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Examining patients' satisfaction in Jordanian emergency departments through business process improvement implementation

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Examining Patients' Satisfaction in Jordanian Emergency Departments through Business Process Improvement Implementation

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Dedication

Without the love, passion, and patience of my beloved kids, Karim and Nawar, this dissertation would have never materialized. This work is dedicated to my supportive father, Shaker, and mother, Shahnaz. My work is dedicated to my siblings who have never spared any emotional or financial help during my long journey at Eastern Michigan University.

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Abstract

There have been recent advancements in healthcare services provision to enhance patients' satisfaction. Previous research has concluded that Jordanian ratings of service quality and quality of care provided in public hospitals are lower compared to other nations in the region and abroad. These studies, however, failed to utilize any standardized customer satisfaction tools. At the same little empirical research has attempted to investigate the link of business process improvement in Jordanian hospitals to the enhancement of patients' satisfaction.

This research bridges the gap in the literature by first testing and validating SERVQUAL, a customer satisfaction tool, in Jordanian hospital environments while examining the effect the split-flow model, a proven business process improvement model, on increasing the positive experience of patients in public hospitals' emergency departments in Jordan.

Based on data obtained from a questionnaire comprised of the validated SERVQUAL instrument and a new survey measuring patients' ratings of the split-flow model implementation components, the dissertation concluded that SERVQUAL is an effective tool for measuring customer (patient) satisfaction and that the business process improvements influences patients' satisfaction. Overall, a clear, specified, and monitored process of receiving, handling, and discharging patients yield better experience. More specifically, the look, feel, and appeal of facilities is related to patients' satisfaction in Jordan. The more modern, up-to-date, and neat looking facilities and staff are, the better experience patients reported. Further, higher degrees of responsiveness and empathy are associated with increased levels of patients' satisfaction in Jordan. The implementation of split-flow model component decreased wait times, hastened

general team assessment, and provided clear information on patients' conditions, discharge instructions, and future visits, which generated better ratings.

This research is important in many respects. It uncovered the dearth of specific quantitative metrics on patients' satisfaction in Jordan. Most measures of the construct are survey-based, jeopardizing the reliability and validity of inferences drawn from the analyses utilized. Further, the analysis has demonstrated that Jordanian emergency departments have business processes that need reengineering to enhance patients' satisfaction. More experimental research is needed to test the viability of different business processes in emergency departments to yield an optimized design and process guaranteeing higher rates of satisfaction.

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Chapter One: Introduction and Background

Patient satisfaction is an important element of healthcare systems since it provides a metric for measuring the technical, service, and structural quality of care. Previous research has established a strong association between patient satisfaction and important healthcare outcomes such as patient retention, referrals, clinical readmissions, and recovery (Faezipour & Ferreira, 2013; Tsai, Orav, & Jha, 2015; You et al., 2013; Reader, Gillespie, & Roberts, 2014; Ferrand et al., 2016; Trzeciak & Mazzarelli, 2016; Mohammed et al., 2016). The focus on patient satisfaction has increased emphasis on patient-centered care practices, timely delivery of clinical interventions, and efficient delivery of healthcare services. Further, patient satisfaction has been found to be strongly associated with how well hospitals, outpatient clinics, doctors, nurses, and allied health staff are performing in delivering effective and efficient services to those in need (Boudreaux & O'Hea, 2004; Kane, Maciejewski, & Finch, 1997). Patient/consumer satisfaction in healthcare is not only important for the sustained profitability or survival of the hospital, but also for increased effectiveness and efficiency, and for better treatment outcomes (Baalbaki, Ahmed, Pashtenko, & Makarem, 2008).

Previous research has established that patient satisfaction in Jordan is lower when compared to its level in industrialized countries such as the United States, United Kingdom, Canada, Australia, and New Zealand (Alhusban & Abualrub, 2009; Zineldin, 2006; Alasad & Ahmad, 2003; Raed, Abudalaziz, Kholoud, & Tariq, 2017; Saif, 2016). These studies have also suggested that government-owned public hospitals possessed lower patient satisfaction rates compared to privately owned healthcare providers. Low levels of service quality, increased waiting times, medical errors, lack of patient-centered care, and more importantly, the shortage of a clear clinical process for patients to expect and follow are a few of the widely cited reasons

explaining patient satisfaction deficits in Jorden (Zineldin, 2006). Researchers and practitioners have been calling for process reengineering of every phase the patients go through, from the entrance door to the discharge gate, for a long time (Shim & Kumar, 2010; Blasak, Starks, Armel, & Hayduk, 2003; Dickson, Singh, Cheung, Wyatt, & Nugent, 2009; Leggat, Gough, Bartram, & Ballardie, 2016; Feibert, Andersen, & Jacobsen, 2017; Cochran & Swartz, 2016). Such research cites the well-documented positive correlations between process quality measures and reduced wait times, decreases in the number of medical errors, increases of desirable discharges, and more importantly an increase in patients' service care (Lisankie, Saint-hilaire, Wein, Wilson, & Cole, 2016; Wiler et al., 2016; Sayah et al. 2016; Alexander, Abbott, Zhou, & Staff, 2016; Bucci et al., 2016).

This study contributes to the ongoing research in healthcare in Jordan by highlighting the positive role of process improvement in increasing the quality of healthcare outcomes such as patient satisfaction. Several studies, mostly in Western contexts, have directly investigated the relationship between patient satisfaction and quality of healthcare processes (Baldassarre, Ricciardi, & Campo, 2016; Pryss, Mundbrod, Langer, & Reichert, 2015; Foshay & Kuziemsky, 2014; Kash, Spaulding, Johnson, & Gamm, 2014; D'Andreamatteo, Ianni, Lega, & Sargiacomo, 2015; Partington, Wynn, Suriadi, Ouyang, & Karnon, 2015). Such analyses concluded that the incorporation of process mapping, flowchart diagrams, lean management, Six Sigma principles, total quality management (TQM), simulation, and continuous quality improvement (CQI) into the work of healthcare results in positive gains, increased effectiveness, efficiency, and client's satisfaction, within the industry (Casalou, 1991; Patel, 2009; Øvretveit, 2000; McLaughlin & Kaluzny, 1990; Duggirala, Rajendran, & Anantharaman, 2008). This investigation extends this framework by applying the same logic to Jordanian hospitals emergency departments.

Statement of the Problem

Although, the direct link between patient satisfaction and process design, mapping, and improvement in healthcare systems has been sufficiently explored in developed countries, there is very limited studies on the patients' satisfaction in developing countries (Alasad & Ahmad, 2003; Alexander et al., 2016; Al Khani, 2015). Aharony and Strasser (1993) observed that the situation worsened in developing nations, like Jordan, where the application of systematic analysis of the relationship between process management, reengineering, and improvement is limited and investigation of their effects on patients satisfaction has been insufficient (Al-Badayneh, 1991; Alasad & Ahmad, 2003; Zamil, Areiqat, & Tailakh, 2012). This study addresses these problems in the literature by analyzing the implementation of healthcare process improvement in Jordanian hospital emergency departments (EDs) and identifying its effect on patients' satisfaction.

Nature and Significance of Research

The business environment of healthcare systems has transformed rapidly throughout the past few decades (Purbey, Mukherjee, & Bhar, 2007). Healthcare providers are expected to deliver excellent service and outcomes while maintaining high levels of accountability (Price et al., 2015). They are obliged to meet increasing governmental standards and requirements that raise the level of their compliance infrastructures (Bodenheimer & Sinsky, 2014). In the USA, most of the healthcare providers are non-profit organizations (Bartel, Beaaulieu, Phibbs, & Stone, 2014). It is important, even for organizations such as these, to maintain their compliance, certifications, and high levels of performance while reducing the costs and resource utilization associated with their service delivery systems (Micheli & Kennerley, 2005). Given these

demands and requirements, healthcare providers are pressured to implement the most efficient, effective, and highest performing processes.

Demand on healthcare services in Jordan has significantly increased in the past two decades due to rapid increase of the country's population. In 2016, the government approved the construction of two educational hospitals in the capital Amman and Irbid, a governorate north of the capital. Princess Basma Educational Hospital has a projected cost of $70 million, mainly financed through grants supplied by the Gulf Cooperation Council. Similarly, the World Health Organization (2015) pledged to finance a healthcare facility providing services for the increasing number of refugees in the country. Jordan's ratio of hospital beds per 10,000 fell from 19.3 in 2010 to 18.6 in 2014, signaling an increasing demand on healthcare services. Throughout the five-year period, statistics indicate that the country only added about 628 beds, unsatisfying current levels of demand. Notice that such statistics neglect the 25% to 30% increase in the population to refugees and non-Jordanians living in the country, about 2 to 3 million non-citizens from Syria, Iraq, Libya, Yemen, and other Arab nations (United Nations High Commissioner for Refugees, 2017).

Healthcare sectors have borrowed several management tools from manufacturing and construction, including total quality management, continuous quality improvement, process mapping, business process improvement reengineering, and the family of techniques and methods under the umbrella concept of business process improvement (Finkelman, 2015). The use of process improvement, in developed nations' healthcare systems has yielded valuable business results for various hospital functions such as emergency patients' care (Rebuge & Ferreira, 2012; Pryss et al., 2015). Process improvement constructs propose an overall capability of alignment between all processes and their functions, outcomes, and evaluation metrics (Jeston

& Nelis, 2014). Supporting stakeholders with necessary information is required for modifying, simulating, and evaluating any given process in the healthcare system (Smith, Maltesen, & Wimmelmann, 2017). Further, instilling the attitude and subsequent practice that processes ought to be continuously improved and the use of information technology is crucial in this chain of activities is encouraged (Jones, Rudin, Perry, & Shekelle, 2014).

Healthcare providers are increasingly adopting lean management systems, bundles and approaches to improving their performance (Al-Hyari, Abu Hammour, Abu Zaid & Haffar, 2016). In a study conducted by the referenced authors above, private hospitals in Jordan using just-in-time, human resources management, and total quality management systems have performed better compared to other healthcare providers that do not implement such approaches. In a case study, Al-Qatawneh, Abdallah, and Zalloum (2013) tested the influence of the application of Lean Six Sigma on the performance of a hospital in Jordan. Results indicated that the application of Lean Six Sigma in the management of logistics of the hospital decrease the number of stock-out incidents that could result in the death of patients in some cases. Tabsh (2015) compared the performance of public and private hospitals in Jordan concerning quality management, and he found that the implementation of Six Sigma and knowledge management significantly increased customer service satisfaction and reduced costs.

Like developed nations, the developing world strives for ensuring high standards of healthcare services. To meet this end, healthcare providers have begun their quest of services improvement and one approach has been process reengineering. As in the case in North America, Western Europe, East Asia, and Australia, developing world healthcare providers have applied a host of techniques to redraw their processes in the quest of reducing costs, increasing patients' satisfaction and improving quality of care. Hospitals have radically changed their systems of

hiring medical staff, patients' admissions, ED services provision, and information retention. Healthcare providers in the developing world largely borrow from experiences from their counterparts in the developed world by applying innovative approaches and technology, such as the application of Six Sigma, business process improvement, and informatics technologies to improve their performance at all levels.

Various studies have shown that patients' satisfaction with hospital emergency departments is negatively correlated with the lack of necessary help, insufficient explanation of medical conditions, long waiting periods, inadequate explanation of prognosis, lack of accessible and comprehensible explanations of test results, and the inability to determine and schedule checkup visits, (Boudreaux & O'hea, 2004; Thompson, Yarnold, Williams, & Adams, 1996; Alexander et al., 2016). This line of scholarship has called for the reengineering of ED care processes so as to reflect reduced waiting times, better explanations of test results, improved treatments and prognosis, and the provision of patient-centric care to yield higher levels of patient satisfaction (Carter, Pouch, & Larson, 2014).

In their review of patients' satisfaction with various EDs in USA hospitals, Taylor and Benger (2004), concluded that there are three robust predictors of patients' satisfaction in EDs, namely,

- a lack of interpersonal skills and displaying of empathetic attitudes by the care staff toward patients,
- a lack of appropriate and timely information and explanations of patient conditions and prognoses, and
- perceived length of waiting times.

Taylor and Benger (2004) summarized their findings in table 1, and concluded that by improving various hospital processes and using well-trained and qualified staff with great communication skills, levels of patient satisfaction in EDs will increase.

Table 1
Factor and Global Satisfaction Assessment Studies

Author, year, and country	**Factors assessed**	**Method of assessing factor satisfaction**	**Method of assessing global satisfaction**	**Main findings**
Bjorvell & Steig (1991), Sweden	Perceived levels of information on arrival	100-point visual analogue scale (VAS)	"How do you feel?" "Would you return?" 100-point VAS scale	Increased satisfaction with respect, general treatment, and staff attitude related to perceived level of initial information, $p < 0.05$
Booth, Harrison, Gardener, & Gray (1992), UK	Waiting times	4-point Likert scale and open-ended questions	N/A	Satisfaction levels with components of waiting times. "Ideal" and target times derived.
Hansagi, Carlsson, & Brismar (1992), Sweden	Multiple patient and service factors, and triage category	Likert scale and open-ended questions	"Satisfaction with medical treatment" "Satisfaction with general care" Weighted 4-point scale	Triage category and age related to global satisfaction. $P < 0.001$

Table 1 *continued*

Author, year, and country	Factors assessed	Method of assessing factor satisfaction	Method of assessing global satisfaction	Main findings
Lewis & Woodside (1992), Canada	Triage category, nursing care, physician care, environment, auxiliary staff, waiting times, and information	3 point Likert scale and open-ended questions	"Overall satisfaction with ED visit" Weighted 3 point scale	Separate factor satisfaction levels given. Poor correlation between global satisfactions derived from specific satisfaction derived from specific satisfaction ratings and global satisfaction on direct questioning. Only triage category reported as strongly occurring.
Maitra & Chikhani (1992), UK	Waiting times, receptionist helpful, explanations of management, information on delays, interruptions, treatment discussion with doctor	Modified Likert scale and open-ended question	"Satisfied" or "not satisfied" with outcome of visit. Dichotomous response	Satisfaction correlates with wait to see doctor ($p < 0.003$", doctor's explanation of management $p < 0.002$", total time in ED ($p < 0.01$"
Bursch, Beezy, & Shaw (1993), USA	Multiple service factors	Likert scale and open-ended questions	"Overall, how satisfied with ED care?" Unspecified scale	14 service factors correlated with global satisfaction. Top five were: perceived waiting time, caring nurses, ED staff organization, caring doctor, information given. ($r = 0.63$ to 0.68).

Table 1 *continued*

Author, year, and country	Factors assessed	Method of assessing factor satisfaction	Method of assessing global satisfaction	Main findings
Britten & Shaw (1994), UK	None specified to patients. Twelve main themes identified from interview transcripts.	Frequency and emphasis in interview transcripts.	N/A	Factors identified as important are: information, waiting time, quick pain relief, sensitivity to personal circumstances, excessive questions or examination, a pleasant environment
Thompson & Yarnold (1995) USA	Perceived waiting time	Likert scale	Describe your experience in the ED. Weighted 4-point scale.	Perceived wait relative to expected wait correlates with overall satisfaction. P<0.001
Thompson et al. (1996), USA	Perceived and actual waiting times (to see doctor and for entire visit). Explanation given of delays, and procedures. Staff attitudes.	Open-ended questions	Describe experience. Recommendation Weighted 4- and 3-point scales.	Information and perceived wait (but not actual wait) correlate with global satisfaction. $p < 0.001$
Hall & Press (1996), USA	Multiple demographic and service factors	Likert scale and open-ended question	Recommendation Weighted 5-point scale	Nurse and doctor attitudes (care, courtesy, concern) and perceived wait intervals correlate with global satisfaction. No demographic factor correlated (including age).

Table 1 *continued*

Author, year, and country	Factors assessed	Method of assessing factor satisfaction	Method of assessing global satisfaction	Main findings
Rhee & Press (1996), USA	Nurse and doctor technical ability. Nurse and doctor "bedside manner." Receptionist service. Perceived wait intervals.	5-point Likert scale	Rate overall quality (waited 5-point scale)	Patient perceptions of technical quality of care ($p < 0.001$) and perceived waiting times ($p < 0.005$) correlate with global satisfaction, and are more important than bedside manner.
Bruce, Bowman, & Brown (1998), UK	30 items on nursing care, environment, ancillary services, and information	3-point Likert scales	N/A	Primary area of concern was information about length and waiting time
Yarnold, Michelson, Thompson, & Adams (1998), USA	Perceived waiting times, information and explanations, staff attitudes	Likert scale	"Overall satisfaction" (symmetrical 5-point scale and weighted 4-point scale)	Overall satisfaction levels are almost perfectly predictable from ratings of perceived staff attitudes
Boudreaux, Ary, Mandry, & McCabe (2000), USA	22 items including registration, nurse, and doctor factors, waiting times, discharge instructions, and estimated length of stay.	5 point Likert scale	Recommendation Overall Satisfaction	Caring staff, perception of safety, understanding discharge instructions, nurses' technical skills, and waiting time predict overall satisfaction. $P < 9.05$" Perceptions of care outweighed demographics and visit characteristics. Some differences between predictors of overall satisfaction and

				likelihood to recommend.

Table 1 *continued*

Author, year, and country	Factors assessed	Method of assessing factor satisfaction	Method of assessing global satisfaction	Main findings
Morgan, Shackley, Pickkin, & Brazier (2000), UK	16 varying paired combinations of doctor's manner, waiting time, service accessibility, known doctor, consultation type, and doctor's shift.	Conjoint analysis (ranking of paired preferences)	N/A	Doctor's manner and waiting times are the most important factors. Patients will tolerate a doctor who seems rushed if they can be seen sooner.
Sun et al. (2000), USA	Nine sociodemographic variables, 15 comorbid conditions, 18 processes of care measures. Triage score, five service factors (courtesy, completeness of care, explanation, waiting time, discharge instructions), 19 specified problems.	5-point Likert scale	"Overall satisfaction" (5-point Likert scale) Willingness to return (dichotomous response)	Significant process of care measures: triage status, number of treatments. Significant problems: no help when needed; poor explanation of problem cause and test results; not informed about waiting time, when to resume normal activities, or when to re-attend. Significant patient factors: age and race. Willingness to return is strongly predicted by satisfaction.

While studying the correlation among various activities in EDs and patient satisfaction, Hall (2013) concluded that achieving high levels of operational flow efficiency in emergency departments is strongly correlated (positively) with higher quality of care, financial efficiency, client retention, and more importantly patients' satisfaction. Efficient flow ensures that clinicians deliver sensitive solutions and care to highly sensitive cases in a timely manner while

simultaneously treating non-threating cases with appropriate clinical interventions (Sandbaek, Helgheim, Larsen, & Fasting, 2014). Further, optimal operational flow in EDs decreases safety concerns over missing timely clinical interventions for sensitive patients (Konrad et al., 2013). Finally, and most importantly, it also provides patients with proper and timely clinical treatment along with relevant information and explanation of the condition and expected prognosis, thus concluding that such a modification in patient care processes can change patients' perceptions from an ordinarily negative to a positive experience (DeFlitch, Geeting, & Paz, 2015; Hall, 2013).

EDs have thus experimented with a wider variety of process improvement techniques in order to improve flow in their daily work (Hall, Belson, Murali, & Dessouky, 2013). One of the widely cited evidence-based and empirically supported models has been the split-flow model (Joseph et al., 2013). Split-flow aims to improve the quality of care in EDs in three ways. First, it promises to decrease the percentage of patients left without being seen by doctors. Second, it aspires to lessen crowding in the ED by segmenting cases based on threat levels. Lastly, it provides an expedited treatment process where wait times are reduced to their minimum. Overall, the split-flow care model moves patients efficiently from the entry door to discharge or an inpatient facility rather than sending them back to the help desk (Harris & Wood, 2012).

Sayah et al. (2016) clearly demonstrated that process improvement is far greater and more effective compared to expanding physical infrastructures in ED care. This study utilizes patients' ratings of their experience, satisfaction with services and perceptions of process improvement, their ratings of the rapid assessment protocol component in the split-flow ED care model, the door-to-provider patient flow process, and the duration of care in ED in Jordanian hospitals. The novelty of this research stems from the measurement of process improvement,

discharged ED patients' ratings of the split-flow process of care, rapid assessment protocol, the assignment of patients into threating or non-threating cases process, and finally, the discharge or hospital's admission process.

While it was expected that business improvement may yield similar results when applied to healthcare providers across countries, this is not the case in the developing world for several considerations. First, the regulatory, compliance and legal requirements in the developing world tend to be drastically different from those in the developed countries. Compliance is typically projected to be lower in developing countries due to lower levels of awareness concerning its consequences and the lower levels of deterrence and implementation of penalties associated with noncompliance. Medical staff in the developing countries also have less access to the cutting edge allied services, technology, and supportive elements of care as provided in the developed nations. Second, cultural differences in the developing world influences the beliefs, convictions and behaviors of medical and management staff at healthcare institutions. Therefore, the strict application of business process improvement experiences a lower rate of acceptance among developing nations' healthcare providers compared to developed nations. Third, the amount of government support, financial resources, and human capital in the developing world informed by fragile political arrangements surrounding the healthcare environment has influenced the results of the application of business process improvement on healthcare providers' performance.

Objectives of Research

This study was conducted with the following objectives. Firstly this study checked the validity of SERVQUAL in Joranaian hospitals. Secondly, it identified the current patients' satisfaction levels in Jordanian hospitals' ED. Thirdly, it investigated the relationship between patients' satisfaction and business process improvement within such Jordanian settings. Fourthly,

it assessed whether the application of business process improvement in the form of a split-flow model in Jordanian hospitals' EDs improved healthcare outcomes as measured by patients' satisfaction. Finally, this research constructed applicable recommendations for EDs in Jordan, enabling them to optimize the utilization for improving the quality of care provided. In addition to the above objectives, SERVQUAL instrument was modified, tested, and verified to gauge patients' satisfaction and perceptions of service quality within Jordan's Hospital environment.

This research also investigated the relationship between the quality of services and patient satisfaction. Patient-centered care is linked to improved satisfaction scores in many contexts and this study examined this relation in the Jordanian context. This dissertation further explored the specific direction and magnitude of the relationship between three types of services and patients' satisfaction: care-related services, staff-related services and facilities-related services. Through survey responses, the study was able to construct an account linking quality of services in Jordanian healthcare institutions with patients' satisfaction.

Research Questions/Hypotheses

This study aimed to answer the following set of research questions:

- RQ1: Is the current SERVQUAL model applicable to Jordanian Hospitals environment?
- RQ2: Are patients satisfied with the services offered by Jordanian hospitals' ED?
- RQ3: To what extent do the SERVQUAL dimensions influence patients' satisfaction in Jordanian EDs? (Cause and effect)
- RQ4: Does the Implementation of Business process improvement, like Split-Flow Model in EDs influence patients' satisfaction in Jordan?

These research questions motivated the following hypotheses:

Table 2
Suggested Hypotheses and Analysis

Research Question	Null Hypotheses	Alternative Hypotheses
RQ1: Is the current SERVQUAL model applicable to Jordanian Hospitals environment?		
RQ2: Are patients satisfied with the services offered by Jordanian hospitals' ED?	Hypothesis 1: Patients' perception of service quality in the emergency departments in Jordanian hospitals is greater than their expectations.	Patients' perception of service quality in the emergency departments in Jordanian hospitals is not greater than their expectations.
RQ3: To what extent do the SERVQUAL dimensions influence patients' satisfaction in Jordanian EDs? (cause and effect)	Hypothesis 2: Within the Jordanian hospital emergency departments, patients' satisfaction is not effected by hospital physical appearances.	Within the Jordanian hospital emergency departments, patients' satisfaction is effected by hospital physical appearances.
	Hypothesis 3: Within the Jordanian hospital emergency departments, patients' satisfaction is not related to the reliability of the medical staff	Within the Jordanian hospital emergency departments, patients' satisfaction is related to the reliability of the medical staff
	Hypothesis 4: Within the Jordanian hospitals emergency departments, patients' satisfaction is not related to the responsiveness of the medical staff	Within the Jordanian hospitals emergency departments, patients' satisfaction is related to the responsiveness of the medical staff
	Hypothesis 5: Ensuring patient safety by the medical staff does not influence patient satisfaction in the Jordanian emergency departments.	Ensuring patient safety by the medical staff does influence patient satisfaction in the Jordanian emergency departments.
	Hypothesis 6: Within the Jordanian hospital emergency departments, patients' satisfaction is not effected by the medical staff's empathy/concern towards patients.	Within the Jordanian hospital emergency departments, patients' satisfaction is effected by the medical staff's empathy/concern towards patients.

Table 2 *continued*

Research Question	Null Hypotheses	Alternative Hypotheses
RQ4. Does the Implementation of Business process improvement, like Split-Flow Model in EDs influence patients' satisfaction in Jordan?	The implementation of business process improvement techniques does not influence patients' satisfaction in Jordanian emergency departments.	The implementation of business process improvement techniques does influence patients' satisfaction in Jordanian emergency departments.

Summary

This chapter introduced the problem statement, significance, and objectives of this dissertation. It outlined the lacuna in the literature in the Jordanian healthcare system, the absence of studies connecting business process and patients' satisfaction. The chapter also presented the numerous research questions and hypotheses to be tested based on the questionnaire data to be collected. The chapter further provided a brief outline of the research strategy followed by the dissertation to achieve its stated objectives.

Chapter Two: Literature Review

This chapter outlines the fundamental concepts utilized in this study and presents the literature review in two sections. The first section presents literature on the measurement models for patients' satisfaction, starting with the introduction to the concept of patients' satisfaction and models to measure it. Next, the multi-directional aspect of patients' quality of care and quality of service care are presented to link patient-centric care with patients' satisfaction, followed by describing the research on the conceptualization and operationalization of patients' experience with patients' satisfaction. The second section deals with business process improvement and starts by introducing its definition and history. This is followed by a detailed section, highlighting major milestones in the application of business process improvement in healthcare, where ED split flow process is presented. The chapter then provides an overview of business process improvement and patients' satisfaction and finally concludes by presenting literature on the application of methodology in various industrial and service sectors in the Kingdom of Jordan, examining how such a development progressed over the past few decades. Finally, a note on the application of business process improvement in the Jordanian healthcare sector is introduced.

Patients' Satisfaction

Many scholars (e.g. Faezipour & Ferreira, 2013; Ware & Hays, 1988; Carr-Hill, 1992; Ferrand et al., 2016) and organizations have invested in defining, conceptualizing, and measuring patients' satisfaction. All such attempts revolve around the central premise that patient satisfaction is a reflection of a patients' experience with the quality, service, and conditions of

care they received at the healthcare facility visited. This understanding has generated a plethora of theoretical models trying to explain the process and formulations of patients' ratings of their experiences.

First, a family of theories known as expectancy theories argues that patient satisfaction is the gap between patients' expectations and their ratings of their experiences at healthcare providers' facilities (Reilly, Nyberg, Maltarich, & Weller, 2014; Mousavi, Komashie, & Tavakoli, 2011; Kocher et al., 2002; Alderman, Wilkins, Lowery, Kim, & Davis, 2000; Linder-Pelz, 1982). Such conceptualizations posit that a perfect patient satisfaction score represents a complete match between patients' expectations and beliefs about the experience they ought to receive with the actual experience they received when visiting the healthcare provider. Banerjee, Deaton, and Duflo (2004) suggest that because of extremely low expectations of patients, they may have a restricted ability to assess provider service. If patients are used to low levels of provider effort, then they will view low-effort providers as the norm. Many analyses (e.g., Waters, Edmonston, Yates, & Gucciardi, 2016; Reilly et al., 2014; Mousavi et al., 2011) of patient satisfaction across countries and contexts have empirically supported the premise of these expectancy theories of patient satisfaction.

Second, a family of theoretical models referred to as decision theories of patient satisfaction argue that patients' satisfaction is influenced by their preferences rather than their expectations or beliefs. Further, proponents of this understanding favor the consumption model for understanding how patients formulate ratings of their experiences (Taylor & Cronin Jr., 1994; Konrad et al., 2013). Such models propose that patients will take the difference between their preferences and their actual experience in a contrasting procedure to reach their final value of patient satisfaction. Empirically, analysts have found that patients apply simple contrasting

frameworks, comparing what they actually preferred to what they actually received, and then developed their final patient satisfaction score.

