diagnosis of COVID-19 was based on positive COVID-19 nucleic acid testing according to the unified triage standards of the Guidelines for the Diagnosis and Treatment of Novel Coronavirus Pneumonia (Trial version 4), 4 issued by the National Health Commission of the People's Republic of China. Exits of the hospital were closed except for the one-way entrances for the patients and the designated staff path. The triage level 1 prescreening station was placed at the entrance of the main lobby of the outpatient clinic; the triage level 2 pre screening station was placed in the outpatient clinic for general fever; the triage level 3 pre screening was performed by physicians in different departmental clinics; and the triage level 4 prescreening station for COVID-19 was located in the outpatient clinic of the Department of Infectious Disease on Tangfang Street, the triage procedure effectively screened the patients and identified the high-risk population.¹⁷

METHODOLOGY

This study adopts a quantitative, descriptive cross-sectional design, aiming to capture a snapshot of data within the Emergency Room (ER) department of Shalamar Hospital.

The research takes place exclusively within the confines of the ER department of Shalamar Hospital, chosen for its relevance to the study's objectives and accessibility to the target population.

The study is slated to span a period of two months from the date of Institutional Review Board (IRB) approval, ensuring a sufficient timeframe for data collection and analysis.

Utilizing a purposive sampling technique, the study aims to recruit a sample of 100 participants, exceeding the minimum requirement of 30 for quantitative studies. This sample size is deemed adequate to achieve the study's objectives.

The sampling strategy employed is purposive, a deliberate choice to target specific individuals—medical officers, house officers, and post-graduate residents—directly involved in triage decisions for COVID patients within the ER department.

The study focuses on first-line doctors in the ER department who are directly exposed to COVID patients and play a role in sorting decisions. This group, ideally totaling 100 participants, is critical to understanding the dynamics of triage during the pandemic.

Inclusion Criteria: Inclusion criteria encompass medical officers, house officers, and post-graduate residents assigned to the ER department, emphasizing those actively involved in sorting decisions for COVID patients.

Exclusion Criteria: Conversely, individuals not directly involved in COVID triage, such as nurses, paramedics, general practitioners, senior consultants, and doctors from other specialties, are excluded from participation to maintain the study's focus.

Data collection relies on a self-designed questionnaire hosted on Google Docs, chosen for its convenience and ease of dissemination. This method ensures standardized data collection and facilitates online tracking of responses.

The data collection process involves approaching eligible participants in the ER department, explaining the research objectives, and providing them with the questionnaire. Additionally, the questionnaire is distributed via WhatsApp groups and Gmail to maximize outreach and response rates.

Upon collection, the data will undergo analysis using the Chi-square test on five predetermined questions. Significant results will be further explored, while insignificant findings will be duly noted for reference.

Ethical considerations are paramount throughout the study, with measures in place to ensure participant confidentiality and data integrity. Obtaining IRB approval prior to commencement underscores the commitment to upholding ethical standards in research conduct.

RESULTS

Our study was carried out in Shalamar Hospital, Lahore. In the study, Healthcare Workers(HCW's) included were of mean age 22.41. The demographic data shows that there were 49% males, & 51% females out of which 51% were House Officers(HO's), 18% were Medical Officers(MO's), & 31% were Post Graduate Residents(PGR's).

