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Interfacility patient transfers in Lebanon—A culture-changing initiative to improve patient safety and outcomes

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Abstract

Organizing interfacility transfers is an essential component of regionalized care to improve patient outcomes. This study examines transfer characteristics after establishing a transfer center in a tertiary care center in Beirut Lebanon, and identifies predictors of success in patient transfers.

This retrospective observational chart review examined all transfer center requests to and from the tertiary care center over a 4-year period (2013–2017). Descriptive analysis was done, followed by a bivariate analysis comparing transfers based on final decision (accepted yes/no) and by a multivariate logistic regression to identify predictors of successful transfers.

A total of 4100 transfer requests were analyzed. Incoming transfer requests were more common than outgoing requests (56.5% vs 43.4%) and were mainly for adult patients (71.0% incoming and 78.7% outgoing). Reasons of transfers were mostly medical (99.4%) for incoming transfers and financial (73.1%) and medical (17.9%) for outgoing transfers. Requested level of care was most commonly intensive care unit for incoming transfers (61.6%) and regular floor for outgoing transfers (48.6%). Outgoing transfers were more successful than incoming transfers (59.9% vs 39.6%). Predictors of success in patient transfers within the healthcare system were identified: These included specific types of financial coverage, diagnoses, levels of care, and medical services for incoming transfers in addition to age groups and receiving hospital location for outgoing transfers.

Transfer centers can be implemented successfully in any healthcare system to improve patient care and safety. Identifying facilitators and barriers to successful transfers can help healthcare administrators and policymakers address gaps in the system and improve access to care.

Abbreviations: EMS = emergency medical services, EMTALA = emergency medical treatment and labor act, ICU = intensive care unit, IFT = interfacility transfer.

Keywords: interfacility transfer, Lebanon, outcome, patient safety, regionalization, transfer center

1. Introduction

Regionalization aims at improving patient outcomes and reducing waste in care delivery, in developed and organized healthcare systems through "an active process by which patients are appropriately matched to appropriate resources."[1] For patients with emergency medical conditions, such as trauma, acute myocardial infarction or stroke, expedited and appropriate patient transfers allow for improved timely access to definitive care at predesignated healthcare facilities.[2–8] The healthcare community is also in agreement that medical care must be regionalized to safeguard equity, justice, and to improve patient care.[8]

For regionalization to work, the system must have accountability, transparency and high levels of communication and collaboration between different entities including emergency medical services (EMS), hospitals and healthcare providers.[8,9] Categorization of hospitals based on their acute care capabilities is also required. In such healthcare systems, interfacility transfers can occur for a number of reasons including patient preference, unavailable provisions at the transferring facility, predesignated coverage at selected facilities, financial motives, as well as need for specialized care. Research has shown that well-coordinated interfacility transfers result in improved patient outcomes and increased economic and administrative benefits.[10] In fact, the lack of transfer procedures and of proper communication can have a deleterious effect on patient quality of care.[10]

The healthcare system in Lebanon, similar to most developing countries, lacks essential elements for successful care regionalization. Despite having highly advanced tertiary care centers, the categorization of acute care facilities, that are mostly private, is lacking. Communication and coordination between EMS and hospitals, and between hospitals is also deficient.[11] This results in healthcare access issues and interruption in care continuity and

Editor: Rana El Feghaly.

The authors have no conflicts of interest to disclose.

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Medicine (2019) 98:25(e15993)

Received: 30 January 2019 / Received in final form: 8 May 2019 / Accepted: 16 May 2019

http://dx.doi.org/10.1097/MD.0000000000015993

coordination. Prehospital providers are mostly volunteers trained at the Basic life Support level. National standards for EMS in addition to medical oversight of prehospital care activities are also lacking.[11] Interfacility transports, including those of critical care cases, are carried out by local EMS agencies and by some hospital-owned crews in the absence of prehospital triage criteria, treatment protocols or interfacility transfer guidelines. Patients' needs are often not met during transport. Moreover, communication is limited in such cases to inquiring from receiving hospitals whether they have a bed reserved for the patient or not. As a result, interfacility transfers in Lebanon are frequently patient initiated, poorly coordinated and unexpected at receiving facilities leading in some cases to re-transport to other facilities. This led to a growing number of problems including ED overcrowding, in addition to adverse patient outcomes such as clinical deterioration and in some cases death during transports.