Third, a class of theoretical understandings known as performance models concluded that patient satisfaction is determined by the quality of technical, service, and structural care elements received by patients rather than their expectations, beliefs, or preferences. Such models argue that clinical attributes, such as total recovery of patients, determine the extent to which patients are satisfied with their experiences or not. If patients do not visit the hospital or the clinic again, they are more likely to report higher ratings of their visits. This group of theories contrasts the preferential class of understandings where healthcare outcomes, rather than patients' belief systems, determine patient satisfaction (Taylor & Cronin Jr., 1994; Nathorst-Böös, Munck, Eckerlund, & Ekfeldt-Sandberg, 2001; Micheli & Kennerly, 2005; Purbey et al., 2007).

A line of empirical analyses has established support for this theoretical understanding across different healthcare contexts. Recently, a group of researchers have favored a combined theoretical approach to patient satisfaction, blending elements of the preferential/decision family of theories with the outcomes-based school of performance theories of satisfaction, thus constructing more empirically supported assessments of patients' satisfaction. Despite their numerous theoretical differences, scholars of patient satisfaction have agreed that patients' preferences, expectations, and experiences with quality of care all determine a large portion of their ratings of healthcare experiences (Taylor & Benger, 2004).

Quality of Care

Regardless of their theoretical affiliations, researchers interested in patients' satisfaction have concluded that the quality of care is multi-dimensional (Tsai, Orav, & Jha, 2015; Vuori, 1987; Cleary & McNeil, 1988; Ball, Murrels, Rafferty, Morrow, & Griffiths, 2013). Quality of

care represents multiple processes comprising the entire overall care procedure, from the admission of the patient to his or her discharge. One group of researchers has favored an emphasis on the technical aspects of care, such as the physician-patient relationship. Another group of analysts argue that service quality matters more in explaining patients' satisfaction compared to medical care itself. A more recent group of researchers have suggested the need for including settings or structural elements of care, such as the appearance of the healthcare facility, in the consideration of patient satisfaction (Anhang et al., 2014; Lewis, 1994).

Technical aspects of quality of care refers to the appropriateness of the treatment plan, procedures utilized, and outcomes of medical care throughout the patient experience at the healthcare facility. Many researchers have operationalized the technical quality of care construct with survival rates, recovery time periods, recovery patients' ratings, readmission rates, or other physicians' perceptions of care provided to patients. The technical dimension of quality of care is arguably the most essential component in any attempt to measure the concept since it represents a more objective metric on quality of care in comparison to service or settings-based measures (Wolf, Lehman, Quinlin, Zullo, & Hoffman, 2008).

The second dimension to quality of care is the quality of service care. This refers to whether the care provided was patient centered and to what extent the patient received his or her expected service. Many researchers have operationalized this dimension with the patient-centered care construct, where the administrative, nursing, and medical staff is expected to cater to the needs and desires of the patient. Third, a less utilized and emerging dimension to the quality of care construct is the setting's dimension. This refers to whether the room, building, or appearance of the facility and conditions of the staff (such as their dress code adherence and hygiene levels), as well as their overall rating of the facility, match the expectations of the

patient. This also could be the evaluation by the patient's opinion of the structural attributes of the healthcare facility. Any attempt of investigating patient satisfaction should take quality of care into consideration through the measurement of its various dimensions (Ferrand et al., 2016; Brook, McGlynn, & Cleary, 1996).

Patients' Experience

Another dominant construct in the literature on patient satisfaction is patient experience. Despite the excess references to patient experience in determining their satisfaction, few systematic attempts have been devoted to its conceptualization and operationalization. New healthcare models and initiatives have incorporated patient experience in their key decision-making systems, reimbursing healthcare providers based on levels of patient satisfaction and experience.

Azoulay et al. (2000) suggested that patient experience refers to the overall rating of patients toward all elements comprising their care during their visit to a healthcare facility. Wolf et al. (2014) defined patient experience as the collection of patients' perceptions regarding their interaction with care providers, healthcare facilities, the culture of the organization, and the total rating of their visits. This definition has been reiterated by many, and an equivalent number of measurement tools have therefore been devised to reflect on its conceptual parameters.

The rising value of patients' experience for determining the quality of healthcare systems, reimbursements, rating of hospitals, and explaining patient satisfaction has led to the production of measurement protocols for the construct. LaVela and Gallan (2014) referred to the importance of the measurement of patient experiences by highlighting its significance in providing benchmarks for healthcare organizations, management of patients' care, decision

support for administrators to improve healthcare performance, and for process reengineering so as to generate better care experiences. The authors emphasized the importance of accounting for the multidimensionality of the construct in generating reliable and valid instruments to be used by healthcare providers and researchers. The items composing any instrument must cover the domain of the concept, patients' ratings of the technical medical care, process of care, and settings of care.

Despite the multiplicity of measurement strategies in the healthcare literature for patient experience and satisfaction, self-report measures provide the overwhelming majority of existing data on the construct. Notwithstanding their ease of collection and analysis, self-reporting measures present researchers with several challenges. First, patients may provide ratings of their experiences determined by factors other than any of the dimensions composing quality of care. For instance, previous experiences with medical care may explain part of patients' satisfaction scores provided in other visits. LaVela and Gallan (2014) suggested that patients tend to provide ratings of their happiness or satisfaction with life in general when asked about their experiences with healthcare providers. Second, patients may produce ratings of their experience or satisfaction based on factors such as the race, ethnicity, education, or linguistic ability of care providers. These exogenous indicators are not included in the quality of care composite index. Third, LaVela and Gallan (2014) also argued that patient experience ratings may be influenced by whether the patient received the drug he or she requested, despite the appropriateness of such an action. Therefore, patient ratings become a reflection of instant gratifications.

A second issue highlighted by researchers in the literature on the measurement of patients' experience and satisfaction is the common use of proxy indicators (Wolf, Niederhauser, Marshburn, & LaVela, 2014). Studies have utilized patients' perceptions toward their medical

care expectations, preferences, and decisions as well as their attitudes toward service quality or technical care as proxies for patients' experience ratings. Despite the partial overlap between measurement tools used to operationalize patient experience, satisfaction, and perceptions with quality of care, each construct is distinct and requires a more reflective instrument to generate reliable and valid methods of measurement (LaVela & Gallan, 2014; Jenkinson, Coulter, Bruster, Richards, & Chandola, 2002). Researchers have urged the utilization of mixed-method approaches for the measurement of patients' experience. Survey items do not fully capture the rich experiences of patients when they visit healthcare providers' facilities. Therefore, blending richly detailed information gained through qualitative data assessment with precise, reliable, and valid quantitative data produces a better measurement strategy for patients' experience.

Business Process Improvement

Business process improvement is a management strategy that aims to reduce errors and automate, simulate, and improve any operational process within an organization, which is part of a larger management approach that includes total quality management tools and business process improvements reengineering methods. These strive toward changing existing processes in order to increase regulatory compliance with rapidly changing governmental rules, improving performance through the elimination of errors, and automating non-value-added activities and the use of information technology in support of key decision-making at the top levels of the organization (Talib, Rahman, & Qureshi, 2013; Becker, Rosemann, & Von Uthmann, 2000).

To better understand the function, value, and need of this management strategy, one needs to understand the fundamental elements of a business process improvement. A business process improvement is a series of sequential activities, decisions, and steps taken by a person, department, or organization in order to produce a given output, service, or good. For instance, if

a traveler desires to book a rental car at the airport they need to implement a business process improvement. Figure 1 depicts one of the possible processes this traveler can take to finalize their interaction of booking a rental car. While the first row makes the process appear easy, involving only three steps (reserving, checking out, and checking in a vehicle), each step has a sub-set of activities. At each stage, a decision is made, a record is taken, documentation takes place, and someone must incorporate such information in improving the performance of the rental car service/agency. Business process improvement takes each step, simplifies it, automates it, records it in a useful manner, identifies possible errors, explores ways to reduce costs involved, and supplies decision makers with insightful feedback on how to improve the business while sticking to the vision, mission, and strategies of the organization (Jeston & Nelis, 2014).

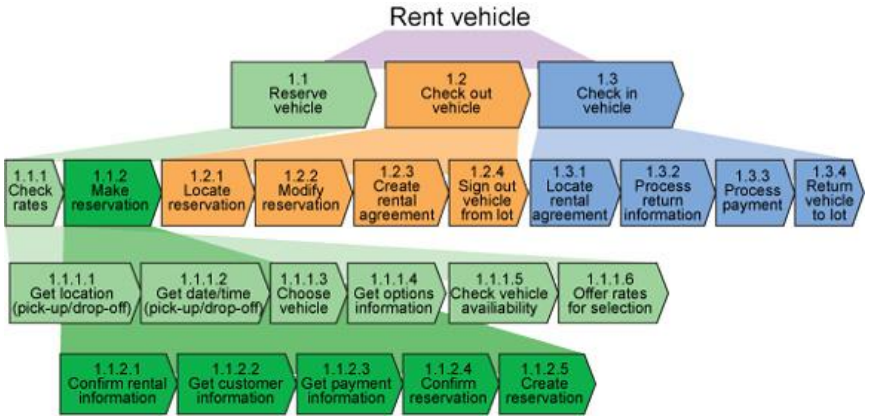

Figure 1. Business process improvement of a traveler booking a rental vehicle.

Much ink has been spent on business process improvement. Despite the plethora of analyses attempting to dissect the dimensions comprising, most researchers agree on the fact that it includes the following areas whenever it is applied to organizations. First, business process improvement strives to align all processes within an organization with the overall vision, mission, and strategic objectives spelled out by the top management of the organization. Second,

it emphasizes the roles of transparency and accountability in each process and its subactivities through the delineation of boundaries and responsibilities at each level of the organization. Third, it relies heavily on proven management tools, techniques of process, and performance measurements. Fourth, it heavily deploys automation and information technology driven solutions to processes changes and reengineering. Fifth, one of the strongest assets for is its recognition and utilization of human capital in designing innovative ways for improving existing business process improvements and designing creative solutions for arduous problems. Finally, it aspires to inculcate a culture of performance, measurement, improvement, and alignment of all activities within organizations (Baldassarre et al., 2016; Jeston & Nellis, 2014; Pryss et al., 2015).

During the past three decades, virtually all industries have implemented elements of business process improvement, changing their operations, designing new processes, and increasing the efficiency of each activity in each process (Van Der Aalst, 2013). The exponential rise in the implementation of Six Sigma, lean manufacturing, lean construction, and total quality management in public and private agencies has brought into the center of the debate on process and quality improvement in both the private and public sectors (Rosemann & vom Brocke, 2015). Businesses across industries and sectors around the world measure process performance in addition to output performance, testifying to the fact that has become an essential ingredient in business success (Hammer, 2015).

Organizational researchers have adopted elements of in their evaluation of business, sector, and new technology performance. For instance, a line of research has incorporated the level of process reengineering, process realignment, and process change adoption levels as explanatory indicators for the success or failure of resource enterprise planning (REPs)

applications (Shaul & Tauber, 2013). Further, construction researchers have studied the influence of just in time approaches (a reengineered process of project scheduling) on the effectiveness of lean construction in cost saving and increasing customers' satisfaction (Hardin & McCool, 2015; Asri, Nawi, Saad, Osman, & Anuar, 2016). Healthcare providers are utilizing business intelligence techniques and information technology applications to improve their levels of compliance, reduce decision errors, and increase patients' care and satisfaction, indicating a rise in's application in the healthcare industry (Vom Brocke et al., 2014).

With the large amount of financial and human capital, information technology, and other resources healthcare providers own, solicit, and deploy, their outcomes, quality of care, quality of services, and patients' satisfaction should be expected to be high. Nevertheless, evidence indicates that such outcomes in many places and periods around the world do not match up to the desired or expected levels from top healthcare executives or third parties such as the government, media, and researchers (Mills, 2014; Sudhinaraset, Ingram, Lofthouse, & Montagu, 2013). Experts explain this performance gap by citing many deficiencies in the process and resource coordination measures taken by healthcare providers. For instance, physicians are not adequately integrated into the information technology or service quality processes within hospitals, which is likely to increase the number of miscodes or the need to hire staff to do the coding (Chib, van Velthoven, & Car, 2015). Processing claims is still heavily informed by manual labor in many healthcare facilities around the world, consuming a great quantity of staff time and introducing a range of possible human errors. Increased levels of integrating human, technical, and clerical processes at healthcare facilities are likely to improve processes, as well as the performance, of hospitals' staff (Srinivasan & Arunasalam, 2013). This is then likely to increase levels of organizational alignment with the processes, services, and goods provided by the healthcare

industry, further enhancing the amount of positive rates on their expected outcomes such as patients' quality of care, patient-centered care, and patients' satisfaction (Gobbi & Hsuan, 2015).

SERVQUAL

One of the most widely researched tools in increasing patients' satisfaction is SERVQUAL. The SERVQUAL model, was developed by Parasuraman, Zeithaml, and Berry (1988). It is one of the best and most used models for evaluating customer expectations and their perceptions of the quality of the services (Zarei, Arab, Froushani, Rashidian, & Tabatabaei, 2012). SERVQUAL is based on the idea that the quality is a subjective evaluation of the customer, as the service is not a physical item but an experience. SERVQUAL simply suggests that five dimensions alter patients' perceptions about the quality of services offered by the hospital or emergency department (ED). As Figure 3 indicates, tangibles refer to the structural- or facility-related elements. Second, reliability refers to the consistency and dependability of the hospital to offer promised services to their patients. Third, responsiveness refers to the prompt provision of services. Fourth, assurance represents the knowledge, skills, and abilities of staff in establishing rapport and trust with patients for the services provided. Finally, empathy represents the extent to which staff and healthcare providers extend emotional support to their patients.

SERVQUAL, like any other business process improvement tools in healthcare, aspires to the utmost delivery of patient centered-care (see Figure 2). Patient-centered care can be defined as the devotion of attention, resources, and decisions allocated by healthcare providers to the needs and outcomes desired by the patients. This includes superb communications skills on the part of the healthcare staff. Staff communication skills refers to the way, manner, and fashion by which healthcare professionals communicate with the patients. This dimension is tantamount to the empathy and assurance dimensions of SERVQUAL.

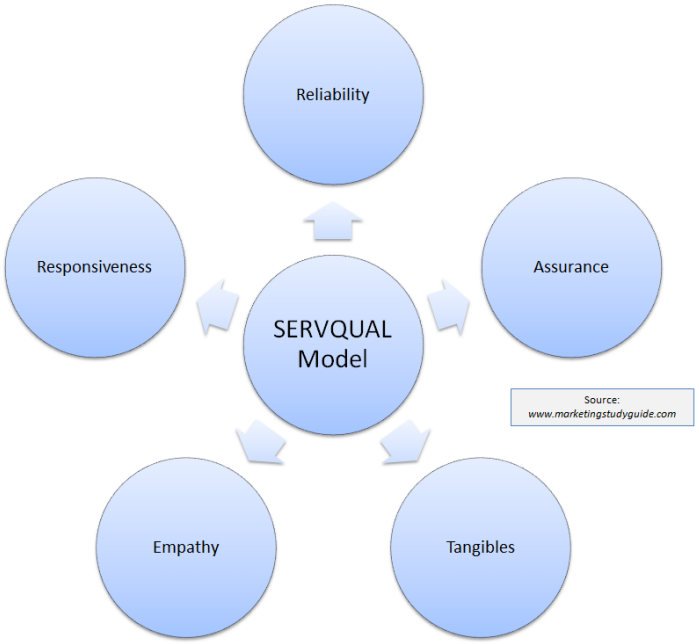

Figure 2. SERVQUAL Model.

The Application of Business Process Improvement in Healthcare

The application of business process improvement in healthcare organizations has been more challenging, slower, and less effective compared to its adoption and implementation in other sectors such as manufacturing, construction, or tourism (Jetson & Nellis, 2014). Healthcare processes are more complex compared to other processes in other business sectors since they involve the life or death of humans, rigorous government compliance, and a highly skilled workforce (Ham, Minnie, & Walt, 2016). The heavy contingency of many processes in healthcare, such as the treatment of patients in hospitals, relies on ad hoc decisions and sub processes based on dynamic input from multiple parties to the process. For instance, a terrorist attack in one area may cause an overflow in the local hospital, making existing standard operating procedures moot since the new exigent conditions necessitate other courses (processes) of action (Allen, 2015). While healthcare providers have invested heavily in preparing disasters

plans, those plans are also contingent on many conditions that remain unknown until the day or time they are faced by the healthcare provider (Timmins, Bone, & Hiller, 2014). Nevertheless, such planning of processes and modeling of them assists healthcare providers in automating a large portion of their human-informed complex processes. Recent evidence indicates that healthcare facilities have largely succeeded in responding to new emergencies, like Ebola (Hiller, Bone, & Timmins, 2015).

Healthcare organizations have borrowed several elements from business process improvement, applying them in their daily work. First, principles of total quality control, mainly total quality management principles, have been implemented (Rosemann & vom Brocke, 2015). Healthcare providers have incorporated total quality management, continuous quality improvement measures, and Six Sigma approaches to their work during the 1970s and 80s. During this period, a large portion of healthcare providers concentrated on improving the technical level of care within their organizations. Low levels of awareness and appreciation to TQM/CQI among the clinical staff, and diminished levels of top management support, have led hospitals to decrease levels of implementing principles throughout such a period (Rosemann & vom Brocke, 2015; Vom Brocke et al., 2014).

With the emerging popularity of Six Sigma in the 1990s, senior executives in the healthcare marketplace suggested that the industry was full of errors, defects, and mistakes, which could be substantially reduced by the application of Six Sigma approaches. Calls arose to the recognition of the fact that human processes are not drastically different from automated processes existent in manufacturing and construction, alluding to the idea that Six Sigma would dramatically decrease human-driven errors in healthcare. Further, scholars and practitioners of healthcare have increasingly advised the application of Six Sigma elements, citing an increased

level of improvement in the performance of the organization through the alignment of its financial and operational processes with its overall strategy (Cima et al., 2011).

At the turn of the century, concepts of lean manufacturing, construction, and management has crept into the healthcare industry, reducing the amount of waste and increasing clients' satisfaction with the services and goods provided. Healthcare providers have amalgamated Six Sigmas with lean management to reduce the rising costs of healthcare, increase process quality, and improve performance measurements (Rosemann & vom Brocke, 2015). This adoption has led to the development of new instruments for measuring the extent to which healthcare providers and their employees understand their processes. New applications for modeling healthcare processes graphically have emerged, and hospitals have invested in the training of their employees on such principles in hopes of achieving their goals of reduced waste, improved care, and more client satisfaction (Zinelden, 2006; Taylor & Cronin Jr., 1994).

The second area healthcare providers have borrowed from and integrated it into their work concerns principles of management. Classical managerial concepts such as design and control of staff, dating as early as Taylor's formulations as well as newer principles of management introduced in the 1980s by Porter's ideas and Rammier-Brache principles encompassing process control and performance improvement, have been incorporated into the work of healthcare industries (Porter & Lee, 2013). An emphasis on process control and reengineering throughout the popularization of the business process improvement reengineering principles in the 1990s has swept across management levels at healthcare facilities (Baldassarre et al., 2016). Managers have set many goals, such as enlargement of healthcare access, reducing wait times for patients, improving quality of care, and increasing patients' satisfaction. Each goal was dissected into processes, which were modeled, and improvements to them have been made

and suggested with a few success cases. Healthcare managers have also increased the utilization of process performance measures such as balanced scorecards. Improved techniques of balanced scorecards, such as destination statements yielding the best-case scenario to the concerned organizational objective or the vision the process attempts to achieve, have been made and incorporated into the work of healthcare organizations' management (Duggirala et al., 2008).

The third area of healthcare application to business process improvement concerns its widest implementation: information technology solutions. First, healthcare providers have increasingly automated their processes, with computers replacing humans in taking, documenting, and storing essential records such as the names, dates, reasons of visit, and discharge comments associated with healthcare services and goods. Healthcare providers have utilized the internet in many ways to automate, improve, and design healthcare related processes. Healthcare providers have utilized plenty of IT applications, such as database management systems, business intelligence software, programming applications, and more recently cloud-based technologies in reengineering, improving, and redesigning their core business process improvements. More importantly, data analytics software has allowed decision makers at healthcare organizations to achieve their goals in a timelier fashion with the assistance of data driven solutions to the problems facing core business process improvements such as claims processing, technical, and service quality of care as well as patient's satisfaction (Jones et al., 2014; Devaraj, Ow, & Kohli, 2013).

It is noteworthy to inspect how business process improvement can potentially assist healthcare providers today, considering raising concerns vested in spiraling costs, divergence in quality delivery among providers, heterogeneity of patients, and more importantly the evaluation of return on investments. Healthcare providers continue to grapple with the old conundrum of

raising health care quality and patient satisfaction while keeping costs at minimum (Bardhan & Thouin, 2013). Today, healthcare's goods and services are more expensive than they have ever been, and patients' expectations have risen steadily, while managers, policy makers, and stakeholders are constantly requesting reductions in costs (Popescu, 2014). One of the solutions to balance costs and effectiveness of the work done by healthcare providers is to parse each challenge into many processes and utilize helpful principles to improve each process by eliminating waste, costs, and increasing quality of services and goods.

Researchers have suggested beginning with process mapping. Healthcare providers are more likely to know exactly who is responsible for each activity, how many resources are necessary to perform such an activity, and the logical relationship connecting all activities involved in a single process. By learning the number, requirements, sequence, and relationships among the set of different activities, healthcare providers can then measure the performance of each activity and assess the process needed to increase the efficiency and effectiveness of the services and goods provided (Huynh, Appell, & Stetkiewicz, 2014; O'Dea, 2014).

Healthcare providers should rely on data-driven solutions more for their process improvement operations. This requires hospitals and outpatient clinics to hire highly skilled individuals with information technology and business intelligence techniques, acquire specialized software, or contract out such services (Raghupathi & Raghupathi, 2014). The insights generated through the in-depth analyses of the data supplied is likely to result in processes reengineering, making them more efficient and effective (Groves, Kayyali, Knott, & Kuiken, 2016). Overall, more voices in the literature have called for an increase in the adoption and implementation of business process improvement principles and methodologies in healthcare applications (Baldasarre et al., 2016; Rebuge & Ferreira, 2012).

Split-Flow

To better understand how split-flow works, a walk-through example of a patient going into an ED is illustrated in Figure 3. Once the patient enters the ED, they see a triage nurse for a quick evaluation of their case. During the evaluation, a records clerk accompanying the nurse takes the information and utilizes up-to-date technology to register the patient's information in a timely fashion, usually a two-to-three minute process. Based on the nurse's evaluation, a threat level is assigned to the patient's condition, and they are either discharged or instructed to wait for the ED physician or physician assistant to consult (or in cases of sensitive threats they are transferred to a room where they are seen immediately by doctors). All non-threating patients are meanwhile waiting to be seen by the physician or physician assistant for a second evaluation, and required tests, treatments, and medications are ordered on the spot. If patients must wait for test results, they are transferred into a comfortable waiting lounge that is monitored by a dedicated nurse attendant. This nurse functions like an air traffic controller, where he or she coordinates with providers and patients, delivers test results, answers any relevant questions posed by patients, and takes the opportunity to push internal staff to finalize patients' treatment plans so they can be discharged. Simultaneously, the nurse ensures patients' monitors are kept in check and response is provided in any cases where needed. A schematic of the split-flow model in EDs is represented in Figure 3.

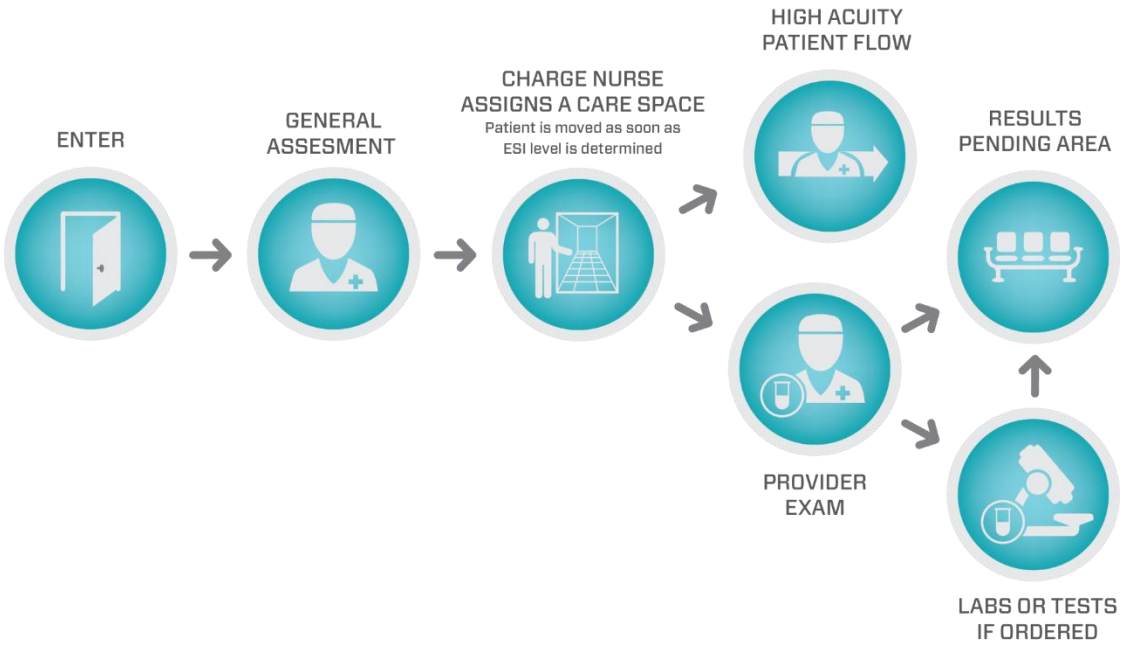

Figure 3. Split-flow process map in emergency departments.

Split-flow is a lean reengineered technique that manages the flow of patients in EDs (Harris & Wood, 2012). This model incorporates several elements, including total quality management, lean management, Six Sigma principles, and process mapping. The reengineering of steps patients must go through in their visit to an ED has been correlated with reduced waiting times for an admission bed, reduced waiting times for blood and other test results to return, a decrease in triage assessment time, a decline in medical expert consultation time, and improved levels of patient satisfaction (Joseph et al., 2013; Dickson et al., 2009; DeFlitch, Geeting, & Paz, 2015). Therefore, the split-flow model is viewed as a comprehensive framework of a reengineered care process where elements of are applied and packaged to account for improved quality of care and patients' satisfaction (Sayah et al., 2016).

Note that the split-flow model follows the general principles of lean construction and lead design. First, the model promises to yield higher levels of client satisfaction, administrators, as

well as patients. Second, the model utilizes waste management tools and techniques, just-in-time delivery and services, and recycling of resources. Third, and most importantly, the split-flow model is based on the general idea of the provision of sustainable healthcare services where patients are expected to be satisfied in the long-run without the intensive investment in new technologies, staffing or facilities.

Business Process Improvement and Patients' Satisfaction

Researchers have established a robust positive connection between process improvement and patients' satisfaction in the healthcare sector. Marley, Collier, and Meyer Goldstein (2004) investigated the relationship between process quality and patient satisfaction in 202 US hospitals using structural equation modeling. They concluded that "leadership is a good exogenous construct and that clinical and process quality are good intermediate outcomes in determining patient satisfaction. Statistical results also suggest that hospital leadership has more influence on process quality than on clinical quality, which is predominantly the doctors' domain." Similarly, the authors resolved that the application of Six Sigma in the form of DMAIC (Define, Measure, Analyze, Improve, and Control) by healthcare providers in pain management improved patient's satisfaction significantly. They concluded that

> The Six Sigma DMAIC methodology can be used successfully to improve patient satisfaction. The project led to measurable improvements in patient satisfaction with pain management, which have endured past the duration of the Six Sigma project. The Control phase of DMAIC allows the improvements to be incorporated into daily operations. (Marley et al., 2004)

Significant improvements in starting surgeries on-time, reducing surgeries past five in the evening, and increasing efficiency in utilizing operational rooms of large, high volume, hospitals were achieved based on a newly constructed value stream map redesigning the surgical process from the decision to undertake a surgery to discharge. The reengineering of the surgical process through reexamination of personnel, information, and time involved with surgeries resulted in better healthcare outcomes, likely producing higher levels of patient satisfaction (Cima et al., 2011). Cuevas and Joseph (2010) applied the Six Sigma framework to studying its effects on reducing patient wait times and satisfaction at an outpatient clinic, the Family Ambulatory Health Center in Flint, Michigan. They found that the

> …project clearly demonstrates the Six Sigma methodology as an effective tool in defining inefficiencies and improving patient flow in a residency outpatient clinic. Six Sigma uses hard data to drive changes rather than notions based on individual perceptions, assumptions and agendas. (Cuevas & Joseph, 2010)

The application of Six Sigma reduced patient wait times by 21 minutes and reduced variation in waiting periods across the different physician experience levels. This has likely increased levels of patients' satisfaction with the center (Cima et al., 2011).

