

Structural and functional analysis of emergency departments in Amman, Jordan: implications for future development

Seif L. Nasir

University of Nebraska at Omaha, Omaha, NE, USA.

This study investigates the current state of emergency healthcare delivery in Amman, Jordan. The first of its kind, the study uses a cross-sectional questionnaire, distributed to 40 hospitals in Amman, in order to assess the accessibility of equipment and medication, as well as the structure and function of emergency departments. Results indicate that although emergency departments in Amman are generally well equipped according to World Health Organization guidelines, variability in departmental processes and available equipment as well as staffing, training and overcrowding remain significant challenges. Discussion revealed that many physicians felt that improvements in staff training would improve the delivery of emergency care. Overcrowding of emergency departments and unnecessary use by low acuity patients also interferes with delivery of appropriate care to critical patients and may drive up healthcare costs. Respondents discussed the need for the development of a formal trauma unit, priority triage screening for critical patients and pre-hospital care and coordination. Further studies are needed to explore these and other aspects of emergency care in Jordan.

Introduction

Deaths due to emergencies, which are acute illnesses or injuries that pose an immediate risk to the life or long-term health of an individual such as poisonings, seizures, cardiac arrest and motor vehicle accidents, among others, are the leading causes of mortality worldwide in individuals 46 years old or younger.¹ Thus, the availability of a well-equipped emergency department is a necessary component in the medical sector of any country aiming to reduce deaths by emergencies.

The vast majority of developing countries lack an efficient system for delivering emergency medical services to those in need because of the high costs of physical and organizational infrastructure such as adequate medical transportation and civilian response to an emergency scenario.² Smith and Haile-Mariam proposed that the following qualities are crucial for the development of emergency medicine (EM) in any country: 1) physicians interested in establishing EM as a specialty; 2) governmental support; 3) support from other physicians and hospital personnel and 4) infrastructural components, including facilities, training, transport and communication.² More recent literature indicates that the development of EM around the globe depends on a number of additional variables including status of health, burden of disease, resource availability and public demand.³

Many Middle Eastern nations are just beginning to develop emergency medical education and treatment programs. Lebanon's medical certification board, for example, recognized EM in 1993, 14 years after EM was recognized by the American Board of Medical Specialties in 1979.⁴ An article published in the *Journal of Emergency Medicine* discusses the difficulties encountered during the development of Lebanon's emergency medical sector, which include a lack of physicians willing to practice emergency medicine, an underdeveloped insurance and physician compensation system

and a shortage of residency opportunities.⁵

Overcrowding in emergency departments (EDs) has been observed as a factor that may negatively impact a department's ability to deliver medical care efficiently. An analysis of the utilization of EDs in Kuwait concluded that emergency physicians classified 61% of cases seen in the ED as urgent and only 2% as life threatening.⁶ A similar study from a Jordanian hospital in 2000 classified 8.8% of ED visits as urgent or life threatening.⁷ The study further suggests that other elements, such as geographical, social and psychological factors—like travel distance to the hospital, advice from friends and relatives, and the patient's experience of illness—can play a role in a patient's decision to attend an ED for medical care, which may contribute to overcrowding. Many other articles have discussed the impact of the unnecessary use of emergency departments, particularly by patients who are seeking the services of a primary care physician, on treatment costs and the timely receipt of care.^{8–10}

Background

An EM residency program developed in Jordan in 2003 and has expanded to 4 residency programs with 50 resident positions in 2014, all of which are sponsored and run by the Jordanian Ministry of Health (personal communication).

The Ministry of Health (MoH) is the major provider of health-care services to Jordanian citizens. The Ministry is a government institution that operates 31 hospitals throughout the country and provides health care services to approximately 69.6% of the population. Approximately 30% of the population is uninsured. The MoH's outreach goal is to provide access to primary health care for all Jordanian citizens, and does so through its own insurance program (the Civil Insurance Program), in addition to providing full medical coverage for children less than six years of age.¹¹

The Jordan Medical Council (JMC) is the only organization in Jordan responsible for the accreditation of medical training programs in the country. Until 1982, subspecialty training programs were not endorsed by the JMC, and only in 1989 did the JMC accredit a training program for family physicians with a desire to work in the EM sector. In 2003, emergency medicine was recognized as an independent subspecialty by the JMC, and residency programs were developed to train emergency medical specialists.¹²

Recently, the Ministry of Health has taken steps toward the development of the emergency health sector and published a set of service standards for general hospitals that includes recommended equipment and medication for the operation of an emergency department.¹³ In 2007, the foundation of the Health Care Accreditation Council (HCAC) introduced a voluntary program to reward the delivery of quality care in several departments, including EDs. Currently, seventeen hospitals in Jordan hold HCAC accreditation, twelve of which are located in Amman (personal communication).