In the absence of a national plan to organize the system and in order to address these problems at a facility level, the American University of Beirut Medical Center (AUBMC) a large tertiary care center and a major national and regional referral center in Beirut Lebanon, created in 2012 a patient transfer center. Its goals were to improve care coordination and patient safety and to ensure care continuity during patient transfer. All interfacility transfers in or out of that facility were centralized to a transfer center. All agencies and hospitals requesting transfers would be referred to the transfer center.

Transfer centers in the United States have previously shown benefits in streamlining the process of interfacility transfers. Kansas University Medical Center, for example, showed better quality transfers after the initiation of a transfer center.[12] The implementation of a transfer center allowed for meeting national obligations for interfacility transfers such as the emergency medical treatment and labor act (EMTALA).[12] Additionally, Kansas University Medical Center and Albany Medical Center experienced decreased ED overcrowding as well as an overall increase in patient satisfaction.[12]

This study describes a patient safety initiative aiming at organizing patient transfers in a setting with limited regulations and government oversight, and presents the results of this implementation in terms of transfer characteristics, patterns and reasons for transfers. It also aims at guiding policymakers and healthcare leaders to expand such initiatives and to organize the overall system for improved patient safety and outcomes by examining specifically predictors of success in patient transfers.

2. Methods

2.1. Design and data

A retrospective observational chart review was carried out of all requests for transfer to and from AUBMC through the transfer center over a 4-year period (January 1, 2013 and January 1, 2017). The Institutional Review Board at the American University of Beirut approved this study.

2.2. Setting

The study was carried out at the AUBMC, one of the largest tertiary care centers in Beirut, Lebanon. AUBMC is a 420-bed university hospital in Beirut serving a local population of approximately 2.4 million. AUBMC serves as a national and regional referral center. The emergency department at AUBMC has around 55,000 patients visits per year. The transfer center at AUBMC was launched in 2013, after successful lobbying at the organization level, in order to streamline the transfer process and centralize it to ensure care coordination and communication and patient safety for patients transferred in and out of AUBMC. Guidelines for patient transfers were adopted from different international sources mainly the US. National Highway Traffic Safety Administration.[13] Policies and procedures for transfers were put in place and followed US regulations such as EMTALA to prevent "patient dumping" and to ensure appropriate patient transfers.[14] Part of the transfer process, staff (communication specialists and nurse case managers) in the transfer center collect essential patient related information (demographic and medical) through phone encounter and electronic communication. Once an appropriate disposition is identified (patient preference, hospital, medical service, and level of care), a conference call is arranged between referring and accepting provider. Bed reservation and transportation requirements in addition to needs during transports are also requested.

2.3. Inclusion/exclusion criteria

All patients who have attempted transfer to or from our facility via the transfer center were considered eligible for inclusion in this study. Patients who transferred to our facility via means other than the transfer center (outside transfer center operating hours) were excluded from the study. Patients with incomplete or pending applications were also excluded.

2.4. Data collection and statistical analysis

Data was collected from transfer center application records, emergency department and hospital records. Transfer diagnosis data element was re-coded using Clinical Classifications Software codes (equivalent to International Classification of Diseases, 10th Revision as per Healthcare Cost and Utilization Project groupings).[15]

Descriptive analysis was done in IBM-SPSS 24.0. Mean and standard deviation were used for continuous variables, and number and percent for categorical variables. Bivariate comparisons of clinical, demographic, and outcome variables for the various study groups (by decision type) was done using the student *t* test, Chi square, or Fishers exact test as appropriate. This was followed by conducting a multivariate logistic regression analysis using a backward selection procedure to determine predictors of success in patient transfers (both incoming and outgoing). A *P*-value less than .05 was used to denote statistical significance.

