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Improving Hospital Patient-Flow: an Experience-Based Co-Design Study

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To patients and those who take care of them.

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On the shoulders of giants.

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"We should never allow the size of our thinking to limit the size of our vision."
J.C. Maxwell

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Paper II

Gualandi R, Masella C, Viglione D, Tartaglini D. (2019) Exploring the hospital patient journey: what does the patient experience?. *PLoS One*. 14(12):e0224899. https://doi.org/10.1371/journal.pone.0224899

Paper III

Gualandi R, Masella C, Viglione D, Tartaglini D. (2020) Challenges and potential improvements in hospital patient flow - The contribution of frontline, top and middle management professionals. *Journal of Health Organization and Management*. Submitted (Nov, 2019). Under review.

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Gualandi R, Masella C, Piredda M, Ercoli M, Tartaglini D. (2020) Enhancing the patient perspective of the hospital journey: what does the patient have to say? *The Patient - Patient-Centered Outcomes Research.* Advanced working paper.

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Gualandi R, Masella C. (2015, June) Improving Hospital Patient-Flow: an experience-based co-design study. 2nd Annual EDIM PhD Conference, Milan, Italy.

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Executive Summary

Health services will increasingly have to balance resource constraints against patient best outcomes. However, established ways to achieve the right trade-off between increasing productivity and enhancing quality remain unquestioned. This issue is more than ever present in the complex hospital setting, where patient flow management is one of the key processes to improve both hospital performance and the best clinical outcomes for the patients.

It is recognized that the success of service providers depends on their ability to provide customer-centric services. In the healthcare sector, this topic is addressed under two main aspects. On the one hand, the evaluation of healthcare services from the patient's perspective, by including his/her experience as well as satisfaction and clinical outcomes; on the other, the involvement of the patient in quality improvement initiatives. However, there is a need to understand whether and how the patient can contribute to the improvement of service delivery. This research contributes to addressing these calls by investigating how patients can be involved in patient flow redesign and how this approach may enhance the improvement in a patient-centered way.

The purpose of this thesis is to explore the contribution and challenges of patients and healthcare professionals in hospital patient flow improvement by using an Experience-Based Co-Design (EBCD) approach. In particular, this research aims to identify whether the patient perspective can capture the core of hospital process-related problems and generate different solutions centered on patients' needs.

By following an Executive Ph.D. Programme within a rapidly growing organization – the Campus Bio-Medico University Hospital of Rome – and through an insider perspective, a series of practical contributions have been achieved. First, the study of patient flow from a patient perspective enables hospital managers to understand how to improve this process both for better use of resources and services integration, and in order to give the attention to the patient that underpins the hospital's mission. Second, this research focus on patient experience has stimulated an early cultural change at the level of hospital top-management in the way that the patient's perspective on service delivery is assessed. Third, the participation of front-line professionals as well as middle and top managers and researchers in a cross-hospital improvement project has increased the level of awareness about the possibility of improving the patient experience by revising and integrating the work-flow processes.

From an academic viewpoint, the contribution of this research is threefold. Firstly, the results of this study contribute to broadening knowledge of healthcare service design by understanding the role the patient may have in the redesign process. Secondly, this study provides an in-depth understanding of how valuable patient experience is for the design of the patient journey, revealing the dynamic and complex interconnections among multiple actors that determine it. Finally, its results also contribute to advances in methodological quality improvement research by taking into account the contextual variables of hospitals and patients' perspectives.

Effective design of patient-centered healthcare services relies on collaboration between patients, front-line staff, decision-makers, and managers. More research is needed to understand whether expanding co-design solutions in the redesign process will enable health managers to get more patient-centered services. The achievement of this goal will represent a competitive value for the organizations.

Chapter 1

1. Introduction

1.1. Background

Health services will increasingly have to compete to manage the balance between resource constraints and patients' best outcomes. The proper allocation of resources in the health sector is more than ever a challenging objective, due to the significant impact on the life of every single person, on the health of the population and economical worldwide factors. In 2016, the world health spend was US$ 7.5 trillion and represented close to 10% of global gross domestic product (GDP). World health spending is growing faster than GDP, and it is expected to increase to $18.28 trillion in 2040 (Xu et al. 2018; Dielman et al. 2016). However, the established ways to achieve the right trade-off between increasing productivity and enhancing quality remain unquestioned (Laing 2002; Locock 2003).

The right balance is even more challenging in the complex hospital setting, given that effective response to acute and urgent clinical patients' needs must deal with the pressure on health budgets, reductions in hospital beds, and with the high cost of advanced technological resources and specialized health professionals. The goal is achieved by locating each patient in the right service at the right time through the management of hospital patient flow. By matching hospital resources with the patient's needs, patient flow management critically affects both hospital productivity and patient clinical outcomes and satisfaction (Haraden & Resar 2004; Hall et al. 2006; Litvak et al. 2010). This key business cross-functional process has to bring together the interests of multiple actors at different organizational levels. Firstly, the healthcare provider tries to manage the resources more efficiently despite the inherent variability of patient flow demand. Secondly, healthcare professionals attempt to dedicate their expertise when and where it is needed. Lastly, the patient is the main actor for whom other actors are creating value, and he expects to have his health problem and related needs solved.

Studies show how hospitals can significantly improve the quality of the service provided by exploring and understanding the individual patient journey (Ben-Tovim et al. 2008; Samaranayake et al. 2016; Trbovich & Vincent, 2018). Indeed, the patient is the only actor who experiences the whole path by connecting each step of the journey. Patient flow redesign efforts are extensively studied to effectively balance the increasing demands of an unknown and variable volume of patients, with limited available hospital resources (Noon et al. 2003; Haraden and Resar 2004; Eriksson et al. 2017). Traditionally, care providers have addressed this issue by turning to the field of operations management. Despite the substantial literature on this topic, it is not clear how patient flow improvement initiatives impact on the quality of the service offered to the patient (e.g., patient satisfaction and experience) in addition to the hospital operational processes results (e.g., timeliness, capacity management, beds usability). Moreover, little research has focused on understanding whether and how patients should be involved in and contribute to patient flow redesign.

In the healthcare knowledge-based system, first-hand experience represents an essential source of knowledge for better design of a service, a process, or a product (Needeleman et al. 2016; Steen et al. 2011). This topic is addressed under two main aspects. On the one hand, the evaluation of service delivery from the patient's perspective, by including his experience as well as satisfaction and clinical outcomes; on the other, the involvement of the patient in quality improvement initiatives.

In particular, in recent years, the patient experience has emerged as an important area of knowledge to evaluate the performance of the services (Locock et al. 2014; Gleeson et al. 2016) and to make the services more patient-centered (Groene et al. 2009; Gabutti et al. 2017). Patient experience data has been widely studied in the NHS, but authors report how the effectiveness of their use for a quality improvement initiative is not yet proven (Manary et al. 2013; Coulter et al. 2014).

The development of a participatory action research methodology known as Experience-Based Co-Design (EBCD) marks a significant contribution in enabling collaborative working between patients and staff in quality improvement efforts starting from the patients' experience (Bate and Robert, 2006, 2007). This participatory action research has been shown to enhance the impact of local improvements of services, but it has not been widely implemented in such a complex and cross-functional process as patient flow management (Adams et al. 2013; Donetto et al. 2015).

In summary, there is a need to understand whether and how the patient can contribute to the improvement of service delivery to achieve improvements that will result in value both for the provider and for the patient. This research contributes to addressing this need by investigating how patients can be involved in patient flow redesign and how this approach may enhance the improvement in a patient-centered way.

1.2. Purpose

The purpose of this thesis is to explore the contribution and challenges of patients and healthcare professionals involved in hospital patient flow improvement. Accordingly, this study sets out to develop more in-depth knowledge on these three related aspects: the use of patient experience in the improvement of hospital patient flow; the contributions and challenges of a participatory action research methodology in the improvement of hospital patient flow; and the feasibility of EBCD as a quality improvement intervention in complex cross-functional processes. In particular, this research aims to identify whether the patient perspective can capture the core of hospital process-related problems and generate different solutions centered on patients' needs.

The thesis is organized as a collection of 4 coherent papers that report the results of the first part of the research conducted in an evolving organization. The first results of the co-design phase are anticipated in the essay, and will soon be published in a fifth paper.

1.3. Research questions

In an effort both to improve value for patients and to use resources efficiently, healthcare organizations are addressing how to involve patients and professionals in the redesign of healthcare services. However, analysis of the literature shows that some gaps exist. First, there is a need to compare different empirical settings in order to provide more effective results on co-creation (Galvagno et al. 2014). In particular, the issues and the opportunities of the involvement of patients to co-create their own experience of service delivery is only partially addressed by the literature. Secondly, it is not clear how professionals and patients may contribute to the redesign of a key business process so as to achieve results both for the patient and the provider (Winasti et al. 2018). Finally, few studies analyse how patient-experience data translate into improvements in the quality of care (Donetto et al. 2019).

Therefore, this thesis aims to address these gaps by answering to the following research question and related sub-questions:

RQ1 – How can patients and healthcare professionals be involved in improving a hospital cross-functional process?

RQ1.1 – How can patient perspectives and experiences contribute to the improvement of hospital patient flow?

RQ1.2 – How can healthcare professionals and patients contribute to the improvement of a cross-functional process?

RQ1.3 – What are the challenges of using an EBCD approach for the improvement of hospital patient flow?

1.4. Relevance for practice

The value of this research is mainly connected to the nature of the issue addressed, which has led the researcher to contribute to practice change by producing actionable knowledge. By doing an Executive Ph.D. Programme within a rapidly growing organization – the Campus Bio-Medico University Hospital of Rome – and with an insider perspective, a series of practical contributions have been achieved.

First, the study of patient flow from a patient perspective enables hospital managers to understand how to improve this process both for better use of resources and services integration, and for giving the attention to the patient that underpins the hospital's mission. Indeed, in recent years, growing economic pressure has forced the hospital management to optimize available resources, particularly beds and operating theaters, to improve the volume of patients treated. One of the practical solutions adopted, referring to the results of the first phase of the study, was that of the design, presentation to the top-management team, and implementation of the nurse case manager role in the Orthopedics area. Moreover, the Managerial Team's decision to entrust the management of beds to a centralized nursing team made it possible to balance attention to the needs of each patient while managing daily patient flow. However, behind the indicators of saturation of hospital spaces and the complexity of patient care, it was never possible to objectively evaluate the patient's perspective in walking the hospital. Through this study, a first

view of what happens during the hospital journey seen with the patient's eyes was given. The data collected through this perspective can improve the hospitalization process, with the intention to better integrate services and clinical units both for the benefit of the patient and the efficiency of the organization. Moreover, assessment and pointers for the improvement of the service delivery of care from a patient-perspective can constitute an added and distinctive value for the hospital, which is currently evaluated in the regional health system only by clinical outcomes and appropriateness of hospitalizations.

Second, the focus of this research on patient experience has stimulated an early cultural change at the level of hospital top-management in the way of assessing the patient's perspective on service delivery. A working group was set up between the Nursing Management Department and the Customer Management Team to expand and integrate the patient experience evaluation and to improve interventions by focusing on the entire journey of the patient. Until recently, the Customer Area considered patient data only in terms of satisfaction, complaints, or praise. By sharing the concept of patient experience and patient journey this Area now declares its goal to be "consolidating a relationship of trust and security so that every patient feels welcomed and taken in charge, and promoting the positive experience of the patient as a complement to the clinical outcome" (Campus web). The project of enhancing and leveraging the patient experience is now at an embryonic stage, but aims to expand into more sectors and clinical units.

1.5. Relevance for research

From an academic viewpoint, the contribution of this research is threefold. Firstly, this study provides an in-depth understanding of how valuable patient experience is for the design of patient journeys, revealing the dynamic, and complex interconnections among multiple actors of which it is composed. The development of multiple methods for studying experiences that span services boundaries allows a more in-depth understanding and analysis of the patient's whole experience, overcoming the fragmentation of health services.

Secondly, the results also contribute to advances in methodological quality improvement research by taking into account the contextual variables of hospitals and patients' perspectives. As a result, the different variables that can influence the patient flow improvement process are identified, providing a more comprehensive view of their impact on both the patient and the provider.

Finally, the results of this study contribute to extending knowledge in healthcare service design by understanding the role that the patient may have in the redesign process. At present, although the co-design groups have been set up, the practical implementation of the results achieved was not developed. However, by analyzing patients' and professionals' interaction in the redesigning of a cross-hospital process, a more in-depth understanding of the value of their involvement and the issues that may influence its effectiveness, will be provided. In particular, by enriching our understanding of EBCD, researchers will be able to articulate theoretically and practically how co-design with patients may contribute to improving a cross-functional process in a patient-centered way. Therefore, the implementation of co-design offers a contribution on the co-creation concept and on its potential benefits for the management of organizations.

1.6. Outline of the thesis

The thesis design is driven by the research questions, and the manuscript is organized as a collection of papers introduced by the following contents of the cover essay.

Chapter 1 describes the research background, purpose, and questions.

Chapter 2 provides a theoretical framework. This section includes previous research and concepts central to this thesis.

Chapter 3 describes the research design, the empirical phase, and methods used for generating and analyzing data.

Chapter 4 includes a summary of the appended papers either accepted for publication or under review.

Chapter 5 presents a discussion of the results achieved by this project, both in terms of the results of the empirical study and of the researcher's experience in conducting this project.

Chapter 6 reports conclusions and considerations for further research.

Chapter 2

2. Theoretical Framework

The reasoning behind this research lies at the intersection of three main themes: service design, quality improvement and value co-creation. The latter is the basis of the Experience-Based Co-Design approach. This chapter shows the main trends of these topics, which, together with a view on the patient-flow hospital process, are useful for understanding and interpreting the results of this research.

2.1. Involving patients in service design

Value co-creation in healthcare

Co-creation is developing as a new paradigm in management literature, and many scholars have studied the co-creation model in various areas (Galvagno & Dalli 2014). Value co-creation is defined as "a function of interaction" (Grönroos and Voima, 2013), "as joint activities by parties involved in direct interactions, aiming at contributing to the value that emerges for one or both (or all involved) parties" (Grönroos, 2012). Perks et al. (2012) gives the following definition: "Co-creation involves the joint creation of value by the firm and its network of various entities (such as customers, suppliers, and distributors) termed here actors. Innovations are thus the outcomes of behaviors and interactions between individuals and organizations." Sanders and Stappers (2008), more simply, define co-creation "any act of collective creativity, i.e., the creativity that is shared by two or more people." The 'sharing' can take place at any level of service delivery, usage, and management. In cooperation with diverse experts such as researchers, designers, or developers, the customer is also an expert reporting his experience.

From an operational point of view, the literature reports many benefits for the company when adopting a co-creation model. These may include nurturing a loyal customer community, rapid adaptation of production cycles, more authentic and better customer experience and journey, cheaper high-quality products for a design-oriented customer, lower risk of overproduction, and less waste. Some authors pointed out how, from an organization's perspective, co-creation can enhance its innovation processes and can discover new sources of competitive advantage (Prahalad and Ramasvamy, 2004; Frow et al. 2015). However, value co-creation is challenging to observe empirically, and it can involve multiple actors integrating resources coordinated through service exchange (Vargo and Lusch, 2015).

Despite the attractiveness of the 'co-' paradigm, there is now a growing debate in the literature on the real opportunities of applying this concept in public services (Dudau et al. 2019). On the one hand, the real potential of the customer to participate proactively and at an equal level in the co-creation process has to be explored (Loeffler & Bovaird, 2016). On the other, it is not clear

which drivers determine the success of a co-creation action. Moreover, most studies focus on the identification of influential factors, while little attention is given to the outcomes (Voorberg et al. 2015).

Frow et al. (2015) have defined specific dimensions that firms have to evaluate to take purposeful advantage of co-creation design opportunities. These are: the motives for co-creation, from the perspective of the customer or the lead firm; the forms of co-creation, such as co-design, co-production, co-promotion, etc.; the engaging of actors, considering that all forms of co-creation require two or more actors; the engagement platform, that enables actors to share their resources; the level of engagement, in which the intensity of a specific interaction lies on a continuum of cognitive, emotional and/or behavioral engagement; and the duration of the engagement, including the duration of both one interaction and of the collaborative relationship.

In the context of healthcare, customer value co-creation is defined by McColl-Kennedy et al. (2012) as "benefit realized from integration of resources through activities and interactions with collaborators in the customer's service network." Greenhalgh et al. (2016) identify 4 models of co-creation in healthcare: value co-creation, which originated in the business and management field; experience-based co-design, which drew on phenomenological philosophy, design science, and management studies; Technology co-design, which originated in computer science and management studies; and community-based participatory research, which originated in development studies literature.

Research in healthcare demonstrates an increasing involvement of patients that firstly results in a positive impact on patients' adherence to treatment. However, in most studies, the patient role is limited to being a provider of information, and patients are not yet involved as co-creators in the development of healthcare services (Groene et al. 2009). Moreover, studies on value co-creation in the healthcare sector are generally focused on the patient and do not mention how and why healthcare organizations should behave to reach a higher level of patient involvement (McColl-Kennedy et al. 2012).

Service design in healthcare

Service design has been defined as a "systems challenge driven by an understanding of human experience" (Evenson 2008), and it is based on two main concepts. On the one hand, service design refers to the design of service systems to co-create value by making people, technologies, and additional resources interact with each other. In this way, value is co-created by the integration of different services and actors. On the other, by taking a human-centered design approach, service design concerns investigating and understanding how consumers experience a service (Holmlid & Evenson 2008).

Laing (Laing 2002) pointed out how the attainment of user-oriented service provision goes beyond clinical outcomes by including the process aspects of service delivery. As a result, service design theory has progressively developed in the healthcare sector by transforming how services are organized and managed. Design theory, tools, and techniques have been developed over time within the healthcare system. In particular, since 2005 the National Health Service Institute for Innovation & Improvement has promoted its implementation in the NHS to improve the quality of the service provided. Such a process of redesign has had significant implications both for the development of new methodologies to improve healthcare services, and for those professionals involved in the service delivery process. Furthermore, greater awareness has been taken of how

all healthcare professionals, from frontline professionals to managers to health policymakers, play an active role in the delivery of the service.

When applying service design theory and tools in the healthcare sector, some issues have to be considered. Firstly, it is necessary to consider the strong professional autonomy present in the service providers (e.g., doctors and nurses) (Bate & Robert, 2007). Secondly, in addition to the patient, professionals have to be taken into account, by considering their needs, motivations, values, learning styles, social networks, and peer influencers (Greenhalgh et al. 2004). Finally, the involvement of users generally occurs between those who have the willingness and capabilities to contribute to innovation activities. However, the patient has an intrinsic situation of vulnerability, which does not make him/her comparable to other customers. Due to the very reason why the patient turns to a health service, he/she may not have the willingness or capabilities to take part in co-design activities. The individual situation, such as a cognitive problem in an older person or an acute clinical condition, minimizes the ability to perform ordinary and straightforward activities and, therefore, to play a pro-active role in a co-design process.

Experience Based Co-Design

Bate and Robert (2006) described three ways of improving healthcare. In the first way, healthcare professionals find solutions consistent with the quality improvement process but without involving the patient. In the second way, healthcare professionals consider the patient's opinion and experience, but they set goals and define improvements by deciding without their involvement. In the third way, patients collaborate with healthcare professionals for quality improvement solutions.

Experience-Based Co-design (EBCD) is an improvement methodology that combines participatory design and user experience design to inform and drive quality improvements in healthcare organizations. EBCD is defined as "'an approach that enables staff and patients (or other service users) to co-design services and/or care pathways, together in partnership' (Coulter et al. 2009). Growing numbers of studies show how this methodology is able to capture significant factors not otherwise identifiable by professionals alone (Locock et al. 2014; Donetto et al. 2015).