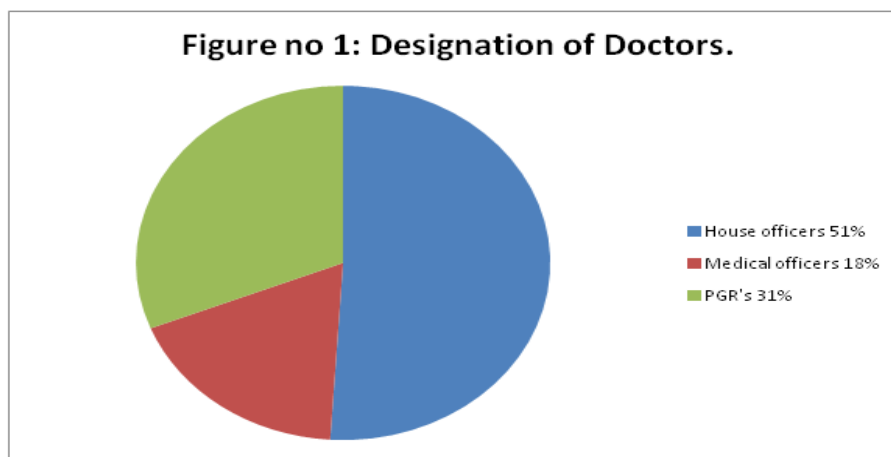


Table 1 shows that 41% doctors disagreed to the question that it was difficult to decide an appropriate treatment for critically ill patients in the ICU during the COVID pandemic. 96% doctors agreed that triage was helpful to them in carrying out sorting decisions during a pandemic. 71% doctors agreed that increased surge capacity(i.e. increased beds, separate COVID wards, dedicated workforce) has helped in the implementation of COVID pandemic triage. 44% doctors agreed that the implementation of triage became difficult during the pandemic due to the ambiguity in differentiating between over- & under-triage. 81% doctors agreed that telephonic triage was helpful to them in reducing the spread of nosocomial disease during the pandemic. 60% doctors agreed that evaluating the accuracy of triage & assessing the causes of mistriage is essential for improving patient safety & the quality of emergency care. 44% doctors agreed that with regard to triage implementation, allocation decisions should be made by an institutional triage team or officer not directly involved in patient care. 72% doctors agreed that Shalamar hospital is properly following triage protocols, specified by the Centre of Biomedical Ethics & Culture (CBEC)

Table 1: Age of Doctors.

Variable	Mean	Standard deviation
Age	22.4100	10.08559

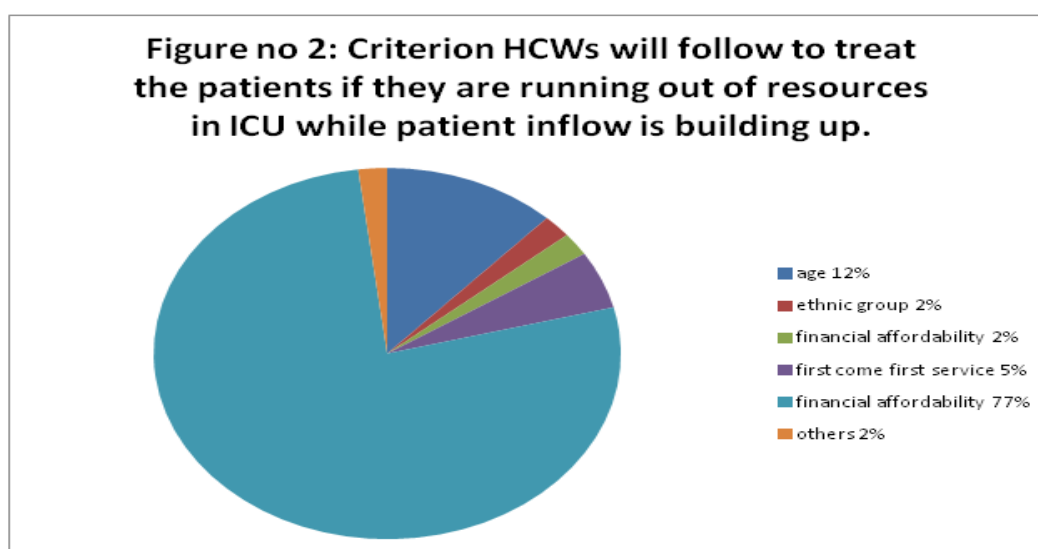
Table 2 shows that 77% doctors agreed to treat patients on their survival probability if they are running out of resources in the ICU while patient inflow is building up. The response to treat patients

according to age, race, ethnicity, first come first serve basis, & financial affordability were insignificant. 63% doctors responded that WHO criteria are followed in Shalamar Hospital.

