Case Report

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Transforming Emergency Care: A Case Study of the University of Gondar Comprehensive Specialized Hospital Emergency Department, under a Resource-limited set up

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Key words: Emergency department, system, best practice, teamwork, University of Gondar

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ABSTRACT

Background: *One of the best practices of ED administration is infrastructure design, system establishment, and uninterrupted ongoing everlasting quality improvement planning. ED senior management must plan, prepare, practice, review, analyze, assess, and strategize for unexpected ED events. UoGCSH is the oldest in Ethiopia and the only referral hospital for more than 13 million people from the five-zone northwest Ethiopia with a 950-bed capacity. During the 2020 G.C., a proposal paper was submitted to the college and hospital administration bodies suggesting stepwise quality improvement of the existing emergency service in terms of infrastructure, ultrastructure and logistics. The proposal suggested short-term, mid-term, and long-term quality improvement segments implemented in an institutionally convenient manner.*

Objective: *To describe the transformation of emergency and critical care medical services at the University of Gondar Comprehensive Specialized Hospital from scratch to the current status.*

Method: *A descriptive case study design was applied to narrate critical care service transformation at UoG Comprehensive Specialized Hospital. Since this case study is a data review from gathered secondary data, desk reviews of the emergency department, quality directorate data review, and the annual audit report review, there was no need for IRB approval.*

Result and recommendation: *After a year of renovation, we were able to organize a newly refurbished emergency room with a triage area with adequate reception space, Red resuscitation area with ten beds (considering patient overflow), Orange with 18 beds, Yellow with 10 beds, and floater area, isolation room, decontamination room, ED laboratory, main store, disaster store and piped oxygen system to all beds. We have gone on a long journey to bring those promised practices into demonstrable practice and, finally, replicable prototypic best practices. Even though we went the extra mile to achieve this status, still we remain behind in reaching the demonstrable tip of the iceberg. Standard emergency room workflow implementation enables us to control the day-to-day patient and attendant crowding that impedes the anticipated medical treatment outcome and results in significant dissatisfaction. Despite this achievement, the establishment of trauma centers and high-quality patient care are recommended.*

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1. Introduction

The emergency department (ED) is a uniquely unstable environment where someone faces unscheduled and undifferentiated diseased patients, stressed families, unsettled staff, and inequitable resources. It is the day-to-day responsibility of the leaders and managers of the ED to ensure that this thing is delivered with the best care to the patients. One of the best practices of ED administration is ensuring infrastructure design, system establishment, and ongoing everlasting quality improvement planning. ED senior management must plan, prepare, practice, review, analyze, assess, and strategize for unexpected events [(1)].

The ED environment is full of interruptions, with multiple interactions and a high density of decision-making. The input, process, and output of ED patients are largely beyond the control of ED staff and managers [(1)].

Historical Background of UoGCSH emergency department

UoG-GCMHS

The University of Gondar is one of the oldest and most well-established higher education institutions in the country. It was established in 1954 as a Public Health College and Training Center in a joint effort between the Imperial Ethiopian government, WHO, United States Operation Mission to Ethiopia, and UNICEF, dictated by the pressing health needs that existed in the 1940s and 1950s. It remains Ethiopia's oldest medical training institution. Our college, Gondar College of Medicine and Health Science (GCMHS), is one of the pioneering college faculty under the University of Godar established in 1954 G.C. Initially, it was established as a Training Center under Addis Ababa University and was later renamed Gondar College of Medical Sciences (GCMS). GCMS gained autonomy from Addis Ababa University in 1992G.C.

GCMHS-UoGCSH-Emergency department

University of Gondar Comprehensive Specialized Hospital (UoGCSH) is the only historically old hospital established during the birth of the college enlightenment, and it has been providing tremendous health services to the local community and the wider nation since then. It is located in Gondar city, central Gondar zone, northwest Ethiopia 663 km northwest of Addis Ababa. UoGCSH is the oldest in Ethiopia and the only referral hospital for more than 13 million people. It serves more than 950 beds capacity. It has a feeder catchment area of 3 general hospitals, 15 primary hospitals, 14 government health centers, and other private health sectors in the city.

The emergency department under UoGCSH was not established independently until recently when grassroots paradigm changes occurred. It was initially led mainly by the giant Department of Internal Medicine and the Department of General Surgery for which there was no known responsible body to handle the distinct leadership of the field. Due to this unrecognized diffusion of responsibilities, the health service delivered to the community was not as similar to that of other parts of the nation and the world. Because of this historical retardation, a team of physicians took the initiative to propose the change of this historical defect aiming for a well-organized, well-structured, well-equipped, and well-maintained emergency system that is independent of its historical joint venture.