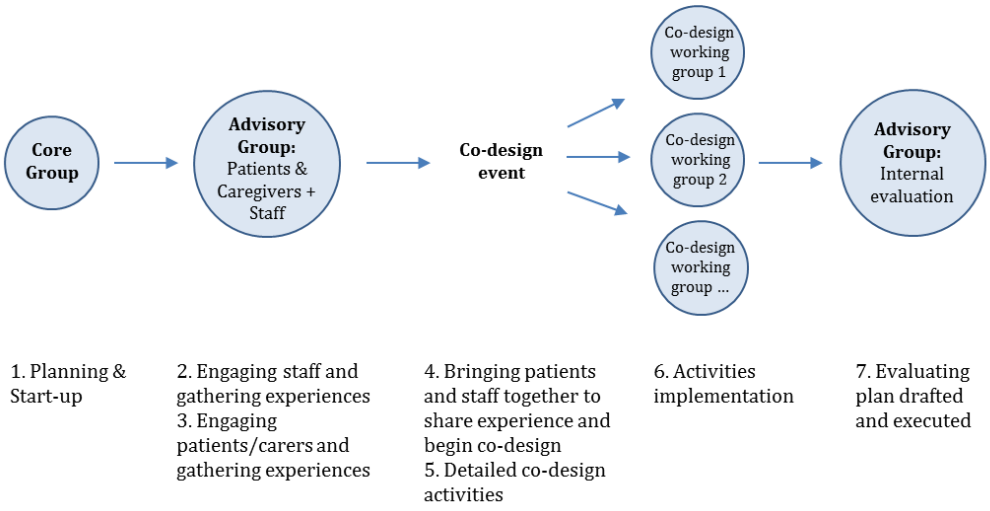
The co-design concept is characterized by the following dimensions: participation, in which as many stakeholders as possible have input; developing of a process; ownership and power, transforming ordinary power relations between stakeholders; outcomes and intent, by focusing on a practical aim (Donetto et al., 2014). By being involved in the co-design processes, participants turn from mere informants to active participants who share innovative solutions, with the aim of producing a quality improvement (Donetto et al. 2015). This methodology is challenging in the healthcare sector where it is difficult to achieve "equality, equal contribution, and mutual respect" because of a historically paternalist culture in the relationship between patient and doctor. Moreover, the hospital setting is characterized by strong professional hierarchies and high degrees of specialization. (Bowen et al. 2013; Donetto et al. 2015).

The focus on experience and the participatory approach are the thread underpinning EBCD. By ensuring the patients', families', caregivers', and staff members' lived experiences are placed at the center of the improvement initiative, the patient has the opportunity to express his/her experience and opinions on equal terms with staff members (Bate & Robert, 2007). In this methodology, the three dimensions of 'good' design are applied: performance, engineering, and aesthetics. Aesthetics contributes most to the analysis of the experience, by encompassing essential aspects of a product or service such as utility, usability, and interactivity (Bate & Robert,

2007). As design principles permeate this approach, concepts, and practical tools coming from this field are used, such as touchpoints and emotional mapping.

EBCD is carried out as a process that involves: planning the project; engaging staff and patients and carers and gathering their experiences; 'diagnosing' and prioritizing issues for improvement; 'co-designing' solutions to the issues identified and implementing them; reviewing and evaluating these solutions (Figure 1).

Figure 1 Experience-Based Co-Design process



The six-stage original version created by Bate & Robert (Bate & Robert, 2007) included in the process the use of the patients' experiences through the production of 20-30 minute 'trigger' film of patient narratives. Furthermore, at the end of the process, a step to celebrate the event is expected. Subsequent versions have been adapted to allow a better implementation in specific contexts and to reconcile the energies required by the running of the entire process with the primary benefits of involving patients and professionals in workgroups.

EBCD has already been applied with significant results in a variety of clinical settings across several countries (Donetto et al. 2105). These include cancer services, Emergency Department services, and gerontology units. Specific strengths of this methodology are: engaging patient and staff in exchange activities; promoting a sense of ownership and community among staff and patients; valuing the input of patients and family caregivers, thus overcoming the paternalistic medical paradigm; and empowering patients and staff, by giving them the opportunity "to be heard" (Donetto et al. 2014; Robert et al. 2015).

Despite the growing diffusion of this approach, studies on its application to cross-functional processes are rare. Moreover, to date, the literature has not produced strong scientific evidence on the effectiveness of the application of this method both for improving the performance of health services, and for its impact on the design of patient-centric services.

2.2. Capturing patient experience

Patient centeredness: from care to process

Studies show how providing patient-centered care is related to better patient and organizational outcomes (Doyle et al. 2013). Patient-centered care is described as the main determinant of care quality and is defined as "care that is respectful of and responsive to individual patient preferences, needs, and values," and that ensures "that patient values guide all clinical decisions" (Gabutti et al., 2017). This multi-dimensional concept has emerged from the increasing awareness that patient care is not limited to clinical, therapeutic, and care treatment. Indeed, the quality of care depends on the resources available and the cost and clinical effectiveness of treatments, but also on the quality of services delivery and their integration.

The Picker Institute identified eight dimensions of patient-centered care: respect for patient preferences, values and expressed needs; information, education and communication; coordination and integration of care and services; emotional support; physical comfort; involvement of family and friends; continuity and transition; and access to care and services (Gerteis et al., 1993a; Gerteis et al., 1993b).

In their research into common trends in the organizational and managerial approaches of hospitals, Gabutti et al. (2017) report the patient-centered approach as one of the main pillars of change. Accordingly, one of the recommendations in order to obtain a patient-centric service is the involvement of patients both at the level of decision-making on their care pathway (Barry & Edgman-Levitan 2012), and in the redesign of care pathways in partnership with the provider (Gabutti et al. 2017). However, Groene et al. (2015) point out that there is a lack of evidence on obtaining a more patient-centered service by involving patients and their representatives in Quality Management initiatives. This is mainly caused by a low rate of patient involvement at the hospital level and an even lower rate at the departmental level (Groene et al., 2009).

The literature is now investigating how to design patient-centric services by developing two main strands. The first is to capture the patient's needs not only from the clinical point of view but also, specifically, through his/her perspective and his/her experience of the whole service. The second is to redesign services through the active involvement of the patient (Groene, 2015).

Defining and using patient experience

According to service management literature, customer experience occurs whenever a customer interacts with a service delivery system. The experience defines what is valuable to a customer, and providing customers with quality experiences is a crucial competitive advantage in a range of service sectors, including the healthcare service (Feirn et al. 2009; Wolf, 2014).

Moving to the healthcare field, multiple factors can affect the patient experience, including the time-space dynamics of the activities performed, and the patients' perceptions and emotions at the time of the experience (Ziebland et al. 2013). In particular, studies have reported how experience is a context-specific construct (Posignon, 2015).

There is no shared definition of patient experience, and this concept often overlaps that of patient satisfaction (Shale, 2013). The Beryl Institute defines the patient experience as "the sum of all interactions, shaped by an organization's culture, that influences patient perceptions, across the continuum of care" (The Beryl Institute, 2018). Wolf et al. 2014 offers a description of each of

the elements mentioned above, emphasizing in particular how the interactions are "the orchestrated touch-points of people, processes, policies, communications, actions, and environment" and that patient perceptions are "what is recognized, understood and remembered by patients and support people" (Wolf et al., 2014). Therefore, the interaction between staff and customers, as well as that between customer and provider, are some of the determining factors of the quality of the patient's experience.

Patient-experience data are a part of a set of indicators increasingly studied to providing excellent patient-centered care by collecting feedback directly from the patient. Patient satisfaction (PRS) includes an evaluation of the gap between patient expectations and experience; patient-reported preferences (PRP) refers to patients' choice of one item more than another (e.g., a therapy component); patient-reported outcomes (PRO) relate to patients' views of their health status (e.g., functioning in daily life) (Klose et al. 2016). Patient-reported preference and satisfaction data typically answer the question, "How do you rate … ?" While patient-reported outcomes and experience (PRE) answer the question "What happened … ?" In Table I, the main characteristics of patient-reported feedback are summarized.

Table I Patient reported feed-back

	How do you rate … ?		**What happened … ?**	
	Satisfaction (PRS)	**Preferences (PRP)**	**Outcomes (PRO)**	**Experience (PRE)**
Definition	"Evaluation based on the extent to which the patients' expectations were fulfilled" (Crow et al. 2002)	"Statements made by patients regarding the relative desirability of a range of health experiences, treatment options and health states." (Brennan, 1998)	"Any report of the status of a patient's health condition that comes directly from the patient's response, without any interpretation of the patient's response by a clinician or anyone else" (FDA, 2009)	"Detailed report of the patient's perspective, offering evidence of areas of improvement or on humaneness of care (of specific services, events or the entire treatment)" (Klose, 2016)
Main focus	Quality of care Quality of service delivery	Quality of care	Quality of care	Quality of service delivery Quality of care
Patient main action	Evaluating	Choosing	Reporting	Telling
Data collection-Time	After the event	Real time	After the event Real time	Real time
Data collection-Methodologies	Surveys	Surveys Interviews	Interviews	Interviews Surveys Shadowing Focus group
Data analysis	Quantitative	Quantitative	Quantitative Qualitative	Quantitative Qualitative
Data usability	National and Regional	National and Regional	Local	Local
Emotional influence	Emotions-sensitive	Emotions-sensitive	Emotions-sensitive	Emotions-driven
Main effects on healthcare services		Improving treatment uptake and real-world efficiency of healthcare technologies; facilitating consumer empowerment; advancing shared medical decision-making	Including the patient's perspective for quality assurance in the healthcare system; measuring the patient-relevant outcomes of a medical intervention in clinical trials	Improving quality of care; improving service delivery in a patient-centred way (hypothesis)

Patient experience is increasingly recognized by healthcare managers as an essential indicator both to improve the performance of the service and to affect the clinical outcome (Doyle et al. 2013; Manary 2013; Gleeson et al. 2016). The English National Health Service reports that a 'good' patient experience is related to eight domains, including respect, information and communication, physical comfort, emotional support, and access to care. Several countries are now monitoring healthcare quality using surveys that inquire into patients and other healthcare users' experiences to assess the performance of health services (Donetto et al. 2019).

Authors are trying to identify variables and correlations to study the patient experience in greater depth and create a reference framework (Ponsignon et al. 2015). The one proposed by Dagger et al. (2007), later integrated by Gustavsson (2016), includes the following dimensions of patients' perceptions of service quality: interpersonal quality, technical quality, environmental quality, administrative quality, family quality, and involvement quality. Table II describes the dimensions and the sub-dimensions, as reported by the authors.

Table II Dimensions of the patient's experience of service quality (Dagger et al. 2007; Gustavsonn et al. 2016)

Dimensions of service quality	Definition	Sub-dimensions		
Interpersonal	The relationship developed and the dyadic interplay between a service provider and a user	**Manner**, the attitude and behaviour of a service provider in the service setting	**Communication**, the interactive nature of the interpersonal process	**Relationship**, the closeness and strength of the relationship developed between a provider and a customer
Technical	The outcomes achieved and the technical competence of a service provider	**Expertise**, provider's competence, knowledge, qualifications, or skill	The **outcome** of the service process, or what a consumer receives as a result of his or her interactions with a service firm	
Environment	The complex mix of environmental features that shape consumer service perception	**Atmosphere**, the intangible, background characteristics of the service environment	**Tangibles**, the physical elements of the service environment that exist at the forefront of awareness	
Administrative	Administrative service elements facilitating the production of a core service while adding value to a customer's use of the service	**Timeliness**, the factors involved in arranging to receive medical services, such as appointment waiting lists, waiting time, the ease of changing	**Operation**, facilitating core service production through the general administration of the clinic and the coordination, organization, and integration of medical care	**Support**, an augmented service element that adds value to the core service
Family	Being able to keep family together	**Closeness**, the ability for the family to stay together	**Normality**, the ability to have a normal family life	
Involvement	Patients' ability to handle the situation	Level of **participation** that patients are allowed to have	**Responsibility** that patients are allowed and willing to take	**Capability** of taking responsibility

Questionnaires or traditional static observation may not be well-suited to reveal all the aspects of patient experience, and existing survey instruments may overlook some critical aspects of the patient perspective. Moreover, patient experience can change over time, depending on when it is requested (Kjellsson 2014). Therefore, the development of instruments to measure patient experience has to consider a broader concept of experience quality by including quality dimensions that truly matter to patients (Manary 2013; Ponsignon et al. 2015).

In a systematic review, Beattie et al. (2015) emphasize how a balanced consideration of aspects of utility is needed when selecting the right patient experience instrument. Some of the main tools for the evaluation of the patient experience are the Picker Patient Experience Questionnaire (PPE-15) a 15-item self-completion postal questionnaire administered within 1 month of discharge; the NHS Inpatient Survey (NHSIP) a 70-item postal survey administered between 4 and 5 months of discharge; the Hong Kong Inpatient Experience Questionnaire (HKIEQ) a 62-item interview with patients by telephone between 48 hours and 1 month after discharge; and the Patient Experience Questionnaire (PEQ) a 35-item postal self-completion questionnaire administered 6 weeks after discharge. Using quantitative and qualitative methods for assessing patient experience remains the subject of ongoing debate.

Even if growing numbers of studies are emphasizing the potential competitive value of improving the patient experience, it is not clear how patient experience data should be used in quality improvement initiatives. Scholars are debating on the use of national experience surveys more to benchmark rather than improve the quality of care (Coulter et al. 2014; Gleeson et al. 2016). The National Institute for Health Research reports how the data on patients' experience produce a quality improvement when they are part of interactions characterized by authority and autonomy, and context-awareness (Donetto et al. 2019). The authors emphasize not underestimating the less documented 'everyday quality improvement' work, and they report that, alongside other professionals, nurses have an essential role in collecting experience data and using them to improve care.

2.3. Improving hospital patient flow

Patient flow and patient journey

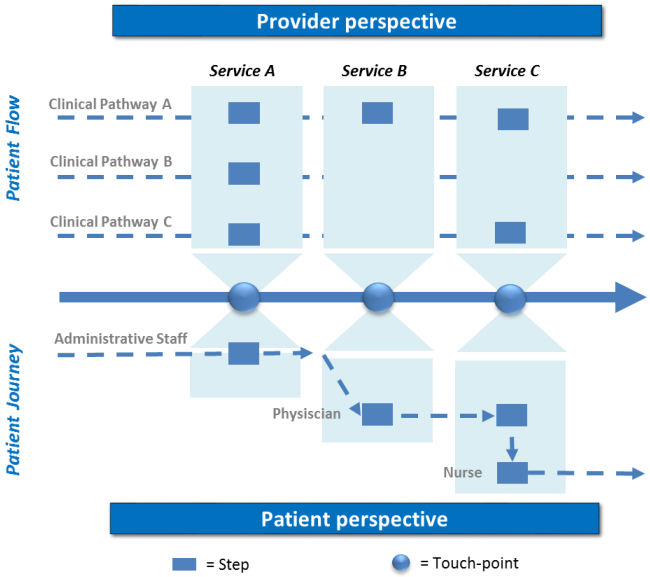
The need to match highly fluctuating demand with current and available capacity is one of the challenges that healthcare managers have to face in their daily activity as in the strategy of health delivery. In the hospital setting, both intrinsic factors of demand and capacity, and management strategies, make it even more challenging to find the right balance between an increase in hospital financial performance and the benefit of each patient. On the one hand, an acute patient flow incorporates many variations in terms of inflow concerning time, health issues and response to treatment; on the other, hospital capacity is driven by several internal and external critical factors such as bed management, internal communication, new technologies and many others (Nugus et al. 2011; The Health Foundation 2013). The entire process has been influenced in recent years by the declining number of hospital beds, increasing financial pressures, and high cost and low availability of skilled healthcare professionals over time (Mousazadeh et al. 2013; OECD 2018). For this reason, patient flow management is one of the processes of the organization that has been

most studied in the hospital environment, especially concerning the problem of overcrowding in the Emergency Departments.

Hospital patient flow is defined as “how hospitals transfer patients between nursing units, and it is influenced by the levels of care required and the severity of patients’ condition.” Patient flow analysis is defined as “the study of how patients move through the healthcare system” (Hall et al. 2006). Patient flow management is widely recognized as a key cross-functional business process for hospitals in order to control healthcare costs while increasing the level of productivity. The main goal is to give patients the level of care required, matching their variable patterns of acuity with available hospital resources. Indeed, optimal care can only be delivered when the right patient is in the right place with the right provider and the right information at the right time (Ardagh, 2015). Any delay in the movement of patients through the system has significant consequences: on the one hand, a delay in taking care of the patients themselves; on the other hand, the impossibility of other patients’ accessing care; finally, an increase in healthcare costs by failing to make the best use of skilled staff time and by increasing the length of time that people are using services (Litvak et al. 2010).

Although in the literature there is often an overlap of terms, the concept of patient flow differs from that of the patient journey, even if it is deeply integrated with it. In Figure 2 this differentiation is shown as a simplification. In a provider perspective, patient flow aims to manage the flow of patients and their clinical path, often defined in clinical pathways. The focus is on the integration of services and on the efficiency of resources that have to result in a timely care response with respect to the demand for care and by "pushing patients forward” along the route. Each service includes an operational step of a series of patients, and it must be able to respond on time and by integrating with the other services. The patient journey is the perspective of the individual patient crossing the various services. The patient comes into contact with the 'final result' of the services through a progressive succession of steps represented by taking charge of the individual professionals with whom he comes into contact. The service is delivered at the intersection of these two perspectives, through touch-points that most characterize the quality of the service provided.

Figure 2 Patient Flow *vs* Patient Journey

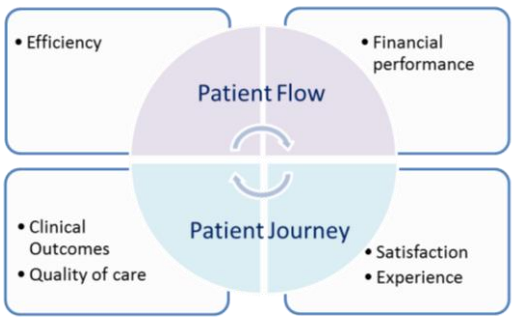


Internal organization, integration of the services, smoothness of pathways across settings require a high degree of coordination of different professions within single teams, but also of more teams delivering care. Consequently, in the management of the entire process, the interests of numerous actors who have different objectives are at stake. Top and middle managers have to maximize hospital assets and to save costs. The saturation of the assistance spaces such as operating theaters, beds, and outpatients has to be constantly maximized, and any extra demand has to be managed with the available resources. Healthcare professionals want to maximize their care and save time. For example, delay in the administrative hospital admissions obliges the doctor to delay his work time, waiting for the patient. The administrative staff have to maximize the volume of patients by avoiding an extra amount of work at the same time, to reduce the waiting time. The patient and his/her family want to maximise his/her care and experience, with the primary goal of regaining health.

Therefore, if on the one hand the flow of patients cannot be determined by every single request of the patient (that is, it is not possible to have dedicated resources for each patient) on the other hand, a focus on company performance indicators such as service efficiency and financial situation would not take into consideration the real goal of the care of the patient. The measure of the quality of the whole service offered has to be expressed according to the different perspectives. From a provider perspective, Jack & Powers (2008) identify the following performance areas that can be linked to the use of demand and capacity management strategies: quality-of-care outcomes, efficiency, and financial performance. From a patient perspective, the quality of the service provided is manifested in several dimensions such as interpersonal, environmental, administrative (Dagger et al. 2007), family closeness, and patient involvement quality (Gustavsson et al. 2016).

Figure 3 shows the leading performance indicators concerning the concepts of patient flow and patient journey.

Figure 3 Leading performance indicators of Patient Flow and Patient Journey management



Hospital patient flow has been the object of several studies in operations research, many of them developed around and under the influence of Lean thinking, to improve operational efficiency (Holden 2011; Hicks et al. 2015; Moraros et al. 2016). In this respect, several simulation studies have been conducted, to study how to promote efficient use of available bed capacity and to manage Emergency Department overcrowding (Braisfold & Vissers 2011; Abe et al. 2016a; Abe et al. 2016b; Elder et al. 2015). Consistent with this, numerous techniques for analyzing patient flow across organizations are also described in the literature, including computer models using

simulation and queuing theory, analyzing routinely collected data about service usage, capacity and workflow planning, systematic feedback from staff, ethnography, and observation. However, most of these works remain at a theoretical level, do not validate the results with field experiments, and rarely focus on the patient's perspective beyond that of the organization (Winasti et al. 2018). In particular, the impact of patient flow improvement on the patient, in terms of satisfaction, experience, and clinical outcomes, is less clear.

Improving a complex process

It is recognized that healthcare organizations are complex dynamic systems (Plsek & Greenhalgh, 2001; McDaniel et al. 2013), and this means that they continually evolve, making each setting somewhat unique and creating unpredictable results. In particular, hospitals are hard organizations to study due to various factors, including professional disciplines, ethical requirements, and large populations of patients with diverse medical conditions (Waring, 2015).

