

Pains and Gains from Iran's Experience with the Management of Covid-19 Pandemic

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Abstract

Background: COVID-19, a rapidly spreading virus, has severely challenged all countries worldwide with no certain prevention and treatment so far. Various clinical and public health interventions have been in action since its first report in December 2019. Sharing the lessons learnt and strengths and weaknesses might cast some light on the future similar crisis management.

Methods: This was a qualitative exploratory research including 22 semi-structured, face-to-face, virtual interviews with key informants and decision makers in the management of current epidemic. Data was analyzed using thematic analysis.

Results: The lessons learnt from and the weaknesses and challenges of COVID crisis management were categorized under the main areas of management and planning, workforce and education and research, decision making and communication.

Conclusions: The current unprecedented crisis has affected various aspects of human life. Policy makers and managers, especially in health care, worldwide are struggling to abate the consequences of this nasty virus, though facing tough challenges. Here some hands-on and real-time experiences from the fight of a developing and highly affected country against this virus is provided which might be of a high value. Whatever approach adopted, it is key to be multifaceted and support all rightly mentioned aspects of health as physical, mental and social.

Background

Throughout history, human beings have always witnessed a variety of disasters disrupting their normal life routines and causing various human, economic and social losses (1). World health organization (WHO) considers disasters as a sudden ecological phenomenon of sufficient magnitude to require external assistance (2). From a medical perspective, disasters occur when the number of patients at a certain time reaches a level that requires more manpower and resources for providing treatment and care services than normal situations (3). Health care organizations (HCOs) play a substantial role in crisis management, where they introduce the plans and strategies essential for preparedness to counteract its adverse implications (4).

Coronavirus, the most recent crisis troubling the world, was first reported in December 2019 in Wuhan City, Hubei Province, China. The virus is currently known as acute respiratory syndrome (SARS-CoV-2). WHO announced it as a global pandemic in March 2020, and the worldwide serious efforts did not succeed in containing the virus as it continued spreading across the countries. So far, no specific vaccine or medication is available for full recovery of COVID-19 patients, however, governments and pharmaceutical companies are urgently attempting to provide an effective vaccine or drug for its eradication.

The first wave of COVID-19 in China killed 1775 people. Fever with respiratory symptoms such as dry cough and breathlessness are the primary signs of COVID-19. Elderly patients and those with underlying diseases (commonly hypertension) are more at risk. A significant proportion of patients has also experienced gastrointestinal disorders such as nausea, vomiting and diarrhea (5). Globally, as of 7 February 2021, there have been 105,394,301 confirmed cases of COVID-19, including 2,302,302 deaths, reported to WHO. With 1,459,370 infected people and 6,983 new cases, Iran has ranked fifteenth based on the number of COVID-19 infected cases worldwide (6).

Due to the rapid pathogenicity of COVID-19, special attention has been paid to this disease in terms of resources allocation in different countries. Several studies have been published shortly after the onset of this disease uncovering the experiences of various countries in managing the crisis (7) (8) (9) (10). Nevertheless, most of these studies have not relied on field data, rather, they were mostly based on individuals' views and perceptions (11) (12) (13) (14) (15).

A study entitled "Lessons to be learned from the prevalence of COVID-19 in Iran," found that the outbreak in Iran was attributed to the paucity of information about the disease as well as the experience of other countries. It is highly recommended to take social distancing seriously in order to avoid the dire consequences of the virus spread (14). In their study, Sufi and colleagues stated that this pathogenic viral infection challenges seriously the companies and industries around the world, and the most critical question here is whether the clinics and medications in various countries are ready to fight against the deadly virus or not. Currently many precautionary measures are being employed to reduce and prevent COVID-19 infection, meanwhile, no drug therapy have been certainly confirmed so far (16), though many efforts are made for working vaccine and some are succeeded.

The prompt structuring of primary health care was significant in improving medical response in one study in Mascut. Besides, the psychological disorders were also detected as a result of social distancing, handling of dead bodies, and job burnout (17).

Iran was also severely affected by this pandemic and is still one of the countries with high morbidity and mortality rates in the world (Fig. 1).