With the relatively recent establishment of the EM sector in Jordan, very little information regarding access or quality of emergency healthcare services in Jordan is available for analysis or review. The purpose of this study is to determine the availability of essential equipment and medication in a sample of emergency departments and to provide an informal assessment of conditions and opportunities for improvement of those departments in the capital city of Amman. Identifying strengths and weaknesses present in EDs may help to raise awareness about the current state of the emergency health care sector and help to address health inequities and improve patient outcomes. This study also aims to open a general discussion in the medical community about the development of emergency medicine as an indispensable specialty in the Jordanian healthcare sector.

Methods

The study was executed using a cross-sectional survey that consisted of 30 yes/no/sometimes questions and three short-answer questions (see Appendix). Since no widely-accepted standards

for the quality of emergency services are known to exist, the researcher developed the questions using the Jordanian Ministry of Health and World Health Organization guidelines for emergency department service standards as references.^{13,14} The questions developed were focused on determining the availability of essential equipment and medication in emergency departments. The short-answer questions were designed with the aim of identifying the perceived strengths and weaknesses in the emergency department as well as potential future developments in emergency care. Once the survey was developed, it was reviewed and approved by the School of International Training in Jordan's International Review Board (IRB).

This study was carried out in Amman, the capital city of Jordan, which hosts a population of approximately four million, making up 61% of the total population of the country. A list of all of the hospitals in Amman was compiled and then refined to include only hospitals with emergency rooms. The end result was a list of 43 hospitals from private, public and military sectors. The researcher visited and distributed questionnaires to 40 of these hospitals (two military hospitals and one private hospital followed protocols that did not permit undergraduate research). Ultimately, the study achieved a response rate of 57.5% (23 hospitals). Questionnaires were distributed to the physician director of the emergency departments of each of these hospitals, with the exception of two departments, in one of which the survey was completed by the head staff nurse, and by a medical resident rotating in the emergency department in the second.

Some respondents elaborated on certain aspects of the survey questions. The researcher carried out short interviews with the study subjects and recorded and analyzed the data along with answers from the corresponding yes/no/sometimes questions.

Quantitative data (Appendix) were coded and entered into a spreadsheet, and the percentages of EDs with essential equipment were calculated. In addition, trends regarding the quality and preparedness of emergency departments in the surveyed hospitals were evaluated. Qualitative data from the short-answer questions were examined and then condensed into keywords that reflected participants' thoughts about factors influencing the quality of care and working conditions in the emergency department. The keywords from each surveyed hospital were then compared and contrasted with one another in order to determine trends in physician attitudes towards the development of emergency medical services in Jordan.

Results

Quantitative Data

After review and analysis of the data, it was found that all of the responding EDs were open 24/7. An average of 9.3 physicians worked in each emergency department. Participants reported an average of 126.2 total hospital beds. Emergency departments averaged 15.4 beds per department; the largest had 60 beds, and the smallest, one bed. This statistic translated to an average of 12.1% of all hospital beds in the study sample being emergency department beds.

Of the 23 departments responding, 22 indicated that the hospital owned a private ambulance. A majority (73.9%) reported that patients accessed the emergency department via private transport (private vehicle or on foot). Six hospitals (26.1%) reported that patients arrived in equal numbers by ambulance and private transport.

61 percent of EDs reported having a system for screening and triaging undifferentiated patients based only on urgency of presentation (case urgency). The remainder of the hospitals employed single-discipline emergency rooms, in which the ED is divided into sections dedicated to the treatment of a particular subset of cases (case specialty)—for example, surgical emergencies, obstetric and gynecological emergencies, pediatric emergencies or medical emergencies (Table I).

Emergency Capabilities

Table II displays the percentages of departments that are equipped to handle particular classifications of emergencies. 91.3%



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(21) of EDs reported having the capability to handle cardiac emergencies. 91.3% (21) reported availability of cardiac equipment. Only one department of the 23 respondents reported not having an electrocardiograph (EKG machine), and the same numbers applied to the presence of cardiac medication and access to ancillary electrocardiography services (Tables III-V). Burns are handled by 82.6% (19) of EDs (three departments responded "sometimes" for treatment of burns and are not included in this statistic). Only 47.8% (11) of departments managed ophthalmic emergencies. Those whose hospitals did not treat such emergencies stated that their hospitals had designated ophthalmology clinics that handled the majority of ophthalmic cases (Table II).