During the 2020 G.C., a proposal paper was submitted to the college and hospital administration bodies suggesting stepwise quality improvement of the existing emergency service in terms of infrastructure and logistics. The proposal suggested

short-term, mid-term, and long-term quality improvement segments. The short-term goals aimed at renovating the existing infrastructure and health service system to cope with and catch up with the ever-growing and everlasting emergency health service demand. The mid-term goals were to have another revitalized new building and be an independently recognized academic segment of the school of the college teaching communities, thereby enabling the launching of residency as part of the quality health service reassurance arena. The third and long-term proposed plan was to have an isolated, well-functioning medical and trauma center that aligns with the international WHO standard.

Objective

To describe the transformation of emergency and critical care medical services at the University of Gondar Comprehensive Specialized Hospital from scratch to the current status.

2. Methods

A descriptive case study design was used to narrate emergency and critical care service transformation at UoG Comprehensive Specialized Hospital. Data was gathered from desk reviews of the emergency department, quality directorate, and the annual audit report. Since this study is a data review from gathered secondary data, desk reviews of the emergency department, quality directorate data review, and the annual audit report review, there was no need for IRB approval.

2.1 Baseline Assessment to see the extent of service delivery and outcome

The aim of the baseline assessment of Gondar University Specialized Hospital adult emergency room service was to know the real emergent patient overload, patient length of stay, patient mortality, and resource accommodation, thereby expanding and improving emergency medical services for those who need emergency medical treatment for all trauma critical illness. These would aid in improving patient survival and health outcomes whatever the case scenario be it medical emergencies or traumatic injuries. This assessment was also aimed at spreading best practices to similar areas as a role model and being a pioneer in medical emergency care system expansion regionally and nationally.

University of Gondar Comprehensive Specialized Hospital has been delivering health services for over half a century since its establishment. Among these, emergency medical service was one of the main roles that it was playing. Before the era of the Ethiopian millennium, this in-hospital emergency medical service was not given an emphasis and priority to the demanding population. The service was given in a small 8-by-12-meter area, combining all unsorted cases and severity except pediatric, obstetrics, and gynecology emergency cases. This service continued with this confined space until 2015 G.C, when the space was expanded and restructured according to the WHO and EHSTG recommendation into Red, Orange, and green and other service areas like ED laboratories, pharmacy, and ED procedure room. Red had 3 beds, Orange had 24 beds, and Green had 14 beds. Despite this limited number of beds, the emergency room always had a flooding turnover of patients, irrespective of the case and severity. The annual flow of patients to the emergency department was approximately 23,400, and more than 400,000 clients were sent to the hospital [(2)].

By 2016/17G.C., there were no emergency medicine and critical care physicians, but 3 critical care nurses were managing critical patients. There was also a shortage of supplies, like basic equipment for patient resuscitation, and almost no emergency drugs, both in the pharmacy, emergency

unit, and ICU, creating another obstacle in providing quality care.

This baseline assessment showed vivid gaps that were present for years in history. Exemplary figures and images are illustrated below to mention some.

Among the national emergency service expansion strategy measurement tools of key performance indicators, ED patient triage time, ED mortality, and ED patient length of stay are the ones that are measured against the stated target. Our patient triage within five minutes ranged from 60-70%. Our ED mortality ranged from 3-4%. Our patient length of stay of more than 24 hours transformed from more than 50% to less than 10%. *(See supplementary figures for previous setups figure 1, 2, and 3)*

2.2 Admin engagement

The Federal Ministry of Health was well committed to expanding emergency and critical care services by designing a national strategy to implement these services across the country [3].

As part of the hospital's five-year strategic plan, the hospital administration team was kin to support the new proposal idea for exploring internal and external support in terms of technical support, funds, logistics, and human resource capacity building.

2.3 Conflict resolution

The departments that were engaged in the history of the emergency room were also the pioneers in initiating the human resource development required for the launching of quality improvement. There was no known raised conflict of interest among the mentioned and other service areas regarding the leadership of the emergency room.

3. Result

3.1 infrastructure/physical space

The Existing emergency room had optimally unused space which if appropriately restructured could be used for the short-term clinical emergency service. The structure and proximity of the building make it easily accessible and possible to link with the main lab, OR, surgical ICU, and radiology unit. After repeated discussions of the issue with the administration body, the admin was able to find an external funder and arrange a framework of agreement for the implementation of the project. After a year of renovation, we were able to organize a newly refurbished emergency room with a triage area with adequate reception space, Red resuscitation area with 10 beds (considering patient overflow), Orange with 18 beds, Yellow with 10 beds, and a floater area, isolation room, decontamination room, ED laboratory, main store, disaster store and piped oxygen system to all beds. *(see supplementary material for figures 4, 5 ,6, 7, 8, and 9)*

3.2 ultra-structure /system

3.2.1 Standard operations, protocols, and clinical decisions

We were able to articulate new standard operating procedures and protocols for the clinical staff, and also, we were able to design new patient flow system in collaboration with the respective departments and service areas. The scope of practice and leadership responsibility finally resides in the hands of the drivers with a smooth transition of power.