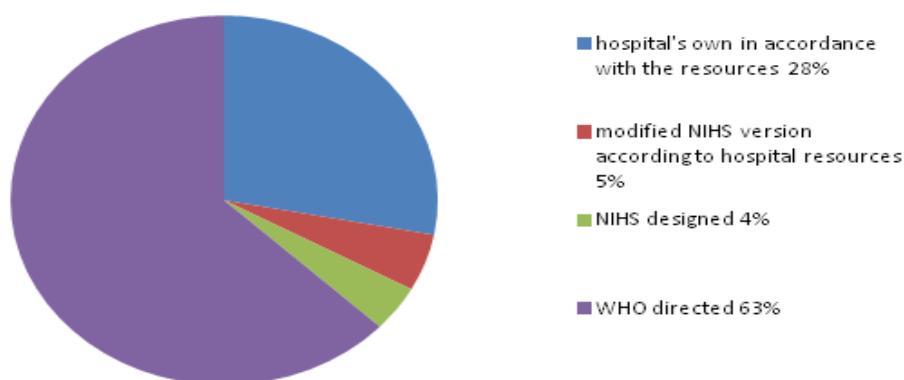
Table 2: Gender of Doctors.

Variables		Percent
Gender	Male	49.0
	Female	51.0

The findings presented in the study shed light on the critical criteria healthcare workers (HCWs) utilize when faced with resource scarcity in the ICU amid escalating patient admissions. Notably, financial affordability emerges as the predominant factor, commanding a substantial 77% of consideration in treatment allocation decisions. This underscores the challenging ethical dilemmas HCWs encounter, where financial constraints may significantly influence patient care choices. Age also emerges as a significant criterion, accounting for 12% of decision-making, suggesting a nuanced balance between medical need and potential life expectancy. Conversely, factors such as ethnic group, first-come-first-serve basis, and other considerations hold comparatively lesser weight, each constituting 2% of the decision-making process. These findings underscore the multifaceted nature of triage decision-making, where ethical, medical, and practical considerations intersect amidst constrained resources and increasing patient demand.



The results depicted in Figure 3 delineate the triage protocol implemented specifically for COVID-19 cases within Shalamar Hospital. The data reveals a predominant reliance on guidelines established by the World Health Organization (WHO), comprising a significant 63% of the adopted protocol. This adherence underscores the hospital's commitment to aligning its practices with globally recognized standards, ensuring consistency and coherence in patient management amidst the pandemic. Additionally, a notable proportion of 28% indicates the development of a triage protocol tailored to the hospital's unique context and resource availability, reflecting a pragmatic approach to address local exigencies. Moreover, a smaller percentage of 5% indicates the adaptation of the Hospital Incident Command System (HHS) protocol to suit the hospital's resources, while 4% signifies the utilization of a protocol designed by the National Institute of Health Sciences (NIHS). These findings elucidate the diverse strategies employed by Shalamar Hospital to navigate the complexities of triage decision-making in the face of the COVID-19 crisis, underscoring a blend of global guidance, local adaptation, and institutional innovation.

Figure no 3: The triage protocol for COVID in Shalamar hospital.

In Table 3, Chi Square results are shown which were run on some questions. The result for the question that whether triage has helped doctors in decreasing the length of stay of patients in the ER or not was significant, & p value calculated was .047. To enact the triage plan, a triage decision support protocol, infrastructure, legal & regulatory protections, & training required in a tertiary care hospital was not significant, & the p value calculated was .775. The results show that availability of resources being the crucial part in the implementation of disaster triage was not significant & the p value calculated was .808. Doctors' responses show that the introduction of telephonic triage has not helped the doctors to reduce workload, the p value calculated is .119, which is insignificant.

Table 3: Maximum responses of doctors on each question.