The emergence of such diseases renders preparedness in health care systems more compelling. Provision of optimal and timely health care services is the main responsibility of hospitals as a key health system component at crises times. Hence, reflecting on the challenges faced and measures taken in these organizations and the country can be beneficial for Iran and similar countries. Therefore, this study aimed to explore the experiences and lessons learnt from Tehran University of Medical Sciences (TUMS) as the largest medical university in the country.

Methods

This qualitative exploratory study was performed using an inductive approach in the period from the emergence of the COVID-19 outbreak in Iran at early March up to November 2020.

This study was carried out in Tehran, the capital city of Iran. Drawing on the eligibility criteria, we interviewed all TUMS top and mid-level managers, and operational officials (including clinical, administrative, financial, and nursing) with an active role in prevention, control, and treatment of COVID-19. TUMS includes more than 16 general and specialist hospitals together provide tertiary services at provincial and national level.

Respondents were firstly selected purposefully based on their knowledge and related responsibilities in disease management. Next, snowball sampling method was applied to identify new potential participants.

Approximately 22 semi-structured, face-to-face, virtual interviews were conducted with key informants and decision makers in the management of current epidemic up to the saturation (Table 1). The interviews, using Skype and WhatsApp, were used to overcome the problem of time constraints and also possible risk of disease transmission. The interview guide consisted of eight main open-ended questions. Besides, some questions emerged during the interview and were useful in scrutinizing the topic under study. On average, the interviews were held in a convenient place and lasted 30 to 90 minutes.

Table 1
Descriptive characteristics of interviewees

Job title	Number	ID
Head of clinical ward (ED, Infectious diseases, etc.)	4	A1-A4
Dean of school	3	B1-B3
Director of Hospital	4	C1-C4
TUMS Board of Directors	5	D1-D5
Hospital Deputy	2	E1-E2
Secretary and member of hospital disaster committee	2	G1-G2
Matron and supervisor	2	H1-H2
Total	22	

Notes were taken during the interviews to confirm data accuracy, and each interview was transcribed verbatim shortly after. Transcripts were resubmitted to the interviewees for any possible modifications.

Data was analyzed using thematic analysis, simultaneously along with data collection. For the purpose of accuracy, the expressions of participants were proofread. Additionally, experts in crisis and hospital management, and medical specialists were reached to expand data directly after the initial analysis, and the results were also confirmed by a group of interviewees.

Results

Approximately 509 codes were initially extracted and then were compiled and classified according to the similarity and appropriateness into six themes and two main categories, including; Hospitals' pains (weaknesses and challenges) and Hospitals' gains (strengths and lessons learned) (place of Table 2).

Table 2
Themes and codes related to TUMS experiences in Covid19 disaster management

Areas	Themes	Sub-themes
Hospitals' pains (weaknesses and challenges)	Planning and Management	Surprise and unpreparedness to face the epidemic given the mysterious nature of the novel virus, lack of timely decisions and sensitivity in the authorities towards the virus, lack of financial resources, poor preventive policies, lack of a clear chart for crisis management of epidemics, discoordination between departments, lack of awareness of existing capabilities and capacities, unfair distribution of resources across the country, imbalance in the provision of medical services, unscheduled corona visits to all hospitals, shortage of facilities and personal protective equipment (PPE) in the early stages of the crisis, inability to control the use of protective equipment and medicines, difficulty of checking the authenticity and standardization of protective equipment and drugs, structural weaknesses (e.g. oxygen transmission), difficulty of organizing volunteers (nursing and medicine) and donations, multiplicity in decisions and policies of universities, faculties and hospitals, centralized management by the university, delay in patient's diagnosis, growing nosocomial infections because of uncontrolled overload.
	Workforce	Resistance to unexpected changes, stress and fear from infection, increase of absenteeism in the early days of the outbreak, work overload and shortage of specialized workforce, psychological problems among staff and patients, insufficient skills of residents and nurses, prescribing drugs out of the approved list by physicians.
	Research and Education	Suspension of clinical education, widespread complaints by medical students, verification of clinical research on herbal treatments, Use of medical students regardless of their specialization for Covid19 treatment, compliance of newly developed studies with scientific and ethical criteria, lack of electronic collection of patients' data.
Hospitals' gains (strengths and lessons learned)	Planning and Management	Continuous support, communication and empathy of senior hospital managers with staff, preventing all specialists from exposure to the disease, using mass media to praise the medical staff and boost their morale, appointing an alternative workforce before crisis, using volunteers, using alternative residential place (e.g. hotels) to alleviate staff concerns about the possibility of transmitting infection to their families, strong team work and full obedience to the crisis commander, readiness of committed, skilled, experienced, and retired clinicians, allocation of medical equipment for COVID 19 patients, strong isolation practices, provision of virtual medical services to elective patients, managing companions' visits, provision of quarantine facilities outside of hospitals, high emphasis on the virtual education and utilizing virtual space (e.g. Instagram).
	Decision Making	Immediate formation of a crisis committee, creating strong advisory team, high flexibility in decisions, gradual evolution of crisis responses, delegating authority to hospitals, continuous reflection on mistakes and feedback learning.

