Assessment of sorting out in the casualty -emergency and accidents department Omdurman teaching hospital (OTH-EA)

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Abstract: Sorting out of sick people in casualty means rating/grouping at triage area rely on their illness and degree of trauma mild, moderate, severe or very severe for handling, therapy, and probability of survival. The objective of this study was to assess, the effectiveness of the system in the casualty concerning rating/grouping of sick people attending triage region.

Methods: It was descriptive-analytical study in EA department OTH May 2008 includes 700 participants by simple random sampling. All cases attend the EA department OTH seeking health care and agreed to be included in this study. All cases attending the EA department in OTH and referred to a specialized hospital or center should be excluded. Data were collected using pre-tested questionnaires, interviews with medical personnel and participants, review of primary registration and files of short stay in the EA department OTH at arrival time and checklist form of medical devices or gear.

Results: In this study 700 patients were seen most cases were cold (mild, not urgent) (396pts) 56.6 %, the hot about 43.4% both are classified into groups or categories according to their degree of illness or injury as follows: severely ill or injured (emergent)(120pts) 17.1%, moderately (urgent)(184 pts) 26.3% . The correctly categorized cases were (599) 85.6% and miss categorized cases were (101) 14.4%, although the sisters did not perform or elicit clinical examination and did not start the first aid or primary survey in addition to there is no medical equipment and surgical instruments.

Conclusion: Sorting of sick people into categories depending upon the degree of sickness or injury in EA department OTH was done only by sisters despite the unavailability of basic elements and equipment, the correctly categorized cases were (599) 85.6% and miss categorized cases were (101) 14.4%. The cold cases better to be treated in the health centers to overcome the accumulation in the casualty for best medical services particularly for emergent and urgent cases.

Keywords: Sorting out; Triage; Omdurman Teaching Hospital; Emergency and Accident; Categorization; Green; Yellow; Red; Black; Emergency; Urgency

Introduction and literature review

Sorting out in casualty is a categorization / classification of sick people at area of sorting out in casualty according to their illness, injury, urgency of management and probability of survival (1) Triage = French =sorting (sorting out) from French verb trier=to sort.