Questions	Maximum responses (%)
Triage protocols have helped medical personnel to fairly distribute the scarce resources available during the pandemic . (3)	39% agreed
It is difficult to decide an appropriate treatment for critically ill patients in ICU during the COVID pandemic triage.(3)	30% agreed
The implementation of triage became difficult during the pandemic due to ambiguity in differentiating between over triage & under triage. (1)	41% Neutral
The availability of resources is the crucial part in the implementation of disaster triage?(1)	34% Agreed
Introduction of telephonic triage has helped the medical practitioners by reducing the workload during disaster triage .(2)	34% Neutral
Evaluating the accuracy of triage and assessing the causes of mistriage is essential for improving patient safety and the quality of emergency care.(5)	33% Agreed
With regard to triage implementation, allocation decisions should be made by an institutional triage team or officer not directly involved in patient care.(5)	27% Agreed
To enact the triage plan, a triage decision support protocol, infrastructure, processes, legal and regulatory protections, and training are required, all of which are currently lacking in most institutions and regions.(4)	34% Agreed

Table 4 presents the responses of healthcare workers (HCWs) to key questions regarding the efficacy and implementation of triage protocols during the COVID-19 pandemic. A resounding 96% of HCWs affirmed the utility of triage in facilitating sorting decisions amidst the pandemic, highlighting its instrumental role in guiding patient care. However, concerning the impact of increased surge capacity on pandemic triage implementation, a majority of 71% of respondents expressed skepticism, suggesting that despite augmented resources such as additional beds and dedicated workforce, challenges persisted in effectively executing triage measures. In contrast, telephonic triage emerged as a valuable tool in mitigating the spread of nosocomial infections, with 81% of HCWs acknowledging its effectiveness in reducing disease transmission within healthcare settings. Moreover, a substantial 85% of respondents affirmed that triage contributed to diminishing patient stay duration in the Emergency Room (ER), indicative of its positive impact on streamlining healthcare delivery. However, while the majority of HCWs perceived tertiary care hospitals as adhering to triage protocols outlined by the National Institute of Health and Sciences (NIHS), a noteworthy 28% expressed reservations, suggesting areas for potential improvement or standardization in protocol implementation across healthcare institutions.

Table 4: Questions response percentages.

Questions		Percentage
Is triage helpful to HCWs in carrying out sorting decisions during a pandemic?(3)	Yes	96.0
	no	4.0
Did the increased surge capacity (i.e increased beds, separate Covid wards, dedicated workforce) help in the implementation of Covid pandemic triage?(4)	maybe	17.0
	yes	12.0
	no	71.0
Was the telephonic triage helpful in reducing the spread of nosocomial(hospital acquired) disease during the pandemic? (2)	yes	81.0
	no	19.0
Does triage help in decreasing the length of stay of patients in ER?(5)	yes	85.0
	no	15.0
Are tertiary care hospitals properly following triage protocols, specified by the National institute of Health and Sciences?(6)	yes	72.0
	no	28.0

DISCUSSION

Triage is defined as the sorting of and allocation of treatment according to a system of priorities designed to maximize the number of survivors or according to the urgency of need for their care.²

Triage is the course of action which we take when we have exhausted our ability to expand our critical care resources that is to surge. Surge capacity includes the key features of staff, space, supplies and systems with communication as a critical feature .

The current pandemic of the novel Coronavirus 2019 has led to the substantial increase in demands in acute and critical care services in hospitals around the world. The clinical demands will exceed the ability to provide one or more crucial resources essential to deliver basic critical care therefore necessitating decisions regarding the reallocation of resources .This potential requires preparation of a triage system to best allocate the critical care resources to maximize benefit for the greatest number of people . Importantly, this triage system should only be deployed as a last resort and implemented as resources become limited and after all attempts to surge, move patients or shift resources from regions with greater availability have been made

When implemented, triage must be applied to all current and new patients presenting with critical illness regardless of the diagnosis of COVID 19 or other illness, while maintaining underlying ethical principles of social justice, beneficence and nonmaleficence, respect for people and their dignity, veracity and fidelity to one another in health care systems. To enact this triage plan, a triage decision protocol, infrastructure, processes, legal and regulatory protections and training are required.