3. Results

A total of 4100 transfer requests were handled by the transfer center during the study period (4 years). The number of transfer requests increased gradually over the study period to reach 1102 requests in 2017. Incoming transfer requests were more common than outgoing requests (n=2317, 56.5% vs n=1783, 43.4%). Transfers involving adult patients constituted the majority of both incoming (71.0%) and outgoing (78.7%) requests. Incoming transfers were mostly from hospitals outside Beirut and suburbs (62.4%) and outgoing transfers were mostly to hospitals located inside Beirut and suburbs (52.3%). Patients needing transfers had different types of financial coverage

Table 1

Population characteristics.

	Incoming transfer requests n (%)	Outgoing transfer requests n (%)
Total	2317	1783
Yr		
2013	319 (13.8%)	297 (16.7%)
2014	372 (16.1%)	293 (16.4%)
2015	436 (18.8%)	293 (16.4%)
2016	561 (24.2%)	427 (23.9%)
2017	629 (27.1%)	473 (26.5%)
Age		
Adults	1645 (71.0%)	1403 (78.7%)
Neonates (<1 mo)	9 (0.4%)	9 (0.5%)
Pediatrics (<18 yr)	663 (28.6%)	371 (20.8%)
Facility location*		
Beirut (and suburbs)	719 (31.1%)	828 (52.3%)
International	149 (6.5%)	106 (6.7%)
Local	1442 (62.4%)	649 (41.0%)
	Missing = 7 (0.3%)	Missing = 200 (11.2%)
Financial coverage		
Social security fund/COOP	610 (26.3%)	582 (32.6%)
Governmental fund/MOH	153 (6.6%)	248 (13.9%)
International fund/NGO	198 (8.5%)	126 (7.1%)
Private insurance	566 (24.4%)	325 (18.2%)
Security forces	379 (16.4%)	65 (3.6%)
Self	684 (29.5%)	640 (35.9%)
Other	37 (1.6%)	5 (0.3%)
Reason for transfer		
Administrative	13 (0.5%)	77 (4.4%)
Financial	2 (0.1%)	1286 (73.1%)
Medical	2302 (99.4%)	315 (17.9%)
Personal	–	81 (4.6%)
		Missing = 24 (1.3%)

COOP = cooperatives, MOH = Ministry of Health, NGO = non-governmental organization.
* Facility location is location of referring facility for incoming transfers and receiving facility for outgoing transfers.

Table 2

Transfer requests medical characteristics.

	Incoming transfer requests n (%)	Outgoing transfer requests n (%)
Medical services		
Chronic care	–	264 (14.9%)
Emergency department	14 (0.6%)	8 (0.5%)
Family medicine	3 (0.1%)	8 (0.5%)
Internal medicine	814 (35.4%)	652 (36.8%)
Neurology	198 (8.6%)	116 (6.6%)
Obstetrics/gynecology	24 (1.0%)	23 (1.3%)
Ophthalmology	–	1 (0.1%)
Pediatrics	569 (24.8%)	334 (18.9%)
Psychiatric	7 (0.3%)	53 (3.0%)
Surgery	638 (27.8%)	258 (14.6%)
Other	31 (1.3%)	53 (3.0%)
	Missing = 19 (0.5%)	Missing = 13 (0.7%)
Level of care		
Chronic care	–	267 (15.2%)
Intensive care unit	1414 (61.6%)	599 (34.0%)
Regular floor	836 (36.4%)	857 (48.6%)
Operating room	4 (0.2%)	4 (0.2%)
Other	41 (1.8%)	35 (2.0%)
	Missing = 22 (0.9%)	Missing = 21 (1.2%)
Diagnosis category		
Infectious diseases	108 (4.7%)	33 (1.9%)
Neoplasms	129 (5.6%)	101 (5.7%)
Endocrine/nutritional/metabolic/ immunity	53 (2.3%)	48 (2.7%)
Blood and blood-forming organs	77 (3.3%)	41 (2.3%)
Mental illness	12 (0.5%)	60 (3.4%)
Nervous system and sense organs	319 (13.8%)	149 (8.4%)
Circulatory system	529 (22.8%)	335 (18.8%)
Respiratory system	353 (15.2%)	264 (14.8%)
Digestive system	189 (8.2%)	133 (7.5%)
Genitourinary system	75 (3.2%)	105 (5.9%)
Pregnancy complication/childbirth/ puerperium	27 (1.2%)	18 (1.0%)
Skin and subcutaneous tissue	31 (1.3%)	27 (1.5%)
Musculoskeletal system and connective tissue	25 (1.1%)	29 (1.6%)
Congenital anomalies	187 (8.1%)	107 (6.0%)
Perinatal period conditions	63 (2.7%)	29 (1.6%)
Injury and poisoning	312 (13.5%)	193 (10.8%)
Ill-defined conditions/health status factors	237 (10.2%)	197 (11.0%)
Residual codes; unclassified; all E codes	237 (10.2%)	111 (6.2%)