Batalden & Davidoff (2007) defined quality improvement as "the combined and unceasing efforts of everyone – healthcare professionals, patients and their families, researchers, payers, planners and educators – to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning)". Some authors describe five knowledge systems involved in improvement: generalizable scientific evidence, particular context awareness, performance measurement, plans that adapt generalizable evidence to the local context, and execution of planned changes (Batalden & Davidoff 2007).

A quality improvement initiative is inherently complex as it is affected by internal factors such as leadership commitment and involvement, empowering and training employees, and training the implementation team (Alexander et al. 2007; Abdallah 2014). Moreover, care is delivered in different settings and at different organization levels that can be characterized as microsystems, mesosystems, and macrosystems (Batalden & Davidoff 2007). Improvement may be affected by a much broader range of economic, administrative, and organizational factors and the interaction of these factors at multiple levels may influence the success or failure of quality-improvement interventions (Ferlie and Shortell 2001; Grol et al. 2007).

In theory, all quality initiatives are structured to provide services at lower costs and higher performance levels. The most common quality improvement approaches reflect this objective through the phases that compose them.; e.g., Six Sigma articulates them as Defining, Measuring, Analysing, Improving, and Controlling to improve performance and minimize operational costs (Gupta et al. 2017); Lean thinking articulates them as specifying value from the standpoint of the customer, identifying and eliminating steps that do not create value, making the steps flow smoothly, letting customers pull value, and beginning the process again (Gupta et al. 2015).

In practical terms, literature studies have revealed several issues when applying quality initiatives in healthcare organizations. Healthcare managers daily seek ways to deal with critical challenges hindering successful implementation and to find the key drivers helping successful implementation (Abdallah, 2014).

Conway et al. (2019) describe how individual, departmental, and organizational level contextual factors can play an essential role in the implementation of a quality initiative. Individual level factors (e.g.: perceived benefit or self-perceived knowledge and skills); social context (e.g.: influence of senior staff and interprofessional and multidisciplinary approaches); and departmental context and resources (e.g.: workload and staffing levels and organizational

climate) may affect the attendance in a quality training initiative (Conway et al. 2019). Moreover, leadership, organizational culture, information technology, and the creation of quality-oriented healthcare teams represent a key leverage point for quality improvement (Ferlie & Shortell 2001; Kaplan et al. 2012). Secanel et al. (2014) provided a conceptual framework to assess relationships between quality management and patient outcomes at the European Union level. In this framework are included hospital-specific factors (organizational culture and professional involvement), clinical pathway factors (the organization of care processes), patient-specific processes and outcomes (clinical effectiveness, patient safety and patient experience, patient involvement in quality improvement) and external factors (external assessment and perceived external pressure). Complementarily, in a recent systematic review of qualitative studies, Vaughn et al. (2019) identify five characteristics of healthcare organizations struggling to improve quality: poor organizational culture, inadequate infrastructure, lack of a cohesive mission and vision, system shocks, and dysfunctional external relations.

For these reasons, when improving a complex process, the different perspectives and needs of the relevant stakeholders, including patients, health professionals, and hospital managers (Kriegel et al. 2015), gain by knowledge improvement. However, the relevance of professionals' perceptions of the overall quality of care in their workplaces has only been partially studied. Some authors demonstrated how trained physicians and nurses are a valuable asset to implementation, and they should be included in the improvement team (Abdallah, 2014). Others emphasize that there is a consensus in according middle managers a role in mediating between strategy and day-to-day activities, even if empirical literature is scarce on their role in quality improvement initiatives (Zjadewicz et al. 2016). Many studies highlight how leadership from top management is one of the critical factors for the success of a quality improvement initiative, alongside organizational culture, data infrastructure, and information systems (Kaplan et al. 2012). However, existing studies have limitations for lack of a practical conceptual model and of well-specified measures to analyze the impact and the role that healthcare professionals have in quality improvement initiatives (Kaplan et al. 2010).

Factors such as the interdisciplinary nature of the question, the ethical, methodological and technical issues involved in carrying out large-scale experimental studies, and the different levels of organizational analysis, make quality improvement research inherently complex (Groene et al. 2009). In particular, traditional research designs may not capture the effectiveness of quality improvement due to the relationship between improvement interventions and context (Ramaswamy et al. 2018).

Potentially interacting determining factors can be described by and derived from different theories that have been applied to improve care (Grol et al., 2007). Because studies of quality improvement are influenced by the context in which they take place, there is a need for conceptualizing and measuring the mechanisms of effect, and the role of context in those mechanisms (Ramaswamy et al., 2018). For this reason, quality improvement shares characteristics with implementation science, in which practical frameworks for process evaluation, mixed methods, and transdisciplinary approaches are commonly employed to understand mechanisms (Bauer et al. 2015).

Chapter 3

3. Research design and methodology

3.1. Research design

By using a participative action research approach, this thesis is driven by an ethnographic-inductive logic in which, after a review of the literature (Paper I), the researcher gains experience on the field and finally describes the theoretical implications of what he saw/heard (Paper II, III, IV, V).

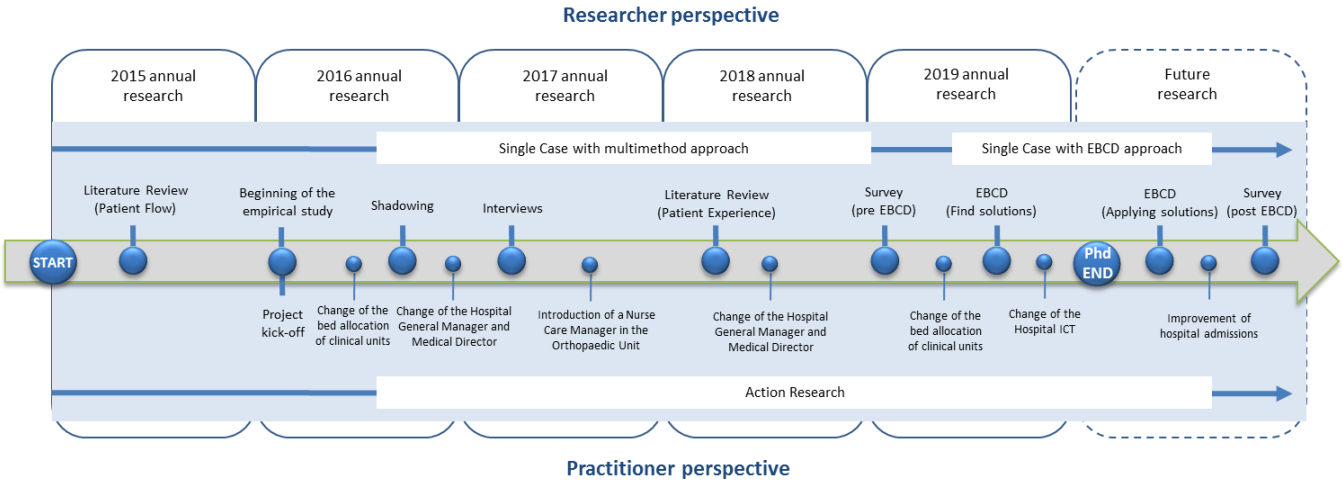
The empirical studies in this thesis refer to experiences narrated by patients, healthcare professionals, and researchers concerning the hospital journey of a patient treated for hip or knee replacement. In this way, the views of several stakeholders can produce knowledge that is more penetrating and insightful than one of the researcher alone.

By considering the goal of this Ph.D. Executive project, the difficulty of controlling all the diverse variables influencing the different hospital settings, and the intrinsic characteristics of the co-design approach, a single case with a longitudinal approach was considered as an appropriate strategy to answer to the research question. The Campus Bio-Medico University Hospital of Rome was selected as part of the Ph.D. Executive project, which had the aim to produce results to benefit the organization in which the researcher works. Consistently, the main goal of the project was to improve hospital patient flow by including the patient perspective. This topic was part of the researcher's daily work, who has long-year expertise as a nurse bed manager and as a member of the operational management team, and it was perceived critical by the Management Team, also considering the incoming Emergency Department opening.

Given that patient flow improvement is inherently complex, in part due to methodological and technical limitations in capturing the effects of context on patient and provider interaction, the project used mixed methods in data collection, measurement, and analysis. A mainly qualitative approach was used, as suitable for interpreting and understanding a problem area that has not been extensively studied.

Figure 4 shows a summary and an overview of the research project, which has developed over 5 years and is still ongoing. The research process begins with a question that needs an answer – researcher-driven: can the patient's knowledge contribute to the improvement of the hospital patient flow? – and a problem that must be solved – practitioner-driven: how can patients and professionals be involved to improve the hospital patient flow? – with the dual objective of increasing knowledge and changing the environment in which the research is carried out.

Figure 4 Overview of the Research Project



In the first part of the project, an explorative approach was used by systematically reviewing the literature to explore which interventions are effective in the patient flow improvement, which measures are used to understand the patient's experience in patient flow and if and at what level the patient is involved in patient flow improvement. Indeed, explorative research is used as suitable for the purpose to have a better understanding of the existing problem, without provide conclusive results, but identifying issues that can be focus for future research. Following this view, the first part of the empirical study was conducted to gather information directly from the field. By shadowing patients and interviewing patients and all the main actors involved in the hospital patient flow, a deeper understanding of the main issues related to a cross-functional hospital process was achieved. In particular, 8 patients were shadowed over three weeks to map the patient's hospital path and identify significant touchpoints. Subsequently, semi-structured interviews were conducted with 8 patients and 22 health professionals, to explore their ideas and perceptions of the hospital patient journey and the overall patient flow management. The journey of orthopedic patients with hip or knee replacement, starting from the first outpatient visit until the first follow-up visit, was considered the unit of analysis of this part of the research.

After this first data collection, in June 2017, the organization introduced some changes to improve the orthopedic clinical path. This change was both in response to the critical issues highlighted by the data collected and to increase the volumes of activity of the Orthopedic Units. In particular, in one of the two orthopedics units, a nurse care-manager was introduced, focusing on the following main functions: facilitating the transfer of the patient to Rehabilitation, and informing the patient before hospitalization to find the aids needed for surgery (i.e., antithrombotic stockings, Canadian crutches, etc.).

By starting from the data generated by the explorative phase, descriptive research was then carried out to describe the real-time experience of patients and the gaps that the patient identifies during his journey. A survey was performed by administrating to orthopedic patient surgery a questionnaire at two different times of the journey: at the time of entry into the hospital room and at the time of discharge. The questionnaire analyzed the patient's journey from the first visit to the time of discharge from the hospital, which was considered the unit of analysis.

Finally, and exploratory phase was started. Patients and health professionals were invited to participate in a co-design workgroup to validate the findings of the previous studies and to

identify solutions to improve hospital flow. This phase is still in progress and the researcher is now defining how to implement the solutions found by the co-design groups through the partnership of the top management team.

The empirical study was preceded by a long period of preparation, which included: the identification of an interdisciplinary core-group of researchers and practitioners, the writing of the project, and the approval of the study by the ethics committee of the Campus Bio-Medico University of Rome and by the Managerial Team.

A total of 312 participants took part in the project, of which 272 patients and 31 healthcare professionals, as shown in Table 2. In addition to the principal investigators, a senior nurse was involved in developing the project and 5 students – 1 from the Engineer Course at Politecnico di Milano and 4 from the Nursing Course at Università Campus Bio-Medico di Roma - were involved for the data collection.

Table III Participant numbers throughout the empirical study

Project phases	*Research Team*	*Patients Shadowing*	*Staff Interviews*	*Patients Interviews*	*Patients Survey*	*Co-design Groups*
Main goal	Project design and development	Mapping hospital patient journey	Mapping and understanding patient experience during hospital patient flow	Mapping and understanding patient experience in hospital patient journey	Capturing patient experience during hospital patient journey	Co-designing solutions for patient flow improvement
Participants	Principal investigators: Head Nurse CBM (1) Member DIG Polimi (1) Nursing Director CBM (1) Principal co-investigators: Senior Nurse (1) Student Polimi (1) Student CBM (5)	THA (4) TKA (4)	Orthopedist (3) Nurse (5) Admissions Officer (3) Patient Transporter (2) Head Nurse (4) Nurse Bed Manager (2) Medical Mng. Team (1) Managing Director (1) Clinical Director (1)	TKA (3) THA (1)	Major orthopedic surgery (127) Minor orthopedic surgery (127)	Group 1: Orthopedist (1) Nurse Case Manager (1) Patient (2) Group 2: Orthopedist (1) Nurse (1) Patient (2) Group 3: Orthopedist (1) Head Nurse (1) Nurse (1) Patient (2)
Total	10	8	22	4	254	14

CBM = Università Campus Bio-Medico di Roma; POLIMI = Politecnico di Milano;
THA = total hip arthroplasty; TKA = total knee arthroplasty

3.2. Empirical context - The Campus Bio-Medico University Hospital of Rome

The Campus Bio-Medico University of Rome is a legally recognized private University located in Rome, Italy. The University began operations in 1993 offering a Degree Course in Medicine and Surgery and a Diploma in Nursing Science (now, Degree in Nursing) with the cultural aim of "restoring to the biomedical sciences the value of human life and the person as their central focus" (Campus web). The University Hospital is a not-for-profit institution where "the dimension of human service comes into full play, in the particular experience of illness and disease" and was inaugurated in 1994 (Campus web). The University currently offer eight Degree Courses in the three departmental faculties: the Departmental Faculty of Medicine and Surgery; Departmental

Faculty of Engineering; the Departmental Faculty of Science and Technology for Human and the Environment. The University Hospital is accredited by the Joint Commission International (JCI) and provides healthcare under the National Health Service and privately. The Hospital is now consisting of over thirty Operating Units, by including outpatient, day-hospital and day-surgery services and multidisciplinary wards, for a total of 310 beds. The hospital wards are multidisciplinary and are organised according to the intensity of care required. The beds are daily assigned by a centralized team composed of nurses and administrative staff. A short-term opening of the Emergency Medicine will consider the enlargement of the facility with additional beds alongside the Emergency Department.

The Hospital Board of Directors is composed of a General Manager, Medical Director, Administrative Director, Director of Customer Care Management, Director of Professional Healthcare Services, Clinical Director and Dean of the Faculty of Medicine and Surgery.

The centrality of the care function that has characterized the Hospital since its origins, has raised nursing profiles both for the care of the patient and for the coordination of the processes related to hospitalization, protected discharge, planning of surgical operations, monitoring and control infection, and quality improvement management. In particular, in 2010 a team of nurses was set up to manage the hospital patient flow supported by administrative staff. Until 2018 the Team depended hierarchically on the Director of Nursing and functionally on the General Manager. From 2019 the Team depends hierarchically on the Medical Director and functionally on the hospital's Operation Team.

3.3. Insider action research

Considering the nature and the aim of the project, an action research approach was used to explore the context and behavior of participants in co-design groups. By using the action research process, the research has direct access to the area of investigation to achieve a change in the research field. Moreover, action research looks at problem-solving from a holistic view, and it is suitable for quality improvement involving patients. Therefore, healthcare professionals and patients were involved in the action research projects, by engaging in a collaborative problem-solving relationship between researcher and participant.

The researcher, as a member of the organization, has assumed the role of an insider action researcher by undertaking an explicit research role in addition to the usual function role (Coghlan & Brannick 2001). The researcher has worked inside the hospital since its origins and knows its history, evolution, and the main actors. Therefore, it was possible to easily involve professionals thanks to the credibility and the middle management position held within the organization by the researcher. Similarly, the patient selection and engagement process were done directly by the researcher, who routinely managed all hospital patient flow data.

The researcher's role and function within the organization have changed over time. At the beginning of Ph.D. program, in 2015, the researcher was working within as the team manager for hospital patient flow management. By working in synergy with the General Manager and the Administrative Director, a series of improvements were carried out to optimize the beds' occupancy and to improve the hospital journey of the patients. With the birth in 2017 of the Operations Team, the researcher has contributed, as a team member, to improve hospital performance related to the management of inpatient admissions. In 2018 the researcher changed his position to Deputy Director of Professional Healthcare Services. The project was carried out in

light of the strong interest of the Nursing Management Team in improving the quality of patients' experience.

3.4. Methods in appended papers

The process of generating and collecting empirical material evolved during the research in line with the objectives of the different phases. The studies generated a large amount of qualitative data, which have allowed to analyze in depth the issues addressed.

In the first phase of the project the patient journey was mapped by collecting the patient's perspective through different methodologies, in order to understand the context and the process of the patient journey. According to White and Cicmil (2016) the activity of process mapping is considered a value approach to generate knowledge within improvement projects in a variety of organisational contexts. Therefore, in the first project phase, two parallel methods were used. On one hand, open interviews with major actors, including patient, were performed in order i) to know the patient journey from several perspectives, in addition to that of the patient ii) to capture the patient's experience iii) to identify what the professionals think of the patient experiences.

On the other hand, the hospital patient journey was observed from the time of arrival at the hospital until discharge to the Rehabilitation Unit. A shadowing methodology was used in order to provide an embodied understanding of patients' experiences in its context. This method has been chosen because the researcher (shadower) observes an individual (shadowee) over a relatively long period, also taking into account the context in which the experience take place (Gilliat-Ray 2011).

A content analysis of the interviews was performed in order to code categories directly from the text data. Qualitative content analysis is indicated for the purpose of classifying large amounts of text into an efficient number of categories that represent similar meanings (Weber, 1990).

After this phase, the need to identify a tool for detecting patient experience improvements during his journey emerged. Actually, there is no standard method for measuring patient experience during hospital patient journey and the tool selected depends the purpose of the study and on the setting in which it is carried out (Kjellsson et al. 2014). Therefore, a further study was started to define a questionnaire to assess the patient experience during the patient journey.

The questionnaire was developed consistently with the results of the first phase and with the purpose of exploring the patient's experience in the most critical points of the patient journey. The design of the tool was guided by the following objectives:

- patient's real time interview during two significant points of the hospital journey;
- simplicity, brevity and use of emoticons to facilitate real-time compilation;
- possibility to write sensations, emotions and personal feedback.

In the last phase, still in progress, Experience-Based Co-Design was applied in order to find concrete solutions to priority issues emerged in the previous phases. The groups was conducted by the researcher through the steps suggested by the Experience-based co-design toolkit (The Point of Care Foundation, 2016). In addition, tools suggested by Boyd et al. (2010) was used in order to organize and managing working group with patients and professionals and brainstorm patient experience and outcome.

Table IV provide a methodological summary of the papers.

Table IV Methodological summary of the appended papers

Paper	*Title*	*Design*	*Method*	*Analysis*
Paper I	Improving hospital patient flow: a systematic review.	-	Systematic search	-
Paper II	Exploring the hospital patient journey: what does the patient experience?	Ethnography	Patients shadowing Patients interviews Healthcare professionals interviews	Qualitative content analysis
Paper III	Challenges and potential improvements in hospital patient flow - The contribution of frontline, top and middle management professionals.	Ethnography	Healthcare professionals interviews	Qualitative content analysis
Paper IV	Using patient experience to detect quality gaps during hospital journey: a mixed-method study.	Survey	Patients real-time questionnaires	Quantitative descriptive analysis, qualitative content analysis
Paper V	Co-designing a cross-functional hospital process: what should we expect?	Action Research	Reflective dialogues in working groups	Qualitative content analysis

3.5. Ethical considerations

Since the study planned the active involvement of patients and healthcare professionals, the entire project was submitted and approved by the Ethics Committee of the University Campus Bio-Medico of Rome (Protocol Code: 25/16 OSS ComEt CBM; Approval date: 07/25/2016). Specifically, the study protocol was drafted in compliance with the European Union Good Clinical Practice Rules and the latest revision of the Helsinki Declaration.

Patients who took part in the project were informed by the researchers that participation was voluntary, that participation or non-participation in the study would not have affected their care plan and their relationship with health professionals, and that they could withdraw from the study at any time. For the shadowing phase, patients were assured that no care procedures would be observed.

Health professionals who took in the project were informed that the data collected would remain anonymous and that their participation or non-participation in the study would not have influenced their working position within the organization

An informed consent was signed and obtained by all participants at each stage of the project and prior to recruitment in the study.

Data collected in the study were treated according to the European Regulation 2016/679 and the legislative decree n. 196/2003 (Privacy Code) articles 11-12-13 on the protection of persons with respect to the processing of personal data. In particular, the data collected were physically and digitally stored in protected places and under the responsibility of the researcher.