Areas	Themes	Sub-themes
	Communication	High inter-departmental cooperation, online sharing of experiences, transparent statistics and daily reports to staff, ongoing training and information from credible sources.

Hospitals' pains

During the COVID-19 pandemic, the hospitals encountered many challenges, some of which had a root in their pre-existing weaknesses.

1- Planning and Management

One of the frequently cited challenges that managers faced was '**Surprise and unpreparedness in facing the epidemic given the mysterious nature of the novel virus**'. This challenge involved all managers and decision makers at all micro and macro levels.

Shortage of financial resources

'For provision of needed equipment, we tried to get remittances from the Ministry, while we receive about 40% only, and we bought the remaining needs from the private sector with the help of donors and non-governmental organizations. One of the problems was the delivery of protective instruments at expensive prices'(D1).

Lack of a clear organizational chart for crisis management of epidemics: Another weakness was the absence of a clear blueprint for managing the epidemic: *'Pre-crisis planning and forecasting operations on the ground is a pressing need'*(D5).

During crisis conditions, it was difficult for decision-makers to provide the materials and equipment needed for prevention and treatment. The interviewees repeatedly stressed the challenges related to providing medicines and preventive disposables: One of the main infrastructural weaknesses in this crisis was **shortage of facilities and personal protective equipment (PPE)** in the early stages of the crisis and **inability to control the use of PPE and medicines**: *'the emergency department receives 100 liters of hand sanitizer per week, that is, 15 liters per day, however, you may not find a single liter in the emergency room right now. The consumption of the solution has increased 7 to 8 times. Several head nurses wrote that these items were taken home by some staff members'* (H2).

They came up with handing each person's protective equipment at the beginning of each shift and get a signature.

Difficulty of checking the authenticity and standardization of PPE and drugs

'Due to the lack of ethanol, many counterfeit disinfectants and methanol alcohols have appeared. We control supply level, and check samples from pharmacies and production centers, unfortunately, we

found large quantities mixed with methanol which is highly toxic, more importantly, it doesn't possess antiseptic properties. The manufacturer may also do this and preserve them in the same place with the same packaging and label to produce a counterfeit solution. Now we assure the quality of all consumables' (D4).

Structural weaknesses

The epidemic showed that some physical infrastructure in hospitals were inconvenient and lacking especially in the crisis situation, such as oxygen, ICU beds and negative pressure rooms. '*Owing to the overuse and the insufficient oxygen production, and the small diameter of pipes, the sustainability of oxygen flow to patients was a serious challenge' (E1).*

Multiplicity in decisions and policies of universities, faculties and hospitals and the centralized management by the university: '*Unfortunately, in this crisis, the ministry acted improperly!! A single voice was not heard ... and each department behaved on its behalf!!! The multiplicity of decision-making authorities was quite observed. The information system was weak, and each ward was collecting and entering its own statistics separately. What were those officials in charge of corona management doing at that time??! For example, they provided protocols for protection and treatment, but the required needs for executing these protocols were not available!! Supposedly, all supplies should be in place according to the protocol, otherwise, this will create a challenge in the workplace' (D2).*

Delay in the case identification and the difficulty to differentiate between COVID-19 and non-COVID-19 patients was a real challenge. '*After one or two weeks, the diagnosis became easier for the physicians. The CT scan took its place and the patients were quickly detected' (C1).*

Growing nosocomial infections

'The presence of workforces from other hospitals who were not aware of the principles of infection control has also created some problems. We found Acetobacter species in suction tubes which were promptly eradicated' (H2).