(insurance status) including Social Security Fund, private insurance or self-pay. Reasons of transfers were mostly medical (99.4%) for incoming transfers while outgoing transfers were mostly financial (73.1%) and medical (17.9%) (Table 1).

The medical services requested were mostly Internal Medicine and Pediatrics for both incoming and outgoing transfers. Intensive care unit (ICU) level was the most common level of care requested for incoming transfers (61.6%) while regular floor care was most common for outgoing transfers (48.6%). Most common diagnoses for patients needing transfers belonged to circulatory and respiratory systems for both incoming and outgoing transfers (Table 2).

Transfer acceptance was more common for outgoing transfers (59.9%) than for incoming transfers (39.6%). Most common reason for transfer failure was financial for incoming transfers (48.8%) and bed availability for outgoing transfers (61.3%). Other reasons for failed transfers included medical and patient-related (patient canceled the request or rejected proposed facility). Decision for majority of incoming transfers (97.1%) was finalized during the same day of transfer request initiation with a median for turnaround time for "call to medical decision" of 55 min (interquartile range 20–120) (Table 3).

When examined by final decision type (accepted yes/no) and stratified by transfer type (incoming vs outgoing), several variables were noted to be significantly different between the 2 groups (Table 4).

Predictors of successful transfers were identified using a multivariate logistic regression (Table 5). For incoming transfers, predictors included: specific types of financial coverage (international fund, private insurance, security forces, self-payer, and other) and specific diagnoses (neoplasm, circulatory system, congenital anomalies, and injury and poisoning). Patients who had government/MOH type of financial coverage, who needed neurology as medical service, who required an intensive care level bed or those with "ill-defined conditions" as diagnosis were less likely to be accepted (Table 4). For outgoing transfers, positive predictors of accepted transfers included: pediatrics/neonates age group, specific receiving location of hospital (international or

Table 3

Transfer process characteristics.

	Incoming transfer requests n (%)	Outgoing transfer requests n (%)
Decision type		
Accepted	915 (39.6%)	1060 (59.9%)
Cancelled	427 (18.5%)	385 (21.8%)
Denied	898 (38.8%)	194 (11.0%)
Incomplete	72 (3.1%)	130 (7.3%)
	Missing = 5 (0.2%)	Missing = 14 (0.8%)
Reason for denial	(N = 898)	(N = 194)
Bed availability	127 (14.1%)	119 (61.3%)
Financial	438 (48.8%)	35 (18.0%)
Medical	322 (35.9%)	27 (13.9%)
Patient related (refused/cancelled)	11 (1.2%)	9 (4.6%)
Unknown	–	4 (2.0%)
Transfer completed		
Yes	949 (41.0%)	1062 (59.8%)
No	1328 (57.3%)	603 (34.0%)
Incomplete	5 (0.2%)	–
Not applicable	21 (0.9%)	53 (3.0%)
Pending	14 (0.6%)	57 (3.2%)
		Missing = 8 (0.4%)
Mode of transfer	(N = 949)	(N = 1062)
Private ambulance	123 (13.0%)	160 (15.1%)
EMS	826 (87.0%)	902 (84.9%)
Time to medical decision		
Within 1 d	1273 (97.1%)	–
More than 1 d	38 (2.9%)	–
	Missing = 1006 (43.4%)	
Time interval process time to decision time	Mean ± SD	Median (IQR)
Time, min	148.95 ± 314.97	55 (120–20)

EMS = emergency medical services, IQR = interquartile range, SD = standard deviation.