Chapter 4

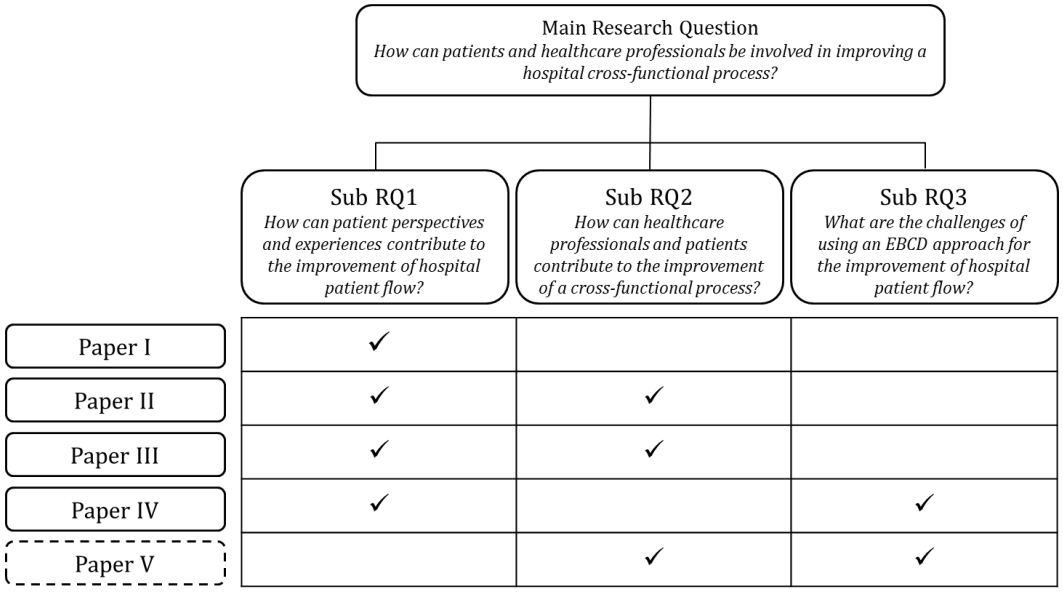
4. Summary of appended papers

4.1. Contributions of the papers to the research question

In this section, a summary of the key topics of each paper are reported. The summary of the content of the papers and of their contribution both from an academic and a practitioners' perspective is reported in the paragraphs 4.3.

In Figure 5 is summarized how the papers included in this thesis contribute to the research questions. For now, paper V it is not included in the following thesis, but is being worked on for a forthcoming publication.

Figure 5 Contributions of the papers to the research question and sub-questions



A systematic literature review was conducted at the beginning of the project to provide a complete, exhaustive summary of current evidence relevant to the research sub-question 1. Specifically, the review was guided by the following questions: (i) Which actions are effective in improving hospital patient flow? (ii) Which outcomes are used to measure patient flow improvement? (iii) What are the enablers of success in the improvement initiative?

The results are reported in Paper I and show how a wide range of actions are reported to improve hospital patient flow, but the patient perspective is scarcely considered. Moreover,

patient involvement in the process improvement is rarely mentioned and occurs only with the patient's consultation on the satisfaction or otherwise of an intervention adopted.

As one of the results of Paper I emphasize how most studies focus on one or a few departments instead of a whole hospital, in the design of the empirical phase, the patient-journey process was mapped and studied from the moment of the first outpatient visit to the first follow-up visit after discharge from the hospital. In Paper II, by shadowing patients and interviewing healthcare professionals, the different points of view are brought together to map and to understand hospital patient journey from a patient-perspective. The study seeks to explore which aspects of the hospital patient journey experience may be captured by the three different standpoints: patient shadowing, health professionals' interviews, and patients interviews. The following questions were addressed: what does the patient experience through the hospital journey? How can it be captured? The results show that professionals can put themselves in the patient's shoes and identify which are the gaps that occur behind the scenes, and that results in bad patient experience. Patients, if observed, experience some gaps in the hospital journey that are not captured when interviewed after some time. Therefore, by answering to the sub research question 2, healthcare professionals and patients may contribute to identifying the gaps in a cross-hospital process by a patient perspective. However, to capture the patient's perspective, it is necessary to integrate multiple methodologies that go beyond the boundaries of the different units of which the healthcare professionals are responsible for, and that consider the patient's experience when he lives it.

Results in Paper III specifies how professionals at different levels of the organization see a process transversal to the organization itself. The aim of this study was to understand the contributions of professionals in identifying areas for improvement in hospital patient flow. The following questions were addressed: which quality dimensions of healthcare services do different professionals identify in regard to improving patient flow? In which ways can frontline, middle, or top management professionals help to identify solutions for improving patient flow? The result emphasizes how the involvement of all professionals, including non-health professionals, can reveal priority areas for improvement and for services integration, and the improvements identified by the professionals largely focus on covering major gaps detected in the technical and administrative quality. This highlights how the 'back office' and the 'front office' of a patient-oriented process are closely connected. As the first line professional sees and works in both phases, he better identifies where gaps exist and often compensates for any organizational shortcomings through the relationship with the patient.

A survey on patient experience during the patient journey were then conducted. The study was carried on to understand if and how patient experience data can contribute to improving the hospital patient journey. In this way, the first part of the EBCD process was addressed by collecting the patient's experience in real-time directly from the patient. Paper IV collects the results of this phase by identifying which data collected directly from the patient could be useful in improving the hospital patient journey.

A fifth paper is in the working phase with the aims to give a contribution to the debate on the value of EBCD in service design. In particular, a framework will be tested to identify which are the main drivers that determine the success of a co-creation initiative. Moreover, the contribution of the EBCD approach in the improvement of the hospital patient flow will be analysed and improvement solutions found through a participatory approach will be reported as a road to innovation for hospital administrators.

4.2. Contribution of the authors to the papers

The contribution of the author of this thesis to the included papers is listed below.

Papers included in this thesis:

Paper I – Gualandi R, Masella C, Tartaglini D. (2019) Improving hospital patient flow: a systematic review. *Business Process Management Journal*. doi: 10.1108/BPMJ-10-2017-0265.

Gualandi Raffaella – Conceptualization of the research idea and methodology. Data collection, curation, and formal analysis. Drafting of the original manuscript. Critical revision with the co-authors.
Masella Cristina – Conceptualization of the research idea and methodology. Critical revision with the co-authors.
Tartaglini Daniela – Research supervision.

Paper II – Gualandi R, Masella C, Viglione D, Tartaglini D. (2019) Exploring the hospital patient journey: what does the patient experience?. *PLoS One*. doi: 10.1371/journal.pone.0224899

Gualandi Raffaella – Conceptualization of the research idea, the research design, and methodology with the co-authors. Project administration. Data collection of empirical material with the co-authors. Data curation, and formal analysis with the co-authors. Drafting of the original manuscript. Critical revision with the co-authors.
Masella Cristina – Conceptualization of the research idea, the research design, and methodology with the co-authors. Critical revision with the co-authors.
Viglione Daniela – Support of the first author in running the project. Data collection of empirical material with the co-authors.
Tartaglini Daniela – Commitment and promotion of empirical research within the organization. Research supervision.

Paper III – Gualandi R, Masella C, Viglione D, Tartaglini D. (2020) Challenges and potential improvements in hospital patient flow - The contribution of frontline, top and middle management professionals. *Journal of Health Organization and Management*. Under review.

Gualandi Raffaella – Conceptualization of the research idea, the research design, and methodology with the co-authors. Project administration. Data collection of empirical material with the co-authors. Data curation, and formal analysis with the co-authors. Drafting of the original manuscript. Critical revision with the co-authors.
Masella Cristina – Conceptualization of the research idea, the research design, and methodology with the co-authors. Critical revision with the co-authors.
Viglione Daniela – Support of the first author in running the project. Data collection of empirical material with the co-authors.
Tartaglini Daniela – Commitment and promotion of empirical research within the organization. Research supervision.

Paper IV – Gualandi R, Masella C, Piredda M, Ercoli M, Tartaglini D. (2020) Enhancing the patient perspective of the hospital journey: what does the patient have to say? *The Patient - Patient-Centered Outcomes Research.* Advanced working paper.

Gualandi Raffaella – Conceptualization of the research idea, the research design, and methodology with the co-authors. Project administration. Data curation, and formal analysis with the co-authors. Drafting of the original manuscript. Critical revision with the co-authors.

Masella Cristina – Conceptualization of the research idea, the research design, and methodology with the co-authors. Critical revision with the co-authors.

Piredda Michela – Data formal analysis with the co-authors.

Ercoli Matteo – Data collection of empirical material.

Tartaglini Daniela – Commitment and promotion of empirical research within the organization. Research supervision.

Paper not included in this thesis:

Paper V – Gheduzzi E, Gualandi R, Masella C, Di Ciccol L, Tartaglini D. (2020) Co-designing healthcare service delivery: what should we expect? *Journal of Service Theory and Practice.* Working paper.

Gheduzzi Eleonora – Conceptualization of the research idea, the research design, and methodology with the co-authors. Drafting of the original manuscript. Critical revision with the co-authors.

Gualandi Raffaella – Conceptualization of the research idea, the research design, and methodology with the co-authors. Project administration. Data curation, and formal analysis with the co-authors. Critical revision with the co-authors.

Masella Cristina – Conceptualization of the research idea, the research design, and methodology with the co-authors. Critical revision with the co-authors.

Di Cicco Luisa – Data collection of empirical material.

Tartaglini Daniela – Commitment and promotion of empirical research within the organization. Research supervision.

Chapter 5

5. Discussion

5.1. Managing service delivery by a patient perspective

Healthcare systems are changing their organizational models and features to remain sustainable in a challenging scenario, which requires them to provide more and better services with equal or decreasing resources. In the hospital setting, where the complexity is high due to the response to the acute and diversified needs of the patients, the management of the key process is usually carried on to maximise efficiency by a provider perspective. Therefore, patients' needs, preferences, and experience risk to be less considered over the convenience of the organization (Locock 2003; Locock et al. 2014).

Even if the patient-centred approach is one of the organizational models that are inspiring the most innovative organizations (Gabutti et al. 2017), the results of Paper I show that few studies consider the patient perspective in the redesign of the patient-flow. In particular, no study considers the patient's experience as an indicator to evaluate the effectiveness of interventions to improve the hospital patient flow (Gualandi et al. 2019a). The patient's perspective is conveyed through the point of view of healthcare professionals. However, even if healthcare professionals place the interest of the patient at the center of their daily activities, patients' expectations and providers' priorities may often not coincide (Gualandi et al. 2019b).

Patient flow improvement is a complex intervention that takes place in an equally complex context involving all the levels of the organization. Even if it is not possible to identify both the necessary and sufficient conditions that predict the outcome with statistical certainty, an understanding of the necessary conditions may assist the management team in successfully redesigning the patient care process (Gospodaraveskaya et al. 2011). The findings in Paper I identified some important variables that must be considered when dealing with a process that involves the patient and multiple actors at multiple levels of the organization. Indeed, the success of an initiative to improve patient flow largely depends on these factors: regional regulations and incentives; top management commitment; the involvement in the core change of a critical mass of talent with an optimal mix of functional skills team; the knowledge and use of the tools of quality improvement; effective communication between the different hospital units and inter/intradepartmental and interdisciplinary collaboration. Organizational strategies, operational efficiency, professional engagement, and patient perspective may be the main drivers to be explored to determine an effective and sustainable improvement. Furthers studies should develop a reference framework to understand what are the key factors that managers can leverage to achieve both an improvement in value for both the provider and the patient.

An in-depth understanding of the aspects concerning the hospital patient flow is possible by taking the patient journey perspective. The finding in Paper II shows how the integration of the different standpoints (patient shadowing and professionals' points of view) by focusing on the patient perspective, allows to better capture what happens and why. Mapping and gathering experience from all the main players who live daily in the field, offers numerous opportunities to identify any discontinuities in the process of 'moving forward' the patient along the hospital path.

First-line healthcare professionals know and see in everyday activities what happens in the 'back-office' that results in the quality of the interaction of touch-points in the 'in the front-office.' However, their view is focused on the piece of process they are responsible for. Conversely, by shadowing patient, it is possible to capture some important aspect that lie at the intersection of one service and another (Gualandi et al. 2019b).

As one of the biggest challenges in the healthcare sector is to achieve a high level of coordination between different specialized services to ensure continuity of patient care, the roots of the lack of integration need to be explored. The analysis of patient flow management offers a view on the integration of the various services both at the operational level and between the operational level and the top management. By involving multiple actors at various levels of the organization, Paper III reveals how each actor can contribute to redesign an important piece of the process by a patient perspective, even if the different points of view need to be integrated to analyse the whole cross-hospital process (Gualandi et al. 2020a). For example, the top-managers identify which are the main priorities of improvement of the patient flow, but they are not able to identify why and how the micro-integration between service does not take place. Since the nursing expertise is employed at different levels of care, at the bedside of the patient as well as in the coordination of the hospital ward and of beds allocation, the involvement of this role is valuable to address the various issues by balancing the interests of the provider with those of the patient (Gualandi et al. 2020a). Further studies should explore if and how the comparison between the different professionals can help integration at the micro level, by sharing their work and identifying positive collaboration dynamics between different services.

5.2. Capturing patient experience

Experience quality in healthcare refers to the patient's perceptions and evaluations of a considerable number of interactions occurring during the provision of care and treatment, and each class of interaction has implications for quality measurement and improvement. In particular, the patient experience is a multi-dimensional construct that includes several areas as the process of making or receiving an appointment, cleanliness of facilities, waiting times, the information provided, and interactions with staff (Ahmed et al. 2014). Literature in now inquiring on which quality tools are most effective, how can various quality tools be integrated into a context-sensitive quality improvement initiative and which enablers facilitate quality improvement resulting in more patient-centred services. As there is no perfect method for gathering experience data, it is important to identify the strengths and weaknesses of the different approaches (Coulter et al. 2014).

Many studies have emphasized how a single methodology is not sufficient to capture all the key aspects of the patient experience during patient journey (Coulter et al. 2014; Donetto et al, 2019). In Paper II and IV we analyse weakness and strengths of different instruments and methods for the measurement of patient experience. In particular, by studying the patient perspective in a natural setting, it was possible to include the context in which the patient journey take place and the meaning the patient attributes to his experience. The results show how the use of multi-methodologies allows to overcome some of the bias present by nature in the healthcare context. First of all, the patient's cognitive and emotional state have a great influence on the experience lived at the present. The results of Paper IV show how the patient's condition changes along the hospital journey and the ability of reporting possible improvements grows when the event has just occurred (Gualandi et al. 2020b). Conversely, the interviews carried out with the patient after some time have not been able to highlight any significant gap (Gualandi et al. 2019b).

Second, by interviewing all the actors involved in the process, it was possible to detect the singular characteristics of the research context. Even if a framework on the main drivers determining a specific setting is not applied, some variables are captured that have characterized the research context. These include the aptitude of health professionals for reasoning in a patient-centred perspective; the teaching hospital environment in which the patient inserts himself; the organizational models adopted for patient flow management. Finally, by shadowing patients and by collecting data through a brief and simple questionnaire focused on the process more than the care, it was possible to analyse everything that occurs beyond medical and nursing care and which is too often not considered.

Because the patient is able to give information relating to the quality of the process of which he is the recipient, in this study patient's positive feedbacks emerged which have been helpful in analyzing what works and why. The patient-reported experience of positive actions/behaviors observed during his journey could be an effective lever for empowering healthcare professionals. Scholars should focus on assessing what the success factors are and which improvement effects are generated by a patient's positive feedbacks compared to the negative ones.

There is no doubt about the large amount of time needed to implement the different methodologies analysed in this project. "Data overload" and time consuming are characteristics that prevent managers to consider this approach as privileged. Therefore, it is necessary to study how to return these data in real-time to stimulate adaptations and improvements in the daily practice of first-line professionals as well as in the top-management level of decision-making. The use of new technologies for the collection and return of patient experience data at various organizational levels represents a solution for directing research to the next step towards the discovery of the activators of success in giving value to the patient.

5.3. Involving patient in the redesign of a complex process

This thesis was designed to understand which role the patients and the health professionals can play in improving a key process for the hospital by achieving a more patient-centred service. Scholars and managers are debating on drivers that organizations need to implement to produce value for the patient and thus to maintain a competitive advantage. The results of the first phase of this project have shown how a cross-hospital process is crucial both for the sustainability of the provider and for the quality of the service to the patient. However, when dealing with hospital patient flow, the patient's perspective appears to be less considered. For this reason, the project developed first by capturing the patient's experience along the patient journey and then involving the patient in a co-design activity. In particular, the EBCD approach was applied by involving patients and health professionals in three different groups. This last phase is still in progress, and the first results are discussed in the following paragraphs.

Experience-Based Co-Design: what has been done

At the time this thesis was written, the co-design groups were carried out, but the solutions found were not implemented. Below is a brief description of how the co-design groups were carried out

The unit of analysis was chosen concerning the results obtained from the previous phases of the project, which showed that the critical issues that most influenced the patient's experience occurred during the pre-operative period and in particular from the entrance to the hospital upon

arrival in the operating theatre. A convenience sample was selected to identify people who were able and willing to participate in the study. Three workgroups were set up to involve at least 2 patients, 1 nurse or head nurse, 1 orthopedic doctor. The researcher assumed the role of moderator and used specific tools as suggested by the Experience-based co-design toolkit (The Point of Care Foundation, 2016) to bring the different actors to find solutions for the identified journey gaps. A properly trained researcher assistant observed the group taking notes on the observable behaviours of the participants without participating in the discussion.

The co-design event was guided along four main phases. In the first phase, the moderator presented the meeting goals and the results of previous studies. In the second phase, the moderator stimulated a brainstorming by asking if the participants recognize themselves in the results of the previous study and by prioritizing gaps in the hospital journey. In the third phase, solutions were co-create by adopting a specific template to identify whom was this improvement for; why and how it should have worked; how should it be supported / corrected. In the last phase, feedback questionnaire were administered and a brief singular interview with each participant was performed. In particular, actors involved in the collaborative process were interviewed after the workgroup in order i) analyse results obtained; ii) analyse their experience in project involvement iii) evaluate strengths an weakness of EBCD approach. All workgroups were audio-recorded and subsequently transcribed into Word files. An analysis of the text of the workgroups and the notes written by the observer was subsequently carried out with three objectives: to analyze the recurring themes between the different workgroups, to analyze the identified improvement solutions, to identify the degree of patient involvement in the event.

Co-Designing healthcare processes: what should we expect

The literature of the last few years has given increasing attention over time to improving clinical knowledge by shifting from asking, "how can quality be measured?" to "how can quality be improved?" (Arah et al. 2006). The focus on Quality Management in healthcare has lead practitioner and researches to debate on the role of the patient as a customer - 'the one we want to create value for' – and on the quality dimension also including patients as co-creators of the quality of the service (Groene & Sunol, 2015).

The EBCD, by its nature, aims to achieve a partnership between professionals, patients, and researchers to share solutions to improve healthcare services. However, more than in the redesign of a single service, when dealing with a cross-functional process, specific roles seem to be established between the different participants according to their expertise. Healthcare professionals have the knowledge to understand why an intervention works or not, because they know what happens in the back-office process. As identified by the results of Paper II, the patient does not seem to notice what happens behind the scenes (Gualandi et al. 2019b). By referring to Figure 2 shown in paragraph 2.3, it can be seen that the patient's view stops at what he gets from the touch-point as a result of a series of covert actions.

Challenges associated with using Experience-based Co-design include significant time constraints in the daily work activity and the ability of patients to fully participate in the co-design process. Indeed, an important issue remains to be explored, which is if it is possible and how to involve vulnerable people in co-design projects. Moreover, since co-design is essentially about "helping the users to articulate…precisely and realistically which benefits to aim for and to match these benefits to the goals of a service design project" (Steen et al. 2011), further research is needed to understand how to improve other processes through the use of EBCD. In particular, it

should be studied how this methodology facilitates a patient-centered approach when applied at service delivery management.

