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How to upgrade a pressurised emergency system; Have we learnt lessons from the COVID-19 pandemic

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Abstract

Background: The emergency health systems (ES) are vulnerable and prone to choking and collapsing as the years go by. They might have been stretched for a long period of time and any unprecedented situation like the COVID-19 pandemic became the last nail in their coffin. Some of the systems may have been badly designed or poorly operated right from the start. These systems never had the inherent capacity or capability to deal with any unpredictable situations. We compared the operational capability of the ES in Saudi Arabia (SA) with the United Kingdom (UK) National health service (NHS), during the Covid-19 pandemic. We also wanted to highlight the factors within the ES, which are vital for its safe functioning.

Method: We performed a literature search to understand the performance of ES in SA during the Covid-19 pandemic and how they coped with extreme pressures. We also analysed the UK emergency system and compared its performance with the SA health system.

Results: Our comparative analysis revealed a completely different approach taken by these two health systems to cope with the challenge posed by the pandemic disaster.

Conclusion: All world emergency health systems were tested at length with Covid-19 pandemic. SA & UK emergency systems devised their individual strategies based on their existing infrastructure, inherent flexibility and preparedness for major incidents. Human factors played an important role in devising an ES and carving a proportionate response to emergency crisis.

Introduction

There is always a finite capacity in an ES and its efficiency and productivity can significantly decline over a period of time [1]. The extent of this deterioration can be short lived or end up in a complete collapse, if the system has not been optimised according to the changing factors [2]. ES resilience was recently tested by Covid-19 pandemic [3].

The poor response of ES to a major crisis can be due to the inherently poor capacity and stretch ability within the system, inadequate operational processes, disproportionate workforce and increasing inflow of patients [4,5]. These factors in isolation can be counter-productive but a cumulative effect is often responsible in pushing the system, off the cliff [6,7].

The scale of Covid-19 pandemic proved to be a hard nut to crack even for systems claiming to have resources, robust operational processes and preparedness for major disasters [8,9]. That was reflected in the morbidity and mortality figures of those countries. UK was one of the worst affected country with COVID-19 and its ES came down to its knees, during the peak Covid-19 season [10-12] (Figures 1-3).

Covid-19 pressed some of ES so hard, that a complete recovery in these systems has never been possible. These particular systems never had the inherent ability, appropriate design, framework and resources to deal even with their normal flows. A continuous attitude of ignorance and turning a blind eye toward obvious issues may have resulted in these outcomes [13-15].

ES includes the community services, patient transport services, emergency departments (ED) and tertiary care systems. All components can be seriously affected by a major disaster as they are all interlinked with each other [16].

We wanted to highlight the areas mainly at risk within the ED, during times of stress and what changes are required to gear up the system towards the level of safe operability [17].

Methods

Literature search was done using the key words "emergency department", "Covid-19", "capacity", "stretch ability", "Saudi Arabia", "United Kingdom", "National heath service", "major incidents", "disaster", research"management"

We retrieved 32 articles relevant to our research question, which we have included in the reference section. We have extracted the major changes which were implemented within the ES in both the target countries (SA & UK).

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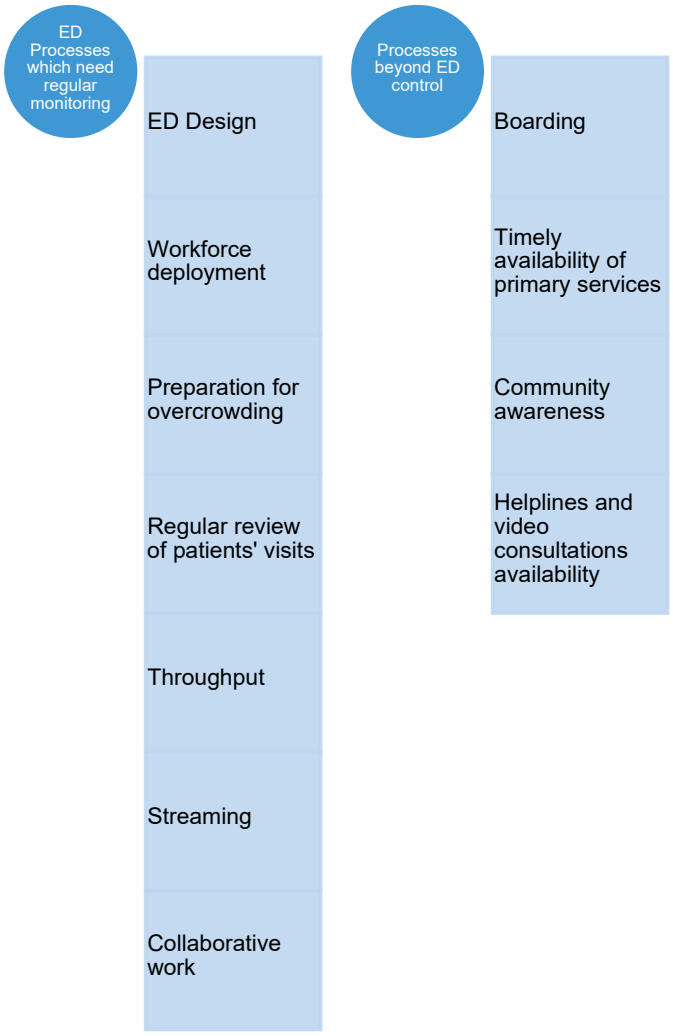