All emergency departments that answered the questionnaire had oxygen delivery capability, whether freestanding oxygen tanks or a central oxygen system. Code carts and pulse oximetry equipment were reported to be present by 95.6% (22) of respondents. Five departments (26.1%) did not have access to respiratory therapy services within their hospital, and two (17.4%) did not have access to an anesthesia department (Table III).

All emergency departments reported having anti-inflammatory medications. Only 17 EDs (73.9%) reported having antidotes for poisoning. One department reported not having medications for cardiac cases, seizures, respiratory distress and burns, and one department reported not having access to sedatives (Table IV).

One of the emergency departments reported not having or using personal protective equipment, including examination gloves, face masks and eye protection (Table V).

Qualitative Data

The first short-answer question on the questionnaire discussed factors that the department respondent felt would make working at the emergency department easier (Section VI, Appendix). The most common answer, suggested by eight participants (34.7%), was increased physician staffing of the ED. Many also added that additional physicians should be emergency medicine specialists. The one medical resident that completed the questionnaire mentioned that her colleagues were often frustrated to receive emergency medicine training from a general practitioner, and felt that a higher standard of care could be expected from residents trained by emergency medical specialists. Some participants felt that more nurses were needed on the ED staff, and some felt that their current nursing staff needed better training.

A number of respondents voiced interest in expanding the ED to accommodate a greater number of patients and ancillary services. Some physicians elaborated by including specific facilities that they felt should be present in the ED, such as X-ray and MRI machines, respiratory therapy, a pharmacy and triage beds. One physician mentioned that the insufficiency of equipment and services was aggravated by the absence of an organizational system for available resources, and that equipment often needed to be retrieved from other departments.

Respondents from seven departments cited the need for a formal trauma system, including priority triage screening, equipment and emergency or trauma specialists, to improve both working conditions and patient outcomes. Eleven respondents discussed the lack of proper pre-hospital care provided to patients, and two physicians felt outcomes would be improved if paramedics triaged patients in a pre-hospital setting. The same 11 respondents also suggested that a paramedic program should be developed, and that only certified paramedics should operate ambulances and provide pre-hospital care. One physician added that a way to communicate with Civil Defense (public sector) ambulances should be available to all emergency departments in order to allow the ED staff to assess and prepare for incoming cases.

Two respondents mentioned high rates of unnecessary emergency department visits from patients seeking the services of a primary care physician. Problems with overcrowding caused by the families of patients, even in examination rooms, were also mentioned. Both participants felt that patient education campaigns, including pamphlets, television programs and radio programs that instruct patients about what illnesses or injuries warrant a visit to the ED would be useful. One physician discussed the importance

of promoting the role of primary health care clinics, both to prevent the abuse of the emergency department and reduce the incidence of ED visits. Two respondents indicated that an important reform of the emergency department would be to focus on triaging patients based on the urgency of presentation (case urgency) rather than the medical discipline of the emergency (case specialty). One

Characteristic	Number of EDs (Percentage)
Open 24/7	23 (100%)
Own private ambulance	22 (95.6%)
Patients arriving by private transport	17 (73.9%)
Triage by urgency	14 (60.8%)
Triage by discipline	9 (39.2%)

Table I: General characteristics of reporting EDs (23).

Service	Percentage
Cardiac	91.30%
Obstetric	56.50%
Ophthalmic	47.80%
Orthopedic	86.90%
Burns	82.60%
Pediatric	78.20%

Table II: Percentage of emergency departments that provide specialty services

Ancillary service	Percentage
Lab	95.60%
Radiology	95.60%
Anesthesia	82.60%
Respiratory therapy	73.90%
Electrocardiography	95.10%

Table III: Percentage of emergency departments with access to ancillary services.

Medication	Percentage
Antidote	73.90%
Cardiac	95.60%
Seizure	95.60%
Inflammation	100.00%
Respiratory distress	95.60%
Burns/skin irritation	95.60%
Sedation	95.60%

Table IV: Percentage of emergency departments with access to medications.