2- Workforce

Complicated circumstances of the crisis is creating plenty of complications for the workforce.

Resistance to unexpected changes

'Making several and unexpected changes, and staff reconfiguration has created staff-borne resistance to these changes. Due to the high number of visits to the triage ward, we had to move in residents from all departments to address the need therein. At first, colleagues in some departments didn't cooperate nor respond to that decision. After some meetings with the heads of departments, the residents became convinced and the problem was resolved' (E2).

Increase of absenteeism in the early days of the outbreak

Another issue was the reluctance of some staff members to attend at their workplace especially at the early days of the epidemic, and this increased the workload of specialized manpower due to the rise in absenteeism rate.

Psychological problems among staff and patients

Close contact with critically-ill and dead patients due to the virus caused psychologically negative effects on staff morale.

Insufficient skills of residents and nurses

'Nurses were only experienced in one ward and did not have an idea about other wards. Sometimes we have to rotate nurses in other places for three or six months to get familiar to all situations. Some wards were transformed to ICUs, but out of every ten nurses, two haven't previously worked in the ICUs. In this crisis, perhaps nothing has hurt us as much as this' (H1). 'We recognized weaknesses also in education!! The unfortunate thing in the ICU was that our internal residents, for example, haven't been knowing how to do intubation!!' (C3).

Prescribing drugs out of the approved list by physicians

Drugs out of the essential list prescribed by physicians were also costly for the health care system. Prescribing these drugs, which are not covered by insurance, resulted in a shortage and created a black market for this type of drugs. *'In our country, this demand has induced the smuggling market. This false induced demand of people to such drugs as they thought in effectiveness in prevention of the disease, was one of the main challenges' (E2).*

3- Research and Education

In the education sector, hospitals encountered the following challenges after the emergence of the epidemic such as: **Suspension of clinical education, widespread complaints by medical students** because of insufficient precautions and fear of entrance to hospital wards.

Verification of clinical research on herbal treatments

There were many claims that COVID-19 disease could be treated with herbs, and this required extensive clinical research.

Compliance of newly developed studies with scientific and ethical criteria

Due to the high workload of the research department, ethics committees worked non-standard. Research was not carried out properly. Supervision was not enough. Some time on one patient, two or three RCTs were performed, which was unethical and questioned the quality of the results (A3)

Lack of electronic collection of patients' data

Due to forfeiture of a uniform information system, and the lack of electronic medical record for patients, data collection about patients was troublesome.

Hospitals' gains

Despite various challenges and difficulties caused by the COVID 19 for the hospitals, there were a plenty of opportunities and lessons learnt for all groups and organizations.

1- Planning and Management

Continuous support, communication and empathy of senior hospital managers with staff: The interviewees pointed to the support and empathy between senior hospital managers and staff as a Managerial strengths: *'In the first days of the epidemic, we wanted to prepare a package to provide it to the hospital personnel, but, they didn't appear on the scene!! Accordingly, we decided to go to the hospitals without unnecessary precautions. When the staff observed the top management in the field, they got motivated to attend to their work'*(D1). Having lunch together with staff, joint New Year gatherings were overly welcoming.

Using mass media to praise the medical staff and boost their morale

some effective solutions were asking media for praising the role of medical staff, supreme leader 'thank you' message which boosted their morale. Counting on volunteers was also helpful in addressing manpower shortages.

Using volunteers

In critical situations, there are opportunities that can be invested in by organizations. Donors and volunteers acted as an opportunity window for hospitals to handle some of the crisis-led defects.