In a more recent analysis, Al Khani (2015) attempted to investigate the relationship between redesigning patient flow pathways and satisfaction by reducing the waiting times at a retina clinic. Results indicated the doubling of patients seen within the same period before the reengineering of the patient flow process. The analysis depended on the implementation of a new process of patient flow through the use of process mapping and the application of the health service executive model, which was used in the United Kingdom to a similar end. Jarve and Dool (2011) found that an improved referral process implemented in a Midwestern healthcare system

in the United States improved levels of satisfaction among patients. The authors argued that a formal gap analysis coupled with quality improvement investigation resulted in an improved referral procedure, implying all steps taken to refer a patient from one physician to others.

Mazer (2015) suggested that contemporary processes in place for evaluating patients' experiences are based on what hospitals do rather than on the emotional subjectivities of the patient coming to get the services needed and offered by healthcare providers. She alluded to the need for reengineering care processes to reflect the preferences and expectations of patients, which are likely to produce higher levels of satisfaction. She also argued that measuring fear, anticipation, frustration, embarrassment, and results' orientation should be integrated in process mapping, management, and reengineering when care services are planned. Taking patients' subjective emotional condition into consideration when planning processes of care is a crucial step toward raising levels of satisfaction.

Business Process Improvement Application in Jordan

While business process improvement has been applied extensively in industrialized nations such as the United States and Western Europe, its widespread application in the Middle East is still emerging and limited. Few analyses have applied and its related concepts, such as business process improvement reengineering, to essential sectors such as energy, manufacturing, construction, and healthcare in the Hashemite Kingdom of Jordan. This section outlines the findings of current research on the application of in Jordan.

Analyzing the challenges in the energy sector of the country, Moshari and Ebrahimi (2015) concluded that demand side management techniques can help the nation overcome a few of the pressing problems posed by energy consumption. Electric power providers can use automated processes to control the amount of electricity utilized by customers during peak hours.

This, coupled with an awareness campaign on conserving energy, can modify the behavior of end users by controlling the demand for electricity and adding many benefits to energy providers in their work. Similarly, Tuama and Alqhiwi (2014) found a statistically significant relationship between the implementation of Six Sigma and business process reengineering (BPR) with institutional effectiveness, in addition to process performance in the pharmaceutical industry in Jordan. They suggested that the dimensions of including process redesign, process innovation, and process measurement are positively correlated with organizational productivity and performance measured in quality of services provided and sales.

In a general recommendation developed by third party consultants commissioned through the United States International Aid Agency, USAID/Jordan have generated a manual for the provision of quality services by Jordanian customs centers throughout the kingdom. The manual includes several recommendations, starting with the idea of focusing on the process rather than its function and creating process profiles that could then be mapped out. Finally, the manual presented a methodology to measure the processes' performance, aiding Jordanian officials in better redesigning their processes and yielding higher performance. This measurement strategy included the calculation of the costs associated with each process, pass yields, percentage of finished transactions before and after the process reengineering takes place, hands-off (number of hands per transaction), and time spent to complete a transaction (USAID, 2015).

The study of business management processes (BMP), business process reengineering (BPR), Six Sigma, and total quality management (TQM) in the Jordanian healthcare system is limited (Al-Badayneh, 1991; Alasad & Ahmad, 2003; Zamil et al., 2012). While many studies have investigated the link between care and patient satisfaction, few analyses have looked at how improved processes could yield better healthcare outcomes. Most studies focus on the link

between nursing care and patients' ratings of services. The literature does not explore or explain the links between healthcare's process management and reengineering and healthcare outcomes extensively, which creates a research gap that this present study fills.

Chapter Three: Research Methodology and Design

This chapter summarizes the research design, population and sample, data collection, and data analysis strategies and techniques utilized by this research. First, a note on the appropriate research strategy and the choice of design is outlined. Second, a brief discussion of the population and sample targeted by this research is followed. Third, this study presents the survey instrument used to measure the various relevant variables used in this dissertation. Finally, an explication of the proper statistical techniques for the type and nature of the data collected and used as data analytic methods is spelled out.

Research Design

Several exploratory studies (Andaleeb, 2011; Shemwell, Yavas, & Bilgin, 1998) on the determinants of patients' satisfaction have repeatedly identified the process of healthcare provision as a main influential factor. Few qualitative studies (Alasad & Ahmad, 2003; Zineldin, 2006) had used structured interviews and patient feedback in Jordan to verify whether patients' perceptions regarding processes does influence their satisfaction. Nevertheless, they established that patients' perceptions, satisfaction, and feedback about quality of care is firmly linked to the services delivery, treatment planning and implementation, and admission, as well as discharge processes (Meesala & Paul, 2018).

The researcher has considered this relationship between business process improvement implementation and patient satisfaction at a single point with a single sample (one n and one t). This is contrary to longitudinal or panel research designs where multiple time points or samples are considered. The researcher does understand that cross-sectional research designs are weaker

in comparison to other designs that take measurements across time and samples, since they only offer a snapshot of the relationship in the time horizon (Busk, 2014). While cross-sectional research strategies are weaker in generating causal statements about relationships among variables, they are easily implemented, less expensive, and suitable for the initial phase of exploratory and explanatory research (Ellingsen & Ackerman, 2015).

This research is explanatory rather than descriptive or exploratory. Explanatory research designs describe the relationships, strength, and direction of a set of quantitative variables (Babbie, 2015). This research uses a convenient sample of Jordanian patients, ages 18 and older, who were seen at emergency departments in public Jordanian hospitals between January 1, 2017 and December 30, 2017. This makes the research design a cross-sectional one, one sample at one time point (Ployhart & Vandenberg, 2010). The choice of this research design was made by practical considerations, the difficulty of implementing an experimental study in a foreign country, the dearth of data available for business process improvement, the patient satisfaction instrument and scores in Jordan, and the limited funding and resources available to the researcher.

Population and Sample

The population for this research was Jordanian patients who received medical care in emergency departments at public health operating facilities in Amman and Irbid in 2017. This research distributed the survey instrument to 400 Jordanians, ages 18 and older, who received emergency hospital services from public hospitals in the capital of Jordan, Amman and Irbid. The researcher then reached out to hospital administration, internist, and family friends in Jordan who further identified more subjects.

This choice of population was informed by data availability, human information retrieval capacity, and access. Patients' satisfaction data availability is limited in Jordan, as few hospitals collect systematic information on how their care, services and processes are rated by patients (Alhusban & Abualrub, 2009). In cases where such information exists, limited access was granted. To capture such information, several background clearances by the Ministry of Health that coordinates with Intelligence Services had to be undergone, ensuring the security of data. It was impossible to obtain approval to conduct this research timely. This process often takes more than a year and release of such information to outside agencies is rarely granted. The years 2017 was chosen because patients are more likely to remember the processes, services and care provided to them by hospitals recently compared to earlier periods. Retrospective research based on people's ability to remember events has established that the closer the gap between the period considered by the research and that of the survey completion yields more reliable and valid information compared to larger gaps (Fisher & Geiselman, 1992). Lastly, given the access to the population by the researcher (being of Jordanian citizenship) and previous working experience in the country with extensive networks in Amman and Irbid, the researcher was able to obtain convenient data from those patients who visited ED departments at various hospitals in Amman and Irbid in 2017.

It is nearly impossible to construct a meaningful and utile sampling frame from this extensive population; however, the following is an attempt to describe few of the population's characteristics. According to the World Health Organization the population of the Kingdom of Jordan in 2015 was 7,594,000 people. The per capita income in 2013 was 11 thousand US dollars. Life expectancy for females in 2015 was 76 and 72 years for males. The total

expenditure on health per capita in 2014 was $798 (USD). The country spent about 7.5% of its GDP on healthcare expenditures for the year 2014 (World Health Organization, 2015).

The United Nations High Commission on Refugees (UNHCR) reported that Jordan has 89 refugees per 1,000 as of February 2018 (UNHCR, 2018). Eighty percent of refugees, the majority being Syrian, live in poverty, and 51% of them are children. The Central Intelligence Agency's World Factbook (2019) lists the following demographic breakdown for people living in Jordan: Syrian 13.3%, Palestinian 6.7%, Egyptian 6.7%, Iraqi 1.4%, and other 2.6% (includes Armenian and Circassian).

While probability sampling is superior to non-probability sampling for research projects aiming at generalizing the findings of the research (Fowler, 2013, p. 110), it is not always possible to construct a sampling frame for hard to reach populations such as all Jordanian patients. Therefore, the researcher utilized snowball sampling to identify relevant research subjects to complete the study. Snowball sampling is a non-probability sampling technique where the researcher identifies research subjects based on other subjects' referrals (Goodman, 1961). Normally, the researcher interviews a potential subject that identifies more subjects who fit the criteria for research participation. Snowball sampling is useful in cases where the sample is hard to identify and reach (Noy, 2008). This population was variegated in many ways; therefore, snowball sampling made it more accessible for recruiting subjects for the study.

Snowball sampling strategy was further preferred due to the difficulty of acquiring partners who are able to collect data inside the country at the time of the research. As discussed earlier, to obtain consent for a research project in the Jordanian healthcare system, an intelligence service background check had to be secured. Further, it was hard to get stakeholders within Jordanian hospitals to collaborate with the researcher in order to conduct this study, given the

lack of a coherent organizational structure and the inexperience of hospitals in dealing with outside researchers (Al-Badayneh, 1991). Moreover, the information provided by patients reflected accurate depictions of the extent to which EDs achieved patient satisfaction.

Selection Criteria

The selection criteria for patients in this study was governed by a set of conditions specifying the type, size, and nature of hospitals they visited for emergency treatment in 2017. Much of Jordan's population live in urban metropolitan areas, and most patients therefore came from Amman or Irbid, the two largest cities. Second, only those patients attending large hospitals, 200 bed or more, were included in the analysis.

Human Subjects Approval

In April 2018, the researcher obtained approval from the Eastern Michigan University's institutional review board to conduct the research. The process lasted two months refining the questionnaire, methods of data collection and consent forms. Confidentiality and privacy were stressed in every step in the data collection and analysis processes. The letter of approval is attached in Appendix A.

Notice that the survey was translated into Arabic by a faculty member teaching at a public university. The translated version is included in Appendix B. The Arabic version of the survey has been face validated by the recruiters of the study, as well as the faculty member who approved of the researcher's translation. Further, when the pilot study took place, participants informed the researcher that the questions and items on the instrument were clear and easy to read and understand.

Data Collection

The research instrument is divided into three parts. Part 1 gathers the demographic data; such as age, national origin, and educational level. Part 2 is the split-flow model implementation instrument which collects information on patients' experiences with the triage process in relation to the doctors, staff, and facility (Appendix C). Finally, Part 3 uses SERVQUAL, a service quality instrument, to measure patient perceptions on five key dimensions of service quality: tangibles (facilities), reliability, responsiveness, empathy, and assurance (Appendix D).

To measure the main independent variable, business process improvement, questions were added to assess patients' perceptions of the split-flow procedure followed by the ED was implemented. Split-flow has been considered one of the best process reengineered solutions for ED efficiency and effectiveness. Therefore, the higher the ED possessed split-flow characteristics, the more it applied business process improvement strategies and techniques. This survey included patients' assessment of the triage, waiting time, provision of care, and discharge components of the split-flow treatment model in EDs. Each component was measured by several items. Each item was measured on a Likert-type item from 1 = strongly disagree to 5 = strongly agree with the statement being presented to patients. Table 2 includes all items that were used to measure patients' perceptions with the split-flow model exercised by the ED they visited.

The SERVQUAL questionnaire was modified to suit healthcare research. Each statement represented an independent item that covered an aspect of one of the larger three dimensions of the satisfaction construct. All items were measured on Likert-type items ranging from 1 to 5, 1 = strongly disagree and 5 = strongly agree.

Instrument Reliability and Validity

As this is the first time an amended version SERVQUAL was used to collect patient satisfaction data in a Jordanian environment, a pilot study was conducted. This pilot study consisted of a fifty-patient sample to authenticate the instrument for its validity and reliability. Multiple methods were used to calculate reliability and validity. Reliability was assessed through internal consistency and split-half reliability method, while validity was assessed in three different ways: face validity, content validity, and construct validity. Construct validity was assessed through investigating the two related concepts of discriminant and convergent validity (Nunnally & Berstein, 1994; Raykov & Marcoulides, 2011; Streiner, 2003). Details about each type of reliability and validity is supplied in the pilot study section included in the results chapter of the dissertation. Results of the pilot study indicated that the questionnaire possessed adequate reliability and validity. Therefore, the researcher moved to collect more responses to complete the intended objectives of this project.

Internal consistency has been widely used as a metric for assessing the reliability of surveys (Nunnally & Bernstein, 1994). The computation of the reliability analysis generates a number referred to as Cronbach alpha describing how closely all items on a test or survey are related. Conceptually, alpha can be defined as follows:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

Equation 1. Cronbach Alpha defined.

Where N is the number of total items comprising the survey, c-bar is the average inter-item correlation among all items and v-bar is the average variance among all items. From the

above formulation (Equation 1), it is clear that as the number of items on the survey increase, alpha will increase (Gliem & Gliem, 2003). By the same token, if the inter-item correlation average is low, alpha is expected to be low as well. While many researchers (Tavakol & Dennick, 2011; Sijtsma, 2009) have recommended cut-offs for concluding when alpha can be indicative of an adequate internal consistency for surveys, the higher the alpha value is, the more reliable the survey is. In this study, this study followed Nunally's (1978) recommended alpha level of 0.70 or higher as a good reliability of surveys for this research.

Split-half reliability is a suitable technique to estimate the reliability of an instrument and measures the extent to which all parts of the test contribute equally to what is being measured. (Callender & Osburn, 1977). To calculate split-half reliability, the researcher must divide the instrument, questionnaire, into two halves and calculate the correlation between the two total scores obtained. If the correlation was 0.7 or higher, then the instrument is said to possess adequate reliability, as in the case of internal-consistency (DeVellis, 2006). But this correlation is only for the half, so to check reliability of entire test, use the following formula:

$$R' = 2r/1+r$$

(r = coefficient of split half, R' = coefficient of entire test)

In evaluating the reliability of surveys, researchers can assess the reliability of each item included in the instrument. One of the numbers that allow researchers to judge whether the item corresponds with the total score of the instrument is the item-total correlation, the relationship between each item and the total score on the test. This correlation denotes whether each item corresponds to its specified construct or not. The pattern of correlations between a given set of items and the total score informs researchers whether the set of items correspond to the overall

test or survey. While researchers have disagreed on the acceptable cut-offs for judging the reliability of each item, a score of 0.3 or above is said to be sufficient to establish the stability of the item for research purposes (John & Benet-Martinez, 2000).

Validity refers to whether the constructs or items comprising the instrument measure the intended concepts (Cronbach & Meehl, 1955). There are many types of validity, and this study utilizes three main metrics of validity to evaluate whether the instrument at hand possesses validity or not. First, content validity is conducted to examine the extent to which a measure is representative of all facets of a given construct. Content validity refers to the degree of similarity between the instrument and previously utilized instruments in the literature. More specifically, it concerns whether the utilized instrument covers the whole concept as demonstrated in the extant literature covering the given subject matter. To determine the content validity of the questionnaire in this study, a literature review was conducted in Chapter Two. To cast a judgment concluding whether the instrument possesses content validity or not, the researcher must demonstrate that the utilized instrument has been utilized frequently previously by other researchers and the conceptualizations of the constructs are congruent with previous definition's proposed by researchers in the same domain (Lynn, 1986). Next, face validity was performed. It refers to the extent to which a measuring instrument appears valid on its surface and every item on the research instrument have a logical link with the objective

Finally the most important of all validity, construct validity, is performed. Construct validity refers to the degree of similarity and discrimination of the items or sub-scales comprising an instrument (Bagozzi & Phillips, 1991). The use of various methods of validity ensures the accuracy, precision and confidence in the measures and inferences generated by them in research.

Convergent validity, a type of construct validity, represents the degree to which items of the survey correspond to their specified dimension or any similar dimension in another instrument. One of the measures utilized to evaluate convergent validity is the inter-item correlations between the group of items and the total score comprised of their total score. A correlation of 0.3 and higher ensure convergent validity (Nunally, 1978). Another way to evaluate convergent validity is by checking the pattern of factor loadings obtained from an exploratory factor analysis. If the items hypothesized to load on their corresponding factor do so after the conducting of the EFA, then the sub-scale is said to possess convergent validity. In other words, cross-loadings of significant values, above 0.4, are not desirable and do not allow for the conclusion of convergent validity (Tabachnik & Fidell, 2007). The third method for convergent validity uses the average variance extracted (AVE). AVE is the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error. SPSS does not calculate AVE. Therefore, the AVE of a construct should be > .5 for ensuring convergent validity (Diamantopoulos & Siguaw, 2000, p. 14).

The other type of construct validity is discriminate validity. Discriminate validity, refers to the extent to which a group of items measure a distinct construct from another group of items (Campbell & Fiske, 1959). This type of validity signifies the extent to which a dimension corresponds to a qualitatively different attribute from other dimensions in the same instrument or others. To evaluate discriminant validity for this research, two different methods were used. The first method utilizes correlation matrix for the construct. If correlations among them fall below 0.5 or -0.5, then the instrument is judged to possess discriminant validity (Tabachnick & Fidell, 2007). The second method utilizes average variance extracted (AVE) and correlation coefficient

among various constructs. The discriminant validity is justified when the following condition is met:

$$AVE_{Contruct1} > (\text{Correlation coefficient}_{\text{ Construct 1 and Construct X}})^2$$

Equation 2. Justification of discriminant validity.

Table 3 shows how AVE and correlation and square of correlation are represented in a table format.

Table 3
Average Variance Extracted (AVE) and Correlation Coefficient

	CR	**AVE**	**Construct 1**	**Construct 2**	**Construct 3**	**Construct 4**
Construct 1			1.000	C_{12}^2	C_{13}^2	C_{14}^2
Construct 2			C_{21}	1.000	C_{23}^2	C_{24}^2
Construct 3			C_{31}	C_{32}	1.000	C_{34}^2
Construct 4			C_{41}	C_{42}	C_{43}	1.000

In this research, all the above methods were used to verify the validity of the instrument in the new context, Jordan Hospitals, for the pilot study.

Data Analysis

Prior to the use of multiple linear regression to test several hypotheses proposed by the research, SERVQUAL analysis was be completed. In this regards a means comparison analysis was carried out, simple means' comparison and independent sample t-tests, to detect the differences in perceptions and expectations, called the gap, towards service quality. Notice that such methods are appropriate when the research objective is to compare averages of different variables across the same or different groups of the sample. To analyze the gaps, a significant

gaps refers to any mean gap of -1 or less. This metric is adopted since hospitals aspire to provide excellent services, and anything that fails this ideal should be marked as a gap. Therefore, the smaller the gap threshold, the better hospitals are served with research findings. While SERVQUAL identifies several potential gaps in the functioning of organizations and the fulfillment of customers' needs, Gap 5 from Figure 4, represents the most important gap in this research (Parasuraman, Zeithaml, & Berry, 1988). This gap represents the discrepancy between customers' expectations and the care received. Note that other gaps in the model specifically relate to internal organizational problems and mismanagement. Therefore, this research considered a good gap where the discrepancy of the expectations and perceptions of patients is low, below 2. If it was larger than 2, then the research concluded that the gap is large, and it needed correction.

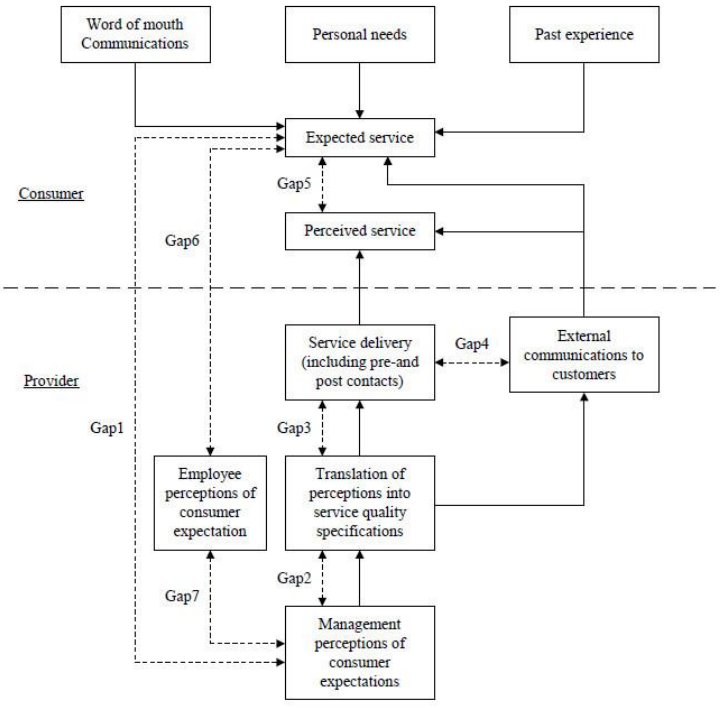

Figure 4. Model of service quality gaps.

This dissertation utilizes multiple regression analysis to examine the empirical support of the proposed hypotheses in light of the data collected from Jordan. Prior to the performance of the multiple regression analysis, the data were tested to check for the assumptions of the multivariate technique. Along with descriptive statistics and tests of normality, multicollinearity was performed until data were deemed acceptable for further analysis. The data proved to meet the assumptions of Ordinary Least Squares (OLS) regression, allowing the researcher to model the relationships without any major violations from the data.

Correlations were calculated and OLS estimation was then used to calculate the coefficients of the independent variables, business process implementation, split-flow model, and service quality constructs on the dependent variable patients' satisfaction.

Table 4 presents six different models corresponding to the proposed hypotheses evaluated by this research. The dependent variable, patients' satisfaction, is the mean of the gaps of all five SERVQUAL dimensions. This measure is a good metric due to its positive significant relationship to the five dimensions of service quality (Freitas, Silva, Minamisava, Bezerra & Sousa, 2014: Aiken, Sloane, Ball, Bruyneel, Rafferty & Griffiths, 2018; Rudzik, 2003; Hagen, Veenstra & Stavem, 2006). It is a sufficient metric for patients' satisfaction given its straightforward interpretation compared to other complex metrics. Further, each model specifies the variables measuring the respected construct such as facilities or communications features in hospitals.

Table 4
Research Models

Model 1:

Tangibles (Facilities) Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (PT1) + \beta_2 (PT2) + \beta_3 (PT3) + \beta_4 (PT4) + \varepsilon$$

Model 2

Reliability Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (PR5) + \beta_2 (PR6) + \beta_3 (PR7) + \beta_4 (PR8) + \beta_5 (PR9) + \varepsilon$$

Model 3

Responsiveness Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (PR10) + \beta_2 (PR11) + \beta_3 (PR12) + \beta_4 (PR13) + \varepsilon$$

Model 4

Assurance Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (PA14) + \beta_2 (PA15) + \beta_3 (PA16) + \beta_4 (PA17) + \varepsilon$$

Model 5

Empathy Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (PE18) + \beta_2 (PE19) + \beta_3 (PE20) + \beta_4 (PE21) + \beta_5 (PE22) + \varepsilon$$

Model 6

Split-Flow Model Implementation Effect on Patients' Satisfaction

$$PS = \beta_0 + \beta_1 (Triage) + \beta_2 (Waiting) + \beta_3 (General\ Team\ Assessment) + \beta_4 (Discharge) + \varepsilon$$

Where PS = Patients' Satisfaction

β = Regression Coefficient (Beta)

ε = Error Term

Prior to the performance of the multiple regression analysis, the researcher tested for the assumptions of the multivariate technique. Along with descriptive statistics and tests of normality, multicollinearity will be performed until data deemed acceptable for further analysis. The data proved to meet the assumptions of OLS regression, allowing the researcher to model the relationships without any major violations from the data.

Multiple regression was chosen for its versatility in detecting precise effects of hypothesized factors on an outcome. Following the footsteps of many researchers (Chatterjee & Hadi, 2015), the collected ordinal data were utilized as an appropriate input for regression. The logic for this stems from the fact that the constructs in question are latent and not binary. Since they represent continuums of attributes, one may logically treat them as continuous measures, if assumptions are verified. Further, behavioral researchers (e.g., Cohen, West, & Aiken, 2014; Pedhazur & Kerlinger, 1973) have argued that variation in Likert items, in more than three categories allow researchers to have data similar to continuous measures, which is acceptable for regression use (Cohen, West, & Aiken, 2014; Pedhazur & Kerlinger, 1973).

In this research, the outcome of regression analysis can yield low R-squared values. This is not unusual when human behaviors are studied. Any field that attempts to predict human behavior, such as psychology, sociology, etc., typically has R-squared values lower than 50% because humans are simply harder to predict than, say, physical processes.

Summary

This chapter outlined the research design conducted by this research. First, a note on the population, sample, data collection, and data analysis segments of research was discussed. Second, the chapter presented the series of models to be estimated by the research, predicting

variance in patients' satisfaction in Jordanian hospitals. The following chapter presents the results obtained from the survey data analysis for the dissertation.

Chapter Four: Data Analysis and Results

This chapter outlines the findings of the research project. First, the pilot study is introduced, and its findings are discussed. Within this section, a detailed section on the reliability and validity of the data is supplied. Second, the analysis shifts to the entire sample utilized in the research. Following the presentation of the measurement properties of the questionnaire, the analysis presents the findings of the hypothesis testing section. This section includes the regression analysis portion of the dissertation outlining the empirical support of the hypothesized propositions advanced in the first chapter.

Pilot Study

This research has made extra efforts to test the validity and reliability of split flow instrument that was developed and applied in this research and the SERVQUAL instrument, which was applied for the first time in Jordanian hospitals. Once the instrument was verified to be reliable and valid, the final data analysis was conducted but only used one or two methods. Table 5 illustrates the tests the pilot data analysis will perform for the reliability and validity of the two instruments.

Table 5
Reliability and Validity Tests for Pilot Data Analysis

Reliability	Validity
Internal Consistency	Face Validity
Split-Half	Content Validity
Item Total Correlation method	Construct Validity Convergent Validity *EFA/ Factor loading*

Composite Reliability	*Inter-Item Correlation Average* *Variance Extracted* Discriminant Validity *Correlation* *Average Variance Extracted*

To complete the pilot study, the researcher reached out to personal networks of physicians, nurses, and healthcare staff working in Amman and Irbid in Jordan. The researcher asked three doctors, two nurses, and two administrators working at public hospitals to recruit subjects for the pilot study. Each person was asked to obtain consent from anyone agreeing to complete the questionnaire either in written format or orally. Once a subject agreed to participate in the research, the survey was sent to the subject via email or a phone interview via Skype. The researcher did not obtain any information on subjects unless the subject emailed or phoned the researcher based on the request of the personal connection upon the expression of interest to participate in the study.

From April 15 until May 8, 2018, the researcher obtained responses from 50 participants. This was possible due to intensive communications with the researcher's recruiters on the ground in Jordan. Note that 38 participants filled the questionnaire via email while 12 completed the data collection through phone interviews. Note that each of the subject has visited an emergency department in Jordan in 2017. This sampling design of the pilot study, as well as the overall research, is convenience sampling. This has allowed the researcher to obtain the necessary information to complete the pilot study timely and effectively. Phone interviews with participants lasted between 12 and 18 minutes where respondents were instructed to answer the items on the questionnaire as accurately as possible after obtaining their oral consent to the study.