Equipment	Percentage
EKG	95.60%
Code cart	95.60%
O2 source	100.00%
Pulse oximetry	95.60%
X-Ray	91.30%
Ultrasound	91.30%
CT scan	82.60%
Personal protective equipment	95.60%

Table V: Percentage of emergency departments with access to equipment.

department reportedly hoped to introduce the specialty-directed approach. However, all hospitals that commented on the availability of specialists agreed that a family medicine clinic (or a 'fast track' or 'urgent care') should be available to deal with non-critical cases that present to the emergency department.

Two departments commented on the need to reform the

medical insurance programs available to patients. They reported that many patients are turned away from of important care after initial stabilization in the emergency department for financial reasons. They felt that it was their duty as physicians to provide care to all people who come to their department. The physicians suggested that the adoption of electronic patient record systems that would allow physicians and administration to access patient information including insurance status, family history and medication history may be helpful. One physician suggested that this information should be on a network accessible to all hospitals to reduce the number of patients seeking illicit medications from multiple hospitals.

The final question presented on the questionnaire inquired about future developments that physicians would like to see in their emergency department. The most common response was "more beds" (17.3%), followed closely by the adoption of a computerized patient record system (13%) and improvement of access to ancillary facilities (13%). Responses pertaining to both the development and renovation of the facilities in the department, as well as space and accommodation, were also common.

Discussion

Strain on Jordanian EDs is a very important issue. This strain leads to difficulties in providing the highest quality of care. Improving the quality of ED care entails adopting a priority screening system and ensuring the availability of equipment, medications and sufficient accommodation for incoming patients, according to the study respondents.

Improvement of pre-hospital care, particularly first-responder and emergency transport, was addressed by many of the respondents. Many discussed the fact that emergency medical technicians do not have to be licensed paramedics and that this negatively affects the outcomes of patients arriving via medical transport. Developing and implementing a graduate-level paramedic course at universities and health centers throughout Jordan would create a skilled workforce able to provide quality care on-site of an emergency.

Although this study suggests that emergency departments in Amman are generally well equipped and reasonably staffed, the data collected suggests that there may be inconsistencies in the available equipment and facilities between departments that may lead to significant variations in the quality of care. In order to reduce these variations, EDs should meet certain criteria in order to be classified as such. Criteria might include the presence of certain equipment and medication, the availability of trained EMTs and a rotating staff of specialized emergency physicians. Ideally, the criteria would be created and regulated by an objective third party, such as the Health Care Accreditation Council, in a similar

manner to that of the Joint Commission in the United States. However, it is also important for departments to have the capacity to monitor their own performance and foster a culture of self-improvement.

Physicians included in the study mentioned that although space for patient accommodation was an issue in the ED, hospitals and EDs also need to consider the availability of physicians and other qualified medical staff. Participants perceived that there is a growing demand for emergency medical care. They felt that this demand is influenced by factors such as increases in population and urbanization and is outpacing the emergency physician supply. Participants felt that complex emergencies are difficult to deal with because of this. By supporting the development of emergency medicine as an independent specialty, physicians will be able to provide the highest quality of focused care to patients in need. The training of nurses as well as paramedics and non-medical staff rotating in the emergency departments should also be addressed. Many nurses educated in Jordan tend to leave the country following their professional education to work abroad for higher salaries. Hiring more highly qualified nurses and providing continuing education programs for nurses and physicians will keep staff members up to date on medical developments and findings, and help guarantee that patients are receiving the best quality of care available.

Promoting primary care and public health infrastructure is essential to reducing the incidence of medical emergencies. Identifying factors that have negative impacts on health, particularly accidents and injuries, and targeting them with programs that educate the public and reduce health inequalities may help reduce overcrowding, abuse and costs of receiving care in an emergency department. Doing so is equally important to forming a framework for the development and growth of the emergency medical sector in Jordan.

Conclusion

This study assessed the quality of emergency health care in Amman, Jordan as a function of the availability of essential emergency equipment and perceptions of ED workers, which are variables that may or may not reflect the actual quality of care delivered. In addition, it is possible that the EDs that did not participate in the study had significantly different characteristics, which may have affected the results. However, as the first study of its kind, it may help lay the groundwork for future studies of the emergency health care sector in Jordan. Future work is needed to explore these factors in more depth, including emergency medical services and transport, emergency medical education, public health education and the relationships between the EDs and the hospital system. Other topics for further research might be exploration of demographics of emergency patients and the opinions of patients regarding the quality

and accessibility of emergency care. Expanding the focus of research to rural areas might also be helpful to the further development of the emergency sector in Jordan.

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