Readiness of committed, skilled, experienced, and retired clinicians and strong team work and full obedience to the crisis commander: Workforce in the university hospitals are committed, skillful and expert professors in all medical specialties and cooperative with personnel in different hospitals during crisis situations: *'Crisis commander needs like military service ... yes, there is a sacrifice. In the hospitals, old employees usually declare their own opinions, but our staff only comply with orders'*(C2).

Strong isolation practices and provision of virtual medical services to elective patients

The most effective clinical solutions measures were the isolation of suspected cases at arrival, the bilayer triage, and the establishment of a virtual clinic to provide health care services to elective patients.

2- Decision making

High flexibility in decisions

Organizing regular meetings for crisis committee and making cross-cutting decisions, and then evaluating the results and implementing changes on the basis of informed decisions was a successful way in proper management of the epidemic

'For triage, we first designated a temporary kiosk near the thorax ward, and then when we saw that there were too many visits, we considered a room in front of the emergency room for triage. With the increase of pre-triage visits, it evolved from tents to fixed structures (D19)'.

Delegating authority to hospital directors to manage resources and use their facilities, along with the establishment of capable advisory boards, was also another effective way to manage the crisis.

Gradual evolution of crisis responses

'we initially had serious challenges for finding separate ward and ICU for COVID 19 suspects. But we managed to find at the first two days, and in the following days, crisis committee meetings were held to expand the capacity of these places and to find alternatives for the places that might be occupied next week, depending on the high number of visits (C1)'.

Continuous reflection on mistakes and feedback learnings

one of the initial ineffective decisions of TUMS was the assignment of a certain hospital for corona patients. The choice of a new place to provide services to these patients led to a critical issue which indicated that policymakers and managers did not make that decision thoroughly.

3- Communication

Transparent statistics and daily reports to staff

'transparency in generating and disseminating statistics (mortality and morbidity rate) and daily and formal report to the workforce could highly comfort them at the initial days and lessened their stress and anxiety caused by the possible rumors (E1)'.

Ongoing training and information from reputable sources

Continuous and ongoing education and awareness improvement, for example, via e-learning for the community about this crisis should be done. Specific body under health care system should be in charge of disseminating information, in coordination with the global sources. Too many channels might give wrong and misleading information (G1).

Discussion

At present the virus is spreading in most countries and has not be contained so far, and Iran is ranked 15th amongst the countries with high prevalence of COVID-19 (Statistics on February 7rd, 2021). The Iranian health care system is struggling against this unprecedented crisis that opened the floor for new considerations in disease management. TUMS, as the largest and the oldest medical university in the country, leads confrontation against this disease, hence, managers and decision-makers therein provide medical services with a remarkable experience pooled during this crisis. Therefore, this research aimed at

introducing an evident analysis of these experiences to assess the challenges, strengths and weaknesses, and draw lessons learned over this pandemic.

The high mortality rate in Iran at the peak time might be mainly attributed to the policies applied to control the epidemic and, of course, to treat and the failure in identifying all positive cases in the country (18).

Several factors including the policies adopted to control the epidemic, the system for detecting the positive cases at the community level, the ratio of hospital admissions to facilities such as ICU beds, ventilators, the variation in age and vulnerable groups, and the mortality rate in the country all need to be scrutinized and analyzed and the subsequent evidence effectively is tapped into for controlling the epidemic.

Most of the interviewees mentioned the challenge of **Surprise and unpreparedness for the epidemic** as the key managerial challenge. The **deficiency in PPE and the less initial personal precautions**, and paucity of medical and diagnostic equipment at hospitals in the early days of the crisis rendered this claim evident. In their correspondence with the chancellor of the national advisory committee on COVID-19 epidemic management, managers of the Iranian Health Insurance Organization have suggested to make use of the experience of other countries like China, England, Italy, and Spain in implementation of lockdown, and raising the awareness in the society on how to deal with the disease; "After the N1H1 flu epidemic, there was an evidence that measures should have been taken to strengthen the health care system and develop appropriate policies and procedures to deal with it, however, the decisions were not effective after the emergence of corona epidemic, or at least, they were not able to contain the virus transmission " (18). Considering the experience of China and some European countries shows that there was a need for serious measures and more preparations in Iran prior to the outbreak (19). The WHO has stated that the first window of opportunity to deal with the epidemic was supposed to be 1–2 months ahead to the epidemic in the country, whilst, many countries have missed this opportunity (20).