Figure 1. Processes affecting the operability of ED

We have kept our focus mainly on the ED processes which in our assessment can be classified in two types; processes that must be monitored regularly to keep the ES ready for a bigger challenge. The second type of operational processes are beyond ED control but taking eyes off them can seriously impair the responsive of ED to a major disaster.

ED processes, which have to be monitored regularly

1-ED Design should encourage a quick and safe through put. Quick patient reception and registration followed by a robust triage and allocation of clinical space is mandatory [18]. Age specific clinical space (e.g., pediatric section) is a mandatory part of any standard ED to encourage better streamlined flow. The designs should allow flexibility and accommodation to deal with major disasters. Although pandemics like Covid-19 occur once in a century, preparation for a worst calamity should always be part of ED strategic design and planning.

2-Workforce deployment: This element should be carefully tailored to match patient flow. Majority of ED peaks occur in the evenings and last till the early part of the morning. The antisocial hours can have a huge impact on the employee's work life balance. A carefully designed schedule for the staff, matching the departmental requirements should be implemented to avoid burnout. Employee's out of hours' work should be incentivised to attain better productivity. With increasing emergency demands, tailored workforce to match the patients clinical burden may be required. Incorporation of emergency and advanced nurse practitioners in minor injury and major resuscitation areas respectively has proven to be a good expandable practice [19].

3-Preparation for overcrowding in ED: This has been known for years and regularly caused ED to be overwhelmed to a choking point (15). Boarded patients in ED and high volume of new patients have both contributed to ED overcrowding (8,10). Many EDs hold sick patients in the ambulances outside ED due to lack of space within ED. Consequently, ambulances are either not available to pick sick patients from the community or their response times are significantly delayed. An already overcrowded system is likely to succumb quickly and will not have the capability to deal with major incidents [20].

4-Regular review and analysis of the patients visiting the ED: This should be regularly analyzed as part of daily performance review. Knowing the numbers and quality of patients being managed in ER would help the management teams plan not only for daily business but also unforeseen circumstances [21].

5-Throughput: How much time is spent to diagnose, manage and dispose a patient from the ED depends on the patient's clinical acuity or triage category. Triage category allocates a standard time (in which a clinical encounter by a physician is required), which allows the sicker