The illness, injuries or disasters were caused either by nature or man-made disasters. Triage is an essential juncture of military medicine only western front in the great war 1914. When the enormous causalities from the western front battle of 1914 and afterward overwhelmed the military casualty collect and clearing apparatus the Royal Army Medical Corps (RAMC) was required to evolve condition and treatment received. Originally the procedure was used by the military to sort soldiers wounded in
battle for the aim of establishing treatment precedence. Injured soldiers were sorted by severity of their injuries ranging from those that were severely injured and deemed not salvageable, to those who needed immediate care, to those that could safely wait to be treated. The overall goal of sorting was to return as many soldiers to the battlefield as quickly as possible. Emergency departments (EDs) recognized they needed a method to sort sick people and identify those needing immediate care. Physicians and nurses who had used the triage procedure effectively in the military first introduced triage into civilian EDs. The registered nurse (RN) determines patient acuity based on a brief triage assessment triages each participant and determines the priority of care based on physical, developmental and psychosocial needs as well as factors influencing access to health care and participant flow through the emergency care system. (2) It is supported by the emergency nurse association (ENA) standards of emergency nursing practice. The emergency nurse Triage is to be performed by an experienced ED nurse who has demonstrated competency in the triage role. The goal is to rapidly gather "sufficient" information to determine triage acuity. (3) Though it is recommended that comprehensive triage is to be completed in 2 to 5 minutes, triaging paediatrics and elderly patients has been found to take more time than other patients. The level of detail necessary for comprehensive triage can be difficult for the experienced nurse to complete in a short timeframe such as 2 to 5 minutes. (4) Triage tags are often used to document patients. The tags come in variety of different designs. Different colours are used to represent priority of injury or illness as in USA. Green: minimal or minor illness or injury (walking wounded) these patients can make their own way to the casualty collection point/treatment sector. Yellow: (delayed), usually need assistance making their way to the treatment sector. They need required attention but are not immediately life threatening. Red: immediately /critically ill or injured with treatable life-threatening (uncontrollable bleeding, difficulty of breathing, decreased mental status.) They will be treated and transported from the scene first. Black expectant (morgue) is used for dead and unsalvageable patients (cardiac arrest) these victims will be removed from the scene but only after all the living /salvageable patients. (5) In England they used labels; Red = will die in a few minutes if no treatment, Yellow = will die in two hours if no treatment, Green = can wait and Blue =dead. (6) The victim’s survival depends on the effectiveness of well-trained personnel, security availability of surgical equipment and supplies, medications, area of triage and timelines of these activities. (7) The medical staffs of sorting patients consist of physicians or surgeons with paramedics (nurse). (1) The introduction of triage systems into emergency departments in the 1960s, 1970s, and 1980s had several clear benefits for patients and for the department for instance, each patient is greeted by an experienced triage nurse, a patient who cannot wait to be seen is immediately identified, first aid is provided, and registered nurse is available to meet the emotional needs of the patient and family. (8) In 2001, the emergency nurse association surveyed U.S. emergency departments about the type of triage acuity scale used by their department. (9) In 2003, the national centre for health statistics found that 47%of EDs used three-level triage systems, while 20%used four-level and 20% used five-level systems.(10) The commonly used three-level scale includes these acuity levels; emergent, urgent and nonurgent.(3) Triage action at the disaster site includes identifying victims, assessing injuries, assigning priorities for care, and stabilizing and transporting victims to centres for further care. A triage area is the area where victims are placed immediately after rescue and where they undergo a physical examination in order to assign priority for treatment and transportation to hospitals should be the responsibility of a physician or, alternatively, a nurse or paramedic with experience in mass casualty management and with authority to coordinate emergency care activities at the disaster site and depends on the magnitude of the disaster and the number of victims, one or several, victim collection centre or triage areas are indicated at the disaster site. Emergency medical care in these areas is aimed at stabilizing the patient and providing basic care to ensure survival. Usually, stabilization implies clearing the respiratory tract, controlling bleeding, and maintaining circulation. The triage officer has an important role. After a rapid medical examination, he assesses the victims and assigns them the respective priority. The triage nurse is expected to obtain a complete history, take vital signs and complete department-specific screening questions. Enough information must be obtained to make the correct triage decision. Under-triage in the
eran of ED overcrowding can compromise patient safety. (11) Patients considered urgent are those that require prompt care but can wait up to several hours if necessary. Nonurgent patients have conditions that need attention, but time is not a critical factor. Rapid, accurate triage of patients is key to successful emergency services outcomes. Under categorization (under triage) leaves the patient at risk for deterioration while waiting. Initial overcrowcategorization (over triage) uses scarce resources, limiting availability of an open ED bed for another patient who may require immediate care therefor the initial triage categorization by the triage nurse must be as accurate as possible. Accurate triage categorization can only be accomplished using a reliable and valid triage acuity system in which all ED nurses have been adequately trained. The average waiting time for patients to be seen by an emergency physician in 2001 was 49 minutes, which represented an increase of 11 minutes from 1997. (12) The nursing shortage is another factor that has impacted emergency department overcrowding. Clearly a busy emergency department can lead to delays in care. (13) The causes and effects of ED overcrowding are complex and difficult to define, and researchers continue to develop metrics to measure them. (14) Many models identify increasing patient acuity as a major factor in ED overcrowding, and in some studies researchers have used triage ratings to represent ED patient acuity. (15) Another research; Emergency Services in Malta Casualty and Emergency Department was found all persons involved in the running of such a service are highly trained. This includes the ambulance personnel, radiographers, nurses and doctors. At a casualty department one must not forget the reception, porter, and cleaning staff whose support, although not so obvious, is essential. The appropriate use of ED by patients reduces the number of patients and gives enough time for real cases. (16) Another method for grouping patients according to the severity of their condition as category 1: cases that require immediate intervention and resuscitation. which includes conditions that threaten life or may quickly deteriorate. This category requires immediate and aggressive intervention arrest, major trauma, shock etc. Category 2: require emergent care. This includes conditions that have the potential of life threatening. This category requires rapid intervention but can be delegated; chest pain, internal bleeding, acute shortness of breath etc) Category 3: require urgent care. It includes conditions that could potentially progress to becoming a serious problem, requiring emergency intervention; mild or moderate asthma, moderate pain, persistent vomiting etc). Category 4: require less urgent care. It includes conditions relating to patient age, distress or potential for deterioration or complications that could be avoided by intervention; urinary tract infection, post-operative wound infection, upper respiratory tract infection. (17) The system of work in Sudan, the federal ministry of health introduced new system of emergency departments. These patients are sorted out by doctor and experienced sister, into hot include (emergency and urgency cases) and cold cases. This is done according to urgency and gravity of their condition. Emergency such as arrest, major trauma, shock, chest pain, acute shortness of breath, anaphylactic shock internal bleeding, snake bite, scorpion sting, hair dye poisoning, burn etc. Urgency such as moderate pain, mild asthma, skin rash, deep vein thrombosis etc. Cold such as throat pain, heartburn, upper respiratory tract infection etc.