Co-design is a valuable and fashionable concept that has been increasingly studied in recent years, not without some criticism (Dudau et al. 2019). On the one hand, authors are debating on how firms can purposefully identify co-creation opportunities (Frow et al. 2015). On the other, it is not clear what are the determinants which allows the actors to achieve a real co-creation and how the engagement level of the actors influences the co-creation result. From the first observations found by the co-design groups, some interesting issues emerged. First, the patient only if stimulated by the physician intervention declares his "submerged" needs. The patient is primarily focused on having solved his health problem and, after some time, does not immediately identify or remember any gaps or negative experiences he had during the journey. However, if stimulated by the professional, he remembers the area that should be improved. Second, the patient identifies some behaviours of professionals (haste, lack of availability, the need to wait for a bed) as a result of organizational problems rather than lack of attention to the patient himself. Finally, when interviewed individually at the end of the co-design team, the health professionals declare that they cannot tell the patient about the gaps that take place behind the scenes. In a certain way, an imbalance between the different actors exists not only because of the well-known relationship with an information asymmetry between doctor and patient, but also because the health professional does not feel like expressing his experience in front of the patient. These first data will be the basis for testing a framework that defines under which conditions of engagement co-creation produces value.

5.4. Personal reflections of the researcher

The development of a Ph.D. Executive project has generated a real change both in the researcher and in the context in which it was carried out. Furthermore, it was possible to increase the knowledge of patient flow improvement and the co-design approach by simultaneously acting in the research field. Therefore, through the action research approach and thanks to the profound understanding of the context by the researcher, it was possible to bring research closer to the real world, producing useful results for professionals and managers.

The challenge of a nurse to carry out a Ph.D. in Management Engineering is supported by taking advantage of different fields of knowledge outside the medical world to find new and innovative solutions to the benefit of patients. Indeed, the exchange of ideas with professionals from other disciplinary sectors is a rich mine of knowledge and ideas generation, and researchers should continue to promote this 'cross-fertilization process'.

Nursing expertise can contribute to addressing health management issues in a patient-centred way as the nurse is an actor who best knows what the patient experiences because, due to the nature of the job, the nurse is able to capture the patient's needs in response both to health problems and to the rules of the organization (i.e., time of a hospitalization or assigned department). Moreover, the presence of this role in crucial points of the organization can help improve business processes starting from the real needs of the patient.

5.5. Limitations

Consistently with the aim of the explorative research, this study involves a relatively small sample in a single hospital context. Hence, the results cannot be generalized. However, an in-depth understanding have been reached of the issues addressed. Moreover, the way with which this project was carried out from a methodological point of view can be duplicated and adapted to different contexts. Further studies are needed, for example, on the hospital journey in patients with different pathologies, who enter the hospital with different expectations from those of the surgical patient.

Over time, the study was subject to numerous hospital organizational changes, slowing down the co-design process after the first data capture phase. For this reason, considerations on the effectiveness of co-design cannot include important factors such as internal hospital organization and organizational culture that have evolved. Moreover, in the current state, the EBCD cycle is not concluded, and the implementation phase of the solutions found in the co-design group is missing. Since the proposed interventions are to be carried out at a cross-hospital level, a strong commitment of the top management is needed. The results achieved so far have been presented to the top management team and EBCD has been accepted as a methodology for exploring new clinical areas and continuing the quality improvement process.

Chapter 6

6. Conclusion

The involvement of the customer should be a fundamental of any organization to develop a continuous flow of innovative solutions. In the healthcare sector, this challenge is even more evident since the relationship with the patient is part of the treatment itself. Physical environments and cutting-edge technologies are undoubtedly essential factors that can contribute to the added value to be given to the patient, but the first factor is the quality of the relationship between patient and professional. In this research, when asked about their experience during the patient journey, patients talk most about their relationships with professionals. The healthcare professionals in turn are able to fill organizational gaps through a good relationship with the patient. Service delivery management should increasingly build patient-centered processes starting from understanding how to create the conditions for professionals to make the most of the many significant touchpoints that make up the patient journey.

The patient experience concept is becoming a core building block of the strategy of healthcare providers and policymakers (Bate and Robert, 2007). Patient's experience is closely linked to factors such as the hospital context, the pathology, and the type of surgery that he has to have. Where medicine is advancing in carrying out increasingly targeted therapies profiled on the patient, reflection should be made on a 'targeted management' of service delivery that considers the different patient profiles not only for pathology but also for other factors such as social context, emotional state, and setting in which he receives care.

The patient experience is specifically valuable when he is observed in real-time, in the environments in which he lives his emotions, and at the interconnections between one service and another. In this work, it has experimented if and how the patient can contribute to identifying areas of improvement in the patient journey. However, the effective use of patient experience data in quality improvement is at the center of the debate of scholars and healthcare managers (Coulter 2014; Donetto et al. 2019). The EBCD methodology is increasingly adopted within the health sector and goes precisely in the direction of understanding how to effectively use patient experience data. In this study, the particularity was to apply this approach to a cross hospital process rather than to a single service or clinical unit. Limits and opportunities can be explored to demonstrate if this approach determines the achievement of patient-centered and sustainable services. Effective design of patient-centered healthcare services relies on collaboration among patients, front-line staff, decision-makers, and managers. The achievement of this goal will represent a competitive value for the organizations.

This study helps lay the foundation for further research. It identify possible causes and interacting variables in patient flow management by a patient perspective; it enables the researcher to understand the importance of enhancing patient experience for the improvement of the quality of cross-hospital process; it stimulates the generating od new ideas on the co-creation concept, by considering the particular conditions characterizing the healthcare context.

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Appended papers

Improving hospital patient flow: a systematic review

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Abstract

Purpose – Improving hospital patient flow has become a policy priority, to effectively balance the increasing demands of an unknown and variable volume of patients with limited available hospital resources. A systematic literature review was conducted in order to identify actions, actors involved and enablers in improving hospital patient flow. The paper aims to discuss this issue.

Design/methodology/approach – Searches were conducted in Scopus, Web of Science, MEDLINE and The Cochrane Library for quantitative and qualitative empirical primary studies with patients (adults) receiving inpatient acute hospital care. The study protocol was based on PRISMA-P guidance. A critical appraisal of included studies was performed by using the Quality Improvement Minimum Quality Criteria Set.

Findings – In total, 38 key papers were identified. A wide range of actions are reported, but most studies focus on one or a few departments instead of a whole hospital. Process efficiency is most often used as a performance indicator, clinical outcomes are poorly analyzed, and patients' expectations and experience are rarely considered. Top-management commitment and front-line staff involvement are considered key factors for the success of implementations. Patient involvement in the process improvement is rarely mentioned.

Originality/value – Achieving improvements in hospital patient flow requires the design and implementation of complex, multifaceted and coordinated interventions. This study may be of value to healthcare managers, helping them to act effectively in their context, and to researchers of future studies including the different variables and the patient's perspective.

Keywords Process improvement, Patient experience, Clinical outcomes, Hospital patient flow

Paper type Literature review

1. Introduction

Healthcare organizations are facing major challenges in responding to the growing demand for health services despite limited resources. Indeed, organizations have to manage critical tensions between cost saving, services improvement and equity of access, while maintaining the central focus on increasing value for patients. This topic is particularly challenging in the hospital setting, where the high cost of inpatient hospitalizations has led to a reduction of the number of acute hospital beds, against an increasing demand for inpatients admissions mainly from the emergency departments (ED) (Nugus *et al.*, 2011; Mousazadeh *et al.*, 2013; The Health Foundation, 2013; The Organisation for Economic Co-operation and Development, 2018). For this reason, improving hospital patient flow has become a policy priority, to effectively balance the increasing demands of an unknown and variable volume of patients with limited available hospital resources (Noon *et al.*, 2003; Haraden and Resar, 2004; Litvak *et al.*, 2005; Eriksson *et al.*, 2017).

Patient flow can be defined as "how hospitals transfer patients between nursing units, and it is influenced by the levels of care required and the severity of patients' conditions" (Hendrich *et al.*, 2004). Effective patient flow ensures that patients are present and ready at each point of care they need (Kriegel *et al.*, 2015). In the hospital setting, patient flow is particularly complex as it is high variable, it depends from timing patient inflow, patient's needs, response to treatment and the state of medical knowledge (Bohmer, 2005). Moreover,

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several actors are involved at each level of the process (e.g. practitioners, nurses, administrative staff and the patient himself), and this makes coordination a critical issue.

Alexander *et al.* (2007) point out a need to make research more relevant to healthcare managers by expanding the methods utilized by health services research works. Understanding the factors contributing to hospital patient flow improvement is crucial to ensure care quality and patient safety, to control healthcare costs while increasing the level of productivity and to improve patient experience (Vissers *et al.*, 2001; Litvak *et al.*, 2005; Collins, 2010; Lovett *et al.*, 2014; Yarmohammadian *et al.*, 2014). In recent years, hospital patient flow has been the object of several studies, many of them developed around and under the influence of "Lean thinking" (Holden, 2011; Hicks *et al.*, 2015; Moraros *et al.*, 2016) and this has stimulated wide debate among researchers on the future of lean thinking in healthcare systems both as a theory and a set of practices (Radnor and Osborne, 2013; McCann *et al.*, 2015). Moreover, several simulation models have been developed to study how to promote efficient use of available bed capacity and to manage ED overcrowding (Bhattacharjee and Ray, 2014; Salleh *et al.*, 2017). However, in spite of the growing number of quality improvement initiatives to improve hospital patient flow and to reduce unwarranted variation, it is not clear what works and how managers could apply these initiatives considering their specific context.

Therefore, the aim of this paper is to highlight what works, for whom, why and in what circumstances in improving hospital patient flow. Accordingly, a systematic literature review was conducted to answer the following research questions:

RQ1. Which actions are effective in improving hospital patient flow?

RQ2. Which outcomes are used to measure patient flow improvement?

RQ3. What are the enablers of success in the improvement initiative?

2. Theoretical background

It is recognized that healthcare organizations are complex dynamic systems (Plsek and Greenhalgh, 2001; McDaniel *et al.*, 2009) and this means that they continually evolve, making each setting somewhat unique and creating unpredictable results. In particular, hospitals are difficult organizations to study due to various factors including professional disciplines, ethical requirements and their large populations of patients with diverse medical conditions (Waring and Alexander, 2015).

The process of implementing quality improvement initiatives has received increasing attention over time (Shortell *et al.*, 1998; McFadden *et al.*, 2015). However, even though the use of quality improvement methods in healthcare is now widespread, the full implications of complexity in the design, conduct and evaluation of improvement initiatives have not yet been described (Brainard and Hunter, 2015). Kaplan *et al.* (2012) reported that the success of a quality improvement project is influenced by many key factors including external environment (i.e. external motivators and project sponsorship); organization (i.e. leadership, senior leader as project sponsor, culture, maturity of organizational quality improvement and physician pay structure); quality improvement support and capacity (i.e. data infrastructure, resource availability and workforce focus on quality improvement); microsystems (i.e. quality improvement leadership, culture supportive of quality improvement, capability for improvement and motivation to change); quality improvement team (i.e. diversity, tenure, leadership, physician involvement, subject matter expert, decision-making process, norms and quality improvement skill); triggers such as the presence of a specific event that stimulates a new emphasis on improving quality; and improvement projects being perceived as part of the organization's strategic goals.

When quality improvement is focused on patient flow, there are three main perspectives to be taken into account: patients' viewpoints, health professionals' needs and management objectives (Kriegel *et al.*, 2015). The patient is the main actor going through all hospital's services and processes and somehow connecting them in the course of his/her specific journey (Ben-Tovim *et al.*, 2008). Currently, staff only focus on the components they are responsible for, while patients move horizontally across hospitals, receiving care from different units (Ben-Tovim *et al.*, 2008; Nugus *et al.*, 2011). Recently, practitioners and research works have started debating on the role of patient as a customer (the one we want to create value for) and as a co-creator of quality improvements (Groene and Sunol, 2015; Bombard *et al.*, 2018). From a management point of view, Jack and Powers (2008) identify efficiency, financial performance and quality-of-care outcomes as key areas of performance linked to demand and capacity management in healthcare. They argue that quality-of-care outcomes are increasingly considered by researchers, even if they are difficult to measure.

In accordance with this view, the aim of this review is to study existing literature on hospital patient flow focusing on implementation and outcomes achieved. We adopt Donabedian's (1966) model, known as the structure process and outcome quality assessment tool, to schematize our results. In this well-known model quality may be evaluated using outcomes (i.e. the effects of healthcare, such as survival and satisfaction), processes (i.e. whether medicine is properly practiced) and structure (i.e. the settings in which processes occur, and this includes elements such as the qualifications of healthcare staff, facilities and equipment).

3. Methodology

A systematic literature review was performed in order to answer the research questions. The study protocol is based on the Preferred Reporting Items for Systematic reviews and Meta-Analyses for Protocols guidance (PRISMA-P) (Shamseer *et al.*, 2015). This guidance consists of a 17-item checklist that facilitates the development and reporting of a systematic review. The items include the identification of data related to the research protocol, the description of the rationale for the review, the questions the review will address, the eligibility criteria, the information sources, the search strategy and the mode of data presentation (Moher *et al.*, 2015).

Searches were conducted in Scopus, Web of Science, MEDLINE and The Cochrane Library for relevant English-language studies with human subjects from 1999 until October 31, 2018. The year 1999 was selected because of the publication of the report *To Err is Human* by the Institute of Medicine (1999/2000) that marks a significant change in the risk management and quality improvement approach in the healthcare system. Literature search strategies were developed using medical subject headings and text words. Due to the lack of standard terms to define hospital patient flow and its outcomes, a wide variety of search terms was used (e.g. hospital patient flow, patient journey, hospital bed capacity, outcome assessment and performance indicators).

As the focus of this paper is not how patient flow should be improved, but how it has been improved, studies on simulation and modeling were excluded.

For inclusion in this review, the articles had to fulfill the following criteria: quantitative and qualitative empirical primary studies with (adult) patients receiving acute hospital inpatient care; randomized or non-randomized trials, prospective or retrospective cohort studies, case-control studies. The following studies were excluded: psychiatric and pediatric hospital units (because of the special care needs for patients and caregivers); outpatients and rehabilitation settings (as we intended to focus on hospital patient flow); descriptive studies lacking comparison groups, including case reports; modeling and simulation studies that show potential improvement of the patient flow, but have not been applied in the field; reviews, editorials and policy statements without direct empirical support. Table I provides a summary of the search strategy. The complete search strategy is reported in the Appendix.

Items	Criteria
Population	Patients (adults) receiving inpatient hospital care
Interventions	Health system interventions for the purpose of improving hospital patient flow (examples include increasing hospital capacity, instituting multidisciplinary teams). Observational studies are included
Comparator	Experimental studies: no interventions
Outcome	Efficiency outcomes (e.g. hospital length of stay, emergency department waiting times) Quality-of-care outcomes (e.g. mortality, proportions of patients readmitted to hospital within 30 days) Financial outcomes (e.g. costs of labor) Patient satisfaction and experience Staff perception and satisfaction
Timespan	1999–October 31, 2018
Setting	Inpatient medical or surgical (not psychiatric or pediatric) units at acute care hospitals
Other criteria	Language: English Admissible designs: randomized controlled trials; non-randomized trials; prospective and retrospective cohort studies; case-control studies Non-admissible designs: descriptive studies lacking comparison groups, including case reports; modeling and simulation studies with no application in a real context; reviews, editorials and policy statements without straight empirical support

Table I.
Inclusion and exclusion criteria

In order to evaluate improvements in hospital patient flow, the following outcomes were considered: efficiency outcomes (e.g. hospital length of stay (LOS), ED waiting times); quality-of-care outcomes (e.g. mortality, proportion of patients readmitted to hospital within 30 days); financial outcomes (e.g. costs of labor); patient satisfaction and experience; staff perception and satisfaction.

The examination of inclusion criteria was performed in three steps: titles examination; selection of papers, excluding duplicates; abstracts and full-text examination to select articles responding to the research question. Each stage of the literature review process can be viewed in Figure 1.

A critical appraisal of included studies was performed by using the Quality Improvement Minimum Quality Criteria Set (QI-MQCS) (Hempel *et al.*, 2015). The QI-MQCS is a specific tool for quality improvement studies assessment. It is composed of 16 items addressing the following domains: organizational motivation, intervention rationale, intervention description, organizational characteristics, implementation, study design, comparator, data source, timing, adherence/fidelity, health outcomes, organizational readiness, penetration/reach, sustainability, spread and limitation. Table II describes each domain.

4. Results

Figure 2 shows the number of records at each stage of the literature review process. After removing duplicated items, of 368 potentially relevant studies, 213 full-text articles were included for review. Of these, 38 key papers were identified for presentation, citation and discussion in this review.

Out of 38, 24 were performed in the ED setting, sometimes with other closely related departments taken into consideration (e.g. ICU, Coronary Unit, Surgical or Medical Departments); 3 studies were performed in a Critical Unit Service setting (Intensive Care, Trauma Intensive Care or Coronary Unit); 1 in an Operating Room, 1 in an Orthopedic Unit, 1 in a Neuroscience Unit and 1 in General Medicine and Surgery Units. Only seven studies analyze interventions to improve hospital patient flow covering the whole hospital (Yancer *et al.*, 2006; Ortiga *et al.*, 2012; Jweinat *et al.*, 2013; Lovett *et al.*, 2014; Richardson *et al.*, 2017; Sheridan *et al.*, 2017; Odom *et al.*, 2018). Detailed characteristics and results of included studies are described in the Appendix.

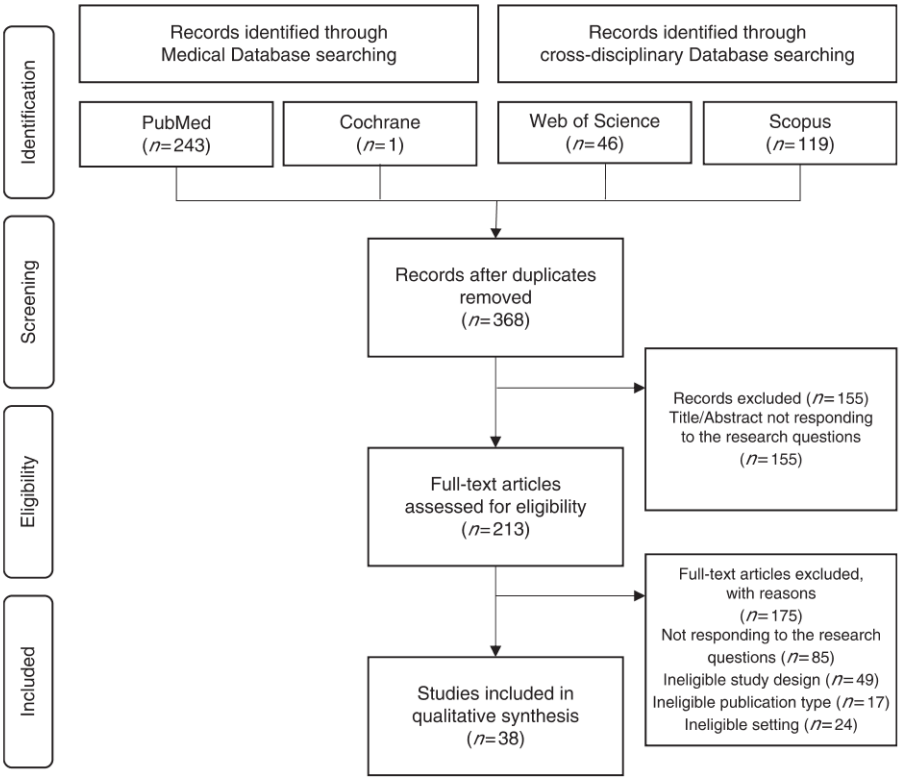

Figure 1. Literature review flow diagram

Domain	Description
1. Organizational motivation	Organizational problem, reason or motivation for the intervention
2. Intervention rationale	Rationale linking the intervention to its expected effects
3. Intervention description	Change in organizational or provider behavior
4. Organizational characteristics	Demographics or basic characteristics of the organization
5. Implementation	Temporary activities used to introduce potentially enduring changes
6. Study design	Study design and comparator
7. Comparator	Information about comparator care processes
8. Data source	Data sources and outcome definition
9. Timing	Timing of intervention and evaluation
10. Adherence/fidelity	Adherence to the intervention
11. Health outcomes	Patient health-related outcomes
12. Organizational readiness	Barriers to and facilitators of readiness
13. Penetration/reach	Penetration/reach of the intervention
14. Sustainability	Sustainability of the intervention
15. Spread	Ability to be spread or replicated
16. Limitations	Interpretation of the evaluation

Source: Hempel *et al.* (2015)

Table II. Quality Improvement Minimum Quality Criteria Set (QI-MQCS) domains

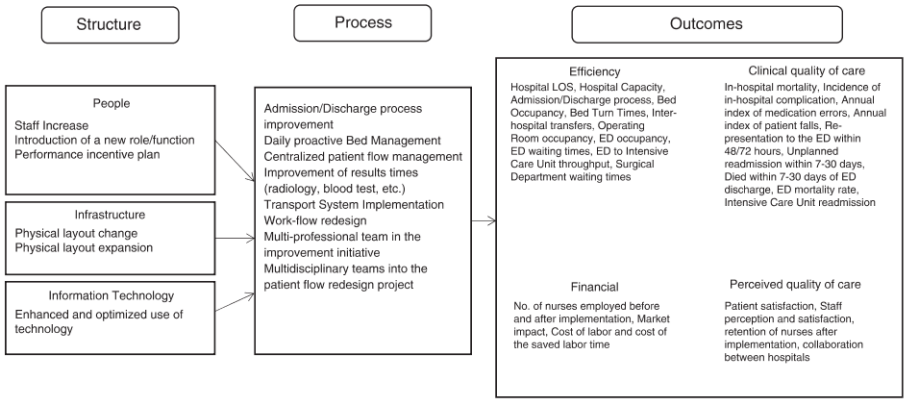

Figure 2.
Theoretical framework of actions and outcomes linked to patient flow improvement

Table III reports the critical appraisal of the included studies by assigning a score equal to 1 to each item met of the QI-MQCS. The score assigned to the studies for each item is described in the Appendix. The studies on average scored 10 out of 16 (max: 14; min: 6). The weaker aspects in the studies are: a description of the intervention's ability to be spread or replicated (lacking in 33 studies), evidence of adherence or a mechanism ensuring compliance with the intervention (lacking in 30 studies) and a description of health-related outcomes (lacking in 24 studies).