Table 4

Comparison of variables by decision type "accepted.".

	Decision type (accepted)		
Incoming transfer requests	No n (%)	Yes n (%)	*P*-value
Financial coverage			
Social security fund/COOP	431 (30.9%)	179 (19.6%)	<.001
Governmental fund/MOH	108 (7.7%)	45 (4.9%)	.008
International fund/NGO	64 (4.6%)	134 (14.6%)	<.001
Private insurance	247 (17.7%)	318 (34.8%)	<.001
Self	473 (33.9%)	208 (22.7%)	<.001
Other	13 (0.9%)	23 (2.5%)	.003
Medical services			
Internal medicine	504 (36.5%)	307 (33.6%)	<.001*
Pediatrics	319 (23.1%)	250 (27.3%)	
Surgery	367 (26.6%)	270 (29.5%)	
Emergency department	5 (0.4%)	9 (1.0%)	
Family medicine	0 (0%)	3 (0.3%)	
Neurology	144 (10.4%)	54 (5.9%)	
Obstetrics/gynecology	12 (0.9%)	12 (1.3%)	
Psychiatric	6 (0.4%)	1 (0.1%)	
Other	22 (1.6%)	9 (1.0%)	
Level of care			
Intensive care unit	892 (64.8%)	519 (56.7%)	<.001*
Regular floor	464 (33.7%)	371 (40.5%)	
Operating room	2 (0.1%)	2 (0.2%)	
Other	18 (1.3%)	23 (2.5%)	
Diagnosis category			
Infectious diseases	77 (5.5%)	31 (3.4%)	.018
Endocrine/nutritional/metabolic/immunity	41 (2.9%)	12 (1.3%)	.011
Nervous system and sense organs	218 (15.6%)	101 (11.0%)	.002
Circulatory system	290 (20.8%)	239 (26.1%)	.003
Respiratory system	235 (16.8%)	117 (12.8%)	.008
Congenital anomalies	68 (4.9%)	119 (13.0%)	<.001
Injury and poisoning	161 (11.5%)	150 (16.4%)	.001
Ill-defined conditions/health status factors	166 (11.9%)	70 (7.7%)	.001
Residual codes; unclassified; all E codes	160 (11.5%)	77 (8.4%)	.019

	Decision type (accepted)		
Outgoing transfer requests	No n (%)	Yes n (%)	*P*-value
Yr			
2013	128 (18.1%)	167 (15.8%)	.039
2014	114 (16.1%)	179 (16.9%)	
2015	116 (16.4%)	177 (16.7%)	
2016	190 (26.8%)	237 (22.4%)	
2017	161 (22.7%)	300 (28.3%)	
Facility location			
Beirut (and suburbs)	272 (50.2%)	553 (53.4%)	<.001
International	16 (3.0%)	89 (8.6%)	
Local	254 (46.9%)	394 (38.0%)	
Financial coverage			
Social security fund/COOP	259 (36.5%)	319 (30.1%)	.005
Private insurance	111 (15.7%)	210 (19.8%)	.026
Diagnosis category			
Injury and poisoning	62 (8.7%)	130 (12.3%)	.02

Incoming transfers: Additional variables compared but were nonsignificant included: Yr, age, facility location. Outgoing transfers: Additional variables compared but were nonsignificant included: Age, reason for transfer, level of care, and medical service.

COOP = cooperatives, MOH = Ministry of Health, NGO = non-governmental organization.

* Indicates that the *P*-values were calculated using the Fisher exact test.

Wherever no asterisk was displayed the Pearson Chi-Square test was used to calculate the *P*-values.