Pilot Study: Patient characteristics. Table 6 displays the sample characteristics (descriptive statistics) for the pilot study. There were more males compared to females in the survey (58% versus 42%). Only 4% of the sample did not have a formal higher education college degree, noting the high participation rate of educated Jordanians given the researcher's personal connection in the selection of the medical staff and their patients. While this presents a sampling bias into the study, the researcher actively asked the study recruiters to ask everyone regardless of their level of education to participate in the research. The high degree of education in the sample is a classic limitation in survey research in the developing world, where more educated individuals are more likely to fill out research questionnaires (Saleh & Bista, 2017). Most participants were relatively young, falling between the ages of 18 and 40, about 60% of the pilot study sample. Most participants were Jordanians, about 60%. The percent of Arab participants was 24% consistent with the CIA's demographic breakdown of the country, 30% non-Jordanian Arabs residing in Jordan as of 2018. This is, however, consistent with the most recent demographic statistics in Jordan, 69% Jordanians and about 25-28% other Arabs, including Syrians, Palestinians, Egyptians, and Iraqis.

Table 6
Pilot Study Sample Characteristics

Variable	**N**	**%**
Gender		
Male	29	58
Female	21	42
Educational Level		
Less than High School	2	4
High School	5	10
Some College	0	0

Table 6 *continued*

Variable	**N**	**%**
BA/BS	22	44
MA/MS	12	24
Ph. D./Equivalent	9	18
Age		
18-29	15	30
30-39	16	32
40-49	8	16
50-59	3	6
>60	8	16
Nationality		
Jordanian	30	60
Arab	12	24
Western	8	18

Pilot Study: Reliability of the split-flow model instrument.

Cronbach's alpha & split-half method. Table 7 displays the reliability analysis for the split-flow model questionnaire. The alpha for the split-flow model questionnaire was 0.840, and the alphas obtained from the split-half approach were 0.724 and 0.748, suggesting good reliability. Correlation between halves, 0.689 was moderate but very close to strong (0.7), and the correlation of the entire test has a strong correlation, 0.816. Given that, all alphas exceed the recommended cut-off value of 0.7, and strong correlation among items, this research concludes that the questionnaire measuring the implementation of split-flow model in Jordanian emergency departments is reliable.

Table 7
Pilot Study - Reliability Analysis for the Split-Flow Model Questionnaire (15)

Cronbach's Alpha	All Items		0.84
Cronbach's Alpha	Part 1	Value	.731
		N of Items	7
	Part 2	Value	.748
		N of Items	8
	Total N of Items		14
Correlation Between Halves			.689
Correlation of Entire test			.816

Pilot Study: Reliability of the split-flow model instrument --- item reliability analysis. The reliability analysis for items in split-flow model survey was conducted using the item total correlation method. The item-total correlation is a measure of the reliability of a multi-item scale and a tool for improving such scales. Table 8 displays results from the sub-scale analysis (item total correlation) for the split-flow model implementation questionnaire. Cronbach's alphas for the general team assessment (alpha 0.747) and waiting (alpha 0.703) have strong reliability (Nunnally & Bernstein, 1994), while the triage process (alpha 0.556) and discharge (alpha 0.583) indicates moderate reliability. Such low reliability are not unusual for convenience sampling and small sample size. The Item-total correlation for every items is greater than 0.3, indicating that the corresponding item does correlate very well with the scale overall. Therefore, the split-flow model instrument is internally consistent and reliable. The low reliability scores for triage, process, and discharge may be explained by the sampling design, data collection, and relatively small sample size for the pilot study (Gliem & Gliem, 2003).

Table 8
Pilot Study: Reliability analysis of split-flow model implementation in Jordanian EDs.

Item	Item-Total Correlation
Triage Process α = (.556)	
T1: I was seen by staff within 15 minutes of arrival	.322
T2: I was told that I had an acute or non-acute case	.370
T3: I was transferred to a waiting area after triage	.388
T4: I was transferred to a bed after triage	.501
T5: The entire triage phase of my visit took less than 15 minutes	.315
Waiting α = (.703)	
W1:My total waiting time in the waiting area was less than 15 minutes	.617
W2: Once in the exam room, I waited less than 15 minutes to be seen by someone	.429
W3: My total waiting time to receive exams/tests orders/results was less than 15 minutes	.511
General Team Assessment α = (.747)	
GTA1: A doctor saw me twice or more during my visit	.503
GTA2: A doctor spent more than 15 minutes in evaluating my case	.502
GTA3: Nurses responded to my requests within less than 15 minutes	.498
GTA4: Nurses approached me to inquire about my case within less than 15 minutes	.672
Discharge α = (.583)	
D1: The entire discharge process took less than 15 minutes	.486
D2: The discharge staff answered all my questions related to the medical/financial services	.405
D3: The discharge staff explained discharge instructions, billing and financial documents well	.435

Pilot Study: Content and face validity of the complete instrument. Instrument validity starts with the content validity, and this research utilized the face validity for it. Prior to the distribution of the instrument, it was verified by the student's research committee, and public health experts at Eastern Michigan University evaluated the whole questionnaire for its readability, feasibility, layout, and style and for clarity of word. It was concluded that the instrument possessed adequate face validity Secondly, a comprehensive literature review of split-flow model, as appeared in Chapter 2, was conducted and concluded that questions appearing on

the survey have measured all conceptual constructs comprising the split-flow model. This indicates that the instruments possess adequate content validity.

Pilot Study: Construct validity of the split-flow model instrument.

Pilot Study: Convergent validity---exploratory factor analysis, EFA method. To evaluate the construct validity of the instrument, an exploratory factor analysis (EFA), inter-items correlation analysis, and average variance extracted were performed. Table 9 illustrates the two tests that indicate the suitability of the data for structure detection. The Kaiser-Meyer-Olkin (KMO) measures the sampling adequacy and Bartlett's test of sphericity. A KMO of greater than 0.5 indicates that a factor analysis may be useful with the data. At the same time, Bartlett's test has a significance of 0.00, again emphasizing on conducting a factor analysis on the split flow data.

Table 9
Pilot Study: KMO and Bartlett's Test for the Split-Flow Model Questionnaire (15)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	1248.865
	df	105
	Sig.	.000

Table 10 displays the results of the exploratory factor analysis on the split-flow model's implementation in Jordanian EDs. Results indicate that four dimensions can explain 66.776% of the variation.

Table 10
Pilot Study Exploratory Factor Analysis for Split-Flow Model

Component	Extraction Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**
1	4.882	32.549	32.549
2	2.037	13.583	46.133
3	1.733	11.553	57.686
4	1.364	9.091	66.776

The loading factor for all items in these four components are larger than 0.4, thus assuring convergent validity of the split-flow instrument (see Table 1). Therefore, the results concluded that the questionnaire corresponds to its theoretical formulation comprising four dimensions.

Table 11

Pilot Study Loading Factors (Communalities) for Split-Flow Model

Constructs	ITEMS	Loading (Extraction)
WAITING Experience	WAITING2	.633
	WAITING1	.699
	TRIAGE5	.641
	TRIAGE4	.537
	DISCHARGE1	.433
GTA	GTA3	.699
	TRIAGE3	.596
	GTA4	.757
	GTA2	.688
Discharge Experience	DISCHARGE3	.830
	DISCHARGE2	.846
	TRIAGE1	.693
Triage Experience	WAITING3	.723
	TRIAGE2	.555
	GTA1	.685

Table 12 illustrates the varimax rotation method results with a cutoff loading value of 0.5. The four components identified by EFA lined up well with the four dimensions for split flow analysis data. For example, general team assessment (GTA) is similar to Component 1, discharge is similar to Component 2, waiting is similar to Component 3, and triage process is very close to Component 4. Having said this, the researcher did realize that these EFAs may or may not compare with a real sub-scale/construct and can have different meaning altogether.

Table 12
Pilot Study Exploratory Factor Analysis: Varimax Rotation for Split-Flow Model

Item	**Components**			
General Team Assessment	1	2	3	4
GTA1: A doctor saw me twice or more during my visit	.782			
GTA2: A doctor spent more than 15 minutes in evaluating my case	.451	.686		
GTA3: Nurses responded to my requests within less than 15 minutes	.500			.656
GTA4: Nurses approached me to inquire about my case within less than 15 minutes	.701			
Waiting				
W1:My total waiting time in the waiting area was less than 15 minutes			.826	
W2: Once in the exam room, I waited less than 15 minutes to be seen by someone			.781	
W3: My total waiting time to receive exams/tests orders/results was less than 15 minutes	.682		.455	
Triage Process				
T1: I was seen by staff within 15 minutes of arrival				.826
T2: I was told that I had an acute or non-acute case			.656	
T3: I was transferred to a waiting area after triage		.513		.534
T4: I was transferred to a bed after triage	.414		.510	
T5: The entire triage phase of my visit took less than 15 minutes	.768			
Discharge				
D1: The entire discharge process took less than 15 minutes	.572			
D2: The discharge staff answered all my questions related to the medical/financial services		.892		
D3: The discharge staff explained discharge instructions, billing and financial documents well		.889		

There are five cross loadings in Table 13, however, with the understanding that standardized loadings of at least 0.5 (ideally higher than 0.7) will confirm that the measured

variables are strongly related to their associated construct (Hair et al., 2010, p. 722), setting a value of 0.5. This will reduced the cross loading to one in T3 for component 2 and 4 only.

Table 13
Pilot Study Exploratory Factor Analysis: Varimax Rotation for Split-Flow Model (Loading at least 0.5)

Item	Components			
General Team Assessment	1	2	3	4
GTA1: A doctor saw me twice or more during my visit	.782			
GTA4: Nurses approached me to inquire about my case within less than 15 minutes	.701			
W3: My total waiting time to receive exams/tests orders/results was less than 15 minutes	.682			
D1: The entire discharge process took less than 15 minutes	.572			
T5: The entire triage phase of my visit took less than 15 minutes	.768			
Waiting				
W1:My total waiting time in the waiting area was less than 15 minutes			.826	
W2: Once in the exam room, I waited less than 15 minutes to be seen by someone			.781	
T2: I was told that I had an acute or non-acute case			.656	
T4: I was transferred to a bed after triage			.510	
Triage Process				
T1: I was seen by staff within 15 minutes of arrival				.826
T3: I was transferred to a waiting area after triage		.513		.534
GTA3: Nurses responded to my requests within less than 15 minutes				.656
Discharge				
D2: The discharge staff answered all my questions related to the medical/financial services		.892		
D3: The discharge staff explained discharge instructions, billing and financial documents well		.889		
GTA2: A doctor spent more than 15 minutes in evaluating my case		.686		
Average Variance Extracted (AVE)	0.50	0.69	0.50	0.47
Composite Reliability	0.83	0.87	0.79	0.72

Finally, average variance extracted (AVE) was calculated (Table 13) for each component greater than or equal to 0.5, indicating that instrument has convergent validity. Using AVE, composite reliability was also calculated, showing the range of 0.72 and 0.87 for the four components.

Pilot study: Convergent validity and inter-item correlation method. Inter-item correlation is the method used to conduct convergent validity on the new split-flow instrument (Table 14). All correlations, except one GTA1 and Discharge1, were greater than 0.3 and were significant at 0.05 or lower level, indicating that sub-scale possess convergent validity. The exception, GTA1 and Discharge 1, may be explained by the minimal sample size for the pilot study, the agreement acquiescence bias exhibited by many respondents and convenience sampling of the research. Perceptions concerning triage, waiting times are likely related to perceptions about general team assessment and discharge since they all take place at the same site, with the same actors and process. In larger samples, such associations are expected to exhibit lower values (Tabachnik & Fidell, 2007).

Table 14
Pilot Study Inter-Item Correlation Matrixes: Split-Flow Instrument
14a.

	GTA1	**TRIAGE5**	**GTA4**	**WAITING3**	**DISCHARGE1**
GTA1	1.000				
TRIAGE5	.471	1.000			
GTA4	.462	.505	1.000		
WAITING3	.463	.552	.637	1.000	
DISCHARGE1	.201	.359	.379	.359	1.000

14b.

	DISCHARGE2	DISCHARGE3	GTA2
DISCHARGE2	1.000		
DISCHARGE3	.715	1.000	
GTA2	.641	.506	1.000

14c.

	WAITING2	WAITING1	TRIAGE2	TRIAGE4
WAITING2	1.000			
WAITING1	.446	1.000		
TRIAGE2	.365	.448	1.000	
TRIAGE4	.354	.388	.331	1.000

14d.

	TRIAGE1	GTA3	TRIAGE3
TRIAGE1	1.000		
GTA3	.374	1.000	
TRIAGE3	.314	.384	1.000

Pilot study: Discriminant validity---correlation method. Table 15 displays results of the discriminant analysis for the split-flow model implementation in Jordanian EDs. Results indicate the all four constructs, triage, waiting, GTA and Discharge, have values between -0.5 and 0.5 thus they are strongly discriminant with each other.

Table 15
Pilot Study: Discriminant Validity for Split-Flow Model

Correlations				
	Triag	**Waiting**	**GTA**	**Discharge**
Triag	1	.254	.466**	.386**
Waiting	.254	1	.416**	.254
GTA	.466**	.416**	1	.361*
Discharge	.386**	.254	.361*	1
***. Correlation is significant at the 0.01 level (2-tailed).*				
**. Correlation is significant at the 0.05 level (2-tailed).*				

Finally, the convergent validity was checked using the average variance extracted (AVE) (Table 16). As the AVE of a construct should be greater than the square of the correlation coefficient of inter-construct correlation, Equation 2, it is concluded that, discriminant validity can be accepted for this split-flow measurement model, and it supports the discriminant validity between the constructs.

Table 16
Pilot Study - Discriminant Validity for Split-Flow Model - Correlations Square

Correlations				
	Triag.	*Waiting*	*GTA*	*Discharge*
Triag.	1	.064	.217	.149
Waiting	.254	1	.173	.064
GTA	.466**	.416**	1	.13
Discharge	.386**	.254	.361*	1
Average Variance Extracted (AVE)	***0.50***	***0.69***	***0.50***	***0.47***

Split-flow instrument: Pilot summary.

In conclusion, the pilot study analysis found that the split-flow instrument reliable and valid. Despite few weaknesses noted, the biases in the sample, questionnaire response rate and threats to survey data quality are likely behind such observations. Therefore, once the quality of the sample and questionnaire improves, the reliability and validity of the instrument is likely to increase.

Pilot study: Reliability of the SERVQUAL model instrument.

Cronbach's alpha & split-half method. Table 17 displays the reliability analysis for the SERVQUAL model questionnaire. The alpha for the entire questionnaire (44 items) was 0.890, and the alphas obtained from the split-half approach were 0.748 and 0.854, suggesting good reliability. The correlation between halves was 0.763, indicating adequate reliability for research purposes. The correlation of the entire test indicates a strong association, 0.866. Given that all alphas exceed the recommended cutoff value of 0.7, and strong correlation among items, this research concludes that the questionnaire measuring the implementation of SERVQUAL model in Jordanian emergency departments is reliable.

Table 17
Pilot Study: Reliability Analysis for the SERVQUAL Model Questionnaire (44)

Cronbach's Alpha	All Items		0.89
Cronbach's Alpha	Part 1	Value	.748
		N of Items	22
	Part 2	Value	.854
		N of Items	22
	Total N of Items		44
Correlation Between Halves			.763
Correlation of Entire test			.866

Pilot Study: Reliability of the SERVQUAL model instrument.

Item Reliability Analysis. The reliability analysis for items in the SERVQUAL model questionnaire was conducted, using the item-total correlation method. Table 18 displays results from the sub-scale analysis (item-total correlation) for the SERVQUAL questionnaire. Cronbach's Alphas for perceived responsiveness is above 0.70 threshold to be considered adequate reliability (Nunnally & Bernstein, 1994). Perceived tangibles, reliability, assurance, and

empathy all had alphas below the sufficient level of reliability indicating inadequate reliabilities. Expected responsiveness, assurance, and empathy all featured adequate reliabilities whereas expected tangibles and reliability had lower than recommended levels of reliability. The low reliability scores are potentially due to small sample size and convenience sampling.

Table 18
Pilot Study: Item Analysis of the Service Quality Instrument

Item	**Perceived Item-Total Correlation**	**Expected Item-Total Correlation**
Tangibles	(α = .622)	(α = .596)
Excellent Emergency Departments will have modern looking equipment.	.680	.574
The physical facilities at excellent Emergency Departments will be visually appealing.	.593	.298
Employees at excellent Emergency Departments will be neat appearing.	.400	.198
Materials associated with the service (such as pamphlets or statements) will be visually appealing at an exc ellent Emergency Departments.	.040	.474
Reliability	α = (.601)	α = (.330)
When excellent Emergency Departments promise to do something by a certain time, they do.	.350	.196
When a customer has a problem, excellent Emergency Departments will show a sincere interest in solving it.	.407	.399
Excellent Emergency Departments will perform the service right the first time.	.206	.296
Excellent Emergency Departments will provide the service at the time they promise to do so.	.578	-.015
Excellent Emergency Departments will insist on error free records	.306	.010
Responsiveness	α = (.837)	α = (.710)
Employees of excellent Emergency Departments will tell customers exactly when services will be performed.	.617	.750
Employees of excellent Emergency Departments will give prompt service to customers.	.604	.471
Employees of excellent Emergency Departments will always be willing to help customers.	.677	.654

Table 18 *continued*

Item	Perceived Item-Total Correlation	Expected Item-Total Correlation
Employees of excellent Emergency Departments will never be too busy to respond to customers' requests.	.797	.152
Assurance	α = (.511)	α = (.783)
The behavior of employees in excellent Emergency Departments will instill confidence in customers.	.519	.806
Patients of excellent Emergency Departments will feel safe in transactions.	.031	.530
Employees of excellent Emergency Departments will be consistently courteous with customers.	.577	.312
Employees of excellent Emergency Departments will have the knowledge to patients' questions.	.245	.758
Empathy	α = (.572)	α = (.858)
Excellent Emergency Departments will give customers individual attention.	.074	.411
Excellent Emergency Departments will have operating hours convenient to all their customers.	.241	.515
Excellent Emergency Departments will have employees who give customers personal attention.	.584	.288
Excellent Emergency Departments will have their customer's best interests at heart.	.684	.531
The employees of excellent Emergency Departments will understand the specific needs of their patients.	.129	.321

Concerning the item-total correlations of items, many items were found to reflect lower than recommended levels of stability and robustness, 0.3 (Gliem & Gliem, 2003). Among the 22 items comprising the perceived scores of respondents on the five dimensions of the SERVQUAL, seven items possessed lower correlations with the total score of their construct than 0.3. Similarly, nine items among the 22 total number of items measuring the five dimensions on the expected scores reflected correlations with their respective constructs of lower than 0.3. Again, such a result is not out of range given the small sample size and sampling biases introduced by the design of this research. Also, if the item-total correlation for any item is less

the desired value for expected, it has a higher value in preserved and vise-versa. This indicate that the item does correlate well in at least one.

Pilot Study: Convergent validity.

Exploratory factor analysis (EFA) method. To evaluate the construct validity of the instrument, an exploratory factor analysis (EFA) inter-items correlation analysis, and average variance extracted, were performed. Table 19 and Table 20 illustrate the two tests that indicate the suitability of the data for structure detection. The KMO measured the sampling adequacy and Bartlett's test of sphericity. A KMO of greater than 0.5 indicates that a factor analysis may be useful with the data. At the same time, Bartlett's test has a significance of 0.00, again emphasizing on conducting a factor analysis on the split-flow data.

Table 19
KMO and Bartlett's Test for the SERVQUAL (Pilot) Model (Only Perceived Items) Questionnaire (22)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.651
Bartlett's Test of Sphericity	Approx. Chi-Square	757.913
	df	231
	Sig.	.000

Table 20
KMO and Bartlett's Test for the SERVQUAL (Pilot) Model (Only Expected Items) Questionnaire (22)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.636
Bartlett's Test of Sphericity	Approx. Chi-Square	713.983
	Df	231
	Sig.	.000

The EFA results indicate that seven dimensions possess a larger than 1 eigenvalue, the criterion of factors extraction specified. The seven dimensions explain about 79% of the variance in the dataset. Table 21 demonstrates the distribution of items on their respective dimensions by showing their unrotated loadings structure. Notice that items with loadings lower than 0.4 were excluded from the table. This eases the readability and interpretation of the table. In addition, it only includes those items with robust relationships with their respective factors.

Table 21
Exploratory Factor Analysis for SERVQUAL (Pilot) Model

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.051	32.049	32.049	7.051	32.049	32.049	4.802	21.829	21.829
2	2.535	11.522	43.570	2.535	11.522	43.570	2.586	11.754	33.583
3	2.172	9.874	53.444	2.172	9.874	53.444	2.435	11.067	44.650
4	1.767	8.030	61.474	1.767	8.030	61.474	2.102	9.557	54.207
5	1.534	6.974	68.448	1.534	6.974	68.448	2.069	9.406	63.613
6	1.315	5.979	74.427	1.315	5.979	74.427	1.761	8.006	71.619
7	1.016	4.617	79.043	1.016	4.617	79.043	1.633	7.424	79.043
Extraction Method: Principal Component Analysis.									

The unrotated solution in Table 22 indicates many cross-loadings and a larger structure, seven dimensions, compared to the theoretical expected result of SERVQUAL of five dimensions. However, the sixth and seventh component has only two items while it is preferred to have at least three items in any component.

Table 22
Exploratory Factor Analysis for SERVQUAL (Pilot) Model Unrotated Solution

	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
P13	.877						
P21	.876						
P12	.852						
P14	.828						
P11	.746						
P16	.732						
P20	.726						
P1	.682		-.488				
P10	.636				-.445		
P3	.565	-.448		-.473			
P2	.537		-.504				
P19	.433			.426			
P15		-.743					
P17		.738					
P4		.732					
P8			.662		.430		
P9			.518				.486
P22				-.638			
P6			.521	-.539			
P18					.598		
P7						.563	-.515
P5						.509	
Note. Extraction Method: Principal Component Analysis. a. 7 components extracted.							

Table 23 presents the EFA results from an analysis with varimax rotation. The solution generated five factors for all loading greater than 0.5. As can be seen in Table 23, the number of cross-loadings were reduced to five and the pattern of loadings line up with their respective dimensions much clearer. While the items did not load as they were theoretically expected to do so, their loadings approximate the constructs specified by the SERVQUAL model. For instance,

P1, P13, and P21 all come from different dimensions; however, they are all different manifestations of responsiveness of hospitals to patients.

Table 23
Exploratory Factor Analysis for SERVQUAL (Pilot) Model Varimax Solution

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Responsiveness					
P13	.871				
P14	.838				
P20	.817				
P11	.798				
P1	.760				
P21	.705				
P2	.684				
P12	.653		.536		
P16	.634				
P10	.538				
P3	.508				
Reliability					
P17		.820			
P4		.804			
P7		.794			
Empathy					
P18			-.737		
P5			.564		
P19			.532		
Reliability					
P8				.834	
P9				.507	
Assurance					
P22					.773
P6				.523	.640
P15					-.572
Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 12 iterations.					

Pilot SERVQUAL validity.

Inter-item correlation method. Appendix E and F, display the inter-item correlations between perceived and expected ratings of Jordanian patients about the service quality in emergency departments. Results of the analysis indicate that the instrument possesses low convergent validity. Constructs seem to be independent of each other reflected by the low correlations among the items across distinct constructs. Nevertheless, items of the same construct do not possess strong relationships. For instance, few correlations among the triage construct exceed 0.5. This reflects a low convergent validity. This finding applies for both sections of the SERVQUAL instrument, the perceived and the expected.

Discriminant validity - correlation method. Tables 24 and 25 indicate the inter-item correlations among the 10 different constructs comprising the SERVQUAL instrument. Each construct was calculated as an additive scale summing respondent's rating of the items falling under each construct as they appear on the survey in the appendix. Notice that, overall, the pattern of correlations between perceived constructs and expected constructs is low, indicating a high discriminant validity. Nevertheless, looking within each group of constructs, one can notice that few correlations exceed the 0.50 threshold threating discriminant validity. The result indicates that the instrument as a whole possesses low discriminant validity given high correlations among each group of constructs. This may be due to the small sample size and sampling biases in the design of this research.

Table 24
SERVQUAL Perceived (Pilot) Discriminant Validity

	PTANGIBLES	PRELIABILITY	PRESPONSIVENESS	PASSURANCE	PEMPATHY
PTANGIBLES	1.000	.176	.686	.554	.532
PRELIABILITY	.176	1.000	.420	.287	.312
PRESPONSIVENESS	.686	.420	1.000	.775	.716
PASSURANCE	.554	.287	.775	1.000	.730
PEMPATHY	.532	.312	.716	.730	1.000

Table 25
SERVQUAL Expected (Pilot) Discriminant Validity

	ETANGIBLES	ERELIABILITY	ERESPONSIVENESS	EASSURANCE	EEMPATHY
ETANGIBLES	1.000	.580	.545	.617	.707
ERELIABILITY	.580	1.000	.468	.566	.527
ERESPONSIVENESS	.545	.468	1.000	.829	.619
EASSURANCE	.617	.566	.829	1.000	.715
EEMPATHY	.707	.527	.619	.715	1.000

SERVQUAL instrument: Pilot summary. The pilot study analysis indicated that the service quality instrument is suitable to be used in Jordan. It possesses sufficient levels of reliability and validity. While in few areas, the instrument did not perform well, it is appropriate for the use for this research. Once the sample and design are improved, the quality of the instrument is expected to rise psychometrically.

Complete Data Collection and Analysis

The data were collected between April 20 and May 31, 2018. Respondents were recruited through the researcher's personal network. Each person who approved to participate in this research supplied a person with a valid email address or phone number where the researcher

could reach out to them. A total of 700 copies of the surveys were emailed or offered to be completed via phone, and only 336 were completed. Table 26 displays the distribution of respondents' medium of communication, where 128 were contacted via phone and 208 completed the questionnaire on an embedded link using Google Forms. Note that few surveys were completed using Skype interviews that included more than one member of the household. Interviews lasted from 12 to 18 minutes. The researcher would read each item out loud and answer any questions the respondent had.

Table 26
Distribution of Respondent's Medium of Survey Completion

Medium of Communication	**Frequency**	**Percent**
Google Forms	208	62
Skype Interview	128	38

The response rate of the study was 48%. This rate is acceptable given the convenient nature of the sample and lengthy nature of the questionnaire. In addition, this rate is adequate for further investigation due to the fact that the researcher was not present in Jordan, where all participants resided, introducing a geographic barrier lowering the response rate. While response rates exceeding 60% are considered good for survey research project, the wide variation of the sample for this research and the relatively large number of the sample size and its diversity provides a confident assurance that the 48% response rate is sufficient.

Complete Data Descriptive Analysis. Table 27 displays the sample's characteristics of the study. There were more males than females, 56% versus 44%. Seventy-seven percent of the sample possessed a bachelor's degree or higher. Seventy-seven percent of participants were also below the age of 50, pointing to the youthful nature of the sample. Most participants in the research were Jordanians, 76%. Participants were not asked about the name, length, or type of visit they experienced in 2017 in emergency departments across the country.

Table 27
Sample Characteristics

Variable	**N**	**%**
Gender		
Male	187	56
Female	149	44
Educational Level		
Less than High School	12	4
High School	31	9
Some College	29	8
BA/BS	112	33
MA/MS	87	26
Ph. D./Equivalent	65	20
Age		
18-29	101	30
30-39	107	32
40-49	50	15
50-59	24	7
>60	53	16
Nationality		
Jordanian	256	76
Arab	51	15
Western	29	09

Table 28 presents the data frequency for the split-flow instrument. Each item ranges from 1 to 7 where 1 = *strongly disagree* and 7 = *strongly agree* and 4 = *neutral*. The frequencies of service quality items are presented in the appendix, G1 and G2. Notice that there is a clear gap between perceptions and expectations, to be explained further later in the chapter.

Table 28
TRIAGE1 Data Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	82	24.4	24.4	24.4
	2.00	107	31.8	31.8	56.3
	3.00	69	20.5	20.5	76.8
	4.00	61	18.2	18.2	94.9
	5.00	17	5.1	5.1	100.0
	Total	336	100.0	100.0	

Reliability and validity analyses of the split-flow questionnaire.