4.1 Actions to improve hospital patient flow

Management of patient flow is multifaceted and driven by several internal and external key factors: patient acuity, bed management, internal communication, new technologies and many others. Consequently, a wide range of interventions to improve hospital patient flow is reported by the studies included in this review. The structure model in Figure 2 reports the main actions emerging from the review.

A detailed list of actions to improve hospital patient flow and of measures adopted is reported in the Appendix.

4.1.1 Structure. People. For most of the studies, actions to improve patient flow included an increase in staff or the identification of a new function role, in particular among nurses. Among these, the transfer coordinator (Cha *et al.*, 2009) and the navigator role (Fulbrook *et al.*, 2017; Richardson *et al.*, 2017) are experienced nurses fully assigned to the ED, and whose function is to coordinate and facilitate the patient transfer process and to enhance ED throughput. Fulbrook *et al.* (2017) emphasize that this role works best when relationships are perceived as collaborative and provide assistance to improve a system flow.

Only three authors reported the use of performance incentive plans among actions to improve hospital patient flow (Jweinat *et al.*, 2013; Vermeulen *et al.*, 2014; Svirsky *et al.*, 2013). In particular, Jweinat *et al.* (2013) reported a program that provides financial incentives to all employees if specific, measurable, hospital-wide goals were met including key performance patient flow measures, such as the percentage of 11:00 a.m. discharges.

Infrastructure. Physical layout change or expansion has generally been tested in combination with reorganization of the work teams and redesign of the workflow (Arya *et al.*, 2013; Chadaga *et al.*, 2012; Dickson *et al.*, 2009; Driscoll *et al.*, 2015; Elder *et al.*, 2015; Evans *et al.*, 2011; Hendrich *et al.*, 2004; Lovett *et al.*, 2014; Mumma *et al.*, 2014; Borenstein *et al.*, 2016; Odom *et al.*, 2018; Perry *et al.*, 2010; Sánchez *et al.*, 2018; Twanmoh and Cunningham, 2006; Yancer *et al.*, 2006; Williams *et al.*, 2011; Zocchi *et al.*, 2015).

Author	Year of publication	Country	Study design	Setting	QI-MQCS score
Borenstein *et al.*	2016	USA	Cluster randomized controlled	General medical/ surgery hospital units	14
Sánchez *et al.*	2018	Spain	Prospective pre-post	ED	14
Soong *et al.*	2013	Canada	Retrospective pre-post	ED and General Internal Medicine Department	14
Fulbrook *et al.*	2017	Australia	Prospective controlled	ED	13
Hendrich *et al.*	2004	USA	Prospective pre-post	Coronary Critical Unit and its step-down medical unit	13
Jweinat *et al.*	2013	USA	Prospective pre-post	Hospital	13
Bhakta *et al.*	2013	USA	Retrospective pre-post	Trauma Intensive Care Units	12
Chadaga *et al.*	2012	USA	Prospective pre-post	ED	12
Healy-Rodriguez *et al.*	2014	USA	Retrospective pre-post	ED	12
Howell *et al.*	2010	USA	Retrospective pre-post	ED, ICU and Coronary Care Unit	12
Muntlin Athlin *et al.*	2013	Sweden	Prospective non-randomized cohort	ED	12
Ortiga *et al.*	2012	Spain	Cross-sectional pre-post	Hospital	12
Richardson *et al.*	2017	Australia	Prospective pre-post	ED, Hospital	12
Alikhan *et al.*	2009	Canada	Prospective pre-post	ED	11
Cha *et al.*	2009	South Korea	Prospective pre-post	ED	11
Elder *et al.*	2015	Australia	Retrospective cohort	ED	11
Elliot *et al.*	2015	USA	Retrospective interrupted time series	ED, Medical ICU	11
Lovett *et al.*	2014	USA	Prospective pre-post	Hospital	11
Perry *et al.*	2010	New Zealand	Prospective pre-post	ED and Surgical Department	11
Zocchi *et al.*	2015	USA	Prospective pre-post	ED	11
Arya *et al.*	2013	USA	Retrospective pre-post	ED	10
Brown *et al.*	2015	USA	Retrospective pre-post	ICU and OR	10
Castillo *et al.*	2011	USA	Retrospective pre-post	ED	10
Chan *et al.*	2014	China	Prospective pre-post	ED	10
Dickson *et al.*	2009	USA	Prospective pre-post	ED	10
Mumma *et al.*	2014	USA	Retrospective cohort pre-post	ED	10
Vermeulen *et al.*	2014	Canada	Retrospective cohort pre-post	ED	10
Evans *et al.*	2011	Canada	Pre-post	ED, ICU and Hospital Departments	9
Imperato *et al.*	2012	USA	Retrospective pre-post	ED	9
Sheridan *et al.*	2017	Canada	Prospective pre-post	Hospital	9
Driscoll *et al.*	2015	USA	Pre-post	Neuroscience service line	8
Odom *et al.*	2018	USA	Pre-post	ED, Hospital	8
Svirsky *et al.*	2013	USA	Prospective with control group	ED	8
Yancer *et al.*	2006	USA	Pre-post	Hospital	8
Amato-Vealey *et al.*	2012	USA	Pre-post	Operation Room, Intermediate Care Unit, Surgical Floors	6
O'Connell *et al.*	2008	Australia	Pre-post	ED	6
Twanmoh and Cunningham	2006	USA	Not cited	ED	6
Williams *et al.*	2011	Canada	Prospective pre-post	Orthopaedic Surgery Center	6

Table III.
Quality assessment of studies included according to the QI-MQCS

In the ED setting, an increase of beds was associated with no significant change in the percentage of patients who left without being treated, or with an increase in ED boarding hours (Mumma *et al.*, 2014) while a dedicated surgical assessment area involving a dedicated acute surgical team results in a significant reduction in hospital stay and in an improvement in ED efficiencies (Perry *et al.*, 2010).

Hendrich *et al.* (2004) tested the use of acuity-adaptable rooms to provide an improved care environment for patients who required progressive care. The design of the new rooms was performed in order to shift indirect time back to the nurses and patients' care by reducing the steps necessary for nurses to obtain supplies, reduce transfers of patients, maximize technology for efficiency, and have information for patients and caregivers readily available at the point of care. Significant improvements were achieved in quality and operational cost such as a large reduction in clinician handoffs and transfers; a reduction in medication error and patient fall indexes; improvements in predictive indicators of patients' satisfaction; and decrease in budgeted nursing hours per patient day with increased inpatient days per bed (Hendrich *et al.*, 2004).

Information technology. The introduction of a single web-based technology platform is one of the key actions when faced with the management of patient flow in the whole hospital (Lovett *et al.*, 2014). By collecting data from various systems and providing a patient flow dashboard and real-time tracking of all patient flow activity, a bed management system can optimize efficiency and communication, alert staff and provide timeliness information to end users (Jweinat *et al.*, 2013; Lovett *et al.*, 2014).

4.1.2 Process. In order to standardize the admission and discharge process a series of initiatives were adopted. These include: a set of hospital-wide actions to standardize the admission process and to predict and anticipate patient discharge. In the ED setting, interventions are related to initial assessment at triage by including physicians in triage, simplifying triage documentation and introducing quick triage protocols (Imperato *et al.*, 2012; Arya *et al.*, 2013; Soong *et al.*, 2013; Svirsky *et al.*, 2013; Chan *et al.*, 2014; Elder *et al.*, 2015; Zocchi *et al.*, 2015). In the surgical setting, a set of integrated recommendations (i.e. anticipated discharge date, notifying family members of the discharge time and defining standard discharge responsibilities for key individuals) involving the Operating Room, the Intensive Care Unit and Surgical Care Units improved the admission and discharge process (Williams *et al.*, 2011; Amato-Vealey *et al.*, 2012).

Several authors report that daily proactive bed management obtains a better use of available resources and avoids delays in the hospitalization of patients in severe clinical conditions (Alikhan *et al.*, 2009; Cha *et al.*, 2009; Howell *et al.*, 2010; Chadaga *et al.*, 2012; Healy-Rodriguez *et al.*, 2014). In particular, integrating multiple services into a single, centralized Patient Flow Management Center, that manages supply and demand for hospital inpatients, is related to improvements in boarding time from ED to bed assignment and bed turnover time (Lovett *et al.*, 2014; Healy-Rodriguez *et al.*, 2014; Ortiga *et al.*, 2012; Richardson *et al.*, 2017).

The effectiveness of multi-professional teams to improve patient flow and clinical outcomes has been tested by several studies (Alikhan *et al.*, 2009; Amato-Vealey *et al.*, 2012; Borenstein *et al.*, 2016; Chadaga *et al.*, 2012; Dickson *et al.*, 2009; Elliot *et al.*, 2015; Evans *et al.*, 2011; Healy-Rodriguez *et al.*, 2014; Jweinat *et al.*, 2013; Lovett *et al.*, 2014; Muntlin Athlin *et al.*, 2013; Odom *et al.*, 2018; Ortiga *et al.*, 2012; Sánchez *et al.*, 2018; Yancer *et al.*, 2006). Some examples include the development of a Hospital Medicine ED Team consisting of hospital medicine physicians, ED physicians, social workers and nurses (Chadaga *et al.*, 2012); the development of a multi-professional team responsible for the whole care process for a group of patients (Muntlin Athlin *et al.*, 2013); the incorporating of one logistic manager and two registered nurses in a logistics management program

(Healy-Rodriguez *et al.*, 2014). A major focus on workflow redesign is evaluated by Borenstein *et al.* (2016) who reported the positive impact of restructuring routine workflows on general medical inpatient units, by training and by organizing existing personnel into interprofessional teams.

Finally, many authors emphasize the importance of introducing multidisciplinary teams into the patient flow redesign project. Professionals from top and middle management and from front-line staff were involved in corporate patient flow performance teams (Alikhan *et al.*, 2009) or in a Steering Committee (Evans *et al.*, 2011). Top-management involvement is reported as a key factor both in the orientation and promotion of the project, and in the strategic definition phase of any incentives for employees in order to achieve improvement goals. In particular, the need to promote significant incentives, such as financial compensation or recognition, is reported in order to facilitate the front-line providers' involvement (Driscoll *et al.*, 2015; Svirsky *et al.*, 2013). Project management work groups can include nursing managers, patient transport managers, housekeeping managers, case manager supervisors, bed managers and many other professional roles (Driscoll *et al.*, 2015; Evans *et al.*, 2011; Sánchez *et al.*, 2018). External consultants were included in the working groups to guide and train employees in the newly adopted methodologies (Alikhan *et al.*, 2009; Castillo *et al.*, 2011; Driscoll *et al.*, 2015; Jweinat *et al.*, 2013; Lovett *et al.*, 2014; Vermeulen *et al.*, 2014; Zocchi *et al.*, 2015) or to redesign physical layout and environments (Hendrich *et al.*, 2004). Sánchez *et al.* (2018) affirm that a consultant who masters the "lean methodology" is mandatory in each lean project.

Only one study describes the involvement of patients in the redesign of patient flow. Ortiga *et al.* (2012) reported the creation of an interdisciplinary team of clinicians, hospital administrators and patients/families to examine bottlenecks and improvement areas in service delivery in order to improve hospital capacity. However, the degree of patient involvement and what solutions the patients proposed are not reported.

4.2 Outcomes measures in improving hospital patient flow

4.2.1 Efficiency. All of the 38 research studies analyzed in this review were directly related to efficiency organizational performance indicators. Most of them refer to the ED input-throughput-output process and include ED patients' LOS, ED waiting times and ED to Intensive Care Unit throughput. Hospital capacity is evaluated by measuring hospital time of day capacity and surgical cancellations due to no beds (Alikhan *et al.*, 2009; Evans *et al.*, 2011; Jweinat *et al.*, 2013; Ortiga *et al.*, 2012). Admission and discharge processes are measured with indicators such as the number of same day of surgery admissions, percentage of patients placed in second-choice unit (Jweinat *et al.*, 2013; Ortiga *et al.*, 2012; Driscoll *et al.*, 2015), percentage of discharge planning and 11:00 a.m. discharges (Ortiga *et al.*, 2012; Sheridan *et al.*, 2017; Jweinat *et al.*, 2013). Hospital LOS, stratified for inpatients who did not undergo surgery, inpatients who underwent operations and scheduled patients' LOS, was analyzed according to the setting in which the intervention was performed (Bhakta *et al.*, 2013; Borenstein *et al.*, 2016; Elliot *et al.*, 2015; Jweinat *et al.*, 2013; Ortiga *et al.*, 2012; Yancer *et al.*, 2006; Perry *et al.*, 2010).

4.2.2 Financial. Financial performance was analyzed by three studies. A more efficient redesign of the care environment for patients who required progressive care significantly increased available nursing time and permitted a reduction in budgeted staffing care hours (Hendrich *et al.*, 2004). A simple cost-benefit analysis was undertaken by considering ED triage category; primary diagnosis, and whether the patient was admitted to hospital or not (Fulbrook *et al.*, 2017) and by analyzing the space and staff investment (Lovett *et al.*, 2014).

4.2.3 Clinical quality of care. Only ten studies analyzed quality-of-care outcomes. In-hospital mortality and death after ED assessment are the most common clinical outcomes

analyzed (Bhakta *et al.*, 2013; Borenstein *et al.*, 2016; Cha *et al.*, 2009; Elliot *et al.*, 2015). Additional outcomes influenced by patient flow improvement are: re-presentation to the ED within 48/72 h and unplanned readmission within 7–30 days (Vermeulen *et al.*, 2014; Elder *et al.*, 2015), hospital complications (measured as diagnoses not present on admission) (Borenstein *et al.*, 2016) and medication error and patient fall indexes (Hendrich *et al.*, 2004).

4.2.4 Perceived quality of care. Only six studies analyze patient satisfaction with the service provided and most of them do not specify the key areas of analysis (Alikhan *et al.*, 2009; Dickson *et al.*, 2009; Yancer *et al.*, 2006; Williams *et al.*, 2011; Fulbrook *et al.*, 2017). Hendrich *et al.* (2004) reported a reduction in predictive indicators of patients' dissatisfaction referred to as "not made to feel less nervous or withdrawn," "not treated with respect and dignity" and "nurses not friendly and caring" by testing the use of acuity-adaptable rooms. Chadaga *et al.* (2012) reported on staff perception and satisfaction. Although the sample was limited, the authors collected data on the agreement of physicians and nurses after the implementation of a hospital medicine ED team, with respect to the following statements: improved quality of care, improved communication, improved collegiality and clinical decision making, improved patient flow and hospital medicine ED team as an asset to the hospital. Other studies analyzed indicators such as retention of nurses after implementation and collaboration between hospital units (Castillo *et al.*, 2011; Hendrich *et al.*, 2004; Chadaga *et al.*, 2012; Brown *et al.*, 2015; Driscoll *et al.*, 2015). In almost all studies, there was no concurrent collection of data relating to the effect of the program changes on patient and staff satisfaction. No study has been found on the effect of an improvement on the patients' and caregivers' experience.

4.3 Enablers in patient flow improvements

Since all interventions require a significant change in the departments' organization, some authors point out key factors needed for success. These are summarized below using Kaplan's model (Kaplan *et al.*, 2012).

4.3.1 External environment. Regional regulations and incentives that stimulate the organization to improve its performance and quality in patient flow management are reported (Evans *et al.*, 2011; Soong *et al.*, 2013). In particular, when dealing with the priority placement of patients and with the problem of ambulance diversion, incentives for integration between hospitals and improvement of their internal processes are adopted (Castillo *et al.*, 2011).

4.3.2 Project's strategic importance to the organization. Previous failed attempts to improve hospital patient flow are due to the lack of a comprehensive strategy and of interdependent institution-wide coordination (Healy-Rodriguez *et al.*, 2014; Jweinat *et al.*, 2013; Lovett *et al.*, 2014). For this reason, top-management commitment is recognized by many authors as one of the primary factors for the project's development (Yancer *et al.*, 2006; Alikhan *et al.*, 2009; Dickson *et al.*, 2009; Amato-Vealey *et al.*, 2012; Evans *et al.*, 2011; Ortiga *et al.*, 2012; Jweinat *et al.*, 2013; Lovett *et al.*, 2014; Mumma *et al.*, 2014). Moreover, the success of the project's implementation depends on strong executive oversight with clear accountability, engagement of the ED leadership team and subject matter expertise of those charged with implementation (Richardson *et al.*, 2017).

4.3.3 Quality improvement support and capacity. A key factor for quality improvement initiatives is the knowledge and use of the tools of quality improvement, as well as a significant investment in building expertise in data capture, analysis and management (Evans *et al.*, 2011). Moreover, the institution of standardized performance indicators at all levels of the organization provides feedback on personal work and can improve the adherence of professionals to the improvement program (Alikhan *et al.*, 2009; Evans *et al.*, 2011; Jweinat *et al.*, 2013; Odom *et al.*, 2018; Richardson *et al.*, 2017; Soong *et al.*, 2013;

Zocchi *et al.*, 2015). Visual management tools also help all the actors involved to achieve improvement goals and to see the whole patient process by the use of information technology (Alikhan *et al.*, 2009; Castillo *et al.*, 2011; Chadaga *et al.*, 2012; Driscoll *et al.*, 2015; Evans *et al.*, 2011; Healy-Rodriguez *et al.*, 2014; Jweinat *et al.*, 2013; Mumma *et al.*, 2014; Odom *et al.*, 2018; Sánchez *et al.*, 2018; Sheridan *et al.*, 2017; Yancer *et al.*, 2006).

4.3.4 Quality improvement team. Alikhan *et al.* (2009) highlight the essential factor of "Getting the right people on the bus" by involving in the core change team a critical mass of talent and an optimal mix of functional skills. The authors report that beyond methodological knowledge, strong interpersonal and facilitation skills and commitment to the mandate, teamwork and a sense of optimism are key.

4.3.5 Microsystem. Effective communication between the different hospital units and inter/intradepartmental and interdisciplinary collaboration play a key role in patient flow improvement. This can be achieved by cross-department planning and sharing information, by enhancing communication with medical departments and between nurses on different patient care units (Jweinat *et al.*, 2013; Chan *et al.*, 2014; Brown *et al.*, 2015; Driscoll *et al.*, 2015). Staff empowerment, standardization of best practices and culture change in the environment may also improve clinical, operational and financial outcomes (Jweinat *et al.*, 2013; Zocchi *et al.*, 2015).