Beirut and suburbs), specific medical services (surgery, paediatrics, or chronic care), all types of level of care except intensive care level, and specific diagnoses (ill-defined conditions). Patients who were self-payers or who had social security fund type of coverage, who needed an intensive care level or who required transfer to a local facility outside Beirut and suburbs were less likely to be accepted (Table 4).

4. Discussion

Interfacility patient transfers take place within a healthcare system despite absence of national guidelines or regulations. This study presents the results of an initiative to organize interfacility transfers in a developing country for improved patient safety and outcomes. This is the first study to describe the successful implementation of a system of interfacility transfers in an international setting using validated standards and guidelines.

The number of transfers handled by the transfer center increased over the years for multiple reasons: First, this concept of centralizing transfers was new to Lebanon and stakeholders such as physicians, other hospitals and EMS agencies needed time to become familiar with this change and to refer all transfer inquires to the transfer center. Second, the integration of the transfer center in the organizational structure was gradual and required modifications of hospital policies to reflect the role of the transfer center and its processes. Last, the center grew over the years and its operation hours were expanded to cover all weekdays, weekends, and holidays with the exception of overnights where transfers remained restricted to only lifesaving incoming transfers through the ED.

Table 5

Predictors of successful transfers.

Incoming transfer requests	OR	95% CI	*P*-value
Financial coverage: Governmental fund/MOH (No)			
Yes	0.535	0.348–0.824	.004
Financial coverage: International fund/NGO (No)			
Yes	6.595	4.394–9.897	<.001
Financial coverage: Private insurance (No)			
Yes	4.574	3.523–5.940	<.001
Financial coverage: Security forces (No)			
Yes	2.801	2.091–3.751	<.001
Financial coverage: Self (No)			
Yes	1.498	1.160–1.936	.002
Financial coverage: Other (No)			
Yes	5.353	2.497–11.476	<.001
Medical services (Internal medicine)			
Pediatrics	0.866	0.655–1.145	.314
Surgery	0.892	0.689– 1.155	.386
Neurology	0.428	0.293–0.624	<.001
Others*	0.847	0.485–1.479	.559
Level of care (Intensive care unit)			
Regular floor	1.809	1.462–2.239	<.001
Operating room and other	2.538	1.267–5.084	.009
Diagnosis: Neoplasms (No)			
Yes	1.55	1.038–2.315	.032
Diagnosis: Circulatory system (No)			
Yes	1.979	1.569–2.497	<.001
Diagnosis: Congenital anomalies (No)			
Yes	2.821	1.853–4.294	<.001
Diagnosis: Injury and poisoning (No)			
Yes	1.475	1.097–1.983	.01
Diagnosis: Ill-defined conditions/health status factors (No)			
Yes	0.684	0.494–0.948	.023
Outgoing transfer requests	**OR**	**95% CI**	***P*-value**
Age (Adults)			
Pediatrics and neonates	2.686	1.255–5.749	.011
Transferring location (Beirut and suburbs)			
International	3.574	1.955–6.532	<.001
Local	0.696	0.553–0.874	.002
Medical services (Internal medicine)			
Pediatrics	2.589	1.335–5.021	.005
Surgery	2.784	1.292–6.000	.009
Neurology	2.183	0.726–6.562	.164
Obstetrics/gynecology	1.196	0.451–3.174	.719
Psychiatric	1.751	0.610–5.024	.298
Chronic care	3.359	1.669–6.759	.001
Others*	1.771	0.864–3.627	.118
Level of care (Intensive care unit)			
Chronic care	2.366	1.199–4.668	.013
Regular floor	1.295	1.000–1.676	.05
Operating room and other	2.506	0.905–6.940	.077
Financial coverage: Social Security Fund/COOP (No)			
Yes	0.644	0.491–0.844	.001
Financial coverage: Self (No)			
Yes	0.571	0.438–0.745	<.001
Diagnosis: Skin and subcutaneous tissue (No)			
Yes	0.388	0.168–0.893	.026
Diagnosis: Ill-defined conditions/health status factors (No)			
Yes	1.509	1.042–2.185	.029

Variables that were entered into the model were as follows:

Age, transferring location, financial coverage, medical services, level of care, diagnosis (infectious diseases, neoplasms, endocrine/nutritional/metabolic/ immunity, blood and blood-forming organs, nervous system and sense organs, circulatory system, respiratory system, digestive system, genitourinary system, pregnancy complication/childbirth/puerperium, skin and subcutaneous tissue, musculoskeletal system and connective tissue, congenital anomalies, perinatal period conditions, injury and poisoning, ill-defined conditions/health status factors, residual codes; unclassified; all E codes).