Rationale and Justification; sorting of sick people is an important station in the casualty from which the cases will be selected and categorized depending upon the degree of illness or injury. The degree of survival and outcome of treatment depends on this station. This study was not highlighted in Sudan although it is an international system and of great importance. The general objective is to assess, the effectiveness of the system in the casualty, concerning rating/grouping of the sick people attending the area of triage. The specific objectives were to determine the use of basic devices and gears including, personnel, time of sorting out region, to assess the pathway system, and to determine the aetiological factors behind miss classified cases.

Material and methods

Descriptive analytical study for all sick people, looking for medical services in EA department OTH May 2008, every other day by simple random sampling. 700 participants are involved. Inclusion criteria:

All patients attending the EA department OTH looking for medical services and agreed to be included in this study.

Exclusion criteria:

All patients referred to a specialized hospital or center or disagreed to be included in this study were excluded.
Methods of data collection: Data was collected by the following tools:

- Pre-tested questionnaire
- Interviews with medical personnel and patient
- Review of registration and files of a short stay in the EA department OTH at arrival time. (annex 1)
- Checklist form of medical and surgical equipment and instrument

Recruitment and Training of Field Workers:
The field team consisted of 4 medical doctors. Intensive training for one week was given to the field personnel to ensure the quality of data collection.

Data analysis and management:

Data processing will be carried out at the computer using the SPSS program.

Ethical consideration: Was taken verbally from OTH

Results

Sorting out area: It occupies about 5.5 x 2.75 m (15.125 square meters). It lies just behind the main entrance of the casualty between the cold and hot case clinics. It contains one counter or fixed table, one mobile or portable table, six chairs, 15 stretcher, 4 computers, 2 fans, and tags or labels. Concerning the medical and surgical equipment, the sorting out area is almost having no equipment; which was observed in the type checklist form. Interview with the medical manager and quality control doctor revealed that there is no equipment in sorting out area because the sorting out area is still crowded by a massive number of sick people and using of these equipment resulting in further delay in the sorting out area. On the other hand, the acting personnel in the sorting out area are only nine sisters (two sisters per shift). Only one sister was trained in Malaysia for one year in triage activities and responsibilities. There is technical statistician; otherwise there is no emergency physician, surgeon, doctor or nurse. The responsibility of personnel in sorting out area is to classify the patients into categories according to their degree of illness or injury, and the priority for emergent, urgent and then nonurgent. Groups A&B: emergent with red card or label. Group C: Urgent with yellow card. Group C: Urgent with green card for orthopedic patients only. Nonurgent: "cold cases" patients referred to the doctor after they registered their data after paid money.