In time of corona crisis, managers had to **make prompt decisions** in the organization such as changes in the way of services provision, staff rotation, costs increase, etc., and this in turn led to staff resistance to these changes. One of the most influential ways for managers to mitigate this challenge is care the staff various needs and address the gap with them. Managers in critical situations ought to devote their leadership style to contain stress and concerns. As a rule of thumb, staff cooperate more when they are on a common ground with their superiors, in the same situation, and easily to reach and communicate.

Participants in this study stated that the crisis management courses they have enrolled in, and the knowledge they received were very effective in their successful control of the situation. Furthermore, self-management for the managers comes as a pre-requisite to their capability in managing the crisis. Patience, readiness to criticism, and openness to discussion are the most important personality traits and communication skills necessary for managers.

Furthermore, media acted on appreciating the sacrifices of medical staff and boosting their morale, and has greatly reduced the staff resistance to accepting corona patients. Using these strategies is one of the strengths of hospital managers affiliated with TUMS. The findings of this study indicate that the interdepartmental coordination and the harmony between managers and staff, and effective teamwork provided a concrete foundation for better management of this epidemic. These results were consistent with some previous experiences in other countries (17) (21).

Half of the interviewees stated that one of the managerial strengths is the **support the staff receive and the empathy with the senior** hospital managers. In such situation where employees struggle with the fear of being exposed to an unknown virus, and which coerced a group of them to leave their jobs accordingly, managers need to exert a great effort to uphold the morale of their staff. Several researches on human sciences demonstrated that a manager can increase performance and productivity in the organization, and enhance job motivation and satisfaction of employees and reduce stress among them by establishing proper communication and paying attention to their emotions (22).

One of the strengths of the Iranian health care system is the **committed, skillful and experienced retired clinicians** in all medical specialties. The public universities of medical sciences in Iran include thousands of specialists, physicians, and nurses, and many were significantly involved in preparing laboratories and health care centers in response to the pandemic (12).

Lack of facilities and equipment was the most influential structural weakness in the university hospitals. Most of the interviewees in this study believed that facilities such as convenient places for quarantine, as well as the equipment they need, such as ventilators, were not adequately provided. The latest reports from state officials said that these deficiencies are in its way to be addressed, yet, nothing has changed (24). A study conducted in India outlined the measures executed to manage this epidemic and prevent deficiencies: "Implementation of policies in line with the Indian standards depends on the availability of resources for ICUs as well as other departments, publishing guidelines on the rational use of medical resources during epidemics throughout hospitals and care centers for the various departments involved in executing policies" (21). The WHO has also recommended countries affected by the epidemic to take preventive steps against the virus spread including: readiness of health service centers, laboratories and health care providers with adequate protection equipment and upgrading resource management system (25).

Delay in diagnosis of patients was mentioned by the interviewees as the most clinical-diagnostic weakness. This problem can be partly due to not only the few information on the virus profile, but also the relatively long time required to get the results of PCR diagnostic test. Asymptomatic patients were admitted to the wards and were diagnosed with COVID-19 within a few days. Before the outbreak, training sessions were enough to improve the scientific knowledge of the medical staff, conversely, all groups should be enrolled in updated and special scientific webinars or effective preventive and treatment methods.

Having a **capable advisory team** and **holding regular meetings for crisis committee** were crucial to reducing the risk of decisions made. The results of recent decisions were reviewed regularly and the programs were amended or upgraded as needed. The flexibility of programs and the gradual response to challenges were appropriate solutions for similar situations. Also, the importance of preventive precautions these days and not attending gatherings, and the best utilization of virtual activities, were efficient measures in preventing the virus spread. Moreover, numerous virtual meetings and webinars to share expertise were regularly undertaken as fundamental measures.

One of the managerial weaknesses observed in this crisis was the **imbalance in the provision and distribution of medical services** across the country. Despite the importance of prevention in this epidemic, the preventive policies adopted were very weak (14). For instance, there was no quarantine nor severe traffic restrictions in the urban places in the first weeks of the outbreak, even though, this was one of the lessons drawn from the Chinese experience (19).