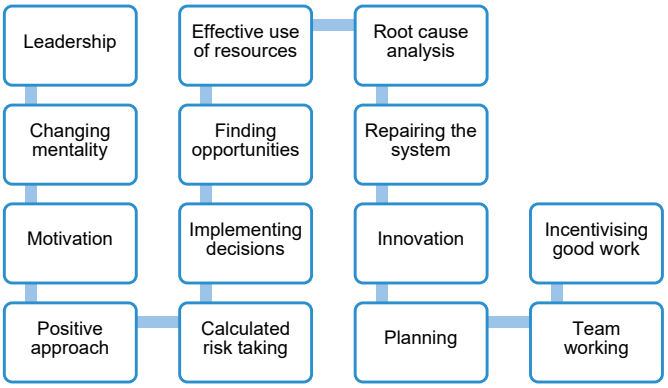

Figure 2. Human factors that help development of emergency systems

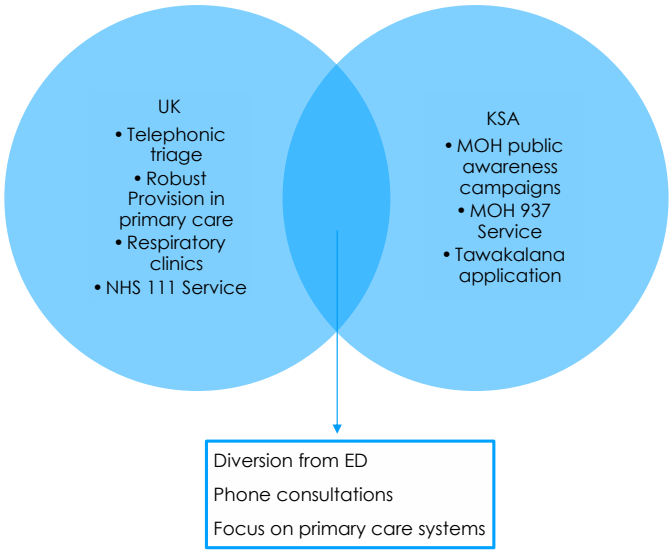

Figure 3. Similarities and differences between UK and SA emergency system

patients to be seen earlier. Even the sickest of the ED patients require a limited clinical input within the ED (the golden hour) followed by an ongoing journey for definitive management by an appropriate specialty. Timely decisions have a lot of impact on the patient stay within the ED. Regular monitoring of "door to doctor" and "door to disposition"times can help remove the bottle necks [22].

6-Streaming: Not all patient's clinical needs warrant them to be examined by the ED physician [3]. A significant number of patients can be diverted back to the community services (e.g., by offering GP appointments, directing to pharmacy for a refill prescription) from ED triage. A robust protocol based system at the front end can be extremely useful. Up to 15-30% of the patients can be successfully streamed to a non-ED services, based on this approach. This practice can help create capacity and will be extremely useful, during the pandemic or similar extraordinary situations, threatening ED capacity [23].

7-Collaborative work: ED should have zero tolerance for accommodation of admitted patients. Unfortunately it has become a regular occurrence. An agreed plan (e.g. capacity protocol) should be effectively triggered to mitigate the effects of overcrowding. The specialties should work shoulder to shoulder with ED staff to help decant ED. Senior decision makers from specialities should be deployed in ED (including out of hours and weekends). The collective team effort can have a massive effect on patient's discharge [24].

Processes beyond ED control, which have to be regularly risk assessed

1-Boarding: This is a regular occurrence internationally within ED. It is a multifactorial phenomenon with less solutions within the ED. The "exit block" caused by lack or delayed availability of inpatient beds is hitting ED hard [8]. The poor hospital discharge rate of inpatients usually due to lack of timely review by senior decision makers has been increasingly responsible. Increased volume of frail elderly population has been a growing problem within ED, which eventually leads to prolonged inpatient occupancy of hospital beds. Plans to provide care closer to home for the elderly and multidisciplinary decision making on the front door of the ED (like multidisciplinary geriatric team) can help streamline patients back to community. Proactive discharge planning of inpatients with an expected date of discharge (EDD) and expediting patient discharge journey (e.g., timely delivery of pharmacy) can go a long way [25].

2-Timely availability of primary care services: Enabling quicker access to general practitioners (GP) and other community services can significantly lessen burden on ED. One has to carefully tailor additional provision of primary care services, as it sometimes can bring additional consumers with no overall change in the ED patient numbers [26].

3-More health awareness in the community [3]: Dissemination of public health messages to adopt a healthy life style and to approach appropriate health services (e.g., ambulance transportation only for sicker group of patients) [27].

4-Availability of phone helplines and video consultations: That has been widely practiced during the Covid-19 pandemic season and has been partly successful. The lack of face to face interaction loses the sensitivity of clinical encounter and can sometimes under-diagnose a clinical condition. In the pandemic situation, it was tested as an alternate means of examination in a virtual environment but the validity is far from being tested. Video consultations do provide a better virtual environment but risk patient's privacy and confidentiality [28].

Human factors which can affect and impede development and progression

1-Leadership**:** Leader should have a complete insight of the ED problems and a strategic sense to follow a clear direction of travel. Lack of appropriate knowledge and experience leads to poor problem solving ability in challenging situations. The failing leaders are afraid of changing decisions with changing circumstances. When confronted with bigger problems (like pandemics), bigger thinking of the leader comes to rescue [29].