Split-flow questionnaire: Cronbach's alpha & split-half method. Table 29 displays the results of the reliability analysis for the split-flow model implementation portion of the questionnaire. Cronbach's alpha for the whole instrument is greater than 0.7 the other reliability scores were all below 0.7, demonstrating a moderate reliability for the instrument. This indicates that if the sample size increased or the interviews with respondents were face-to-face or respondents took their time to answer the items on the instrument, the reliability of the instrument will increase. Given such close scores to the reliability threshold for research purposes and the plethora of biases plaguing this research, the instrument is accepted to be reliable.

Table 29
Reliability Analysis for the Split-Flow Model Questionnaire

Reliability Statistics			
Cronbach's Alpha	All Items	**0.785**	
Cronbach's Alpha	Part 1	Value	.664
		N of Items	8[a]
	Part 2	Value	.731
		N of Items	7[b]
	Total N of Items		15
Correlation Between Forms			.496
Correlation of Entire test			.663

Split-flow questionnaire: Item reliability analysis. Table 30 demonstrates the results of the item total correlation analysis for the split-flow model implementation portion of the questionnaire. Note that all items, except Triage2 and Waiting3, have item-total correlations of 0.3 or higher, indicating an acceptable level of item reliability and stability. All sub-scales of the split-flow model had reliability score of 0.7 or below, indicating a moderate reliability. Therefore, the split-flow model instrument is internally consistent and reliable.

Table 30
Reliability Analysis of Split-Flow Model Implementation in Jordanian EDs

Construct	ITEMS	Corrected Item-Total Correlation
Waiting Experience (Alpha = 0.534)	WAITING1	.381
	WAITING2	.459
	TRIAGE2	**.181**
	TRIAGE4	.440
GTA (Alpha = 0.659)	GTA1	.330
	GTA4	.415
	WAITING3	**.262**
	DISCHARGE1	.400
	TRIAGE5	.495
Discharge Experience (Alpha = 0.716)	DISCHARGE2	.455
	DISCHARGE3	.351
	GTA2	.454
Triage Experience (Alpha = 0.503)	TRIAGE1	.348
	TRIAGE3	.384
	GTA3	.533

Construct Validity of the Split-Flow Model Instrument.

Convergent validity: Exploratory factor analysis (EFA) Method. To evaluate the construct validity of the instrument, an EFA was performed. Table 31 illustrates that the KMO is greater than 0.5, indicating that a factor analysis may be useful with the data. At the same time, Bartlett's test has a significance of 0.00, again emphasizing on conducting a factor analysis on the split-flow data.

Table 31
KMO and Bartlett's Test for the Split-Flow Model Questionnaire (15)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	1248.865
	df	105
	Sig.	.000

Table 32 displays the results from the convergent validity analysis for the split-flow model. The exploratory factor analysis results indicated that the instrument had four stable factors, as expected. Those were triage, waiting, general team assessment, and discharge. Factor loadings of all items, except for Triage1, corresponding to their hypothesized dimensions were above 0.4, indicating a strong relationship between the items and their dimensions (Tabachnik & Fidell, 2007). The results indicated that the instrument possesses adequate convergent validity.

Table 32
Dimensions of Split-Flow Model Implementation in Jordanian Hospitals

Split Flow Items	**Extraction**
TRIAGE1	**.372**
TRIAGE2	.582
TRIAGE3	.545
TRIAGE4	.442
TRIAGE5	.573
WAITING1	.663
WAITING2	.514
WAITING3	.594
GTA1	.540
GTA2	.528
GTA3	.647
GTA4	.479
DISCHARGE1	.471
DISCHARGE2	.737
DISCHARGE3	.725

Table 33 displays the results of the exploratory factor analysis on the split-flow model's implementation in Jordanian EDs. Results indicate that four dimensions can explain 54.485% of the variation.

Table 33
Exploratory Factor Analysis Split-Flow Model

	Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**
1	3.889	25.929	25.929
2	1.775	11.833	37.762
3	1.324	8.824	46.587
4	1.185	7.899	54.485

Table 34 illustrate the varimax rotation method results with a cutoff loading value of 0.4. The four new components identified by EFA still lined up well with the four dimensions for split-flow analysis data, e.g., waiting is similar to Component 1, GTA is similar to Component 2, discharge is similar to Component 3, and triage process is very close to Component 4. There are only two cross loadings, highlighted in Table 33, which can be eliminated if the factor loading is set to 0.5. Thus, the split-flow instrument has construct validity.

Table 34
Varimax Rotation for Split-Flow Model (Loading at least 0.5)

	Rotated Component Matrix[a]				
		Component			
	Items	1	2	3	4
Waiting	WAITING2	.722			
	WAITING1	.668			
	TRIAGE5	.586			
	TRIAGE4	.534			
	DISCHARGE1	.500			
GTA	GTA3		.747		
	TRIAGE3		.723		
	GTA4		.547		**.462**
	GTA2		.539	**.467**	
Discharge	DISCHARGE3			.845	
	DISCHARGE2			.829	
	TRIAGE1			.581	
Triage	WAITING3				.691
	TRIAGE2				-.577
	GTA1				.473
Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.[a] a. Rotation converged in 8 iterations.					

Discriminant validity: Correlation method. Table 35 displays results of the discriminant analysis for the split-flow model implementation in Jordanian EDs. All correlations were significant. Results indicate that only one correlation between waiting and triage is outside the -0.5 and 0.5 range, while all four constructs have values with that range, thus, they are strongly discriminant with each other.

Table 35
Discriminant Validity for Split-Flow Model

Correlations					
		Waiting	**GTA**	**Discharge**	**Triage**
Waiting	Pearson Correlation	1	.448**	.272**	**.620****
	Sig. (2-tailed)		.000	.000	.000
GTA	Pearson Correlation	.448**	1	.385**	.409**
	Sig. (2-tailed)	.000		.000	.000
Discharge	Pearson Correlation	.272**	.385**	1	.273**
	Sig. (2-tailed)	.000	.000		.000
Triage	Pearson Correlation	**.620****	.409**	.273**	1
	Sig. (2-tailed)	.000	.000	.000	

Complete Study

Reliability of the SERVQUAL model instrument.

Cronbach's alpha & split half method. Table 36 displays the reliability analysis for the SERVQUAL model questionnaire. The alpha for the entire questionnaire (44 items) was 0.891, and the alphas obtained from the split-half approach were 0.752 and 0.880, suggesting good reliability. The correlation between halves was 0.775, indicating adequate reliability for research purposes. The correlation of the entire test indicates a strong association, 0.848. Given that all alphas exceed the recommended cutoff value of 0.7, and strong correlation among items, this research concludes that the questionnaire measuring the implementation of SERVQUAL model in Jordanian emergency departments is reliable.

Table 36
Reliability Analysis for the SERVQUAL Model Questionnaire (44)

Cronbach's Alpha	All Items		0.891
Cronbach's Alpha	Part 1	Value	.752
		N of Items	22
	Part 2	Value	.880
		N of Items	22
	Total N of Items		44
Correlation Between Halves			.775
Correlation of Entire test			.848

***Item Reliability Analysis*.** The reliability analysis for items in the SERVQUAL model questionnaire was conducted, using the item-total correlation method. Table 37 displays results from the sub-scale analysis (item-total correlation) for the SERVQUAL questionnaire. Cronbach's alphas for perceived responsiveness is above 0.70 threshold to be considered adequate reliability (Nunnally & Bernstein, 1994). Perceived tangibles, reliability, assurance, and empathy all had alphas below the sufficient level of reliability indicating inadequate reliabilities. Expected assurance featured adequate reliabilities whereas expected tangibles, reliability, responsiveness, and empathy had lower than recommended levels of reliability.

Table 37
Item Analysis of the Service Quality Instrument

Item	**Perceived Item-Total Correlation**	**Expected Item-Total Correlation**
Tangibles	(α = .637)	(α = .575)
Excellent Emergency Departments will have modern looking equipment.	.648	.507
The physical facilities at excellent Emergency Departments will be visually appealing.	.574	.398

Table 37 *continued*

Item	Perceived Item-Total Correlation	Expected Item-Total Correlation
Employees at excellent Emergency Departments will be neat appearing.	.451	**.148**
Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent Emergency Departments.	**.087**	.439
Reliability	α = (.628)	α = (.330)
When excellent Emergency Departments promise to do something by a certain time, they do.	.363	**.135**
When a customer has a problem, excellent Emergency Departments will show a sincere interest in solving it.	.426	.328
Excellent Emergency Departments will perform the service right the first time.	**.200**	.376
Excellent Emergency Departments will provide the service at the time they promise to do so.	.640	**.045**
Excellent Emergency Departments will insist on error free records	.311	**.057**
Responsiveness	α = (.854)	α = (.685)
Employees of excellent Emergency Departments will tell customers exactly when services will be performed.	.604	.710
Employees of excellent Emergency Departments will give prompt service to customers.	.637	.376
Employees of excellent Emergency Departments will always be willing to help customers.	.745	.658
Employees of excellent Emergency Departments will never be too busy to respond to customers' requests.	.810	**.173**

Table 37 *continued*

Item	Perceived Item-Total Correlation	Expected Item-Total Correlation
Assurance	α = (.600)	α = (.794)
The behavior of employees in excellent Emergency Departments will instill confidence in customers.	.610	.797
Patients of excellent Emergency Departments will feel safe in transactions.	**.037**	.570
Employees of excellent Emergency Departments will be consistently courteous with customers.	.595	.325
Employees of excellent Emergency Departments will have the knowledge to patients' questions.	.320	.763
Empathy	α = (.575)	α = (.598)
Excellent Emergency Departments will give customers individual attention.	**.032**	.302
Excellent Emergency Departments will have operating hours convenient to all their customers.	**.242**	.388
Excellent Emergency Departments will have employees who give customers personal attention.	.605	**.253**
Excellent Emergency Departments will have their customer's best interests at heart.	.716	.493
The employees of excellent Emergency Departments will understand the specific needs of their patients.	**.131**	.340

Concerning the item-total correlations of items, many items were found to reflect lower than recommended levels of stability and robustness, 0.3 (Gliem & Gliem, 2003). Among the 22 items comprising the perceived scores of respondents on the five dimensions of the SERVQUAL, six items possessed lower correlations with the total score of their construct than

0.3. Similarly, six items among the 22 total number of items measuring the five dimensions on the expected scores reflected correlations with their respective constructs of lower than 0.3.

Non-response bias for the survey represented by the relatively participation rate and the non-representativeness of the convenient sample may have influenced the pattern of responses, lowering the reliability and validity of the research instrument. Further, response bias may have also influenced the reliability and validity of the answers provided by participants. Most participants featured a closer relationship to the recruiters on the ground that may have elevated social desirability and acquiescence biases. Self-selection bias may also have occurred since most participants in the study voluntarily participated. This may have systematically excluded other unknown groups in the population. Questionnaire biases may have lowered the reliability and validity of the SERVQUAL instrument in Jordanian emergency departments (Sedgwick, 2013). Finally, as we have seen in the pilot study, if the item-total correlation for any item is less the desired value for expected, it has a higher value in preserved and vise-versa. This indicate that the item does correlate well in at least one.

Construct validity of the SERVQUAL model instrument.

Exploratory factor analysis, EFA Method. To evaluate the construct validity of the instrument, an EFA, inter-items correlation analysis, and average variance extracted were performed. Tables 38 and 39 illustrate the two tests that indicate the suitability of the data for structure detection. The KMO measured sampling adequacy and Bartlett's test of sphericity. A KMO of greater than 0.5 indicates that a factor analysis may be useful with the data. At the same time, Bartlett’s test has a significance of 0.00, again emphasizing on conducting a factor analysis on the split-flow data.

Table 38
KMO and Bartlett's Test for the SERVQUAL Questionnaire (22)

KMO and Bartlett's Test (Only Perceived Items)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.663
Bartlett's Test of Sphericity	Approx. Chi-Square	5635.210
	Df	210
	Sig.	.000

Table 39
Exploratory Factor Analysis on SERVQUAL Questionnaire (22)

KMO and Bartlett's Test (Only Expected Items)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.576
Bartlett's Test of Sphericity	Approx. Chi-Square	5643.106
	Df	253
	Sig.	.000

The EFA procedure instructed SPSS to extract all factors with eigenvalues greater than 1. The result as presented in Table 40 returned six independent dimensions explaining 75% of the variance in the dataset. Table 41 shows the unrotated solution with factor loadings suppressed at the 0.05 level to reflect stable and robust item-construct relationships and minimize the number of cross-loadings producing a clearer dimensionality of the dataset. Notice that Dimensions 5 and 6 are only represented with one item giving reason to think that they are not robust.

Table 40
Exploratory Factor Analysis for SERVQUAL Model

Total Variance Explained									
	Initial Eigenvalues			*Extraction Sums of Squared Loadings*			*Rotation Sums of Squared Loadings*		
Component	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
1	7.017	33.416	33.416	7.017	33.416	33.416	6.226	29.648	29.648
2	2.278	10.848	44.264	2.278	10.848	44.264	2.313	11.016	40.664
3	2.240	10.666	54.929	2.240	10.666	54.929	2.305	10.975	51.639
4	1.819	8.660	63.590	1.819	8.660	63.590	2.014	9.592	61.231
5	1.269	6.043	69.633	1.269	6.043	69.633	1.666	7.933	69.164
6	1.199	5.709	75.342	1.199	5.709	75.342	1.297	6.178	75.342
Note. Extraction Method: Principal Component Analysis.									

Table 41
Exploratory Factor Analysis on SERVQUAL Model

Component Matrix[a]						
	Component					
	1	2	3	4	5	6
P21	.903					
P13	.883					
P12	.880					
P14	.861					
P11	.773					
P16	.754					
P20	.744					
P1	.637		-.523			
P3	.569					
P5						
P19						
P17		-.784				
P4		-.703				
P15		.611		-.552		
P8			.682			
P2			-.667			
P9			.613			
P6				.713		
P22				.679		
P7					.738	
P18						.741

Extraction Method: Principal Component Analysis.
a. 6 components extracted.

Table 42 shows the EFA rotated solution for the perceived portion of the SERVQUAL model. The solution can be interpreted as reflecting a five dimensional structure similar to the theorized relationships in the original SERVQUAL model. While the specified relationships do not hold in the solution, the distribution of items could resemble the model specifications. Therefore, the result of the EFA concludes that the SERVQUAL model possess convergent validity in Jordanian emergency departments.

Table 42
Exploratory Factor Analysis (Rotated) on SERVQUAL Model

Rotated Component Matrix[a]					
	Component				
Items	1	2	3	4	5
Responsiveness					
P13	.843				
P14	.811				
P10	.788				
P20	.788				
P11	.766				
P12	.760				
P21	.749				
P16	.741				
P2	.680				
P3	.572			.552	
P5					
Assurance					
P17		.865			
P4		.733			
P15		-.562			
Empathy					
P9			.733		
P19			.725		
Reliability					
P6				.787	
P22			.601	.680	
Tangibles					
P18					.813
P7					.803
P8					.759

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 8 iterations.

Convergent validity.

Inter-item correlation method. Appendix G shows the inter-item correlations between perceived SERVQUAL items. It is clear that convergent validity is low among constructs. Many items correlated well below the recommended threshold 0.5. Similarly, Appendix H illustrates the inter-item correlations between expected SERVUAL items. The pattern of correlations confirms the fact that the instrument possess low convergent validity. This could be explained by the questionnaire and sampling biases introduced by the research design.

Tables 43 and 44 indicates the inter-item correlations among the 10 different constructs (5+5) comprising the SERVQUAL instrument. Each construct was calculated as an additive scale summing respondent's rating of the items falling under each construct as they appear on the survey in the appendix. Notice that overall, the pattern of correlations between perceived constructs and expected constructs is low, indicating a high discriminant validity. Nevertheless, looking within each group of constructs, one can notice that few correlations exceed the 0.50 threshold defining discriminant validity. The result indicates that the instrument as a whole possesses low discriminate validity given high correlations among each group of constructs. This may be due to the small sample size and sampling biases in the design of this research.

Table 43
Inter-Item Correlations among Perceived Construct

	PTANGIBLES	**PRELIABILITY**	**PRESPONSIVENESS**	**PASSURANCE**	**PEMPATHY**
PTANGIBLES	1.000	.176	.686	.554	.532
PRELIABILITY	.176	1.000	.420	.287	.312
PRESPONSIVENESS	.686	.420	1.000	.775	.716
PASSURANCE	.554	.287	.775	1.000	.730
PEMPATHY	.532	.312	.716	.730	1.000

Table 44
Inter-Item Correlations among Expected Construct

	ETANGIBLES	ERELIABILITY	ERESPONSIVENESS	EASSURANCE	EEMPATHY
ETANGIBLES	1.000	.580	.545	.617	.707
ERELIABILITY	.580	1.000	.468	.566	.527
ERESPONSIVENESS	.545	.468	1.000	.829	.619
EASSURANCE	.617	.566	.829	1.000	.715
EEMPATHY	.707	.527	.619	.715	1.000

SERVQUAL instrument: Summary

The reliability and validity analyses indicated that the instrument is reliable and valid. This is notwithstanding the weaknesses noted above. Once the biases in the sampling design and questionnaire development are taken into consideration, the instrument is likely to be more suitable for use in Jordanian emergency departments.

Research questions/hypothesis analysis

RQ1: Is the current SERVQUAL model applicable to Jordanian hospitals environment? SERVQUAL analysis starts with the calculation of the unweighted difference between the perceived and expected service for every SERVQUAL item. Figure 5 displays the mean gaps per dimension in the service quality instrument. The average gaps ranged from -1.17 (minimum) for empathy to -2.21 (maximum) for reliability. In regard to the tangibles, responsiveness and assurance dimensions, the gaps ranged between -1.38 to -1.75, indicating a moderate gap between expectations and perceptions.

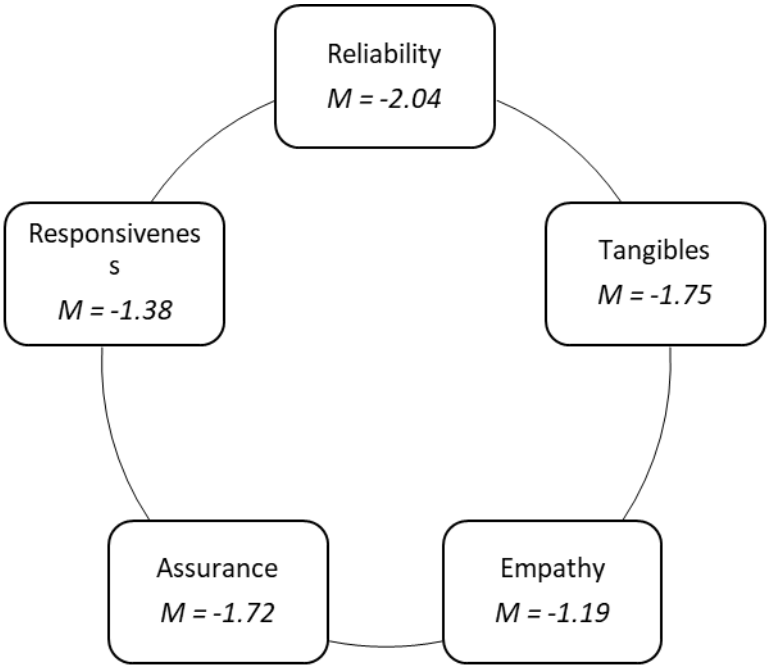

Figure 5. Mean gaps results per dimension for service quality.

SERVQUAL analysis was conducted by calculating the means of items for every construct in the service quality questionnaire and the gap between the expected and perceived mean. The negative gap values indicate that expected means of tangibles, reliability, responsiveness, assurance, and empathy are higher compared to perceived means. This suggests that patients expected better service quality compared to what they received or the Jordanian hospitals are not providing satisfactory services to their patients.

The sub-scale tangibles have four items comprise of the dimension of SERVQUAL, and all are significant gaps (Table 45). For the sub-scale tangibles, the largest gap of -2.08 is observed for facility, concluding that Jordanian patients believe that their hospitals, including emergency departments, are not visually appealing. Further, it is apparent that the gap between expected neat dress code and the observed attire is also high (mean gap of -1.98), suggesting that Jordanians patients do not believe that the hospital medical staff were neatly dressed. Jordanian

patients believe that their hospitals fail to feature modern-looking equipment as expected (mean gap of -1.74). However, on a more positive note, the lowest gap recorded in the tangibles dimension was that of patients' perceptions of the quality of the materials produced by the emergency department was better, which indicates a closer fit of the expectations and perceptions (mean gap of-1.2).

Table 45
Service Quality Gap for Tangible in Jordanian EDs

Sub-Scale and Item	**Mean Expected**	**Mean Perceived**	**Mean Gap**
Tangibles			-1.75
1. Excellent Emergency Department will have modern looking equipment.	6.04	4.30	-1.74
2. The physical facilities at excellent Emergency Department will be visually appealing.	6.00	3.92	**-2.08**
3. Employees at excellent Emergency Department will be neat appearing.	6.00	4.02	-1.98
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent Emergency Department.	5.35	4.14	-1.21

The reliability dimension is composed of five items and all have significant gaps (Table 46). As displayed by the largest gap observed within the reliability dimension (mean gap of -3.24), Jordanian patients perceived that they cannot rely on records of the hospital to be error free. Item 7, with a gap of -2.69, indicate that the hospitals Jordanian patients have visited lately do not provide the correct services on the first time, indicating a poor first-time service throughout. Item 8 has a mean gap of -1.60, indicating that hospitals have not shown sincere efforts in solving patients' problems. Finally, the lowest gap within the reliability dimension is for Item 5 (mean gap of -1.52), concluding that Jordanian patients perceived that hospitals do not keep their promises on performing task in a timely manner.

Table 46
Service Quality Gap for Reliability in Jordanian EDs

Sub-Scale and Item	**Mean Expected**	**Mean Perceived**	**Mean Gap**
Reliability			-2.04
5. When excellent Emergency Department promise to do something by a certain time, they do.	5.54	4.02	-1.52
6. When a patient has a problem, excellent Emergency Department will show a sincere interest in solving it.	5.52	3.92	-1.60
7. Excellent Emergency Department will perform the service right the first time.	6.30	3.61	-2.69
8. Excellent Emergency Department will provide the service at the time they promise to do so.	5.76	3.76	-2.00
9. Excellent Emergency Department will insist on error free records	6.09	3.66	-3.24

Concerning the third dimension of SERVQUAL, responsiveness (Table 47), Jordanian patients' perceptions are closer to their expectations compared to tangibles or reliability, as mean gaps are not as much apart as they are in the previous two dimensions. All gaps were below -2 on all items, indicating their significance. Item 11 has the highest gap (-1.6), suggesting that the Jordanian patients did not received prompt services in the hospitals. Item 10 has the second highest gap (-1.48), implying that Jordanian patients indicated concern regarding whether the medical staff provides accurate and exact information to patients in EDs when needed. Patients indicated that when they are in need, the medical staff was mostly unwilling to help out (mean gap -1.10). While Jordanian patients indicated a better perception rate of responsiveness, their most concern lied in the promptness of service or assistance provision (mean gap of -1.6). They indicated that they did not receive prompt service, something expected in emergency departments.

Table 47
Service Quality Gap for Responsiveness in Jordanian EDs

Sub-Scale and Item	**Mean Expected**	**Mean Perceived**	**Mean Gap**
Responsiveness			-1.38
10. Employees of excellent Emergency Department will tell patients exactly when services will be performed.	5.78	4.30	-1.48
11. Employees of excellent Emergency Department will give prompt service to patients.	6.07	4.47	-1.60
12. Employees of excellent Emergency Department will always be willing to help patients.	5.90	4.80	-1.10
13. Employees of excellent Hospitals will never be too busy to respond to patient's requests.	5.80	4.42	-1.38

With respect to assurance (Table 48), Jordanian patients seem to be unsatisfied with the knowledge, skills, and abilities of the ED medical staff, indicated by the largest gap, (-2.38), in the assurance dimension. Item 14 has the second largest gap (-1.86) within assurance dimension. It also relates to employees' behaviors and how it failed to impart confidence within the patients. Items 15 and 16 correspond to the two very close smallest gaps (-1.31 and -1.33) related to the extent to which patients felt safe in the hospital and courtesy of the staff members.

Table 48
Service Quality Gap for Assurance in Jordanian EDs

Sub-Scale and Item	**Mean Expected**	**Mean Perceived**	**Mean Gap**
Assurance			-1.72
14. The behavior of employees in excellent Emergency Department will instill confidence in patients.	6.38	4.52	-1.86
15. Patients of excellent Emergency Department will feel safe in transactions.	5.50	4.29	-1.31
16. Employees of excellent Emergency Department will be consistently courteous with patients.	5.28	3.95	-1.33
17. Employees of excellent Emergency Department will have the knowledge to answer patients' questions.	6.30	3.92	-2.38

Finally, the empathy dimension is composed of five items and has the lowest service quality gap, -1.19, of all dimensions indicating the area where Jordanian patients rated the hospitals better (Table 49). Jordanian patients reported less than expected responsiveness to their specific needs (Item 22 gap -1.83). Item 20 (-1.38) has the second highest gap in empathy. Jordanian patients experienced less than expected attention from the staff during their visit. Similarly, according to Item 21 (-1.03), Jordanian patients reported that hospitals does not have patients' best interest at heart. Finally, the lowest mean gaps of -.088 and -0.77, respectively, inculcate that ED provide individual attention to patients and patients appreciates the hours of operation.

Table 49
Service Quality Gap for Empathy in Jordanian EDs

Sub-Scale and Item	**Mean Expected**	**Mean Perceived**	**Mean Gap**
Empathy			**-1.19**
18. Excellent Emergency Department will give patients individual attention.	5.40	4.52	-0.88
19. Excellent Emergency Department will have operating hours convenient to all their patients.	5.57	4.80	-0.77
20. Excellent Hospitals will have employees who give patients personal attention.	6.24	4.86	-1.38
21. Excellent Emergency Department will have their patient's best interests at heart.	5.76	4.73	-1.03
22. The employees of excellent Emergency Department will understand the specific needs of their patients.	5.66	3.83	-1.83

Next, the weighted SERVQUAL analysis was conducted. For each dimension the average expected value was used to calculate the weight the patients has given to that dimension. Table 50 illustrates that Jordanian patients do care about all SERVQUAL dimensions and their importance is almost the same. According the survey the Jordanian patients rank responsiveness as the top of their list followed by assurance, tangibles, reliability, and finally, empathy.

Table 50
SERVQUAL Dimensions Weighted Ranking

SERVQUAL Dimension	Expected	Weight	Rank
Tangibles	5.8475	0.2005	3
Reliability	5.842	0.2003	4
Responsiveness	5.8875	0.2018	1
Assurance	5.865	0.2011	2
Empathy	5.726	0.1963	5
	29.168	1.000	

Table 51 illustrates the Gap 5 (difference between perceived and expected values) weighted score of all the SERVQUAL dimensions based on the weighted score. Weighted analysis indicates that, just like in unweighted analysis, Jordanian hospitals are lagging in reliability (-0.428). Hospitals are not performing services as promised, and their services are not dependable and accurate. The least gap was in empathy (-0.211), again, same as the unweighted score.

Table 51
Gap 5 Weighted Analysis

SERVQUAL Dimension	P-E	Weight	Weighted Score
Tangibles	-1.753	0.199	-0.349
Reliability	-2.048	0.209	-0.428
Responsiveness	-1.390	0.201	-0.280
Assurance	-1.695	0.212	-0.359
Empathy	-1.178	0.179	-0.211

Next individual sample t-test were performed on these gaps to test if there is a significant difference between the expected and perceived values. The testing for means' difference would yield a statistical significant result if the mean gap between perceived and expected scores of any item was equal or less than -1. Notice, in Table 52, that all the gaps were significantly different, indicating two possible outcomes either (a) patients expectations are very high or (b) the services rendered by the hospitals is poor.