5. Discussion

The aim of this systematic review was to synthesize the findings of studies that attempted to improve hospital patient flow by identifying measures, outcomes and enablers of success. Due to the variety of terms used to indicate this process, a search was performed including all the terms and their respective synonyms and resulted in the identification of 38 key papers.

On assessing the quality of studies included according to the QI-MQCS, only a small part of them were found to be designed with any strong methodology. Accordingly, almost all the studies reported the impossibility of generalizing the results achieved as a limitation. This is due to the variety of the hospitals in which improvements were implemented. Moreover, some studies reported that the introduction of multiple interventions, with multivariate analysis not being feasible, and no comparison tool available, prevented any causal relationship from being inferred from the before-and-after results (Ortiga *et al.*, 2012; Lovett *et al.*, 2014).

Almost all the studies were performed in the ED setting, since they were motivated by the urgency of managing ED overcrowding and its effect on ambulance diversions, waiting times and patient care quality. However, EDs do not exist in isolation, and authors emphasized the need for a hospital system-wide approach to improve the overall patient flow performance (Alikhan *et al.*, 2009; Castillo *et al.*, 2011; Chadaga *et al.*, 2012; Evans *et al.*, 2011). Despite the complexity of the variables involved in patient flow management, only the study of the whole hospital process can identify system improvements and integration between the different hospital services. Indeed, multiple hospital units, departments and support services are involved in providing inpatient resources and many processes have to be performed in synchrony in order to smooth hospital patient flow. Therefore, studies report a wide range of actions, varying from interventions to improve admission and discharge processes, to taking advantages of the use of technology and redesigning an effective workflow.

The literature analysis reveals that most of the existing measures of patient flow performance focus on process indicators, while only a few authors analyze clinical outcomes, patient satisfaction and quality-of-care outcomes. Moreover, traditional measures of the effect of improvements are often productivity-based, and others measures such as patient safety, patient experience and quality of service as perceived by the patient are

seldom included. These results are in line with a recent systematic review where authors reported how studies on patient flow improvement rarely focus on the patient's perspective (patient journey) beyond that of the organization (patient flow) (Winasti *et al.*, 2018). This seems to be in conflict with the nature of the healthcare service, which is mainly characterized by high patient expectations on service quality despite limited available resources (Kros and Brown, 2013). As from the patient's experience, an admission as an inpatient in an acute hospital is a major event, his/her perspective should be studied more and evaluated with defined and shared indicators.

With regard to key success factors, this review shows that initiatives to improve hospital patient flow are successful when all the actors are involved, together with a strong top-management commitment. Studies emphasize the importance of top-management involvement as well as the involvement of front-line professionals, but few studies discuss patient involvement. Even though in the last few years growing attention has been paid to patient and caregiver involvement in order to improve health services starting from their experience (Bowen *et al.*, 2013; Donetto *et al.*, 2014; Locock *et al.*, 2014), these results are in line with the recent study by Groene and Sunol (2015) that report how patients are rarely involved in process redesign. On this subject, literature still has many fields to explore in depth, starting from defining the different levels of patient involvement in health services to creating services really centered on patient needs (Castro *et al.*, 2016; Gustavsson and Andersson, 2017). The shift to a patient-centered approach requires the development of a culture in which all stakeholders are empowered and encouraged to make improvements from a patient perspective as well as a process efficiency perspective.

The results of this review bring together measures, factors and variables affecting hospital patient flow improvement in order to inform healthcare managers on how to act effectively in their context. The analyzed studies emphasize key issues to manage a complex hospital process. Interventions to improve patient flow can be performed at various organizational levels (i.e. infrastructure, information technology and multidisciplinary teams) but the biggest challenge remains to integrate multiple actors and processes. However, further research on patient flow improvement in a hospital system-wide approach is needed. In particular, this review points out the need of improving hospital patient flow, both by analyzing the whole process throughout the hospital and by considering the patient's perspective. This will allow hospital productivity to be improved without losing the focus on added value for the patient.

This review presents some limitations. First, the review was limited to 1999–2018. Considering that most of the studies are published in the last years of the period assessed, very recent studies may have been excluded. Second, due to the exclusion criteria applied and to the keywords used, this review may have excluded important studies in other healthcare settings (i.e. outpatients and psychiatric settings) that could contribute to the interpretation of results, probably mainly considering the patient's perspective. Finally, studies show a variability of research design and setting. Therefore, the possibility of reaching clear conclusions about interventions to improve hospital patient flow is limited by the mixed results and the heterogeneity of the study designs.

6. Conclusion

Hospital patient flow is complex and multidimensional, since it is determined by institutional and organizational variables, as well as patients' conditions. Achieving improvements in hospital patient flow requires the design and implementation of complex, multifaceted and coordinated interventions. Further research should evaluate the different perspectives and needs of the relevant actors by considering clinical outcomes, providers' point of view and patients' experience and satisfaction, besides process efficiency indicators.

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Further reading

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Appendix

#	Searches	Records
	Medline	
#37	Search ((((((Hospitals) OR Hospital*)) AND ((((patient flow) OR patient journey) OR patient care process) OR workflow)) AND ((((Patient Transfer/organization & administration*) OR Patient transfer*) OR Patient flow logistic) OR Patient flow logistics)) AND ((((((((Hospital Bed Capacity) OR Inpatient capacit*) OR Inpatients) OR Hospital access*) OR Access block*) OR Bed-block*) OR Bed occupanc*) OR ((Bed utilization) OR Bed utilisation)) OR Patient throughput) OR Patient discharg*)) AND ((((((((((Outcome Assessment (Health Care)) OR Treatment Outcome) OR Process performance) OR key performance indicators) OR Efficiency, Organizational*) OR Hospitalization/statistics & numerical data) OR waiting times) OR perioperative patients delay) OR patient safety) OR Patient-Centered Care/standards) OR Patient-Centered Care/method*) Filters: Publication date from 1999/01/01 to 2018/10/31; English	243
#36	Search ((((((Hospitals) OR Hospital*)) AND ((((patient flow) OR patient journey) OR patient care process) OR workflow)) AND ((((Patient Transfer/organization & administration*) OR Patient transfer*) OR Patient flow logistic) OR Patient flow logistics)) AND ((((((((Hospital Bed Capacity) OR Inpatient capacit*) OR Inpatients) OR Hospital access*) OR Access block*) OR Bed-block*) OR Bed occupanc*) OR ((Bed utilization) OR Bed utilisation)) OR Patient throughput) OR Patient discharg*)) AND ((((((((((Outcome Assessment (Health Care)) OR Treatment Outcome) OR Process performance) OR key performance indicators) OR Efficiency, Organizational*) OR Hospitalization/statistics & numerical data) OR waiting times) OR perioperative patients delay) OR patient safety) OR Patient-Centered Care/standards) OR Patient-Centered Care/method*) Filters: English	259
#35	Search ((((((Hospitals) OR Hospital*)) AND ((((patient flow) OR patient journey) OR patient care process) OR workflow)) AND ((((Patient Transfer/organization & administration*) OR Patient transfer*) OR Patient flow logistic) OR Patient flow logistics)) AND ((((((((Hospital Bed Capacity) OR Inpatient capacit*) OR Inpatients) OR Hospital access*) OR Access block*) OR Bed-block*) OR Bed occupanc*) OR ((Bed utilization) OR Bed utilisation)) OR Patient throughput) OR Patient discharg*)) AND ((((((((((Outcome Assessment (Health Care)) OR Treatment Outcome) OR Process performance) OR key performance indicators) OR Efficiency, Organizational*) OR Hospitalization/statistics & numerical data) OR waiting times) OR perioperative patients delay) OR patient safety) OR Patient-Centered Care/standards) OR Patient-Centered Care/method*)	269
#34	Search ((((((((((Outcome Assessment (Health Care)) OR Treatment Outcome) OR Process performance) OR key performance indicators) OR Efficiency, Organizational*) OR Hospitalization/statistics & numerical data) OR waiting times) OR perioperative patients delay) OR patient safety) OR Patient-Centered Care/standards) OR Patient-Centered Care/method*	432,847
#33	Search Patient-Centered Care/method*	2,494
#32	Search Patient-Centered Care/standards	2,011
#31	Search patient safety	130,503
#30	Search perioperative patients delay	675
#29	Search waiting times	20,149
#28	Search Hospitalization/statistics & numerical data	4
#27	Search Efficiency, Organizational*	20,830
#26	Search key performance indicators	3,331
#25	Search Process performance	71,644
#24	Search Treatment Outcome	1,142,036
#23	Search Outcome Assessment (Health Care)	201,836
#22	Search ((((((((Hospital Bed Capacity) OR Inpatient capacit*) OR Inpatients) OR Hospital access*) OR Access block*) OR Bed-block*) OR Bed occupanc*) OR ((Bed utilization) OR Bed utilisation)) OR Patient throughput) OR Patient discharg*	115,513

Table AI.
Search strategy

(*continued*)

#	Searches	Records
#21	Search Patient discharg*	27,250
#20	Search Patient throughput	13,630
#19	Search (Bed utilization) OR Bed utilisation	8,469
#18	Search Bed occupanc*	2,873
#17	Search Bed-block*	84
#16	Search Access block*	164
#15	Search Hospital access*	104
#14	Search Inpatients	46,494
#13	Search Inpatient capacit*	51
#12	Search Hospital Bed Capacity	24,400
#11	Search (((Patient Transfer/organization & administration*) OR Patient transfer*) OR Patient flow logistic) OR Patient flow logistics	19,369
#10	Search Patient flow logistics	8,607
#9	Search Patient flow logistic	11,246
#8	Search Patient transfer*	8,276
#7	Search Patient Transfer/organization & administration*	1,226
#6	Search (((patient flow) OR patient journey) OR patient care process) OR workflow	307,774
#5	Search workflow	16,118
#4	Search patient care process	84,634
#3	Search patient journey	3,578
#2	Search patient flow	206,646
#1	Search (Hospitals) OR Hospital*	4,382,932
Web of Science		
#10	#7 AND #6 AND #5 AND #4 AND #3 AND #2 AND #1 Refined by: PUBLICATION YEARS: (2018 OR 2014 OR 2010 OR 2006 OR 2017 OR 2013 OR 2009 OR 2005 OR 2016 OR 2012 OR 2008 OR 1999 OR 2015 OR 2011 OR 2007) AND DOCUMENT TYPES: (ARTICLE OR REVIEW OR CLINICAL TRIAL)	46
#9	#7 AND #6 AND #5 AND #4 AND #3 AND #2 AND #1 Refined by: PUBLICATION YEARS: (2018 OR 2014 OR 2010 OR 2006 OR 2017 OR 2013 OR 2009 OR 2005 OR 2016 OR 2012 OR 2008 OR 1999 OR 2015 OR 2011 OR 2007)	47
#8	#7 AND #6 AND #5 AND #4 AND #3 AND #2 AND #1	48
#7	TOPIC: (Outcome Assessment) OR TOPIC: (Treatment Outcome) OR TOPIC: (Process performance) OR TOPIC: (key performance indicators) OR TOPIC: (Efficiency) OR TOPIC: (waiting times) OR TOPIC: (perioperative patient* delay) OR TOPIC: (patient* safety) OR TOPIC: (patient centered care)	5,002,089
#6	TOPIC: (Patient throughput) OR TOPIC: (Patient Discharg*)	206,320
#5	TOPIC: (Hospital Bed Capacity) OR TOPIC: (Inpatient Capacity) OR TOPIC: (Inpatient) OR TOPIC: (Hospital access*) OR TOPIC: (Access block*) OR TOPIC: (Bed-block*) OR TOPIC: (Bed utilization) OR TOPIC: (Bed utilisation)	264,885
#4	TOPIC: (Patient Transfer*) OR TOPIC: (Patient flow logistic*) OR TOPIC: (Workflow)	226,508
#3	TOPIC: (Patient Care Process)	200,862
#2	TOPIC: (Patient Flow) OR TOPIC: (Patient Journey)	335,529
#1	TOPIC: (Hospital*)	1,801,142
Cochrane Library		
#1	"Patient Flow" in Title Abstract Keyword OR "Patient Journey" in Title Abstract Keyword OR "Bed Management" in Title Abstract Keyword AND "Hospital capacity management" in Title Abstract Keyword AND "outcome" in Title Abstract Keyword – (Word variations have been searched)": one result	1

Table AI.

Table AII.
Characteristic of included studies

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Alikhan, 2009, Canada, Study year(s): 2008–2009, *Healthcare Management Forum*	Prospective pre-post study	ED	Not cited	Customized methodological framework embedding aspects of LEAN, Six Sigma and Plan-Do-Study-Act methods	Institution of a Corporate Patient Flow Performance Team Standardized performance indicators restitution at unit, service and program levels Admission/Discharge process improvement Daily proactive bed management Facilitating internal communication Using visual management tools	External consultants Top-Management Middle-Management	83.1% decrease in emergent volumes waiting for greater than 24 h 49.1% improvement in ED LOS for admitted patients no adverse outcomes on other key indicators
Amato-Vealey, 2012, USA, Study year(s): –*AORN Journal*	Pre-post study	Operation Room, Intermediate Care Unit, Surgical Floors	Not cited	Six Sigma	Institution of a Core Group of employees of all involved areas Discharge process improvement	Front-line staff	Percentage increase of intermediate care unit discharges before noon
Arya, 2013, USA, Study year(s): 2010–2011, *Academic Emergency Medicine*	Retrospective pre-post study	ED	20.653 adults 20.215 controls	Not cited	Split Emergency Severity Index 3 (ESI 3) patient flow model	Not cited	5.9% decrease, from 2.58 to 2.43 h, in the geometric mean of LOS for discharged patients Abdominal pain was the most common

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							diagnostic grouping with a reduction in LOS of 12.9%, from 4.37 to 3.8 h
Bhakta, 2013, USA, Study year (s): 2009–2011, *The journal of Trauma and Acute Care Surgery*	Retrospective pre-post study	Trauma Intensive Care Units	262 adults 267 controls	Not cited	Implementation of trauma bed protocol in order to faster patient throughput within the ED and decrease trauma admissions to non-trauma ICUs	Not cited	Compared to the control phase: ED LOS significantly decreased from 4.2 ±4.0 to 3.1 ±2.1 kh a greater proportion of total patients were admitted to a designated ICU (93% vs 83%) ICU readmissions were unchanged
Borestein, 2016, USA, Study year (s): 2012–2013, *Nursing Outlook*	Cluster randomized controlled trial	General medical/ surgery hospital units	792 adults 592 controls	Quality Improvement	Redesign of unit-based workflow and use of trained interprofessional team	Interprofessional leadership work-group (unspecified actors)	Among patient admitted to the intervention unit Mean difference in observed vs expected length of stay 1.03 days shorter Incidence of complications and transfer to ICU lower

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							Incidence of discharge to institutional care higher No difference in mortality during hospitalization
Brown, 2015, USA, Study year(s): 2006–2010, *Journal of Healthcare Quality*	Retrospective pre-post study	ICU and OR	521 adults 1.036 controls	Not cited	Implementation of a coordinated patient transport system for patient's transfer from ICU to OR	Not cited	After implementation: on-time OR start time deviations significantly lower Improvement in on-time OR starts Significantly reducing idle OR time
Castillo, 2011, USA, Study year (s): 2006–2008, *The Journal of Emergency Medicine*	Retrospective pre-post study	ED	14.117 diversion hours 17.618 diversion hours control	Not cited	Implementation of best practice among collaborative Hospitals	Project sponsor and project champions External consultants Top-Management	Decrease of 19.9% of monthly average hours of diversion
Cha, 2009, South Korea, Study year (s): 2006–2008, *Academic Emergency Medicine*	Prospective pre-post study	ED	45.583 adults, children 41.726 controls	Not cited	Implementation of an independent-capacity program which included the ability of emergency physicians to transfer admitted patients to	Not cited	Decrease of the mean ED LOS from 15.1 to 13.4h Decrease of the mean LOS in the emergency ward from 4.5 days to

(*continued*)

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
					surrounding area hospitals		3.1 days Decrease od the percentage of transfers to other hospitals from the ED from 3.5 to 2.5% Increase of hospital mortality from 1.96 to 2.12, without clinical significance
Chadanga, 2012, USA, Study year (s): 2008–2010, *Journal of Hospital Medicine*	Prospective pre-post study	ED	48.595 adults 50.469 controls	Toyota Lean for quality improvement – Rapid Improvement Event	Implementation of a Hospital Medicine ED Team	Middle-Management (Hospital Medicine Service)	Reduction of 27% of diversion due to medicine bed capacity Reduction of 67% of patients transferred to a medicine floor and discharged within 8 h Increase of 61% in the number of discharges from the ED of admitted medicine Boarded admitted patients were rounded upon 2 h earlier by Team Satisfaction among ED attendings was high

(*continued*)

Table AII.

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Chan, 2014, China, Study year(s): 2011–2012, *World Journal of Emergency Medicine*	Prospective pre-post study	ED	281 adults 313 controls	Lean	A series of lean management work interventions to improve the admission and blood result waiting time	Not cited	Significantly decrease of the triage waiting time and end waiting time for consultation Decrease of the admission waiting time from 54.76 minutes to 24.45
Dickson, 2009, USA, Study year (s): –*Annals of Emergency Medicine*	Prospective pre-post study	ED	Not cited	Lean	A series of lean management work interventions	Not cited	Length of stay reduced in 3 of the EDs
Driscoll, 2015, USA, Study year (s): 2012, *Nursing Administration Quarterly*	Pre-post study	Neuroscience service line (ICU, 2 general floors, post-anaesthesia recovery, rehabilitation unit)	Not cited	Lean/Six Sigma - Rapid improvement event	Intervention in order to decrease hospital internal diversions	Process improvement specialist Middle-Management (Unit-based nursing managers and charge nurses, patient transport manager, housekeeping manager, case manager supervisor, bed manager)	50% decrease in the number of patients being internally diverted Improved collaboration between units
Elder, 2015, Australia, Study year(s): 2012–2013, *Emergency Medicine Australasia*	Retrospective cohort study	ED	8.932 adults and paediatrics 8.250 controls	Not cited	Incorporating a physician at triage (PAT) and implementation of a medical assessment unit (MAU)	Not cited	ED LOS significantly decreased after PATplus MAU was implemented Improvement in time to be seen by a

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							clinician Improvement in proportion of patients who did not wait Increase in meeting 4-hour length of stay target
Elliott, 2015, USA, Study year(s): 2010–2012, *The Joint Commission Journal on Quality and Patient Safety*	Retrospective interrupted time series analysis	ED, ICU	613 adults 1.088 controls	Quality improvement methods, including process mapping and LEAN principles	Implementation of an interdepartmental program designed to expedite the transition of care from the ED to the medical ICU	Interprofessional, multidepartmental task force (unspecified actors)	Reduction of ED LOS by 30% (2.6 h) from baseline No significant differences in Medical ICU LOS , overall hospital LOS , or mortality
Evans, 2011, Canada, Study year(s): 2007–2009, *Healthcare Quarterly*	Pre-post study	ED, ICU and Hospital Departments	Not cited	Adapted model of Plan-Do-Study-Act (PDSA) adding "Define" Lean/Six Sigma	Leans tools Operations research techniques Bed Assignment Tool, Bed Mapping and Status communication Tool	Middle-Management (clinical managers, charge nurses, discharge planners, quality specialists) Front-line staff	Decrease in: Average time (h) from order to admit to depart ET % of patient discharge or admit within 6 and 8 h Decrease in: % surgical cancellations due to no bed No change in: Off-Service Rate

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							(excluding ED days) ICU occupancy rate
Fulbrook, 2017, Australia, Study year(s): 2014, *Australasian Emergency Nursing Journal*	Prospective controlled trial	ED	19.773 adults	Not cited	Introduction of the nurse navigator role	Not cited	Slight improvement in National Emergency Access Target compliance with an average of 4.5 min per presentation saved The labor cost associated with the time saved estimated to be $170,000
Healy-Rodriguez *et al.*, 2014, USA, Study year(s): 2008–2009, *Journal of Emergency Nursing*	Retrospective pre-post study	ED	14.832 adults and paediatrics 13.852 controls	Not cited	Logistic Management Program	Not cited	Decrease in: ED evaluation time (219 vs 207 minutes) Median ED placement time (193 vs 219 minutes Median inpatient length of stay (3.83 vs 3.93)
Hendrich, 2004, USA, Study year (s): 1997–2001, *American Journal of Critical Care*	Prospective pre-post study	Coronal Critical Unit and its step-down medical unit	Not cited	Evidence-based design and continuum quality improvement principles	Acuity-adaptable room	Front-line perspectives (Clinicians) Patients perspectives Expert on designing environments	Significant improvements in quality and operational cost: a large reduction in clinician handoffs and transfers

(*continued*)

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							Reductions in medication error and patient fall indexes Improvements in predictive indicators of patients' satisfaction Decrease in budgeted nursing hours per patient day Increased inpatients days per bed
Howell, 2010, USA, Study year (s): 2005–2007, *Journal of Critical Care*	Retrospective pre-post study	ED, ICU and Coronary Care Unit	17.573 adults 16.148 controls	Not cited	Active bed management	Not cited	Decrease in throughput from ED to coronary care unit and medical ICU by 99 minutes (254 vs 253 minutes) Transfer rates and ICU death rates stable
Imperato, 2012, USA, Study year (s): 2008, *Internal and Emergency Medicine*	Retrospective pre-post study	ED	9.011 adults 8.620 controls	Not cited	Physician in triage	Not cited	Reduction of: The median time from registration to attending physician evaluation by 36

(*continued*)

Table AII.