The level of **delegation in decision-making** was relatively high, and the poor centralized management in hospitals and colleges was recognized. These issues can be attributed to poor knowledge and management skills among officials. This indicates the necessity to employ graduates from management disciplines or carry out training courses on management for the current officials and policymakers. Managers participating in this study acknowledged that the crisis management courses were fruitful.

During the outbreak, many researchers tried to investigate the efficacy of **new or traditional therapies for corona**. To prohibit violation of patients' rights, all researches must be ethically approved before being conducted. For that, an online system has been set up to monitor violations in these studies, thereby, infringements, if happened, should be reported by hospital staff and patients as well.

Another important challenge in research was the **lack of electronic collection of patients' data**. The Iranian health care system was expected to detect the first cases more quickly preceding the death of the first positive case. In other articles, a major challenge appeared early in the epidemic in Iran was the data mismanagement, even though, there are several reporting systems in some provinces (17).

One of the limitations in this research was the generalizability of the results to all hospitals in the country. Furthermore, the study results have been drawn from the interviewees' experiences in the early stages of the outbreak, and this might be emotionally influential or some potential updates might be recently arisen.

Conclusion

The COVID 19 caused situation in most countries highlighted an urgent need to share experiences with other countries more than ever. Although health managers and policymakers in the country have experienced crises such as war, floods, and earthquakes, the COVID-19 infection is unique in its all aspects and consequences. Therefore, this study documented the experiences of senior, middle, and

operational managers at the university and its affiliated hospitals, and introduced the lessons learnt to managers and policymakers accordingly:

1. The officials showed that prevention and preparation stages that should be preceding the crisis have been to some extent neglected, especially in first months, leading into many challenges and problems at hospitals. In such crises, organizations must consider the crisis management cycle and have an emergency plan with high level of preparedness, drills and training.
2. The large number of patient visits to all hospitals at the early months of COVID19 had created overly difficult days and only a few hospitals were assigned to provide services to COVID patients. In this case, policymakers were criticized for not having full assessment of the status quo and better investigation of their decisions. Upon that, all hospitals were tasked to admit these patients and participate in disaster management. Furthermore, the utilization of new and inexperienced facilities for provision of services created many problems during the crisis. It is also noteworthy to avoid rotation of the staff or changing job description in the time of crisis.
3. Addressing the emotions and motivations of employees is entirely essential in crisis management. Given the stress and fear due to this epidemic, staff showed high resistance to decisions, and more absenteeism and even work turnover. This required managers to communicate closely with their staff and show more empathy and compassion, along with seeking the volunteers' services. Public participation and charitable contributions were key for managing the crisis. Time should also be considered as a part of the solution in addition to financial incentives for empowering staff and increasing their engagement. Furthermore, creating a sense of patriotism via playing national anthems continuously and dispatching staff to the holy shrines were also workable.
4. In unpredicted crises, managers encounter the challenge of financing the provision of protective, diagnostic and therapeutic equipment early in the epidemic. In similar situations, managers can establish linkages with the local community to compensate shortcomings via donations, charities, volunteers, etc. These donations should be regulated in a way that assures quality of the instruments and equipment based on well-defined standards. Volunteers and rotated staff in general should also be trained to get familiar with infection control principles before starting their jobs in the workplace. Nosocomial infections were observed in some wards, which may be attributed to the paucity of orientation on the abovementioned issues.
5. Monitoring the provision and distribution of facilities, disposables and equipment is highly essential during crises. One of the major management challenges in this crisis was controlling the use of disinfectants and other disposables. Managers claim that they allocate sufficient quantities in the medical wards, conversely, patients reported significant shortages.
6. The COVID epidemic is a massive crisis that has affected all provinces without an expected end. Given the effect of this crisis on the medical staff and their families and no definitive and unified protocol for treatment and protection, there is a compelling need to provide facilities for the protection of health professionals and also sufficient places for their rest and accommodation. Prior to the crisis, estimations have to be made on alternatives to workforces. It is recommended to have at least 20% as standby staff, count on the clinicians from other specialties, and to send employees

on leave in case of reduced workload. In addition, the clinical training of medical students should be resumed by adopting personal precautionary protocols.