Table 52
Independent Samples t-test

Independent Samples t Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
	Construct	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
1	PTANGIBLES - ETANGIBLES	-1.75	1.102	.060	-1.868	-1.631	-29.1	335	.000
2	PRELIABILITY - ERELIABILITY	-2.04	.96	.052	-2.15	-1.94	-38.7	335	.000
3	PRESPONSIVENESS - ERESPONSIVENESS	-1.38	1.14	.062	-1.51	-1.26	-22.12	335	.000
4	PASSURANCE - EASSURANCE	-1.72	1.0	.057	-1.833	-1.607	-29.9	335	.000
5	PEMPATHY – EEMPATHY	-1.19	.79	.043	-1.280	-1.109	-27.4	335	.000

RQ2: Are patients satisfied with the services offered by Jordanian hospitals' ED?

Hypothesis 1. Patients' perception of service quality in the emergency departments in Jordanian hospitals is greater than their expectations:

$$H0: \mu_{di} \geq 0$$

$$H1: \mu_{di} < 0 \quad \text{(upper-tailed)},$$

where d_i = gap between perceived and expected values of all "i" SERVQUAL dimensions;

$d_1 = d_{tangible}$; $d_2 = d_{Reliability}$; $d_3 = d_{Responsiveness}$; $d_4 = d_{Assurance}$; $d_5 = d_{Empathy}$.

The data collected are from independent observations and are also normally distributed as N is greater than 30. Table 53 provides summary statistics for all experimental conditions. From this table, it was concluded that for all construct the mean value of the expected is larger than perspective values. Except for perceived response construct, all standard deviations are less than one.

Table 53
Paired Samples Statistics for SERVQUAL

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PTANGIBLES	4.1012	336	.84828	.04628
	ETANGIBLES	5.8512	336	.71875	.03921
Pair 2	PRELIABILITY	3.8000	336	.78918	.04305
	ERELIABILITY	5.8476	336	.49220	.02685
Pair 3	ERESPONSIVENESS	5.8929	336	.75931	.04142
	PRESPONSIVENESS	4.5060	336	1.07826	.05882
Pair 4	EASSURANCE	5.8690	336	.90478	.04936
	PASSURANCE	4.1488	336	.83587	.04560
Pair 5	EEMPATHY	5.7381	336	.57071	.03113
	PEMPATHY	4.5429	336	.60294	.03289

Table 54 illustrates the correlation between perceptive and expected for every construct. Pair 3 (responsiveness) and Pair 4 (assurance) are the only two correlations that are significant. The rest of the constructs results are not highly correlated.

Table 54
Correlation Analysis among Preserved and Expected Values of the Construct

		N	Correlation	Sig.
Pair 1	PTANGIBLES & ETANGIBLES	336	.017	.750
Pair 2	PRELIABILITY & ERELIABILITY	336	-.093	.087
Pair 3	ERESPONSIVENESS & PRESPONSIVENESS	336	.256	.000
Pair 4	EASSURANCE & PASSURANCE	336	.273	.000
Pair 5	EEMPATHY & PEMPATHY	336	.076	.166

Table 55 shows the analysis of the t-test performed on all five - construct pairs. The results indicated that all pairs are significant on two-tailed, and are also significant for one-tailed, and thus, the perceived values are significantly different from expected values. This suggests that within the Jordanian hospitals' ED environment, patients are not satisfied by the services they were receiving.

Table 55
Paired t-Test for SERVQUAL Constructs

	Construct Compared	t	df	Sig. (2-tailed)
Pair 1	PTANGIBLES - ETANGIBLES	-29.103	335	.000
Pair 2	PRELIABILITY - ERELIABILITY	-38.761	335	.000
Pair 3	PRESPONSIVENESS - ERESPONSIVENESS	-22.127	335	.000
Pair 4	PASSURANCE - EASSURANCE	-29.996	335	.000
Pair 5	PEMPATHY - EEMPATHY	-27.448	335	.000

Reliability hypothesis testing

RQ3: To what extent do the SERVQUAL dimensions influence patients' satisfaction in Jordanian EDs? (cause and effect). In the research dependent variable was defined as the patient's satisfaction measured by the mean of the gaps of all SERVQUAL. The independent variables vary with respect to the model, as per Table 3. Prior to testing the influence of SERVEQUAL dimensions and business process improvement (BPI) application, split-flow model implementation on patient's satisfaction in Jordan using inferential statistical procedures such as multiple linear regression, a diagnostic analysis has been undertaken to determine whether the data is appropriate for testing proposed hypotheses. For multiple linear regression results to be accurate, reliable, and precise, a number of assumptions for the data inputted into the model and the estimates generated from the algorithm had to be fulfilled, including the normality of the variables. Further, results of regression analysis will be biased heavily if multicollinearity exists in the data, high correlations among the set of variables included in the model. Therefore, testing for multicollinearity through diagnosing variance inflation factors (VIF) of the coefficients was important and performed.

Table 56 displays the distributional measures, skewness and kurtosis, of the variables used in the analysis. In fairly large samples, skewness and kurtosis values ranging between -2 and 2 are considered to fall within the realm of normality (Tabachnick & Fidell, 2007). Only expected responsiveness (10) and expected assurance (12) had a kurtosis value greater than 2, indicating that there is a possibility of outliers in these two variables. Apart from these two variables, it is evident that none of the other values call for serious concern for transformation needs in the data. Therefore, none of the data has undergone transformation for the running of the regression models.

Table 56
Normality Test for the SERVQUAL and Split Flow Constructs

Measures	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Skewness	0.69	0.51	0.14	-0.38	0.49	-0.84	-0.07	0.05	0.35	-1.80	0.22	-1.88	0.27	-0.62
Std. Error of Skewness	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13
Kurtosis	1.63	-0.34	-0.35	0.15	-0.61	0.18	0.02	-0.28	-0.47	**3.22**	-0.78	**3.87**	-0.61	0.21
Std. Error of Kurtosis	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26	.26
Note. Triage (1), Waiting (2), GTA (3), Discharge (4), Perceived Tangibles (5), Expected Tangibles (6), Perceived Reliability, (7), Expected Reliability (8), Perceived Responsiveness (9), Expected Responsiveness (10), Perceived Assurance (11), Expected Assurance (12), Perceived Empathy (13), Expected Empathy (14).														

Model 1.

Hypothesis 2: Within the Jordanian Hospitals Emergency departments, Patients' Satisfaction is not effected by hospital physical appearances. Table 57 shows the collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. The results of multiple linear analysis with patients' satisfaction as the dependent variable and the tangibles items as the set of predictors shows this to be true. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and model is significant at P = 0.000. The model is significant and explain 22.7% of the variance. Out of four items in the tangible dimension, two items were statistically significant and two were not. P1 Tangibles (ED has modern looking equipment) has a positive effect on patients' satisfaction, Beta = 0.285. Further, P3 Tangibles (ED employees are neat appealing) has a positive effect on patients' satisfaction, Beta = 0.278.

Table 57
Regression Analysis for Model 1

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.150	.207		-15.186	.000		
	P1Tangible	.214	.060	.285	3.533	.000	.358	2.796
	P2Tangible	.011	.053	.017	.199	.842	.311	3.217
	P3Tangible	.134	.029	.278	4.694	.000	.668	1.496
	P4Tangible	.007	.046	.009	.145	.885	.651	1.536
Dependent Variable: Mean Satisfaction $R^2 = 0.227$ F= 24.27 (4, 331 df) P= 0.00001								

The hypothesis is rejected, and it is concluded that the tangible variables do affect patients' satisfaction in Jordanian hospitals. Patients' satisfaction in Jordan is affected by the modern - look of the buildings and the grooming status of the reception staff. The better looking the building and the staff's neatness play an important role to satisfied patients.

Model 2.

Hypothesis 3: Within the Jordanian hospitals emergency departments, patients' satisfaction is not related to the reliability of the medical staff. Table 58 shows the collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. Table 57 represents the results from a multiple linear regression model with patients' satisfaction as the dependent variable and perceived reliability items as the independent variables. Reliability in this context refers to the consistency of the services provided by emergency departments. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and model is significant at P = 0.000.

Table 58
Regression Analysis for Model 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.285	.194		-16.900	.000		
	P5Reliability	.189	.029	.325	6.427	**.000**	.858	1.166
	P6Reliability	.094	.033	.154	2.811	**.005**	.732	1.366
	P7Reliability	.057	.042	.072	1.372	.171	.803	1.246
	P8Reliability	.127	.040	.204	3.212	**.001**	.546	1.831
	P9Reliability	-.041	.028	-.080	-1.495	.136	.770	1.298
Dependent Variable: Mean Satisfaction $R^2 = 0.26$ F= 25.09 (5, 330 df) P= 0.001								

The model is overall statistically significant explaining about 26% in the variance of patients' satisfaction in Jordan. Three items were statistically significant and two were not, as can be shown by the bolded observed significance levels in the table. P5 Reliability (when excellent EDs promises to do something by a certain time, it does so) possessed the strongest positive effect, with a Beta = 0.325. P8 Reliability (ED provides the service at the time they promise to do so) has the second strongest positive effect, with a Beta = 0.204. Finally, P6 Reliability, (when you have a problem, the ED shows a sincere interest in serving you) has a positive significant effect with a Beta = 0.154.

Based on the results in Table 58, the hypothesis is rejected, and it is concluded that within the Jordanian hospitals emergency departments, patients' satisfaction is related to the reliability of the medical staff. Jordanian patients are dissatisfied with emergency departments that renege their promises of providing services consistently on a timely fashion. It can also be concluded that Jordanian patients are dissatisfied with emergency departments that renege their promises of providing services consistently on a timely fashion.

Model 3.

Hypothesis 4: Within the Jordanian Hospitals Emergency departments, Patients' Satisfaction is not related to the responsiveness of the medical staff. Table 59 displays the results of multiple regression analysis of testing the relationship between responsiveness and mean satisfaction. The collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. Responsiveness in this context refers to the promptness of the services provided by emergency department staff. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and the model is significant at P = 0.001. The model is overall statistically significant explaining 49.7% of the patients' satisfaction

Two of the items were not statistically significant, and two were statistically significant. P13 Responsiveness (employees in ED are never too busy to respond to requests) has the highest beta value of 0.518, while P11 Responsiveness (employees in ED give prompt service) possessed a positive effect of Beta = 0.175, suggesting that the responsiveness does influence the patient satisfaction in Jordanian hospitals. Based on the results in Table 3, the hypothesis is rejected. The analysis concluded that employees in Jordanian hospitals determine patients' satisfaction with services provided. Patients are more satisfied when employees respond to their requests timely and not delayed when there is a need to resolve patients' concerns.

Table 59
Regression Analysis for Model 3

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.524	.138		-25.615	.000		
	P10Responsiveness	-.003	.030	-.006	-.114	.909	.597	1.675
	P11Responsiveness	.107	.033	.175	3.232	.001	.520	1.924
	P12Responsiveness	.048	.037	.077	1.283	.200	.423	2.365
	P13Responsiveness	.274	.036	.518	7.612	.000	.328	3.048
Dependent Variable: Mean Satisfaction $R^2 = 0.497$ F= 81.84 (4, 331 df) P= 0.001								

Model 4.

Hypothesis 5: Ensuring patient's safety by the medical staff does not influence patient's satisfaction in the Jordanian Emergency departments. Table 60 displays the results of a multiple regression analysis with patients' satisfaction as the dependent variable and the assurance items as the set of independent variables. The collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and model is significant at P = 0.001. The model explain 48% of all variation and is overall statistically significant. Out of four assurance items, three items were statistically significant and one was not. P14 Assurance (employees in ED instilled confidence in me) possessed the strongest positive affect with a Beta of 0.62. P17 Assurance (employees have the knowledge to answer questions) possessed a negative effect of Beta = -.326. Finally, P16 Assurance (employees of ED consistently were courteous) had a positive effect of 0.286. Overall, assurance is significant in influencing patients' satisfaction in Jordan, so the null hypothesis is rejected. The findings suggest that the higher the employees' sympathy, concern,

and care are the better satisfaction will be. Patients in Jordan put less emphasis on the knowledge of the staff compared to the care illustrated by them and the hospital.

Table 60
Regression Analysis for Model 4

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2.772	.189		-14.674	.000		
	P14Assurance	.345	.028	.624	12.324	.000	.609	1.642
	P15Assurance	-.060	.034	-.078	-1.776	.077	.800	1.249
	P16Assurance	.161	.028	.286	5.802	.000	.642	1.557
	P17Assurance	-.202	.031	-.326	-6.600	.000	.638	1.567
Dependent Variable: Mean Satisfaction $R^2 = 0.48$ F= 77.61 (4, 331 df) P= 0.001								

Model 5.

Hypothesis 6: Within the Jordanian Hospitals Emergency departments, Patients' Satisfaction is not effected by the medical staff's empathy/concern towards patients. Table 61 demonstrates the results of multiple regression model with patients' satisfaction as the outcome and empathy items on the service quality instrument as independent variables. Empathy relates to the care and concern that hospital show towards their patients. The collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and model is significant at P = 0.001. The model explain 38% of all variation and is overall statistically significant.

Table 61
Regression Analysis for Model 5

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-4.070	.269		-15.136	.000		
	P19Empathy	.038	.047	.043	.821	.412	.669	1.495
	P20Empathy	.203	.042	.282	4.866	.000	.550	1.817
	P21Empathy	.212	.043	.341	4.968	.000	.393	2.541
	P22Empathy	.074	.037	.100	1.978	.049	.722	1.384
Dependent Variable: Mean Satisfaction R^2 = 0.38 F= 52.48 (4, 331) P= 0.001								

Notice that 3 out of the 4 items are statistically significant. P20 Empathy (ED gives personal attention) has a positive significant effect, with a Beta = 0.282. P21 Empathy (ED has the patients' best interest at heart) possesses a positive effect on patients' satisfaction, with a Beta = 0.341. Finally, P22 Empathy (employees of ED understand your needs) has a positive effect Beta = 0.10. The hypothesis is therefore rejected, and it is concluded that empathy has a positive effect on patients' satisfaction in Jordan. The result also concluded that patients in Jordan are more satisfied with services when employees demonstrate their care for them and act as peacemakers to resolve any problem arising with the patient.

Business Process Improvement – SPLIT Flow model.

RQ4: Does the Implementation of Business process improvement, like Split-Flow Model in EDs influence patients' satisfaction in Jordan?

Model 6.

H7: The implementation of business process improvement techniques does not influence patients' satisfaction in Jordanian Emergency Departments. This hypothesis tests the effectiveness of the implementation of business process improvement in Jordanian hospital's

emergency departments. Table 62 displays the results of ordinary least squares multiple regression analysis with the mean satisfaction (mean differences between perceived and expected service quality) as the dependent variable and all 15 items measuring the split-flow implementation as independent variables. The collinearity statistics suggests that reliability test assumptions were validated as tolerances and VIF are within their acceptable ranges. The F-statistic and the p-value associated with it indicate that the model does not have zero valued coefficients and model is significant at P = 0.001. The model explain 60% of the variance in patients' satisfaction within the Jordanian hospitals. The hypothesis is therefore rejected, and it is concluded that the implementation of BPI techniques like split-flow does influence patients' satisfaction in Jordanian emergency departments.

Out of the 15 coefficients estimated, nine were statistically significant, which are bolded in the table. GTA 4 (Nurses approached me to inquire about my case within less than 15 minutes) possessed the strongest effect on patient's satisfaction, Beta = 0.310. This is followed by Discharge 1 (Beta 0.297) and Triage 4 (Beta = 0.223). All other coefficients had beta values of less than 0.2, indicating weak effects; however, they are all significant.

Table 62
Regression Analysis for Model 6

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.483	.127		-27.393	.000		
	TRIAGE1	.066	.025	.104	2.627	.009	.793	1.261
	TRIAGE2	.011	.020	.020	.535	.593	.858	1.166
	TRIAGE3	-.064	.025	-.106	-2.564	.011	.724	1.382
	TRIAGE4	.129	.024	.223	5.501	.000	.754	1.326
	TRIAGE5	.000	.026	-.001	-.015	.988	.608	1.645
	WAITING1	.010	.019	.021	.525	.600	.743	1.346
	WAITING2	.048	.024	.085	1.976	.049	.677	1.478
	WAITING3	.054	.026	.082	2.034	.043	.757	1.321
	GTA1	.077	.023	.134	3.405	.001	.798	1.253
	GTA2	-.030	.025	-.053	-1.209	.227	.642	1.558
	GTA3	.074	.028	.123	2.655	.008	.574	1.741

	GTA4	.168	.023	.310	7.385	.000	.707	1.415
	DISCHARGE1	.154	.021	.297	7.218	.000	.733	1.365

Table 62 *continued*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	DISCHARGE2	.012	.032	.019	.366	.715	.459	2.178
	DISCHARGE3	.004	.032	.005	.109	.913	.539	1.855
Dependent Variable: Patient Satisfaction $R^2 = 0.60$ F = 32.37 (15, 319 df), P = 0.001								

Based on the results of the model, patients' satisfaction is not effected by the amount of time the patient spend in the waiting area or at the triage. Similarly, patients' responses to whether the doctor spent more than 15 minutes evaluating their case, or the discharge competence regarding financial services, or their knowledge concerning future instructions were all statistically insignificant. Overall, the results supports the hypothesis claiming that the implementation of business process improvement measured via split-flow has a positive effect on patients' satisfaction in Jordan.

Summary

This chapter presented the results of the data analysis for the collected survey data from Jordanian patients. The chapter demonstrated that reliability and validity of the research instrument for both the pilot and the complete data. Further, the chapter presented the hypotheses testing findings of this research. The chapter concluded with presenting the multiple regression analysis for the proposed hypotheses and their interpretations.

Chapter Five: Discussion, Conclusions and Recommendations

Overview of the Study

This research analyzed the association between business process improvement, split-flow model implementation, and patients' satisfaction in Jordanian hospitals. Patients' satisfaction in Jordanian emergency departments has been shown to be lower compared to advanced nations prompting intervention. This research tried to find a model enhancing patients' satisfaction through modifying existing business processes in emergency departments, such as the intake, treatment, and discharge.

Using original data collected for this research, responses from 336 patients who visited Jordanian emergency departments in 2017 were obtained through an online questionnaire supplied by phone interviews when necessary. The instrument included two portions: a newly validated split-flow tool and the well-established Service Quality questionnaire modified to fit the Jordanian context. A pilot study preceded the complete data analysis portion to determine the reliability and validity of the questionnaire. While the pilot study analysis indicated that the instrument does not possess desirable psychometric properties to warrant a conclusion of internal consistency and external validity, the biases presented by convenience sampling, length of the questionnaire, social desirability, and agreement acquiescence are likely to weaken the credibility and consistency of the questionnaire.

Multiple regression analysis was used to investigate the relationships among split-flow implementation, service quality, and patients' satisfaction. Results indicated that split-flow implementation in emergency departments partially enhance patients' satisfaction. Similarly, service quality perceptions of Jordanian patients partially correlate with patients' satisfaction. Therefore, the proposed hypotheses by this research possess partial support. Notice that results

also indicated that there is a significant gap between service quality expectations and service quality receptions prompting stakeholders in the Jordanian emergency departments to act to reduce such an observed gap.

Discussion

RQ1: Is there a gap between perceived and expected service quality in Jordanian Emergency Departments? This research has confirmed that there is a significant gap between perceived and expected service quality in Jordanian EDs. On all five dimensions, the gaps between expected and perceived service quality were statistically significant and large (Figure 5). Service quality gaps were as follows with respect to each dimension of the five factors comprising the instrument: -2.04 for reliability, -1. 75 for tangibles, -1.19 for empathy, -1.72 for assurance, and -1.38 for responsiveness (Figure 5).

Concerning the tangibles element of service quality, the structural factor of quality of care, patients reported higher expectations for having modern-looking equipment (PI - E1 = -1.74 gap). Further, patients reported higher expectations concerning having visually appealing facilities (P2 - E2 = -2.08). Patients also held higher expectations for the neatness of staff at hospitals compared to what they experienced (P3 - E3= -1.98). Finally, patients reported a lower gap concerning their expectations and experience with the materials produced by hospitals explaining their services (P4 - E4= -1.21). Figure 6 visualizes the gaps between gaps in the tangibles dimension of service quality appearing in Table 44.

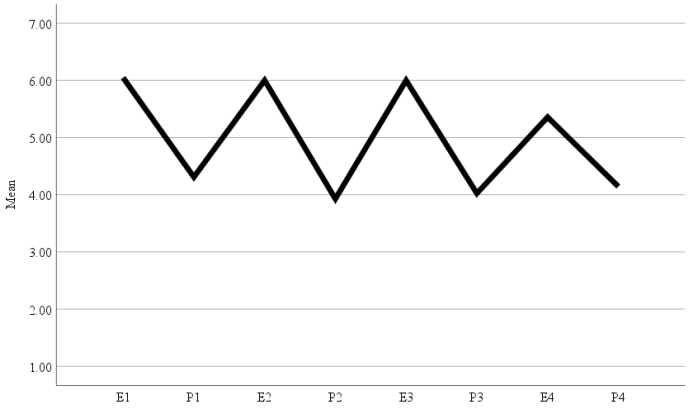

Figure 6. Mean gaps in tangibles.

Figure 7 displays the means of all items measuring the reliability dimension of service quality, concluding significant gaps in every item. Patients reported higher expectations compared to what they experienced in regards to the timing promises made by emergency departments (P5 - E5= -1.52). Relating to whether emergency departments exhibit sincere interest in solving patients' problems, Jordanian patients reported higher expectations compared what they went through (P6 - E6= -1.60). In relation to whether emergency departments perform their services right the first time, patients were unsatisfied with their experiences, reporting a high gap (P7 - E7= -2.69). Further, patients reported higher expiations compared to their experiences in regards emergency departments promising to perform the services according to the specified timeline (P8 - E8= -2.00). Finally, the highest service quality gap found was in patients' experiences with records registration (P9 - E9= -3.29). Jordanian emergency departments' reliability gap was high and significant.

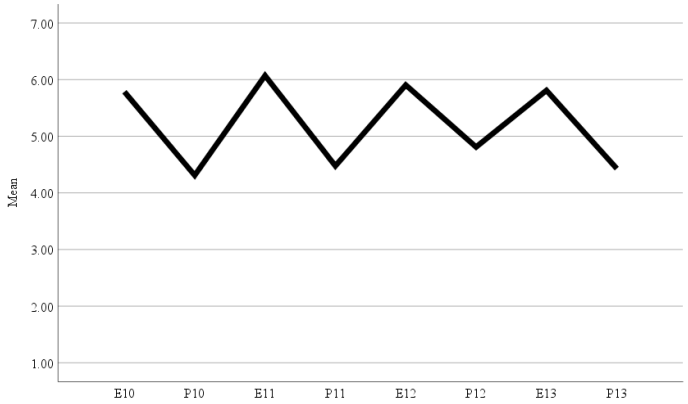

Figure 7. Mean gaps in reliability.

Jordanian patients reported a significant gap in the responsiveness dimension in service quality. Patients reported higher expectations for EDs to inform them about the services to be performed (P10 - E10 = -1.48), Figure 8. Patients also reported higher expectations for getting prompt services (P11 - E11 = -1.60). Patients reported higher expectations for staff's willingness to help (P12 - E12= -1.10). Finally, patients indicated that they had higher expectations for staff's fulfillment of their requests while being busy (P13 - E13= -1.38). Figure 8 visualizes the gaps between gaps in the responsiveness dimension of service quality appearing in Table 46.

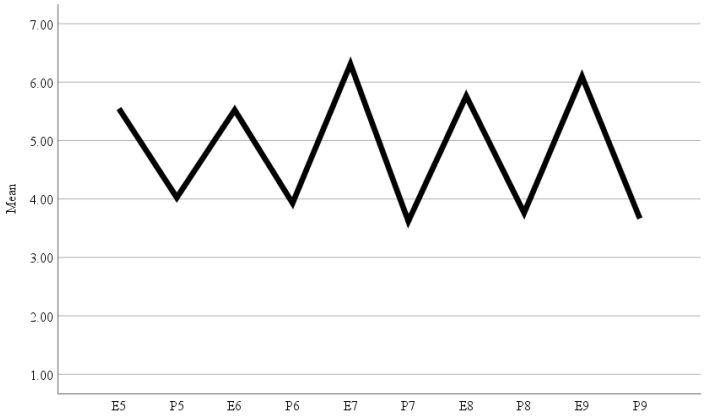

Figure 8. Mean gaps in responsiveness.

Figure 9 displays the gaps in the assurance dimension in the service quality instrument based on the data collected from Jordanian patients in this study as per Table 47. Patients reported lower perceived scores concerning whether the staff of the ED instilled confidence in them or not compared to expected perceptions (P14 - E14= -1.86). Patients in Jordanian EDs reported higher expectations compered to perceived experiences regarding the feeling of being safe in transactions (P15 - E15= -1.31). Patients also reported higher expectations of staff's courtesy in EDs (P16 - E16= -1.33). Finally, patients reported higher expectations to the knowledge exhibited by ED staff in Jordan (P17 - E17= -2.38).

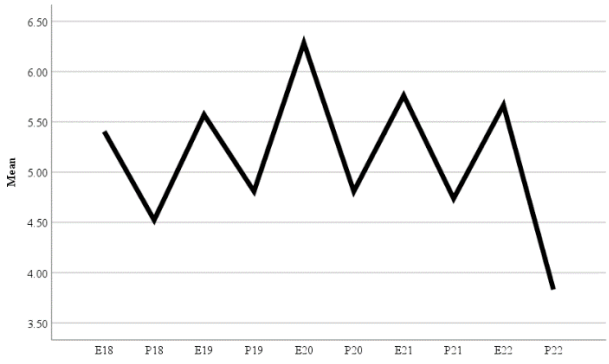

Figure 9. Mean gaps in assurance.

Figure 10 presents the means' gaps in empathy between expected and perceived service quality as per Table 48. Patients reported higher expectations for individual attention compared to what they experienced (P18 - E18 =-0.88). Patients held higher expectations regarding EDs staff operation hours and availability compared to what they experienced (P19 - E10= 0.77). Further, patients reported higher expectations regarding patients' attention (P20 - E20 =-1.38). Patients reported higher expatiations regarding EDs having their best interest at heart when

delivering services (P21 - E21= -1.03). Finally, patients reported lower satisfaction with EDs meeting their specific needs (P22 - E22= -1.83).

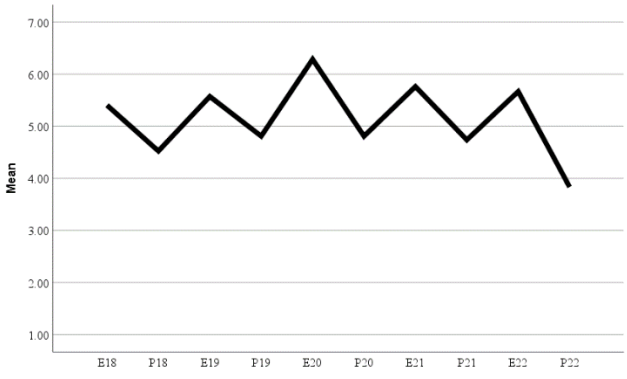

Figure 10. Mean gaps in empathy.

The results of this project are consistent with previous research. Al-Momani (2016) investigated the gap between perceived and expected nursing quality of care in Saudi Arabia and found a significant gap between perceived and expected services on all five dimensions of the SERVQUAL instrument. Similarly, Nadi et al. (2016) found a significant gap between perceived and expected quality of care across the five dimensions in their study on three hospitals in Iran. Similarly, Mohebifar, Hasani, Barikani, and Rafiei (2016) calculated gap scores between expected and actual service quality in six academic hospitals in Iran and found that in all five dimensions, the gap is significant and high.

RQ2: How does the implementation of business process improvement in EDs influence patients' satisfaction in Jordan? This research found partial support for the positive effect of business process improvement on patients' satisfaction in emergency departments. Results of this research are consistent with previous findings. Murrell, Offerman, and Kauffman (2011) found that the implementation of business process improvement represented in lean thinking and rapid

assessment processes using available resources reduces wait times and increase the number of patients assessed by the emergency department. Commenting on the success of business process improvement in making the emergency department more efficient and increasing patient satisfaction ratings, Mazzocato et al. (2012) concluded, "(a) standardized work and reduced ambiguity, (b) connected people who were dependent on one another, (c) enhanced seamless, uninterrupted flow through the process, and (d) empowered staff to investigate problems and to develop countermeasures using a scientific method." Musse (2015) investigated the effects of business process improvement on the performance of healthcare providers in Ethiopia and found a positive association between particular business process improvement concepts and improved quality of care. Kumar and Shim (2007) believe that the implementation of business process improvement reengineering in emergency departments has reduced waiting times significantly in Singapore's hospitals.