The pathway of sorting out area act as following: After categorization of patients the cold cases referred to the doctors acting in cold area, the cold surgical cases referred to the acting surgical unit on duty, the cold urological cases referred to the acting urological unit on duty, the old cases of orthopedic irrespective of the severity were referred to the acting unit of orthopedic on duty, the hot cases (A) referred to room (A), the hot cases (B) referred to room (B), the hot cases (C) referred to room (C) and all newly traumatized cases referred to trauma room (C) as shown in Fig (1).

Fig (1) Pathway of patients from sorting out an area to different parts in the Emergency and Accident Department according to their age, May 2008 – O.T.H

In this study, 700 participants are interviewed and divided into age groups and the highest frequency was found to be in the age group 20-40 years (332 patients) 47.4% of the study population while the least frequency was above 60 years. The males are 391 representing 55.9% whereas the females are 309 representing 44.1%. The patients in the area of triage were evaluated only by sisters who take history without performing clinical examination to categorize and approach the patients’ diagnosis. The sisters usually spend no more than one minute with each patient except with elderly and children who need more time usually more than one minute. Sisters did not start any step of management. 396 patients (56.6%) mild degree (cold), 184 patients (26.3%) moderate degree (hot), and 120 patients
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(17.1 %.) severely ill or injured. The categorization revealed 101 missed categorized cases (14.4%), whereas not missed categorized cases were 599 (85.6%). The missed categorize sick people were determined by the doctors acting in the different parts of the causality, then they were referred to the sorting out area to redistribute to the other specific parts according to the doctor report (history and examination). Different specialty (units: Surgery, Medicine, Orthopedic, Pediatrict Surgery, Chest and Plastic Surgery) were covered by registrars, medical officers, house officers, and nurses for 24 hours. The consultant or head department of each unit is on call if needed. The correlation between degree of illness or injury and categorization of sick people arrived at the sorting out area. The P-value is <0.05 (0.001) which is highly significant as in table (1)

Table (1): Correlation between degree of illness or injury and categorization of patients attending to the sorting out area in the Emergency & Accident Department, May 2008 – O.T.H

<table>
<thead>
<tr>
<th>Category</th>
<th>Degree</th>
<th>mild</th>
<th>#</th>
<th>%</th>
<th>moderate</th>
<th>#</th>
<th>%</th>
<th>sever</th>
<th>#</th>
<th>%</th>
<th>Total</th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miss categorized</td>
<td></td>
<td></td>
<td>74</td>
<td>73.3%</td>
<td>20</td>
<td>19.8%</td>
<td>7</td>
<td>6.9%</td>
<td>101</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not miss categorized</td>
<td></td>
<td></td>
<td>322</td>
<td>53.8%</td>
<td>164</td>
<td>27.4%</td>
<td>113</td>
<td>18.9%</td>
<td>599</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>396</td>
<td>56.6%</td>
<td>184</td>
<td>26.3%</td>
<td>120</td>
<td>17.1%</td>
<td>700</td>
<td>100.0%</td>
<td></td>
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</tbody>
</table>

Discussion

This descriptive-analytical study in OTH-EA division to evaluate the adequacy of the framework in the setback, concerning order of the sick people going to the zone of triage, to decide the work force and essential hardware of dealing with territory and to survey the etiological factors behind miss characterized cases. At the point when the sick people arrived at the dealing with zone, the sisters took just short history to group them as indicated by their degree of illness or injury as follows:

Groups A&B: (emergent) seriously sick or harmed with red card or mark.
Group C: (urgent) somewhat sick or harmed with a yellow card.
Group C: (urgent) somewhat sick or harmed with a green card for orthopedic patients.
Non-urgent: "cold cases" patients alluded to the specialist after they enlisted their information and paid cash.