3.2.2 Logistics and Supplies

We were able to collect the necessary materials, instruments, and other logistics required for the refurbishment of the ED from the hospital and the external funder. We collect 40+ beds (6 are mul-

tipurpose resuscitation beds), 3 crash carts, 4 suction machines, 10 patient monitor machines, 4 perfusers, 3 mechanical ventilators, and other resources required as per standard. *(see supplementary figure 9)*

3.3 Patient

We were able to manage patients through the newly established infrastructure and ultrastructure changing the previous customs of treating patients with no designated case sensitive, case severity manner. We were able to control and maintain the ED surge capacity through the day-to-day active decision-making culture. Patients are no longer treated on floors, corridors, and reception areas. We hope through this new culture, we have introduced proper patient management, patient and family satisfaction, and staff satisfaction despite the ongoing resource limitations in the setup.

3.4 Performance indicators

Among the national emergency service expansion strategy measurement tools of key performance indicators, ED patient triage time, ED mortality, and ED patient length of stay are the ones that are measured against the stated target. Our patient triage within five minutes was transformed from 60-70% to 100 % performance. Our ED mortality dramatically transformed from 3-4% to 1.2-2.1%, a significant decrease from the baseline and approaches to the national target (< 0.5%) requiring ongoing gap identification and quality improvement. Our patient length of stay of more than 24 hours transformed from more than 50% to less than 10%. The above statistical numbers were consistently trending proved by monthly clinical audits and annual audit reports. We strive to achieve more quality improvement indicators per the recommendation of the national Ethiopian health sector transformation guideline [(4)].

3.5 Leadership and Management

Now, the leadership and management are being run by the newly established department and fellow emergency and critical care medicine physicians. We have been through this for the last one and a half years and we have seen significant trending changes.

3.6 Human capacity development

3.6.1 Staff training

Despite being in the warzone, war region, and broken economy, we were able to give training for both integrated emergency medicine case management and ICU patient care. *(See supplementary materials for evidence in Figures 10 and 11)*

3.6.2 Residency training

As part of the continuous sustainable reassurance of quality health service, excellence in the academic arena is a very important journey and framework for quality improvement. Regarding this program, we were able to launch a post-graduate residency program on emergency and critical care medicine last year 2023 G.C. fulfilling all the requirements and materials. Now, we have second- and first-year postgraduate students helping the system to run well calibrated. *(See supplementary figures for evidence in figures 12 and 13)*

4. Discussion and Conclusions

Olivier Serrat articulates good practice as anything that has been tried and shown to work in some way—whether fully or in part but with at least some evidence of effectiveness—and that may have implications for practice at any level elsewhere. Good practice is a process or methodology that is effective in one part of the organization and might be effective in another, too.

We have gone on a long journey in bringing those promised practices into demonstrable practice and finally replicable prototypic best practices.

Even though we went the extra mile to achieve this status, we remain behind in reaching out to the demonstrable tip of the iceberg. Standard emergency room workflow implementation enables us to control the day-to-day patient and attendant crowding that impedes the anticipated medical treatment outcome and results in significant dissatisfaction. We hope that this groundbreaking clinical practice will lead to a further boost in health quality improvement and sustainable service delivery in the hospital, region, and the nation as well.

We, the emergency department members, are always optimistic about the introduction of new system designs and applicable changes that will positively affect the staff and the user community.

5. Limitations and recommendations

For comprehensive well-functioning emergency setups, there are always stakeholders that interlink and interplay with one another for mutual collaboration. Every department and unit has roles and responsibilities to make sure that the input process output principle is always effectively implemented. For this to be sustainable, the communication system and platforms shall always be updated and upgraded. For now, we are giving undifferentiated medical services for both trauma and non-trauma adult patients due to a lack of space, logistics, and human resources, but in the future, it has to be separated to give standard treatment as per WHO recommendations. Since the vicinity is a trauma-prone area, there has to be a separate trauma center complex.

Our limitations are enumerable under this resource-limited setup compared to what we could perform if we had been provided infrastructure, logistics, human resources, and technical support. The combined medical service affected our patient outcomes for both trauma and medical cases. The crippled referral system both from catchment government health sectors and private centers greatly affected our clinical practice. We were not able to fully launch the prehospital medical service as expected due to the ongoing conflict. The ongoing conflict in the region also affected our academic and clinical practice to the great extent that we could not create links with international best setups to share experiences and other supports.

Futurities

We aspire to a bright future in the newly emerging department despite the limitations and threats. We have plenty of opportunities to explore, plan, design, and perform in the clinical service arena. We are also hopeful that the scratched quality improvement process will be continued and sustained by the hospital admins, the university, and external collaborators.

Conflict of Interest

No competing interest

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-Chief of this journal.

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