RQ3: How does the application of split-flow model influence patients' satisfaction among Jordanian patients in EDs? This research found partial support for the proposed effect of split-flow model on patients satisfaction in Jordanian emergency departments. This result is consistent with previous research. The implementation of split-flow model has been successful in increasing patients' satisfaction and perceptions of quality of services. Better handling of the discharge process, explaining the transactions that took place during the visit, having clear follow-up instructions, clarifying financial aspects of the visit, and having the interest of the patient at the core of the service, have all been found to correlate positively with patients' satisfaction. Further, reduced waiting time and better technical quality of care have been shown to correlate positively with patients' experiences. Jordan is no different from other contexts concerning the relationship between split-flow implementation and patients' satisfaction.

RQ5: To what extent do the SERVQUAL dimensions influence patient satisfaction in Jordanian EDs? This research found that service quality dimensions positively influence patients' satisfaction with care provided in emergency departments. Findings of this research are consistent with previous studies. Andaleeb (2001) investigated the association between service quality and patient satisfaction in Bangladesh and found that all five dimensions had significant positive relationships. Similarly, Cong and Mai (2014) analyzed the relationship between service quality and patient satisfaction, finding positive associations between the five dimensions and various indicators of patient satisfaction in Vietnam. Raposo, Alves, and Duarte (2009) investigated the determinants of patient satisfaction with Portuguese healthcare providers and found that satisfaction with facilities, responsiveness, and empathy had the strongest effect on patients' ratings of their overall experience at the hospital.

RQ6: To what extent does staff communications influence perceptions of quality of care among patients? This research found partial support to the positive effects of responsiveness on patients' satisfaction in emergency care. This result confirms earlier findings supporting the robust relationship between staff's responsiveness, empathy, and assurance and patient satisfaction. Lang (2012) has established that active positive empathetic communications is positively associated with patient satisfaction. Lang's analysis demonstrated how Comfort Talk, a system of communications applying patient-centered care, improves a patient's overall experience during a visit. Kennedy et al. (2014) concluded that completing a course in positive communications improves the experience of patients. The analysis has confirmed that exhibiting more empathy and interest acknowledging the patient as a person improves satisfaction ratings significantly.

RQ7: To what extent does the look of facilities influence perceptions of quality of care among patients? This research established partial support for the positive hypothesized effect of physical characteristics on patients' satisfaction in emergency care. This result is consistent with previous findings (Raposo et al., 2009). Evidence from the Middle East demonstrates that patients emphasize the look and feel of facilities in considering rating their healthcare systems where less modern facilities receive lower ratings (Zineldin, 2006). Further, patients tend to value the modernity of equipment they observe while receiving care influencing their ratings of services (Raposo et al., 2009).

Conclusions

This research tested the empirical fit of seven hypotheses. Table 63 summarizes the results of the regression analyses presented in Chapter 4. Results indicate that one hypothesis enjoys full support, while the remaining six hypotheses possess partial support. Partial support refers to the observance of few items to be significant in predicting patients' satisfaction, while other items corresponding to the same construct are not significant. For instance, physical operations and characteristics of hospitals, the tangibles dimension in service quality, only featured P1 and P3, to be only significant, while P2 and P4 are not.

Findings suggest that Jordanian patients are more satisfied if hospital emergency departments have modern looking equipment. Further, they are happier if the reception staff appears to be neat and appealing. Jordanian patients' perceptions about the visual appeal of the department of the hospital in general does not influence their satisfaction with the care received. In addition, patients' perceptions of the materials presented to them by hospital staff does not have a direct significant effect in predicting satisfaction.

Table 63
The Results of Hypotheses

Hypotheses	**Supported/Not Supported**
There is a gap between perceived and expected service quality in Jordanian emergency departments/	Supported
Improved physical appearance increases patient's satisfaction in Jordanian emergency departments.	Partially Supported
Improved reliability of medical staff is positively associated with patients' satisfaction in Jordanian emergency departments.	Partially Supported
Improved responsiveness of medical staff is positively associated with patients' satisfaction in Jordanian emergency departments.	Partially Supported
Improved assurance of medical staff is positively associated with patients' satisfaction in Jordanian emergency departments.	Partially Supported
Improved empathy of medical staff is positively associated with patients' satisfaction in Jordanian emergency departments.	Partially Supported
The implementation of Split-Flow is positively associated with patients' satisfaction in Jordanian emergency departments.	Partially Supported

Jordanian patients are more satisfied once hospitals fulfill their timing obligations. Results indicated that patients are more satisfied when hospitals do what they promise on time and they respond to patients' requests timely. Further, patients are satisfied when they perceive that their interests are sincerely looked after by the medical staff of the hospital. Patients' perceptions about performing the specific task right on the first attempt does not influence their satisfaction with the experience received. Further, patients' perceptions of the records-free policy implemented by the department does not influence their ratings of satisfaction.

Jordanian patients are more satisfied with emergency departments that provide them with prompt services. Further, they are happier with the staff that is never too busy to extend help once requested. Patients' perceptions on the scheduling and timing of services to be performed does not influence their ratings of care received. Further, patients' perceptions about the willingness of staff to assist them in their needs also do not seem to be a good predictor of patients' satisfaction in emergency departments in Jordan.

Jordanian patients are more satisfied with emergency departments that instill confidence in them. Further, they are happier with emergency departments that reflect knowledge, skills, and abilities concerning their condition. Patients are also more satisfied with emergency departments that feature more courtesy. Patients' perceptions of safety do not influence their reports of satisfaction with their care experience.

Jordanian patients are more satisfied with emergency departments that have their best interests at heart. Further, they are more content with departments that address their specific needs and award them personal attention. Patients' perceptions about the convenience availability of staff does not influence their satisfaction with the care received. Further, the individual attention provided by the staff seem to be not significant in explaining patients' satisfaction.

Future Research

Causal analysis of patients' satisfaction utilizing experimental research should define future research on the relationship between service quality and patients' satisfaction. Survey-based studies could supply researchers and practitioners with valuable information concerning correlational relationships, however, they fail to provide a causal analysis serving a research basis for practical applied interventions. Causal modeling could utilize a wide variety of research designs including classical experiments, quasi-experiments, interrupted time series and repeated measurements designs. This increases the confidence in internal, as well as external validity of research studies.

Future research on patients' satisfaction in Jordan, and to a large extent in the developing world, should emphasize the measurement issues associated with modeling patients' satisfaction. Understanding patients' satisfaction as a perception introduces a number of biases to research

such as social desirability, agreement acquiescence, and non-response bias. Utilizing continuous measures of patients' satisfaction are better suited for the statistical models used in evaluating the strength of relationships connecting patients' satisfaction with other constructs such as service quality.

Future research should also avoid the reliance on non-probability sampling techniques and online questionnaire completion as valid methods of data collection. This jeopardizes the validity and reliability of responses tainting the process of generating validated and replicated results. Face-to-face interviews are more likely to generate high response rates, better responses and cooperation from participants. The use of multi-stage or cluster sampling also lessens the sampling biases introduced by the use of convenience and judgmental sampling designs.

Recommendations

This research established a significant relationship between service quality dimensions and patients' satisfaction in Jordanian EDs. Based on this finding, a number of recommendations could potentially assist healthcare facilities in Jordan improve patients satisfaction. Notice that such recommendations are built upon the assumption that the gaps in service quality, found in this research, are valid and reliable.

First, the tangibles dimension of service quality refers to the look, feel, and appearance of facilities. This is the same element referred to as the structural component in quality of care. Jordanian EDs should enforce a high degree of compliance with dress code, cleanliness, and tidiness in the unit. This research found a strong relationship between patients' perceptions of staff's dress code and their satisfaction. Staff should wear professional healthcare attire at all times during their work schedules. This is likely to increase levels of satisfaction with services.

Second, reliability, the technical component of quality of care, has been found to significantly influence patients' satisfaction. Staff should be knowledgeable about the services they provide, their simple and accessible explanations to non-technical audiences like patients and their potential benefits and risks. Further, hospitals should undertake internal assessment of technical quality of care to determine the degree to which their staff is doing what they are supposed to do. This helps healthcare facilities determine if they need to invest in workforce training development and the type of such programs.

Third, responsiveness has been linked to patients' satisfaction. Staff in healthcare facilities in Jordan should be trained to become more responsive, attentive and personable to patients during their visits. Formal communication skills workshops should be periodically administered free of charge to hospitals' staff to increase the level of patient-centered care, thereby improving patients' satisfaction.

Fourth, assurance has been found to significantly influence patients' satisfaction. Staff's confidence in their skills and knowledge should be enhanced to guarantee better confidence levels among patients' in the services provided to them. Further, safety at all levels in healthcare services provision should be measured and serious interventions taken to enhance it since it increases patients' satisfaction. The level of staff's courtesy when dealing with patients should be enhanced through communication skills workshops.

Finally, empathy has been connected to patients' satisfaction. The more empathetic the staff is, the higher the level of satisfaction with services provided is. This relationship has been found universally through the concept of patient-centered care. Staff should be taught to spend more time with patients, be more attentive to their desires and needs, become advocates to

patients, and explain technical concepts in simple accessible language. All such measures are likely to increase patients' satisfaction in Jordanian EDs.

Contribution

This marks the first empirical investigations testing the influence of process improvement on patients' satisfaction in Jordan. This dissertation collected original data on the service quality and the implementation of split-flow model components in Jordanian emergency departments. These data are valuable since they can be used to test several hypotheses regarding the relationship between service quality and patients' satisfaction. The study paves the way for further empirical research on patients' satisfaction in Jordanian healthcare settings.

The study also validated proven models in healthcare research using a new context, Jordan. Models such as the service quality and split-flow process in emergency departments were evaluated considering new evidence. This research concluded that both models possess adequate reliability and validity outside of the countries they have been developed in, the United States and the industrial world. This adds to the existing evidence that such models extend outside of specific geographic regions, as well as varieties of economic, social, and political conditions. This includes the developing world and the Middle East in particular.

On an applied level, the dissertation has uncovered several gaps in the service provision in Jordanian emergency departments. Patients have exhibited excellent expectations with respect to the tangibles, reliability, responsiveness, assurance, and empathy dimensions. The evidence mounted by this research concluded that perceived scores on the five dimensions fell short below desirable standards. This immediately calls for action on the part of the hospitals in Jordan's such action should come in the form of implementing new interventions raising departments' service reliability, assurance, and responsiveness.

More importantly, this research uncovered a serious limitation in conducting research on patients' satisfaction. First, available measures on patients' satisfaction are mostly survey based and rarely come in the form of reliable metrics such as readmission rates or the number of referrals a patient makes. Further, the study has introduced process improvement into the enhancement of service delivery in the hospitals, specifically, emergency departments in Jordan. None of the existing studies have examined the influence of new alternative process systems of handling patients in the emergency departments, including rapid assessment using split-flow model or triage evaluation. The study marks a starting point in the right direction in generating more concrete research on how to reengineer processes within the emergency department to enhance patients' satisfaction.

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APPENDICES

Appendix A: Letter of Approval for Human Subjects

Apr 20, 2018 11:35 AM EDT
Mohammed Ibrahim
Eastern Michigan University, School of Engineering Technology

Re: Exempt - Initial - UHSRC-FY17-18-347 Enhancing Patients' Satisfaction In the Jordanian Healthcare System: Using Business Process Management in Emergency Departments

Dear Mohammed Ibrahim:

The Eastern Michigan University Human Subjects Review Committee has rendered the decision below for Enhancing Patients' Satisfaction In the Jordanian Healthcare System: Using Business Process Management in Emergency Departments. You may begin your research.

Decision: Exempt

Selected Category: Category 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Renewals: Exempt studies do not need to be renewed. When the project is completed, please contact human.subjects@emich.edu.

Modifications: Any plan to alter the study design or any study documents must be reviewed to determine if the Exempt decision changes. You must submit a modification request application in Cayuse IRB and await a decision prior to implementation.
Problems: Any deviations from the study protocol, unanticipated problems, adverse events, subject complaints, or other problems that may affect the risk to human subjects must be reported to the UHSRC. Complete an incident report in Cayuse IRB.

Follow-up: Please contact the UHSRC when your project is complete.

Please contact human.subjects@emich.edu with any questions or concerns.

Sincerely,

Eastern Michigan University Human Subjects Review Committee

Appendix B: Arabic Survey

الملحق أ: إستبيان رضا المريض

نرغب بمعرفة آرائكم حول الخدمات التي يقدمها قسم الطوارئ (إسم المستشفى). إجاباتكم سوف تساعدنا في فهم العلاقات بين ادارة العمليات ورضى المرضى. إجاباتكم سوف تبقى سرية و مجهولة الهوية وسوف لن يتم مشاركتها مع أي جهة غير مصرح لها ذلك.

نشكركم على تخصيص بعض من وقتكم للاجابة على هذا الاستبيان كما ونقدر مشاركتكم بشكل كبير.

القسم 1		
العمر:	المستوى الاكاديمي:	الجنس: .....
الجنسية:	--- أردني --- سوري --- جنسيات عربية اخرى --- أخرى	--- عراقي --- فلسطيني. الأونروا/ وكالة الأمم المتحدة لاغاثة وتشغيل اللاجئين (UNRWA) --- جنسيات غربية

القسم 2

إرشادات: الرجاء بيان مدى موافقتكم على كل عبارة من العبارات أدناه. اكتبوا أقرب إجابة حسب تصوركم مع الأخذ بعين الإعتبار أن 1= لا أوافق بشدة. 2= لا أوافق. 3= لا شيء مما ذكر, 4= أوافق, 5= أوافق بشدة. الرجاء قراءة كل عبارة بدقة و تقديم رأي صريح.

أداة التقييم / Spit Flow Assessment Tool

الرجاء وضع دائرة حول ما تراه مناسبا عن مدى نجاح عمل أقسام الطوارئ في النواحي التالية:	أوافق بشدة	أوافق	لا شيء مما ذكر	لا أوافق	لا أوافق بشدة
التقييم العام للفريق					
قام دكتور بمعاينتي مرتين أو أكثر خلال زيارتي					
قضى الدكتور في تشخيص حالتي أكثر من 15 دقيقة					
إستجابت الممرضات لطلباتي خلال أقل من 15 دقيقة					
جائتني ممرضات للإستعلام عن حالتي خلال أقل من 15 دقيقة					
الإنتظار					
كامل وقت انتظاري في منطقة الإنتظار كان أقل من 15 دقيقة					
في غرفة الفحص إنتظرت أقل من 15 دقيقة لتتم معاينتي من قبل أحدهم					
كامل وقت إنتظاري لتلقي الفحوصات و الإختبارات و النتائج كان أقل من 15 دقيقة					
عملية التقييم الطبي					
تم معاينتي من قبل الكادر الطبي خلا ل 15 دقيقة من الوصول					
تم إخباري أن حالتي خطيرة أو غير خطيرة					
تم تحويلي إلى غرفة الإنتظار بعد التقييم الطبي					
تم تحويلي إلى سرير بعد التقييم الطبي					
إستغرقت كامل مرحلة التقييم الطبي لزيارتي أقل من 15 دقيقة					
عملية الخروج من المستشفى					
إستغرقت كامل عملية الخروج أقل من 15 دقيقة					
اجاب الكادر المعني بعملية الخروج على جميع اسئلتي بخصوص الأمور المالية و الطبية					
أوضح الكادر المعني بالخروج جميع التعليمات بخصوص الفواتير و المستندات المالية بشكل جيد					

الملحق ب: أداة قياس جودة الخدمة

التوقعات

يتناول هذا الإستبيان آرائكم فيما يخص أقسام الطوارئ. الرجاء إظهار المستوى الذي تعتقدون أن تكون فيه أقسام الطوارئ من حيث الخصائص التالية. ما نحن مهتمون به هنا هو رقم يوضح توقعاتكم جيدا فيما يخص المؤسسات التي تقدم خدمات رعاية صحية.

لا أوافق بشدة

أوافق بشدة

1 2 3 4 5 6 7

الأمور الملموسة

ت1. أقسام الطوارئ المتميزة يجب ان تمتلك معدات حديثة. ____

ت2. مرافق الفحص الطبي في أقسام الطوارئ المتميزة يجب ان تكون جذابة للعيان. ____

ت3. الموظفون في أقسام الطوارئ المتميزة يجب ان يبدوا بمظهر أنيق ____

ت4. المواد المتعلقة بالخدمة(مثل النشرات و البيانات) في أقسام الطوارئ المتميزة يجب أن تكون جذابة للعيان ____

الإنطباعات

العبارات التالية تخص أحاسيسكم فيما يتعلق بأقسام طوارئ محددة قمتم بإختيارها. الرجاء إظهار المستوى الذي تعتقدون أن تكون فيه أقسام الطوارئ التي اخترتموها من حيث الخصائص المذكورة في العبارات. نحن مهتمون هنا برقم يظهر إنطباعاتكم فيما يخص أقسم الطوارئ المختارة.

لا أوافق بشدة

أوافق بشدة

7 6 5 4 3 2 1

الأمور الملموسة

أ1. قسم الطوارئ المختار يملك معدات حديثة ____

أ2. مرافق الفحص الطبي في قسم الطوارئ المختار كانت جذابة للعيان ____

أ3. موظفو إستقبال قسم الطوارئ المختار بدو بمظهر أنيق. ____

أ4. المواد المتعلقة بالخدمة (مثل النشرات و البيانات) في قسم الطوارئ المختار كانت جذابة للعيان ____

المصداقية

ت5. عندما تقدم أقسام الطوارئ المتميزة وعدا للقيام بشيء في وقت معين, فإنها تلتزم بذلك. ____

ت6. عندما يكون عند المريض مشكلة فعلى أقسام الطوارئ المتميزة أن تظهر اهتماما خالصا في حلها ____

ت7. يجب أن تقدم أقسام الطوارئ المتميزة الخدمة بشكل صحيح من المرة الأولى. ____

ت8. أقسام الطوارئ المتميزة يجب أن تقدم الخدمة في الوقت الذي وعدت به. ____

ت9. أقسام الطوارئ المتميزة يجب أن تحرص على سجل خالي من الأخطاء. ____

الإستجابة

ت10. موظفو أقسام الطوارئ المتميزة يجب أن يخبروا الزبائن متى سوف يتم تنفيذ الخدمات بالتحديد. ____

ت11. يجب أن يقدم موظفو أقسام الطوارئ المتميزة خدمة فورية للمرضى. ____

ت12. يجب أن يكون موظفو أقسام الطوارئ الممتازة دائما مستعدين لمساعدة المرضى. ____

ت13. موظفو أقسام الطوارئ المتميزة لن يتأخروا أبدا في الإستجابة لطلبات المرضى. ____

المصداقية

أ5. عندما يقدم قسم الطوارئ المختار وعدا للقيام بشيء في وقت معين, فهو يلتزم بذلك. ____

أ6. عندما يكون عندك مشكلة فإن قسم الطوارئ المختار يظهر اهتماما خالصا في حلها. ____

أ7. قسم الطوارئ المختار يقدم الخدمة بشكل صحيح من المرة الأولى. ____

أ8. قسم الطوارئ المختار يقدم الخدمة في الوقت الذي يعد به بذلك. ____

أ9. قسم الطوارئ المختار يحرص على سجل خالي من الأخطاء. ____

الإستجابة

أ10. موظفو قسم الطوارئ المختار يخبرونك متى سوف يتم تنفيذ الخدمات بالتحديد. ____

أ11. موظفو قسم الطوارئ المختار يقدمون لك خدمة فورية. ____

أ12. موظفو قسم الطوارئ المختار دائما مستعدين لمساعدتك. ____

أ13. موظفو قسم الطوارئ المختار لن يتأخروا أبدا في الإستجابة لطلباتك. ____

الضمانة		**الضمانة**	
ت14. تصرفات موظفي أقسام الطوارئ الممتازة يجب أن تغرس الثقة في نفوس المرضى.	____	أ14. تصرفات موظفي قسم الطوارئ المختار تغرس الثقة في نفسك.	____
ت15. مرضى أقسام الطوارئ المتميزة سوف يشعرون بالأمان في المعاملات.	____	أ15. تشعر بأمان في معاملات قسم الطوارئ المختار.	____
ت16. موظفو أقسام الطوارئ المتميزة يجب أن يكونوا لبقين مع المرضى بصورة مستمرة.	____	أ16. موظفو قسم الطوارئ المختار لبقين معك بصورة مستمرة.	____
ت17. يجب أن يكون لدى موظفو أقسام الطوارئ المتميزة المعرفة الكافية للإجابة على أسئلة المرضى.	____	أ17. موظفو قسم الطوارئ المختار لديهم المعرفة الكافية للإجابة على أسئلتك.	____
التعاطف		**التعاطف**	
ت18. يجب أن تقوم أقسام الطوارئ المتميزة تقوم بإعطاء المرضى الاهتمام الشخصي.	____	أ18. قسم طوارئ المستشفى المختار يعطيك الاهتمام الشخصي.	____
ت19. يجب أن يكون لدى أقسام الطوارئ المتميزة ساعات عمل مناسبة لجميع مرضاها.	____	أ19. قسم طوارئ المستشفى المختار لديه ساعات عمل مناسبة لجميع المرضى.	____
ت20. يجب أن يكون لدى أقسام الطوارئ المتميزة موظفين يقدمون الاهتمام الشخصي للمرضى	____	أ20. قسم الطوارئ المختار لديه موظفين يقدمون لك الإهتمام الشخصي.	____
ت21. يجب أن تهتم أقسام الطوارئ المتميزة بمصالح مرضاها من قلبها كل الاهتمام.	____	أ21. قسم الطوارئ المختار يهتم بمصلحتك من قلبة كل الاهتمام.	____
ت22. يجب أن يتفهم موظفو أقسام الطوارئ المتميزة الإحتياجات المحددة لمرضاهم.	____	أ22. موظفوا قسم الطوارئ المختار يتفهمون احتياجاتك المحددة.	____

Appendix C: Split-Flow Patient Satisfaction Using Survey

We would like to know your perceptions about the services provided by the Emergency Department of (Name of Hospital). Your answers will help understand the relationships between process management and patients' satisfaction. Your responses will be kept confidential and anonymous, and will not be shared with unauthorized parties. Thank you for taking the time through responding to the survey. We greatly value your participation.

Part 1		
Your Age: _____	Education level:	Your Sex: _____
Your Nationality:	___ Jordanian_ __ Syrian ___ Other Arab ___ Other	___ Iraqi ___ Palestinian (UNRWA) ___ Western National

Part 2

DIRECTIONS: Please indicate your agreement with each statement below. Write out the closest response to your perception keeping in mind that 1= Strongly Disagree, 2 = Disagree, 3 = Neither, 4= Agree and 5 = Strongly Agree. Please read each statement carefully and provide your truthful opinion.

Spit Flow Assessment Tool

Please circle how well you think the ED are doing in the following areas:	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
General Team Assessment					
A doctor saw me twice or more during my visit					
A doctor spent more than 15 minutes in evaluating my case					
Nurses responded to my requests within less than 15 minutes					
Nurses approached me to inquire about my case within less than 15 minutes					
Waiting					
My total waiting time in the waiting area was less than 15 minutes					
Once in the exam room, I waited less than 15 minutes to be seen by someone					
My total waiting time to receive exams/tests orders/results was less than 15 minutes					
Triage Process					
I was seen by staff within 15 minutes of arrival					
I was told that I had an acute or non-acute acute case					
I was transferred to a waiting area after triage					
I was transferred to a bed after triage					
The entire triage phase of my visit took less than 15 minutes					
Discharge					
The entire discharge process took less than 15 minutes					
The discharge staff answered all my questions related to the medical/financial services					
The discharge staff explained discharge instructions, billing and financial documents well					

Appendix D: The SERVQUAL Instrument

EXPECTATIONS

This survey deals with your opinions of EDs. Please show the extent to which you think EDs should possess the following features. What we are interested in here is a number that best shows your expectations about institutions offering healthcare services

Strongly
Strongly
Disagree
Agree
1 2 3 4 5 6 7

Tangibles

E1. Excellent EDs will have modern looking equipment. _____

E2. The physical facilities at excellent EDs will be visually appealing. _____

E3. Employees at excellent EDs will be neat appearing. _____

E4. Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent EDs. _____

_____

Reliability

E5. When excellent EDs promise to do something by a certain time, they do. _____

PERCEPTIONS

The following statements relate to your feelings about the particular XYZ ED you chose. Please show the extent to which you believe XYZ has the feature described in the statement. Here, we are interested in a number that shows your perceptions about XYZ ED.

Strongly
Strongly
Disagree
Agree
1 2 3 4 5 6 7

Tangibles

P1. XYZ EDs has modern looking equipment. _____

P2. XYZ EDs` physical facilities are visually appealing. _____

P3. XYZ EDs` reception desk employees are neat appearing. _____

P4. Materials associated with the service (such as pamphlets or statements) are visually appealing at XYZ EDs. _____

_____

Reliability

P5. When XYZ ED promises to do something by a certain time, it does so. _____

E6. When a patient has a problem, excellent EDs will show a sincere interest in solving it. ____	P6. When you have a problem, XYZ ED shows a sincere interest in solving it. ____
E7. Excellent EDs will perform the service right the first time. ____	P7. XYZ ED performs the service right the first time. ____
E8. Excellent EDs will provide the service at the time they promise to do so. ____	P8. XYZ ED provides its service at the time it promises to do so. ____
E9. Excellent EDs will insist on error free records ____	P9. XYZ ED insists on error free records ____
Responsiveness	**Responsiveness**
E10. Employees of excellent EDs will tell customers exactly when services will be performed. ____	P10. Employees in XYZ ED tell you exactly when services will be performed. ____
E11. Employees of excellent EDs will give prompt service to patients. ____	P11. Employees in XYZ ED give you a prompt service. ____
E12. Employees of excellent EDs will always be willing to help patients. ____	P12. Employees in XYZ ED are always willing to help you. ____
E13. Employees of excellent EDs will never be too busy to respond to patients' requests. ____	P13. Employees in XYZ ED are never too busy to respond to your request. ____
Assurance	**Assurance**
E14. The behavior of employees in excellent EDs will instill confidence in patients. ____	P14. The behavior of employees in XYZ ED instills confidence in you. ____
E15. patients of excellent EDs will feel safe in transactions. ____	P15. You feel safe in your transactions with XYZ ED. ____

E16. Employees of excellent EDs will be consistently courteous with patients.	P16. Employees in XYZ ED area consistently courteous with you.
E17. Employees of excellent EDs will have the knowledge to answer patients' questions.	P17. Employees in XYZ EDs have the knowledge to answer your questions.
Empathy	**Empathy**
E18. Excellent EDs will give patients individual attention.	P18. XYZ ED gives you individual attention.
E19. Excellent EDs will have operating hours convenient to all their patients.	P19. XYZ ED has operating hours convenient to all its patients.
E20. Excellent EDs will have employees who give patients personal attention.	P20. XYZ ED has employees who give you personal attention.
E21. Excellent EDs will have their patient's best interests at heart.	P21. XYZ ED has your best interest at heart.
E22. The employees of excellent EDs will understand the specific needs of their patients.	P22. The employees of XYZ ED understand your specific needs.