CI = confidence interval, COOP = cooperatives, MOH = Ministry of Health, NGO = non-governmental organization, OR = odds ratio.

* Combination of emergency medicine, family medicine, and other.

Interfacility transfers in Lebanon occur for a variety of reasons and reflect the type of facilities involved in transfer. Incoming transfers were more common than outgoing transfers and this was expected since a tertiary care center usually experiences higher incoming referrals from other hospitals. Incoming transfer requests were mostly for medical reason (99.4%) while outgoing transfers were for a variety of reasons mainly financial (73.1%) followed by medical (17.9%). Potential explanations for this are related to characteristics of the health system in Lebanon and of similar settings: Care at a tertiary care center is more costly than at other types of hospitals and this impacts the decision to transfer to another facility after the initial phase of acute care. In fact, most payers in Lebanon including private insurances and others work continuously to shift patients away from tertiary care centers to other less expensive alternative hospitals through several methods including higher premiums for packages that cover tertiary care centers, pre-approval authorization, gatekeeping, placing caps on inpatient total care in addition to other cost control practices. Additionally, co-pays for patients with a government type of coverage can be high for most hospitals in Lebanon but more so at tertiary care centers. The high cost of care also impacts the decision to transfer for self-payers. The healthcare system in Lebanon is characterized by unregulated service delivery and relies mainly on private hospitals that constitute over 90% of existing hospitals with limited government role on control of cost of care.[16] In this fee for service environment, where 78% budget of the Lebanese Ministry of Health is spent on inpatient care mostly at private hospitals,[17] access to public hospitals, which are less developed and less costly, is limited because of the reduced role and treatment capabilities of such alternatives. A health system reform that aims at improving access by developing further public hospitals and where healthcare costs are more regulated would impact transfer patterns related to financial reasons.

Transfer patterns in Lebanon also mimic to some degree those in more developed settings with more transfers for complex care occurring from rural and community hospitals to tertiary care centers.[18] Most incoming transfers required higher level of care (ICU) (61.6%) mainly for circulatory and respiratory diagnoses. This is related to the fact that very complex cases in Lebanon are usually referred to tertiary care centers, similar to more developed healthcare systems, despite absence of categorization of hospitals in Lebanon based on acute care capabilities. Outgoing transfers required mainly regular floor level of care (48.6%) with some requiring chronic care (15.2%) and this was expected since for patients with prolonged length of stay and who require routine or chronic care, patients and payers usually seek more convenient and less expensive alternatives. Patients and family members also seek geographically closer treatment locations for prolonged length of stay. Examining the types of medical conditions for patients needing transfers would help policymakers conduct needs assessment and reduce disparities related to specialized service availability in different regions. In fact, even in more advanced trauma systems, the development and designation of lower levels of trauma centers can result in lower rates of transfer without impact on outcomes.[19]

Transfer request outcomes in terms of acceptance and denial were also different between incoming and outgoing transfers. The proportion of accepted incoming transfers (39.6%) was lower than that of accepted outgoing transfers (59.9%). Reasons for transfer failures were also different between incoming (financial 48.8% and medical 35.9%) and outgoing (bed availability 61.3%) transfers. These findings reflect both the characteristics of the healthcare environment of this study, which were described above, and potentially the central role of a transfer center in this setting. Lack of bed availability accounted for 14.1% of failed incoming transfers and was mainly related to ICU bed availability. Categorization of reasons for failed incoming transfers was by design (data collection) more specific than that of failed outgoing transfers since it was directly related to transparency about actual cause of denial. Lack of bed availability is reported as the main reason for failed outgoing transfers; however, it is often used as a justification for not accepting transfers when actual reasons might be financial ones. It is also the main reason for denied emergency admissions to hospitals from emergency departments in Lebanon which leads to ED overcrowding and access issues for patients. As a result of such practices, the Ministry of Health in Lebanon initiated in 2018 a mandatory reporting mechanism for hospitals related to daily occupancy and bed availability to address complaints from patients, payers and EMS agencies about access issues related to lack of bed availability. This problem is actually not unique to the healthcare system in Lebanon but is also a common problem even in well-regulated systems such as the US system where federal laws prohibit transfer of unstable patients for financial reasons. Insurance status mainly lack of private insurance has also been previously reported as an important characteristic of patients requiring transfers.[20–22]