After categorization of sick people, the cold cases referred to the acting doctors in cold area, the cold surgical cases referred to the acting surgical unit on duty, the cold urological cases referred to the acting urological unit on duty, the old cases of orthopedic irrespective of the severity were referred to the acting unit of orthopedic on duty, the hot cases (A) referred to room (A), the hot cases (B) referred to room (B), the hot cases (C) referred to room (C) and all newly traumatized cases referred to trauma room (C) as shown in Fig(1). The children were referred to special unit of pediatric surgery or urology. It is important useful plan to start the management from sorting out area. This is an excellent idea and plans to categorize the sick people into cold and hot and more specific into severe (emergent), moderate (urgent) and mild (not urgent). This system minimized the accumulation of sick people in one part in the casualty, categorized the patients according to their degree of illness or
injury for definite and specific management. In this system the priority for severely ill or injured to increase the chance of survival and decrease the complications. The drawbacks in this study included, there is no surgeon, emergency nurse or emergency physician. There is no surgical and medical equipment. The working staff (sisters) wasn't trained except only one and they did not perform clinical examination, starting primary survey or first aid. In this study in the area of triage, the sisters used labels or tags (red, yellow, green and blue) to categorize the patients.

In the USA the sick people sorted by emergency nurse (EN) into groups utilizing various marks as pursued; Green demonstrates minor sickness or trauma (strolling injured) these patients can make their own particular manner to the setback assortment point/treatment division. Yellow: postponed, these patients as a rule need help advancing toward the treatment area, they need required consideration however are not promptly hazardous. Red: promptly/fundamentally sick or harmed people with treatable hazardous wounds or disease. (wild dying, trouble of breathing, diminished mental status.) These patients will be dealt with and moved from the scene first. Dark eager (funeral home) is utilized for dead and unsalvageable people (heart failure) these unfortunate casualties will be expelled from the scene however simply after all the living/salvageable patients. (5) While in Britain the sick people named pursued, Red = will kick the bucket in no time flat if no treatment. Yellow = will kick the bucket in two hours if no treatment. Green = can pause. Blue = dead (6)

The working team in the dealing with zone are nine sisters, one of them was prepared in Malaysia for one year in the arranging of patients, beginning with medical aid and essential review while the rest weren't prepared. Concentrate in U.S.A, appeared; triage was performed by accomplished ED nurture who has exhibited competency in the triage job. The objective is to quickly assemble "adequate" data to decide triage keenness (3). The dealing with zone was canvassed by sisters while in U.S.A the therapeutic staffs of arranging patients comprise of doctors or specialists with paramedics (nurture). (1)

The sisters, for the most part, spend close to one minute with every patient aside from old and youngsters who need additional time normally over one minute. A concentrate in U.S.A. indicated triaging pediatric and old patients have been found to take additional time than different patients. The degree of detail fundamental for exhaustive triage can be hard for the accomplished medical attendant to finish in a short time span, for example, 2 to 5 minutes. (4) The sisters didn't perform or inspire physical assessment to sort the sick people were in New Delhi study appeared after a fast-medical assessment, she evaluates the people in question and relegates them the need. (19) A study done in U.S.A, demonstrated the triage nurture is required to acquire a total history, take fundamental signs and complete office explicit screening questions. Enough data must be gotten to settle on the right triage choice. Under- triage in the period of ED congestion can bargain understanding wellbeing. (2) There is no careful or medicinal gear in dealing with territory notwithstanding nonattendance of prescriptions. While in the U.S.A study indicated the injured individual's endurance relies upon the adequacy (well-prepared faculty, security accessibility of careful hardware and supplies, meds, region of triage and courses of events of these exercises) In New Delhi the result of crisis administrations relying upon the triage and especially the arrangement of sick people. (19) In EA division OTH the patient lands in dealing with zone alone (self-alluded) or alluded from another emergency clinic, wellbeing focus or unique centers. The basically sick or harmed patients were brought by emergency vehicles or different autos, at that point the sister begins dealing with as per the need of level of disease or seriousness for further and increasingly cautious and explicit administration. At that point the sick people ought to allude to different units, unique focus or release home. In Australia the patients came to dealing with a territory as pursued alluded by general expert, wellbeing focus, self-alluded, brought by emergency vehicle or others then the patients are seen by the triage medical attendant and characterized into classifications; need one included (revived cases seen promptly, moved to the word or exceptional unit) and generally earnest, need two (semi-critical can pause) and need three (least dire under planned holding up time). The most critical, need two and need three were seen by A&E then observed by senior, moved to the ward or uncommon unit or released home or alluded to other outpatient or unit or others. Pediatric cases are seen by a pediatric specialist then senior pediatricians moved to the ward or uncommon unit or released home or alluded to other outpatient or unit or others. (18) The quantity of miss arranged patients 101 (14.4%) alluded to the way that there is no
hardware, the sisters didn't prepare, and they performed a physical assessment notwithstanding the nonappearance of crisis doctors or specialists.