Appendix E: Inter-Item Correlation: SERVQUAL Pilot Study
Perceived Service Quality Validity Analysis

Inter-Item Correlation Matrix								
	P1	P2	P3	P4	P5	P6	P7	P8
P1	1.000	.729	.346	.298	.181	-.012	.037	-.133
P2	.729	1.000	.518	-.099	.212	.132	-.031	-.117
P3	.346	.518	1.000	-.038	.327	.486	-.209	-.070
P4	.298	-.099	-.038	1.000	.141	.016	.215	.030
P5	.181	.212	.327	.141	1.000	.253	.176	.242
P6	-.012	.132	.486	.016	.253	1.000	.110	.471
P7	.037	-.031	-.209	.215	.176	.110	1.000	.371
P8	-.133	-.117	-.070	.030	.242	.471	.371	1.000
P9	.103	-.069	.107	-.032	.245	.210	-.049	.363
P10	.554	.344	.276	.338	.373	.117	.166	-.049
P11	.407	.462	.504	.026	.264	.240	.017	.172
P12	.461	.330	.533	.211	.344	.308	.291	.231
P13	.619	.486	.356	.258	.220	.121	.257	.207
P14	.474	.372	.357	.218	.221	.123	.230	.191
P15	.231	.173	.347	-.397	.277	-.119	-.075	-.110
P16	.495	.423	.390	.229	.200	.178	.214	.147
P17	.189	-.203	-.123	.693	-.099	-.072	.135	.093
P18	.126	.141	-.034	.038	-.201	-.114	.012	.072
P19	.105	-.009	.322	-.099	.061	.090	.010	.190
P20	.597	.448	.156	.116	.129	.035	.089	.141
P21	.408	.205	.444	.307	.274	.360	.245	.339

P22	.225	.174	.283	.237	-.095	.352	-.004	.079

Inter-Item Correlation Matrix								
	P9	P10	P11	P12	P13	P14	P15	P16
P1	.103	.554	.407	.461	.619	.474	.231	.495
P2	-.069	.344	.462	.330	.486	.372	.173	.423
P3	.107	.276	.504	.533	.356	.357	.347	.390
P4	-.032	.338	.026	.211	.258	.218	-.397	.229
P5	.245	.373	.264	.344	.220	.221	.277	.200
P6	.210	.117	.240	.308	.121	.123	-.119	.178
P7	-.049	.166	.017	.291	.257	.230	-.075	.214
P8	.363	-.049	.172	.231	.207	.191	-.110	.147
P9	1.000	.228	.160	.313	.283	.183	.303	.065
P10	.228	1.000	.381	.589	.603	.453	.138	.346
P11	.160	.381	1.000	.465	.690	.720	.109	.481
P12	.313	.589	.465	1.000	.642	.616	.311	.673
P13	.283	.603	.690	.642	1.000	.846	.152	.571
P14	.183	.453	.720	.616	.846	1.000	.097	.470
P15	.303	.138	.109	.311	.152	.097	1.000	.246
P16	.065	.346	.481	.673	.571	.470	.246	1.000
P17	.126	.150	.158	.272	.333	.395	-.311	.346
P18	-.117	-.133	.229	-.168	.216	.276	-.067	-.102
P19	.339	.132	.346	.483	.291	.305	.454	.337
P20	.076	.388	.646	.504	.669	.673	.133	.456
P21	.349	.454	.571	.844	.714	.734	.224	.665
P22	-.041	-.004	.026	.301	.196	.216	-.328	.230

Inter-Item Correlation Matrix						
	P17	P18	P19	P20	P21	P22
P1	.189	.126	.105	.597	.408	.225
P2	-.203	.141	-.009	.448	.205	.174
P3	-.123	-.034	.322	.156	.444	.283
P4	.693	.038	-.099	.116	.307	.237
P5	-.099	-.201	.061	.129	.274	-.095
P6	-.072	-.114	.090	.035	.360	.352
P7	.135	.012	.010	.089	.245	-.004
P8	.093	.072	.190	.141	.339	.079
P9	.126	-.117	.339	.076	.349	-.041
P10	.150	-.133	.132	.388	.454	-.004
P11	.158	.229	.346	.646	.571	.026
P12	.272	-.168	.483	.504	.844	.301
P13	.333	.216	.291	.669	.714	.196
P14	.395	.276	.305	.673	.734	.216
P15	-.311	-.067	.454	.133	.224	-.328
P16	.346	-.102	.337	.456	.665	.230
P17	1.000	.015	.080	.261	.420	.249
P18	.015	1.000	.033	.261	.027	-.117
P19	.080	.033	1.000	.280	.435	-.183
P20	.261	.261	.280	1.000	.617	.147
P21	.420	.027	.435	.617	1.000	.378
P22	.249	-.117	-.183	.147	.378	1.000

Appendix F: Inter-Item Correlation: SERVQUAL Pilot Study
Expected Service Quality Validity Analysis

Inter-Item Correlation Matrix								
	E1	E2	E3	E4	E5	E6	E7	E8
E1	1.000	.317	.205	.542	.358	.463	.176	.126
E2	.317	1.000	.092	.217	.267	.074	.180	.053
E3	.205	.092	1.000	.150	.343	.090	-.141	-.140
E4	.542	.217	.150	1.000	.260	.423	.327	.259
E5	.358	.267	.343	.260	1.000	.489	.008	-.276
E6	.463	.074	.090	.423	.489	1.000	.189	.054
E7	.176	.180	-.141	.327	.008	.189	1.000	.463
E8	.126	.053	-.140	.259	-.276	.054	.463	1.000
E9	.084	.502	-.040	-.101	.031	-.075	.084	.036
E10	.574	.186	.083	.472	.172	.402	.181	.139
E11	.513	-.035	.266	.578	.258	.390	.041	.048
E12	.511	.068	-.050	.171	.009	.372	.176	.227
E13	.070	.280	.119	.130	.008	.175	.241	-.038
E14	.597	.240	.096	.527	.069	.353	.249	.264
E15	.438	.001	.350	.231	.253	.406	.037	.087
E16	.115	.260	.023	.259	.021	.103	.548	.459
E17	.638	.347	.151	.495	.246	.500	.273	.148
E18	.580	-.114	.106	.420	-.020	.352	.328	.423
E19	.479	-.026	.071	.610	.132	.388	.421	.197
E20	.158	.327	.344	.089	.072	.026	.313	.052
E21	.389	.289	.074	.582	-.030	.206	.396	.368

E22	.396	.509	.174	.365	.298	.244	.276	.179

Inter-Item Correlation Matrix								
	E9	E10	E11	E12	E13	E14	E15	E16
E1	.084	.574	.513	.511	.070	.597	.438	.115
E2	.502	.186	-.035	.068	.280	.240	.001	.260
E3	-.040	.083	.266	-.050	.119	.096	.350	.023
E4	-.101	.472	.578	.171	.130	.527	.231	.259
E5	.031	.172	.258	.009	.008	.069	.253	.021
E6	-.075	.402	.390	.372	.175	.353	.406	.103
E7	.084	.181	.041	.176	.241	.249	.037	.548
E8	.036	.139	.048	.227	-.038	.264	.087	.459
E9	1.000	.342	-.077	.303	.098	.212	.195	.183
E10	.342	1.000	.520	.747	.219	.716	.516	.260
E11	-.077	.520	1.000	.451	.036	.564	.417	.253
E12	.303	.747	.451	1.000	.120	.702	.513	.206
E13	.098	.219	.036	.120	1.000	.215	.135	.158
E14	.212	.716	.564	.702	.215	1.000	.526	.324
E15	.195	.516	.417	.513	.135	.526	1.000	.217
E16	.183	.260	.253	.206	.158	.324	.217	1.000
E17	.254	.824	.541	.718	.322	.876	.520	.276
E18	-.064	.545	.593	.509	.024	.669	.487	.438
E19	-.064	.573	.584	.269	.047	.435	.081	.231
E20	.218	.240	.055	.243	.088	.260	.084	.310
E21	.144	.322	.300	.170	.088	.497	.191	.335
E22	.196	.283	.091	.217	.309	.449	.033	.151

Inter-Item Correlation Matrix

	E17	E18	E19	E20	E21	E22
E1	.638	.580	.479	.158	.389	.396
E2	.347	-.114	-.026	.327	.289	.509
E3	.151	.106	.071	.344	.074	.174
E4	.495	.420	.610	.089	.582	.365
E5	.246	-.020	.132	.072	-.030	.298
E6	.500	.352	.388	.026	.206	.244
E7	.273	.328	.421	.313	.396	.276
E8	.148	.423	.197	.052	.368	.179
E9	.254	-.064	-.064	.218	.144	.196
E10	.824	.545	.573	.240	.322	.283
E11	.541	.593	.584	.055	.300	.091
E12	.718	.509	.269	.243	.170	.217
E13	.322	.024	.047	.088	.088	.309
E14	.876	.669	.435	.260	.497	.449
E15	.520	.487	.081	.084	.191	.033
E16	.276	.438	.231	.310	.335	.151
E17	1.000	.587	.482	.370	.410	.514
E18	.587	1.000	.600	.048	.422	-.014
E19	.482	.600	1.000	.091	.467	.141
E20	.370	.048	.091	1.000	.140	.541
E21	.410	.422	.467	.140	1.000	.313
E22	.514	-.014	.141	.541	.313	1.000

Appendix G: Inter-Item Correlation: SERVQUAL Complete Study
Perceived Service Quality Validity Analysis

Inter-Item Correlation Matrix					
	P1Tangible	P2Tangible	P3Tangible	P4Tangible	P5Reliability
P1Tangible	1.000	.681	.341	.336	.212
P2Tangible	.681	1.000	.552	-.108	.237
P3Tangible	.341	.552	1.000	.044	.362
P4Tangible	.336	-.108	.044	1.000	.164
P5Reliability	.212	.237	.362	.164	1.000
P6Reliability	.037	.197	.552	-.011	.296
P7Reliability	.073	-.003	-.170	.159	.200
P8Reliability	-.154	-.122	-.022	-.031	.306
P9Reliability	.022	-.184	.045	.000	.180
P10Responsiveness	.559	.272	.297	.422	.431
P11Responsiveness	.414	.455	.546	.100	.348
P12Responsiveness	.472	.321	.501	.279	.423
P13Responsiveness	.582	.405	.399	.326	.301
P14Assurance	.468	.331	.395	.279	.301
P15Assurance	.204	.128	.229	-.322	.295
P16Assurance	.501	.426	.385	.256	.260
P17Assurance	.230	-.207	-.074	.677	-.104
P18Empathy	.135	.146	.010	.061	-.138
P19Empathy	.068	-.058	.253	.004	.133
P20Empathy	.615	.427	.176	.163	.212
P21Empathy	.414	.193	.428	.348	.365

P22Empathy	.234	.216	.315	.165	-.051

Inter-Item Correlation Matrix					
	P6Reliability	P7Reliability	P8Reliability	P9Reliability	P10Responsiveness
P1Tangible	.037	.073	-.154	.022	.559
P2Tangible	.197	-.003	-.122	-.184	.272
P3Tangible	.552	-.170	-.022	.045	.297
P4Tangible	-.011	.159	-.031	.000	.422
P5Reliability	.296	.200	.306	.180	.431
P6Reliability	1.000	.078	.479	.237	.151
P7Reliability	.078	1.000	.356	-.040	.198
P8Reliability	.479	.356	1.000	.427	-.014
P9Reliability	.237	-.040	.427	1.000	.185
P10Responsiveness	.151	.198	-.014	.185	1.000
P11Responsiveness	.301	.053	.187	.167	.408
P12Responsiveness	.337	.348	.308	.286	.595
P13Responsiveness	.191	.312	.237	.273	.584
P14Assurance	.204	.282	.219	.195	.444
P15Assurance	-.126	.001	-.042	.227	.125
P16Assurance	.169	.228	.183	.028	.317
P17Assurance	-.113	.079	.053	.160	.184
P18Empathy	-.064	.013	.033	-.082	-.124
P19Empathy	.122	.087	.256	.371	.143
P20Empathy	.081	.118	.133	.083	.421
P21Empathy	.382	.264	.378	.367	.471

P22Empathy	.366	-.041	.064	-.005	.003

Inter-Item Correlation Matrix					
	P11Responsiveness	P12Responsiveness	P13Responsiveness	P14Assurance	P15Assurance
P1Tangible	.414	.472	.582	.468	.204
P2Tangible	.455	.321	.405	.331	.128
P3Tangible	.546	.501	.399	.395	.229
P4Tangible	.100	.279	.326	.279	-.322
P5Reliability	.348	.423	.301	.301	.295
P6Reliability	.301	.337	.191	.204	-.126
P7Reliability	.053	.348	.312	.282	.001
P8Reliability	.187	.308	.237	.219	-.042
P9Reliability	.167	.286	.273	.195	.227
P10Responsiveness	.408	.595	.584	.444	.125
P11Responsiveness	1.000	.548	.690	.724	.082
P12Responsiveness	.548	1.000	.728	.688	.249
P13Responsiveness	.690	.728	1.000	.858	.145
P14Assurance	.724	.688	.858	1.000	.121
P15Assurance	.082	.249	.145	.121	1.000
P16Assurance	.543	.677	.604	.545	.205
P17Assurance	.211	.326	.398	.464	-.266
P18Empathy	.145	-.128	.149	.178	-.006
P19Empathy	.334	.492	.301	.331	.385
P20Empathy	.618	.603	.654	.665	.150
P21Empathy	.620	.849	.775	.784	.201

P22Empathy	.082	.280	.244	.250	-.348

Inter-Item Correlation Matrix

	P16Assurance	P17Assurance	P18Empathy	P19Empathy	P20Empathy
P1Tangible	.501	.230	.135	.068	.615
P2Tangible	.426	-.207	.146	-.058	.427
P3Tangible	.385	-.074	.010	.253	.176
P4Tangible	.256	.677	.061	.004	.163
P5Reliability	.260	-.104	-.138	.133	.212
P6Reliability	.169	-.113	-.064	.122	.081
P7Reliability	.228	.079	.013	.087	.118
P8Reliability	.183	.053	.033	.256	.133
P9Reliability	.028	.160	-.082	.371	.083
P10Responsiveness	.317	.184	-.124	.143	.421
P11Responsiveness	.543	.211	.145	.334	.618
P12Responsiveness	.677	.326	-.128	.492	.603
P13Responsiveness	.604	.398	.149	.301	.654
P14Assurance	.545	.464	.178	.331	.665
P15Assurance	.205	-.266	-.006	.385	.150
P16Assurance	1.000	.375	-.047	.325	.516
P17Assurance	.375	1.000	.015	.170	.304
P18Empathy	-.047	.015	1.000	.045	.161
P19Empathy	.325	.170	.045	1.000	.278
P20Empathy	.516	.304	.161	.278	1.000
P21Empathy	.662	.452	.020	.434	.668
P22Empathy	.202	.219	-.138	-.201	.192

Inter-Item Correlation Matrix		
	P21Empathy	P22Empathy
P1Tangible	.414	.234
P2Tangible	.193	.216
P3Tangible	.428	.315
P4Tangible	.348	.165
P5Reliability	.365	-.051
P6Reliability	.382	.366
P7Reliability	.264	-.041
P8Reliability	.378	.064
P9Reliability	.367	-.005
P10Responsiveness	.471	.003
P11Responsiveness	.620	.082
P12Responsiveness	.849	.280
P13Responsiveness	.775	.244
P14Assurance	.784	.250
P15Assurance	.201	-.348
P16Assurance	.662	.202
P17Assurance	.452	.219
P18Empathy	.020	-.138
P19Empathy	.434	-.201
P20Empathy	.668	.192
P21Empathy	1.000	.348
P22Empathy	.348	1.000

Appendix H: Inter-Item Correlation: SERVQUAL Complete Study
Expected Service Quality Validity Analysis

Inter-Item Correlation Matrix					
	E1Tangible	E2Tangible	E3Tangible	E4Tangible	E5Reliability
E1Tangible	1.000	.368	.155	.439	.283
E2Tangible	.368	1.000	.104	.314	.240
E3Tangible	.155	.104	1.000	.084	.256
E4Tangible	.439	.314	.084	1.000	.205
E5Reliability	.283	.240	.256	.205	1.000
E6Reliability	.377	.096	.000	.327	.407
E7Reliability	.134	.178	-.213	.298	.036
E8Reliability	.124	.127	-.163	.256	-.269
E9Reliability	.145	.477	.000	-.032	.021
E10Responsiveness	.503	.219	.064	.354	.090
E11Responsiveness	.398	.000	.265	.454	.204
E12Responsiveness	.464	.092	-.059	.066	-.031
E13Responsiveness	.080	.240	.171	.147	.058
E14Assurance	.557	.329	.093	.455	.022
E15Assurance	.417	.061	.293	.171	.140
E16Assurance	.094	.285	.000	.242	.075
E17Assurance	.560	.397	.138	.378	.173
E18Empathy	.557	-.024	.038	.286	-.051
E19Empathy	.367	.000	.000	.487	.068
E20Empathy	.133	.359	.353	.038	.112
E21Empathy	.374	.385	.038	.570	-.034

E22Empathy	.361	.505	.183	.349	.288

Inter-Item Correlation Matrix					
	E6Reliability	E7Reliability	E8Reliability	E9Reliability	E10Responsiveness
E1Tangible	.377	.134	.124	.145	.503
E2Tangible	.096	.178	.127	.477	.219
E3Tangible	.000	-.213	-.163	.000	.064
E4Tangible	.327	.298	.256	-.032	.354
E5Reliability	.407	.036	-.269	.021	.090
E6Reliability	1.000	.205	.073	-.052	.312
E7Reliability	.205	1.000	.473	.159	.154
E8Reliability	.073	.473	1.000	.097	.159
E9Reliability	-.052	.159	.097	1.000	.432
E10Responsiveness	.312	.154	.159	.432	1.000
E11Responsiveness	.282	-.045	.020	-.009	.382
E12Responsiveness	.346	.160	.217	.367	.763
E13Responsiveness	.218	.190	-.028	.095	.227
E14Assurance	.286	.240	.268	.287	.681
E15Assurance	.343	.062	.095	.263	.567
E16Assurance	.120	.500	.468	.241	.251
E17Assurance	.432	.246	.163	.329	.785
E18Empathy	.299	.281	.420	.043	.494
E19Empathy	.286	.402	.204	.024	.430
E20Empathy	.017	.242	.028	.280	.241
E21Empathy	.176	.349	.355	.247	.304

E22Empathy	.210	.297	.206	.187	.231

Inter-Item Correlation Matrix

	E11Responsiveness	E12Responsiveness	E13Responsiveness	E14Assurance	E15Assurance
E1Tangible	.398	.464	.080	.557	.417
E2Tangible	.000	.092	.240	.329	.061
E3Tangible	.265	-.059	.171	.093	.293
E4Tangible	.454	.066	.147	.455	.171
E5Reliability	.204	-.031	.058	.022	.140
E6Reliability	.282	.346	.218	.286	.343
E7Reliability	-.045	.160	.190	.240	.062
E8Reliability	.020	.217	-.028	.268	.095
E9Reliability	-.009	.367	.095	.287	.263
E10Responsiveness	.382	.763	.227	.681	.567
E11Responsiveness	1.000	.388	.046	.482	.410
E12Responsiveness	.388	1.000	.142	.684	.536
E13Responsiveness	.046	.142	1.000	.239	.250
E14Assurance	.482	.684	.239	1.000	.544
E15Assurance	.410	.536	.250	.544	1.000
E16Assurance	.236	.205	.125	.326	.267
E17Assurance	.415	.708	.349	.878	.557
E18Empathy	.515	.500	.036	.650	.503
E19Empathy	.432	.183	-.046	.320	.024
E20Empathy	.004	.238	.044	.256	.103
E21Empathy	.254	.144	.032	.489	.203

E22Empathy	.025	.189	.291	.457	.043

Inter-Item Correlation Matrix

	E16Assurance	E17Assurance	E18Empathy	E19Empathy	E20Empathy
E1Tangible	.094	.560	.557	.367	.133
E2Tangible	.285	.397	-.024	.000	.359
E3Tangible	.000	.138	.038	.000	.353
E4Tangible	.242	.378	.286	.487	.038
E5Reliability	.075	.173	-.051	.068	.112
E6Reliability	.120	.432	.299	.286	.017
E7Reliability	.500	.246	.281	.402	.242
E8Reliability	.468	.163	.420	.204	.028
E9Reliability	.241	.329	.043	.024	.280
E10Responsiveness	.251	.785	.494	.430	.241
E11Responsiveness	.236	.415	.515	.432	.004
E12Responsiveness	.205	.708	.500	.183	.238
E13Responsiveness	.125	.349	.036	-.046	.044
E14Assurance	.326	.878	.650	.320	.256
E15Assurance	.267	.557	.503	.024	.103
E16Assurance	1.000	.269	.421	.174	.258
E17Assurance	.269	1.000	.564	.321	.379
E18Empathy	.421	.564	1.000	.493	-.026
E19Empathy	.174	.321	.493	1.000	.005
E20Empathy	.258	.379	-.026	.005	1.000
E21Empathy	.311	.403	.371	.422	.087

E22Empathy	.175	.498	-.034	.055	.582

Inter-Item Correlation Matrix

	E21Empathy	E22Empathy
E1Tangible	.374	.361
E2Tangible	.385	.505
E3Tangible	.038	.183
E4Tangible	.570	.349
E5Reliability	-.034	.288
E6Reliability	.176	.210
E7Reliability	.349	.297
E8Reliability	.355	.206
E9Reliability	.247	.187
E10Responsiveness	.304	.231
E11Responsiveness	.254	.025
E12Responsiveness	.144	.189
E13Responsiveness	.032	.291
E14Assurance	.489	.457
E15Assurance	.203	.043
E16Assurance	.311	.175
E17Assurance	.403	.498
E18Empathy	.371	-.034
E19Empathy	.422	.055
E20Empathy	.087	.582
E21Empathy	1.000	.321
E22Empathy	.321	1.000

Appendix I: Interview Questions

Following structured interview was conducted with hospital administrators:

1. What is the layout of the emergency ward?
2. How many beds are there in your ED?
3. How many beds are there in the emergency ward/department?
4. Total number of shifts in the Emergency ward?
5. Total number of doctors in the emergency ward per shift?
6. Total number of nurses in the emergency ward per shift?
7. Total number of other medical staff in the emergency ward per shift?
8. Total number of other non-medical staff in the emergency ward per shift?
9. Weekly schedule of doctors, nurses, other medical staff and non-medical staff?
10. Average number of patient seen in the ED per week?
    a. How many patients were admitted in a week?
    b. How many patient stayed in the ED for more than 2 days, 3 days, more?
11. For any given day, how many patients are coming to the emergency ward during the morning hours (6AM-noon), afternoon hours (noon to 6:00PM), evening hours (6PM-midnight) and at night (midnight to 6AM). Need this data for a month time
12. Are the patients charged for the treatment? If yes, do they have to pay it before the treatment or after treatment?
13. Can you please let us know the process you follow at your emergency department when a patient arrives there? Just tell us what happened when a patient show up at the emergency, brought in either by the family or friends or through ambulance. Where they

go first, what happened after that and so on?

Appendix J: Frequency Distribution (Percentage) for Split-flow

Sub-Scale and Item	1	2	3	4	5	6	7
Tangibles							
1. Excellent Emergency Department will have modern looking equipment.	0	0	2.4	2.4	2.4	50	42.9
2. The physical facilities at excellent Emergency Department will be visually appealing.	0	0	0	11.9	19.	26.2	42.9
3. Employees at excellent Emergency Department will be neat appearing.	0	0	0	0	21.4	57.1	21.4
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent Emergency Department.	0	2.4	2.4	28.6	14.3	28.6	23.8
Reliability							
5. When excellent Emergency Department promise to do something by a certain time, they do.	0	2.4	4.8	4.8	31.0	38.1	19.0
6. When a patient has a problem, excellent Emergency Department will show a sincere interest in solving it.	0	0	2.4	21.4	26.2	21.4	28.6
7. Excellent Emergency Department will perform the service right the first time.	0	0	0	0	3.4	64.3	33.3
8. Excellent Emergency Department will provide the service at the time they promise to do so.	0	0	0	7.1	33.3	35.7	23.8
9. Excellent Emergency Department will insist on error free records	0	0	0	2.4	21.4	40.5	35.7
Responsiveness							
10. Employees of excellent Emergency Department will tell patients exactly when services will be performed.	0	4.8	0	4.8	16.7	50	23.8
11. Employees of excellent Emergency Department will give prompt service to patients.	0	0	2.4	2.4	21.4	33.3	40.5
12. Employees of excellent Emergency Department will always be willing to help patients.	0	2.4	.4.8	2.4	21.4	26.8	40.5
13. Employees of excellent Hospitals will never be too busy to respond to patient's requests.	0	0	0	4.8	33.3	38.1	23.8
Assurance							
14. The behavior of employees in excellent Emergency Department will instill confidence in patients.	0	2.4	2.4	4.8	4.8	16.7	69
15. Patients of excellent Emergency Department will feel safe in transactions.	0	2.4	2.4	2.4	54.8	11.9	26.2
16. Employees of excellent Emergency Department will be consistently courteous with patients.	0	0	0	19	50	14.3	16.7
17. Employees of excellent Emergency Department will have the knowledge to answer patients' questions.	0	4.8	2.4	4.8	0	21.4	66.7
Empathy							
18. Excellent Emergency Department will give patients individual attention.	0	2.4	0	4.8	54.8	23.8	14.3
19. Excellent Emergency Department will have operating hours convenient to all their patients.	0	2.4	0	0	45.2	40.5	11.9
20. Excellent Hospitals will have employees who give patients personal attention.	0	0	2.4	2.4	2.4	50	42.9
21. Excellent Emergency Department will have their	0	0	0	7.1	38.1	26.2	28.6

patient's best interests at heart.							
22. The employees of excellent Emergency Department will understand the specific needs of their patients.	0	0	2.4	4.8	42.9	23.8	26.2

Appendix K: Frequency Distribution (Percentage) for SERVQUAL

Sub-Scale and Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Tangibles							
1. Excellent Emergency Department will have modern looking equipment.	0	2.4	16.7	42.9	26.2	9.5	2.4
2. The physical facilities at excellent Emergency Department will be visually appealing.	0	2.4	16.7	42.9	26.2	9.5	2.4
3. Employees at excellent Emergency Department will be neat appearing.	2.4	11.9	35.9	9.5	19	14.3	7.1
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing at an excellent Emergency Department.	0	14.3	21.4	28.6	21.4	11.9	2.4
Reliability							
5. When excellent Emergency Department promise to do something by a certain time, they do.	0	16.7	19.7	38.1	14.3	14.3	0
6. When a patient has a problem, excellent Emergency Department will show a sincere interest in solving it.	0	9.5	38.1	38.1	9.5	4.8	0
7. Excellent Emergency Department will perform the service right the first time.	0	9.5	38.1	38.1	9.5	4.8	0
8. Excellent Emergency Department will provide the service at the time they promise to do so.	2.4	11.9	28.6	28.6	23.8	2.4	2.4
9. Excellent Emergency Department will insist on error free records	4.8	11.9	42.9	11.9	11.9	14.3	2.4
Responsiveness							
10. Employees of excellent Emergency Department will tell patients exactly when services will be performed.	0	7.1	19	33.3	21.9	14.3	4.8
11. Employees of excellent Emergency Department will give prompt service to patients.	0	7.1	14.3	28.6	28.6	23.8	7.1
12. Employees of excellent Emergency Department will always be willing to help patients.	0	4.8	7.1	28.6	28.6	23.8	7.1
13. Employees of excellent Hospitals will never be too busy to respond to patient's requests.	0	9.5	19	23.8	23.8	14.3	9.5

Appendix K *continued*

Sub-Scale and Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Assurance	0						
14. The behavior of employees in excellent Emergency Department will instill confidence in patients.	0	4.8	21.4	26.2	21.4	16.7	9.5
15. Patients of excellent Emergency Department will feel safe in transactions.	0	0	21.4	54.4	16.7	4.8	4.8
16. Employees of excellent Emergency Department will be consistently courteous with patients.	0	16.7	23.8	23.8	21.4	11.9	2.1
17. Employees of excellent Emergency Department will have the knowledge to answer patients' questions.	0	9.5	31.0	33.3	11.9	11.9	2.4
Empathy							
18. Excellent Emergency Department will give patients individual attention.	0	0	7.1	40.5	45.2	7.1	0
19. Excellent Emergency Department will have operating hours convenient to all their patients.	0	2.4	2.4	26.2	50.0	19	0
20. Excellent Hospitals will have employees who give patients personal attention.	0	0	11.9	26.2	35.7	21.4	4.8
21. Excellent Emergency Department will have their patient's best interests at heart.	0	2.4	14.3	26.2	28.6	21.4	7.1
22. The employees of excellent Emergency Department will understand the specific needs of their patients.	0	2.4	47.6	19	28.6	0	2.4