This study identified several predictors of success for incoming and outgoing transfers. Transfer centers improve access to care and successful completion of a transfer is an important outcome for this process: Patients' needs are met during transport and at receiving facility while ensuring patient safety and care continuity through careful coordination and communication. Specific types of insurance coverage, medical diagnoses, levels of care, and medical services were identified to be important predictors for both types of transfers. These predictors reflect facilitators and barriers for the transfer process in this setting. While a tertiary care center should receive complex cases that require intensive care level of service, ICU level of care was a negative predictor of success for incoming transfers. This is due to lack of bed availability, which affects mainly ICU beds, and to the need in the system for more ICU level capacity. Congenital anomalies as a diagnosis is a positive predictor of success for incoming transfers and this may be related to the fact that our institution is a national referral center for congenital heart diseases and for neonatal care. Pediatric and neonates age group is a positive predictor for success for outgoing transfers since our institution benefits from a robust network of pediatricians at other facilities who facilitate acceptance of patients. Insurance status is another predictor of success for both incoming and outgoing transfers with disparities affecting different groups depending on whether the type of coverage is accepted or not at receiving facility.

These predictors can help administrators identify gaps in the healthcare system, focus on challenging cases and expand services to improve acceptance rates for different medical services, levels of care and medical diagnoses. They can also be used to address barriers through establishing stable networks of transfers through agreements between facilities. These predictors also highlight the need for additional regulations in the healthcare system to reduce financial barriers and improve access to care in the system.

Potential limitations of this study include missing documentation related to the retrospective nature of the study. The analysis

included only cases processed through the transfer center of 1 hospital within the system. Clinical outcomes are also not presented; however, there were several tangible outcomes that were observed in the system as a result of the establishment of this transfer center: A culture of safety in the out of hospital environment, standards of patient transports related to patient safety, and care coordination resulted from this initiative. Additional specific outcomes consisted of improved communication between referring and accepting providers, more completeness of transfer of patient records, more appropriate disposition selection (level of care) and reduced need for patient re-transfer. Several initiatives were also launched at facility level to improve acceptance rates of transfers:

(1) Education resources on transfer process were made available online and in inpatient units for patients,
(2) Expedited approval channels were created for different groups of payers and for timely sensitive medical conditions, and
(3) Affiliations with other local facilities now take into account the described transfer patterns by focusing on expanding capacity for chronic care and rehabilitation beds for outgoing transfers.

Medical oversight of transfer center activities and regular involvement of transfer center medical director with EMS expertise with continuous feedback to different stakeholders remain key activities to improving success rates of transfer acceptance. At a national level, a proposal to establish a national patient transfer center using this pilot project was also discussed with stakeholders at the Ministry of Health to help improve patient transfers between facilities.

5. Conclusion

Interfacility transfers of patients are present in every health care system and adversely affect patient outcomes if not appropriate. Transfer Centers using standards of communication, coordination and care continuity are 1 solution to streamline the process of patient transfers. This study describes an initiative that can be applied to any healthcare system regardless of its stage of development and can serve as a pilot for establishing transfer centers locally or nationally using validated standards of care. Identifying facilitators and barriers to successful transfers can help healthcare administrators and policymakers to address gaps in the system and improve access to care. Improved clinical outcomes should result from efficient, timely and safe patient transfers when proper mechanisms and standards of patient transfers are put in place.

Author contributions

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