2-Changing mentality**:** Resistance to change makes a team vulnerable. The team approach and mentality needs overhauling with time. Whilst it is difficult to adopt a change, small alterations are precursors to a bigger better change. Hearts and minds of the service deliverers change, when they visualise the benefit.

3-Motivation**:** Lack of workforce motivation can be a bar in departmental development and responsiveness. It is like a dead log rolling without direction. Hope and positivity can bring arousal. Health care staff are caring by nature and are easy targets for motivational change, when shown the right direction.

4-Positive approach**:** Health workers do not work with a mindset of bare minimum. There is always a quest for improving care of their patients. In some individuals, optimism can be inherently gifted, whilst others see things differently. "Everything has been tried and nothing has worked" approach leads to deterioration of work practices.

5-Calculated risk taking**:** Scare about something bad is going to happen, stops individuals and leaders from inflicting any change. These individuals are waiting for miracles to happen without changing their orthodox practice for years. They are never prepared to take an innovative measures and pose a significant threat to development. Measured risks when taken, pave the way for a better change. Adaptation is consistently required with the newer and changing world around us.

6-Implementing decisions**:** Despite carving heroic plans, implementation is a big challenge. Translating the plans on the floor is a herculean task. The most common failure of the leaders is failure to implement. No change can be called a change unless adopted by the stakeholders. All-inclusive approach (with service providers in the heart of the plan), wins hearts and minds. Hidden questions, threats and fears have to be addressed. The pros and cons of the advocated measures needs to be explained and their importance drummed in the providers regularly. Short feedback sessions and audits can inflict the change. Patient feedback can be rewarding [30].

7-Finding opportunities in the middle of chaos**:** Human reflexes can adopt a bad style of doing things, which may not be conducive to the best outcomes. Staying observant, keeping an optimistic mindset and self belief can bring a positive change. There are always opportunities hidden despite the obvious disarray. Exercising patience and waiting for the right moments can instil change.

8-Effective use of resources**:** Appropriate use of the available resources makes efforts productive [2]. A bad workman always quarrels with his tools and an underperforming clinician always blames his surroundings, work environment and lack of resources for his underperformance. Training and experience of dealing with stressful situations can go a long way [31].

9-Dissection of problems/root cause analysis**:** The system gets blamed by individuals immune to change. They are never inclined to

find the root cause of a problem. They can be unconsciously or consciously insane due to lack of insight and detachment from reality. The bad effect of these individual can cascade down to their juniors and other members of the team. Making the system accountable can highlight poor performers. Open and transparent discussions of untoward incidents by a competent team can go a long way in providing solutions.

10-Repairing the system [5]: The system could have been poorly designed which can fail even the most competent individuals. It may not be fit for purpose due to multiple factors including unnecessary cost cutting measures. The system should have the capability to protect and enhance the working of individuals. Appropriate investment may seem cost intensive but pays off in the long run by increasing productivity and efficiency. A common example could be the incorporation of a robust information technology (IT) system. Reporting safety incidents electronically makes them much easier to report and helps mitigate problems and threats [32].

11-Innovation**:** Doing the same thing and expecting a different result is insane. The world may have changed around the old system but it is still operational and expected to achieve a different outcome. The increasing and changing demands need newer and better systems. The workforce also needs to keep their knowledge and skills updated. Better working practices can be adopted from model departments rather than reinventing the wheel. Bright individuals with fresh positive ideas should be encouraged. Research should be part and parcel of any departmental work to open new fronts [4].

12-Planning**:** Some health systems may be suffering due to lack of appropriate planning. The policies and protocols could be completely outdated. The system is only fire fighting with no planning for risk management. Players might be disillusioned and have a disconnect with reality. This system will need complete revamping and restructuring. Competent staff should be at the heart of decision making to bring a change.

13-Team working**:** Disintegrated teams don't achieve the desired effects [7,13]. There could be a complete lack of motivation and desire. This could be due a low morale caused by burnout and being undervalued. The constitution of the teams should be a carefully thought through process. Regular monitoring and performance audit should be attached with appreciation, recognition and incentives.

14-Incentivising good work**:** Positive energies can sometimes get converted into a negative drive due to lack of appreciation. Performing individuals and their teams should be appreciated. "Nurse or physician of the week" can have most of the team individuals included. Recognition days and events go a long mile.