**Recommendations**

- The triage duty is the liability of emergency doctor, surgeon or general practitioner with trained nurses to take the action timely and precisely.
- Boost the number of personnel in the triage region to work as a multidisciplinary team.
- Get ready the triage with suitable number of up to date medical devices and gears (e.g. stethoscope, sphygmomanometer, laryngoscope, electrocardiography, airway, torch, bag valve mask…etc.) to avoid miscategorization and for the best health outcome.
- Involving house officers and registrars in the area of triage for a period of training approximately two months to improve clinical skills, knowledge, approach and decision making.
- Promote the personnel in the triage to do updating courses in an emergency like basic life support (BLS), advanced cardiovascular life support (ACLS) and advance trauma life support (ATLS) to avoid cumulation of sick people and gain excellent performance.
- Treat all cold cases at the level of health centers unless complicated or difficult to be managed in the health centers to avoid unnecessary cases in sorting out areas.

**Conclusions**

Sorting out of sick people in the triage area was done uniquely by sisters, who took a brief history without clinical physical check-up or starting management. Despite that, the correctly categorized patients are 599 (85.6%) whereas the miss-categorized (101) 14.4%.

**Acknowledgments**

I sincerely acknowledge the co-author; Sara Elsheikh Ahmedana, MBBS Kordofan University Consultant family medicine, specialist diabetes, and COPD management. Special thanks to Prof. Taha Umbeli, MBBS University of Khartoum, Prof. of Obs. & Gynae., Consultant of Community Medicine Omdurman Islamic University for his support and continuous feedback.

**Conflict of interest and financial disclosure:** We have no personal or financial conflicts of interest.

We agree with the submission of this manuscript and declare that we have approved it.

**Ethical Approval:** The study was approved by Sudan Medical Specialization Board

**References**


Appendices

Assessment of Sorting Out in the EA Department - OTH

1/ Personal data:
   1. Age......year  2. Sex: M…. F….
   3. Occupation……
   4. Marital status: married…. single…. divorced…. widow

2/ Time of arrival………………………………………

3/ Starting time of triage …………..

4/ Seen by: 1) doctor… 2)sister… 3) other specify ……

5/Management :
   1. Complaint-C/O ………………………………..
   2.Examination O/E…………………………………………
   3.Diagnosis Δ…………………………………………
   4. Steps have done in management:1. Casualty Room……… 2. Room A………………..
   3.RoomB…………………………. 4.RoomC……………………………

6/ Time of transferring to the other rooms or wards in the casualty or to home………………

7/Patients rating according to the above clinical findings:
   1) severely ill or injured  2) moderate  3) mild  4) dead

8/Patient missed categorized by following them from sorting out an area to other wards in casualty.
   1.Yes  2. No