7. The most effective clinical action that can be taken in this situation is to detect the suspected cases at the time of admission, and to isolate them from others. Specific wards should be assigned to these patients, and their diagnostic and therapeutic equipment should be isolated or at least used in shifts. Measures to minimize the unnecessary hospital visits should be taken into account through specific schedules. Providing medical services virtually for elective patients is useful in such enduring situations.
8. This enduring epidemic and its second and third waves have elevated the workload of manpower, and subsequent burnout and psychological harms. Patients also are in a pressing need for psychological support due to the unprecedented circumstances of quarantine. Preparation of useful brochures to guide all in reducing their psychological problems.
9. Contact tracing and directing people who got in contact with COVID patients to refer to health centers for checkup before hospitalization was also a substantial practice.

List Of Abbreviations

1- PPE: personal protective equipment

Declarations

Ethics approval and consent to participate: Initially, the objectives were explained to and informed consent was obtained from all participants, and confidentiality of their personal information were assured at all stages. A permission for recording the interview was granted by the respondents beforehand. Etiquette and respect during the interview were important for mutual trust and observed throughout the process. Avoidance of leading questions, prejudice and preconceived ideas were also observed. Ethical clearance was also obtained from TUMS' ethical committee (IR.TUMS.VCR.REC.1399.008).

All methods were also carried out in accordance with relevant guidelines and regulations.

Consent for publication: Not applicable

Availability of data and materials: • The datasets used and/or analysed [transcripts] during the current study are available from the corresponding author on reasonable request.

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Authors' contributions: AL has originated the initial idea and contributed in data collection. EJP has conducted the data analysis and drafted and finalized the manuscript following the all comments. MJ has commented on all parts of the research and manuscript. MM has assisted in the data analysis and drafting the manuscript. All authors have read and approved the final manuscript.

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Figures

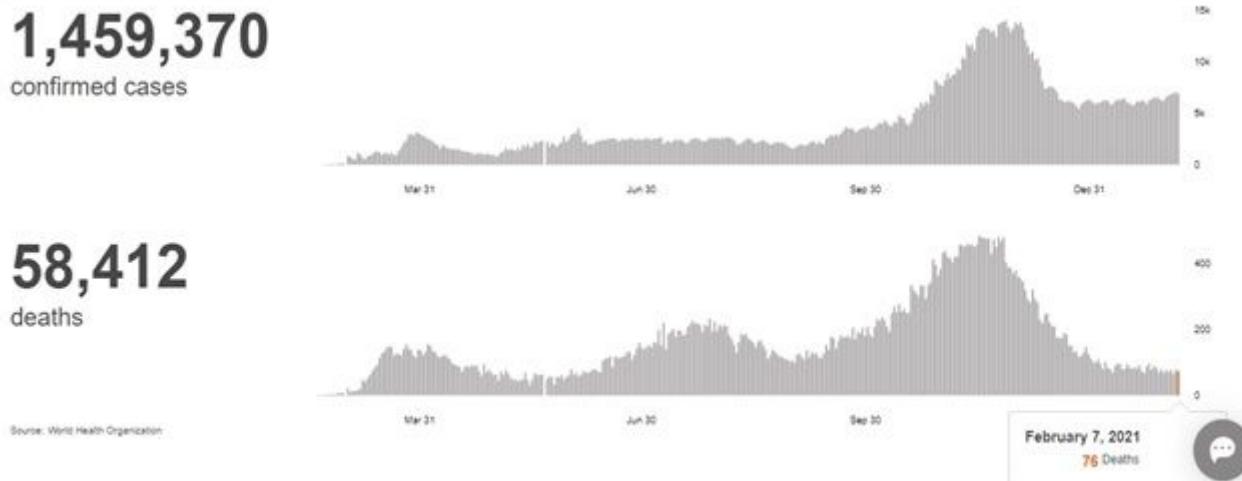


Figure 1

The mortality and morbidity of Covid_19 in Iran (7 February 2021)