In our study, 41 % doctors disagreed that it was difficult to decide an appropriate treatment for critically ill patients in ICU during the COVID pandemic triage. 96% doctors agreed that triage was helpful to them in carrying out sorting decisions during a pandemic. 71 % doctors agreed that increased surge capacity (i.e increased beds, separate Covid wards, dedicated workforce) has helped in the implementation of Covid pandemic triage. 44% doctors agreed that the implementation of triage became difficult during the pandemic due to ambiguity in differentiating between over triage & under triage. 81 % doctors agreed that telephonic triage was helpful to them in reducing the spread of nosocomial disease during the pandemic. 60% doctors agreed that evaluating the accuracy of triage and assessing the causes of mistriage is essential for improving patient safety and the quality of emergency care. 44% doctors agreed that with regard to triage implementation, allocation decisions should be made by an institutional triage team or officer not directly involved in patient care. 72% doctors agreed that the tertiary care hospital is properly following triage protocols, specified by the Centre of Biomedical Ethics & Culture.⁴

77% doctors agreed to treat patients on their survival probability if they are running out of resources in ICU while patient inflow is building up. The responses to treat patients according to their age, ethnic group, first come first base and financial affordability was not significant. 6 hospital doctors responded that WHO directed criteria is followed in Shalamar Hospital.

As in comparison to North American hospitals where triage criteria were benefit, need, age, conservation of resources and lottery. Among the policies that specify the triage team's composition, all require or recommend a physician member, a nurse, a chaplain or a respiratory therapist. 50% of all policies require or recommend that those making triage decisions not be involved in direct critical care but only 7.7% require that their decisions be blinded to ethically irrelevant considerations

Guidelines have the potential to reduce the burden on those who need to determine which patient gets access to a scarce resource .In order to claim moral legitimacy ,the prioritization process must be transparent, inclusive, evidence based and revisable in the light of new information or arguments.⁶

The task force for mass critical care recommends that in the event of an incident with mass critical care casualties, all hospitals within a defined geographic or administrative region, health authority or health care coalition implement a uniform triage process should critical care resources become scarce.³

This framework can provide the essential tools to rapidly assist communities to establish the infrastructure necessary to equitably meet the clinical needs of the greatest number of patients with Covid 19 during a time of scarce resources.

CONCLUSION

In conclusion, our study has illuminated the importance of triage during pandemic times among health care workers with special considerations for those working in departments responsible for caring for COVID 19 patients. However, the absence of an effective governmental plan along with a poor health infrastructure renders developing countries vulnerable to disastrous results. Triage was helpful for doctors to decide which patients require critical care and which do not. The triage was provided with the rules of ethics and justice without discrimination of ethnicity and all other social factor. Evaluating the accuracy of triage and assessing the causes of mistriage is essential for improving patient safety and the quality of emergency care. HCWs should treat patients on their survival probability if they are running out of resources while patient inflow is building up.

LIMITATIONS

The small sample size of study is a limitation, also there is the fact that the information was collected online due to lockdown restrictions at the time.

The precision of the study might be low because of the study's small sample size and data collection procedure, which was done through electronic questionnaire due to lockdown restrictions. The sample of health care workers was not diverse enough, depending on their job description and duty hours that might influence the credibility. Patient factors were an obstacle in decision making of triage. And also many HCWs were not aware of which triage policy is implemented in Pakistan.

RECOMMENDATIONS

The triage system must be implemented according to the ethical rules and needs of the patients. The ethics such as social justice, beneficence and nonmaleficence. The patients who do not initially receive care resources should be assured of being provided the best supportive care possible and re-evaluated. Crisis triage should be designed in a way to respect the principles of utility and fairness, population wide. Doctors should be provided with proper guidelines as to which triage policy is implemented in Pakistan. Online portals and telephonic triage should be available so that patients can have easy access to their doctors. Patient education through all media resources should be carried out to assure the minimum number of patients affecting decision making in the process of triage.

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