Changing patterns of the ES during the Covid-19 pandemic in Saudi Arabia

EDs played a vital role in combating COVID-19 crises by early disease detection and its containment. The Ministry of Heath (MOH) of SA successfully took nationwide health measures, focussing on EDs in particular [1]. ED performance varied across different regions in SA during the COVID-19 peak season. Some EDs were overwhelmed with the maternity and pediatric cases [2]. Longer waiting times and treatment delays of high acuity cases were also reported in some EDs [3]. One study revealed a significant decline in the low acuity and chronic cases within the ED [2-4]. All studies stressed on the vulnerability of the ES during pandemic and stressed on mandatory preparation for major disasters as a key for maintaining high-quality patient care [5].

MOH was the hub for issuing guidance during the pandemic crises. An attempt to integrate the ES to function en block was as follows:

1. Screening processes were introduced upfront within the ED.
2. Entry within the hospital and other public places was strictly monitored through

   "Tawaklana" app (advanced application, showing the vaccination status).
3. Easy accessibility for Covid-19 screening tests and free Covid-19 vaccination.
4. Diversion from ED was also done through virtual clinics.

UK emergency system changes during the Covid-19 period

UK had a totally different approach in fighting the pandemic. The patients were triaged through a central telephonic triage system to assess the eligibility of the patient for the ED. The GP surgeries stopped face to face consultations and only offered telephonic or video consultations. GPs rigorously treated the frail and elderly in the care homes and only called the ambulance in life threatening emergencies.

The community teams were also very active in providing care at the patient's doorsteps, avoiding a hospital visit. Similarly pharmacies and the paramedics were geared up to provide treatments at home. The hospitals wards and ICUs were decanted to accommodate sick patients.

The NHS was not in a good shape prior to the pandemic due to under-funding, which meant insufficient workforce, underdeveloped infrastructure that could not sufficiently stretch to cope with the pandemic. This under-resourcing resulted in decreased number of hospital beds, increased patient waiting time and burnt out the healthcare providers. Moreover, diverting all non-urgent care away from the hospital, discharging non-urgent cases and instating temporary field hospitals translated to a growing backlog of care in the elective and chronic cases [1-3].

Post Covid-19 heath care developments in Saudi Arabia

This pandemic brought to the surface, the importance of primary health care services in facilitating access to health services. Special emphasis has been made by SA government to support the primary health care (PHC). Establishment of PHC has been added to the National Transformation Program as part of SA Vision 2030. This has been translated to positive outcomes, as found in a recent study which highlighted a 37.5% increase in PHC visits and 83% coverage of rural areas. However, there has not been enough studies to shed light on the capacity of PHC centers and their preparedness in combating future pandemics. Some studies have also shed light on the obstacles of PHC, which include their geographical location, workforce shortages, lack of equipment, lack of working incentives in rural areas, under-developed infrastructure, poor integration with secondary and tertiary care centers, lack of electronic medical records etc [6-8].

The primary care in SA is very primitive, where provision of care is by family medicine physicians based in the hospitals. The physicians will only provide care for the patients and employees of the hospital. There is private care available in the community, which is not available outside the big cities. The social system is not well established apart from the main cities. Despite the poor national integration between the primary and the secondary care system, the intra hospital integration of these two interfaces is workable and also functional at KFSH&RC.

Primary care system in United Kingdom

The primary care in the UK is integrated with the social care system. During the pandemic, it was run by a team of multidisciplinary members including GPs, pharmacists, community nurses, and physiotherapists. Moreover, minor injury units is also an additional resource manned by nurse practitioners.

The strong integration between primary care practitioners, pharmacy, paramedics allows treatment to be provided at the doorsteps of the patients, especially in the elderly care group.

It is also worth noting, the GPs visit the nursing and residential care homes. Primary care services are also available via the NHS helpline services. Furthermore, GPs use telephone triage and video consultations to cater patient needs quickly.

The primary care also conduct respiratory clinics and provide vaccinations. Moreover, the NHS primary health care is available on the phone app for patients to request their medication refills and book their face to face appointments with GPs.

The UK rural population still have difficulties accessing primary health care as evident from a recent study published in Public Health England.(8) Furthermore, remote consultations can miss critical cases especially if there is language, communication or technology barriers.

Conclusion

ES should be built with inherent capacity and flexible design to cope with major crisis. ED should be kept unclogged to allow streamlined flow. Integrated emergency systems with competent teams adapt at a proactive approach and stand up to the major challenges.

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