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							min The median LOS for all patients was reduced by 12 min after the intervention The number of patients who left without being seen from 1.5 to 1.3%, but not statistically significant ($p = 0.36$) Decrease in: The number of days on diversion (24 vs 9 days) Total time on diversion (68 h 25 min vs 26 h 7 min)
Jweinat, 2013, USA, Study year (s): 2001–2012, *Joint Commission Journal on Quality and Patient Safety*	Prospective pre-post study	Hospital	Not cited	Lean	Collaborative quality improvement journey	Top-Management Middle-Management External consultants	Adult ED LOS reduction from 5.30 to 4.95h (until 2012) 84% improvement in discharges by 11:00 A.M. Decrease in LOS from 5.23 to 5.05

(*continued*)

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Lovett, 2014, USA, Study year(s): 2010–2013, *American Journal of Medical Quality*	Prospective pre-post study	Hospital	Not cited	Not cited	Single, centralized Patient Flow Management Center (control of bed management across 3 Campuses including service as case management, environmental service, patient transport, ambulance and helicopter dispatch)	Top-Management External consultants	Improvements in: ED walkouts Ambulance diversion Reduction in: Lost transfers time to bed assignment Bed turnover time
Mumma, 2014, USA, Study year (s): 2009–2011, *Academic Emergency Medicine*	Retrospective pre-post cohort study	ED	42.896 adults 48.358 controls	Not cited	Expansion of ED from 33 to 53 adults bed	Not cited	After expansion: % of patient left without being treated is unchanged Total ED boarding time increase from 160 to 180 h/day
Muntlin Athlin, 2013, Sweden, Study year(s): 2010, *Scandinavian Journal of Trauma, Resuscitation and*	Prospective non-randomized cohort study	ED	1.838 adults 724 controls	Mixed-method design: ABAB phases first used where A was the control phase (standard procedure) and B was the intervention phase + three follow-up phases (5-11-16 months)	Introduction of multi-professional teams by reorganization of the work process. Each team, consisted of one physician, one Registered Nurse (RN) and one Assistant Nurse (AN)	Not cited	Compared to the control phase, at the last follow-up: The median time to physician was significantly decreased by 11 minutes The total visit time

(*continued*)

Table AII.

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Emergency Medicine							was significantly shorter (39 minutes shorter on average) The 4 h target was met in 71% compared to 59%
Odom, 2018, USA, Study year(s): 2016–2018, *Nursing Informatics*	Prospective pre-post study	Hospital	Not cited	Data-driven Approach	A set of hospital-wide interventions implemented in order to reduce ED LOS	Top-Management Middle-Management First-Line staff	ED LWBS dropped from 4% down to 3.4% ED LOS remained consistent year over year The physician admission order to inpatient bed assignment improved by over 30 minutes
O'Connel, 2008, Australia, Study year(s): 2004–2007, *The Medical Journal of Australia*	Pre-post study	ED	1.8m attendances	Not cited	Clinical Service Redesign Program	Not cited	Implementation of: % of patients admitted through the ED who egress within 8 h % of patients in triage category 3 whose treatment is commenced within 30 minutes of arrival % of patients

(*continued*)

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							moved off an ambulance stretcher in to an ED bed within 30 minutes of arrival
Ortiga, 2012, Spain, Study year (s): 2007–2009, *BMC Health Service Research*	Cross-sectional pre-post study	Hospital	28.577 adults 27.784 controls	Lean	A set of hospital-wide interventions implemented in order to standardize the admission and discharge processes	Top-Management Middle-Management First-Line staff (clinicians) Patient/Families	Decrease in the median patients' global LOS from 8.56 days to 7.93 days Increase in % of patients admitted the same day of the surgery from 64.87% to 86.01% Increase of the median number of planned discharges from 43.05% to 86.01% Decrease of median number from 5 to 3 of ED patients waiting for an in-hospital bed at 8:00 am
Perry, 2010, New Zealand, Study year(s): 2008–2009, *ANZ Journal of Surgery*	Prospective pre-post study	ED and Surgical Department	5.346 adults 3836 controls	Not cited	Dedicated surgical assessment and review area for acute general surgical patients	Not cited	LOS reduced in all patients from 2.58 to 2.04 days and in those who did not require surgery from 2.56 to 1.96 days

(*continued*)

Table AII.

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Richardson, 2017, Australia, Study year(s): 2013–2015, *Emergency Medicine Australasia*	Prospective with historical control	ED, Hospital	30.984 adults and paediatrics 81.882 controls	Not cited	A set of hospital-wide interventions implemented in order to reduce ED crowding	Top-Management Middle-Management First-Line staff	9.1% increase in presentations and 22.6% decrease in mean ED occupancy ED LOS within 4h improvement from 56.1% to 68.8% Daily crowding with more than 10 inpatients improved from 6:34 to 0:29 Did not wait improvement from 5.1 to 3.0%
Sánchez *et al.*, 2018, Spain Study, year(s): 2015–2016, *International Journal for Quality in Health Care*	Pre-post study	ED	12.704 adults 11,727 controls	Lean	Application of lean thinking in triage acuity level-3 patients	Two people ED executive team certified lean practitioners Front-line staff (doctors, nurses, nursing assistants, porters and administrative personnel)	Significant reductions in: Process time of discharged (182 vs 160 min) and transferred to observation (186 vs 176 min) patients Length of stay (389 vs 329 min) waiting time (71 vs 48 min) No significant differences in: Left without being

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							seen rate (5.23% vs 4.95%) 72 h revisit rate (3.41% vs 3.93%) mortality rate (0.23% vs 0.15%)
Sheridan, 2017, Canada, Study year(s): 2014, *Healthcare quarterly*	Before after study	Hospital	Not cited	Lean, PDSA	Engagement with primary care providers and clinical associates with the use of standard work To improve patient discharge process	Front-line staff (primary care providers, clinical associates)	The target of 80% of discharge summaries sent to primary care within 48 h exceeded at > 93% Reduction in hospital readmission rate
Soong, 2015, Canada, Study year(s): 2010–2012, *BMJ Quality & Safety*	Retrospective pre-post study	ED and General Internal Medicine Department	3.373 adults 3.369 controls	Audit and feedback method	Improvement Team to perform a set of interventions using education, goal setting and real-time performance feedback to improve time to admission to patient referred to general internal medicine	Not cited	Decrease in the meantime from consultation request to admission order entry from 321 to 229 minutes Decrease of overall ED LOS for general internal patients from 1.022 to 963 minutes
Svirsky, 2013, USA, Study year (s): 2011–2012, *The Journal of Emergency Medicine*	Prospective study with control group	ED	1.346 adults	Not cited	Resident-initiated advanced triage	Not cited	Decrease in median ED LOS by 37 minutes No difference in the proportion of patients

(*continued*)

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
							who left prior to medical screening
Twanmoh, 2006, USA, Study year (s): 2003–2004, *Managed Care*	Not cited	ED	Not cited	Not cited	A set of interventions implemented in order to improve ED input-throughput-output process	Top-Management	Decrease in ambulance diversion hours Decrease in ED LOS Decrease in the meantime "door to bed" Decrease in the meantime "door to visit"
Vermeulen, 2014, Canada, Study year(s): 2007–2011, *Annals of Emergency Medicine*	Retrospective cohort pre-post study	ED	Program sites vs control sites	Lean	Regional ED process improvement program (pay-for-results): dedicated hospital improvement teams + one external lean coach	Top-Management Middle-Management (senior leaders, managers) Front-line staff External consultants	Decrease in: ED LOS Time to physician assessment Left-without-being seen rates 72 h ED revisit rates
Williams, 2011, Canada, Study year(s): 2006–2008, *Canadian Journal of Surgery*	Prospective pre-post study	Orthopaedic Surgery Center	3.209 adults	Not cited	Hospital program to augment existing provincial capacity for hip and knee replacement	Not cited	Mean patient satisfaction score of 4.7 out of 5 Complication rate of 4.4% Mean operating room time of 1 hour and 45 minutes Mean postoperative

(*continued*)

Table AII.

First author, year of publication, country, study year(s), journal	Study design	Setting	No. and type of patient	Method to improve	Intervention	Main actors involved in process redesign	Key results
Yancer, 2006, USA, Study year (s): 2003–2005, *Joint Commission Journal on Quality and Patient Safety*	Pre-post study	Hospital	Not cited	Not cited	3 process improvement teams (front-line and leadership staff) to focus on discharge, throughput and ED admission	Middle-Management Front-line staff	LOS of 3.4 days Additional 16% capacity 72% of ambulance diversion hours reduction from 2.365 to 65 Decrease in the average in-hospital LOS (from 3.87 to 3.61) Decrease in the average ED LOS (by 25 min) Improvement of ED patient satisfaction from a score of 3.96 to 4.11 (range, 1–5)
Zocchi, 2015, USA, Study year(s): 2010–2012, *Joint Commission Journal on Quality and Patient Safety*	Prospective pre-post study	ED	Not cited	Plan-Do-Study-Act and other methods	Collaborative Quality Program to improve ED flow	Top-Management External consultants	Among hospitals demonstrating improvement, reduction in the average of Discharged LOS (by 26 min) Admitted LOS (by 36.5 min) Boarding time (by 20.9 min) Left without been seen rates decrease by 1.4 absolute percentage points

PLOS ONE

RESEARCH ARTICLE

Exploring the hospital patient journey: What does the patient experience?

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Abstract

Purpose

To understand how different methodologies of qualitative research are able to capture patient experience of the hospital journey.

Methods

A qualitative study of orthopaedic patients admitted for hip and knee replacement surgery in a 250-bed university hospital was performed. Eight patients were shadowed from the time they entered the hospital to the time of transfer to rehabilitation. Four patients and sixteen professionals, including orthopaedists, head nurses, nurses and administrative staff, were interviewed.

Results

Through analysis of the data collected four main themes emerged: the information gap; the covering patient-professionals relationship; the effectiveness of family closeness; and the micro-integration of hospital services. The three different standpoints (patient shadowing, health professionals' interviews and patients' interviews) allowed different issues to be captured in the various phases of the journey.

Conclusions

Hospitals can significantly improve the quality of the service provided by exploring and understanding the individual patient journey. When dealing with a key cross-functional business process, the time-space dynamics of the activities performed have to be considered. Further research in the academic field can explore practical, methodological and ethical challenges more deeply in capturing the whole patient journey experience by using multiple methods and integrated tools.

Competing interests: The authors have declared that no competing interests exist.

Introduction

In the healthcare knowledge-based system, literature has given increasing attention over time to improving clinical knowledge, including by making use of the patient's insider perspective [1–3]. In particular, patient experience of healthcare and the delivery of care is emerging as an important area of knowledge, but one that is sometimes overlooked [4, 5].

The Beryl Institute defines patient experience as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions, across the continuum of care"[6]. Wolf et al. specify that interactions are "The orchestrated touchpoints of people, processes, policies, communications, actions, and environment" and patient perceptions are "what is recognized, understood and remembered by patients and support people"[7].

In the last few years, emphasis on the emotional drivers of engagements has led many authors to enhance the customer experience starting from an analysis of the customer journey [8]. In the hospital context, the patient journey is a key cross-functional business process where patient and providers share action and information flows between people and systems across various touchpoints. Providers aim to manage hospital patient flow in order to provide safe and efficient patient care while ensuring the best use of hospital resources (i.e.: beds, operating theatres, clinics and specialized staff). Poor patient flow may result in decreasing levels of productivity, increasing risk of harming patients and decreasing levels of quality perceived by patients [9–11]. Patients aim to receive the best care together with a high quality of service. As a matter of fact, the patient is the only actor who experiences the whole path by connecting each step of the journey. Therefore, hospitals can significantly improve the quality of the service provided by exploring and understanding the individual patient journey [12–14].

Many tools may be used to measure and understand patient experience [15, 16]. Surveys are the methods mainly used to capture the patient experience and to evaluate the quality and safety of various clinical processes [17, 18]. However, questionnaires or traditional static observation may not be well-suited to reveal all the aspects of patient experience [19]. In the complex hospital environment, multiple factors can affect the patient experience, including the time-space dynamics of the activities performed and the patients' perceptions and emotions lived at the time of the experience [20]. Moreover, some authors emphasize that what the patient remembers is different from what he/she experiences in real-time, depending on the length of the recall period [21, 22]. Therefore, as what the patient remembers may change over time, gathering accurate and immediate data on the experience lived also depends on the time of the interview.

A recent study reports how the use of unstructured diaries completed in a patient's own words can capture the hospital-stay experience from the patient's own perspective. However, it is not clear how real-time experiences are reported in relation to high-emotional situations or clinical activities that can interfere with the patient's ability and willingness to write (i.e. during the transfer to the operating theatre or in the post-operative period, immediately after surgery). Furthermore, the authors show how study participants with a tertiary education wrote more in their diaries than those without [23]. This could potentially eliminate important aspects of the experience lived by vulnerable people.

Some authors have emphasized the value of shadowing for phenomenological research, by giving a more complete picture of the phenomenon in the real-time context of an organization [24, 25]. Patient shadowing may have an especially valuable role in gaining insights into complex cross-hospital processes, in particular when dealing with vulnerable people who could be excluded from interview studies [26, 27]. Furthermore, some studies have reported how, through shadowing methodology, it is possible to assess the lived experience of patients in a

patient-centred perspective [28, 29]. However, methodological and ethical issues of shadowing still need to be explored in greater depth [25, 30].

While on the one hand patient experience is increasingly considered as a driver for health services improvement, on the other it is still not clear how to capture the whole patient experience in traversing hospital services [31–33]. Therefore, this study seeks to explore which aspects of the hospital patient journey experience may be captured by the three different standpoints: patient shadowing, health professionals' interviews and patients interviews. Accordingly, it aims to answer the following questions: what does the patient experience through the hospital journey? How can it be captured?

Materials and methods

Study design

This study was a qualitative study with a phenomenological-hermeneutic approach using participant interviews and patient shadowing [34, 35]. The Consolidated Criteria for Reporting Qualitative Research—COREQ checklist was used as a guideline to report the study data [36]. The study was undertaken in a 250-bed Italian academic teaching hospital. Orthopaedic patients undergoing total hip (THA) or knee arthroplasty (TKA) were selected in order to analyse a standard clinical path (Fig 1). Urgently admitted patients were excluded due to the different clinical path they have to follow. The unit of analysis was the hospital patient's journey starting from the first outpatient visit and concluding with the first follow-up visit. The study was approved by the Hospital Ethics Committee.

Data collection

Between August 2016 and April 2017, a total of twelve patients and sixteen key professionals were invited to participate and all agreed. There were no prior relationships between researchers and patients; two researchers knew some healthcare professionals because they worked in the same hospital, though in different units and without patient care roles. The possibility of coercion was minimized by guaranteeing data anonymity, by requesting voluntary participation in the study and by dealing with issues on which the researchers had no power to influence anything or anyone at hospital managerial level.

A convenience sample of patients was selected based on whether their inpatient admission and follow-up visit fell within the observation period. Inclusion criteria were: patients scheduled to undergo surgery for THA or TKA, for the shadowing phase; patients who had had a THA or TKA ad were in follow-up, for the interviews. Exclusion criteria were: <18 years, inability to understand, not wanting to participate, inability to read/speak Italian. Patients were asked to participate in the study at the time they arrived in the hospital. The first author invited patients to participate in the study when they met at the hospital for preoperative tests or on the day of admission. Patients accepting the invitation were provided with further information about the project by the first author, and were asked to sign their consent to participate in the study and to the anonymous use of their data.

Eight patients admitted between August and September 2016 were selected for the shadowing phase. A shadowing methodology was used in order to provide an embodied understanding of patients' experiences in context [26]. Two female students from the nursing and industrial engineering degree courses, with no roles in the delivery of patient care, were trained for data collection by the first author. In this way, the risk of not reporting negative feedback during the study by the participants, and subjective interpretations by the authors in capturing data, was minimized. Patients were shadowed from the time of hospital admission to the time of discharge, with the shadower observing the patient during daytime hours and completing a

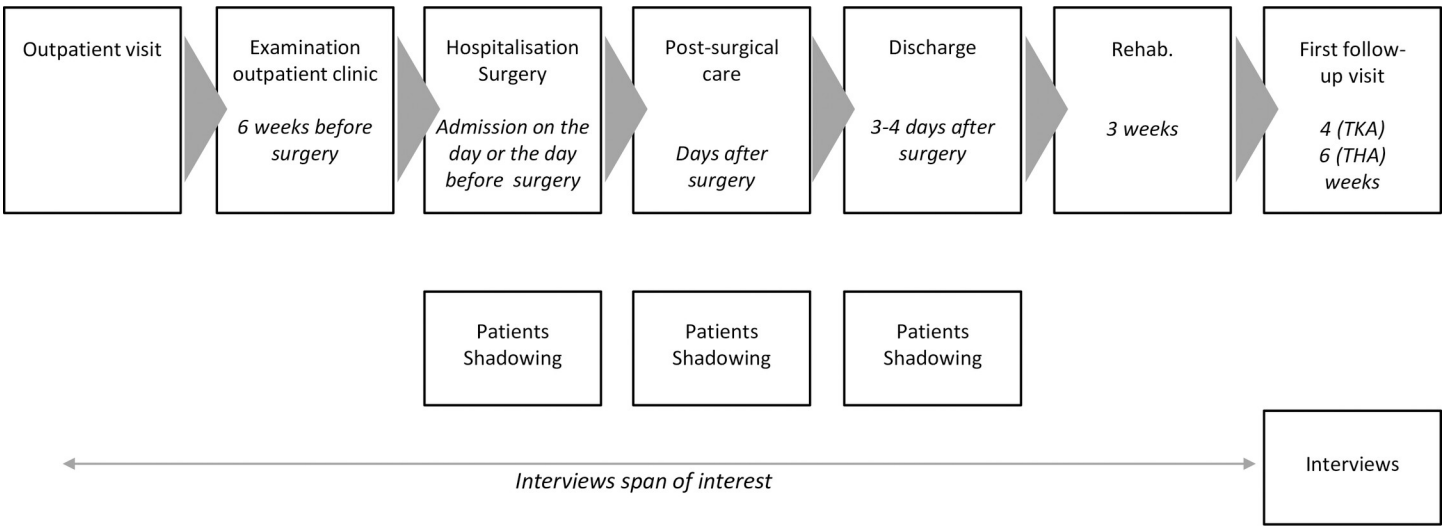

Fig 1. Flow of patients' pathways in total hip arthroplasty (THA) / total knee arthroplasty (TKA) programme and scheduled timing of the study.

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data collection form prepared by the research group. This involved recording every step of the hospital journey process, by analysing each touchpoint and including time, patient, caregiver, activity, shadower's observations, and impressions. In particular, touchpoint observations indicated where patients and families go (setting), with whom they come into contact, how long the experience at each touchpoint takes (time), what patients and caregivers do, and a description of any comments of the patient and family, including any observable emotional state of the patient. By considering patients' emotion as consistent responses to internal or external events, the Plutchik's model was used as framework to understand its intensity in a positive or negative characterization [37]. In particular, Plutchik suggests emotions are low, medium or high-intensity, and if left unchecked, they can intensify. Accordingly, the patient's emotional journey was also assessed in reference to external events that altered the patient's emotional level.

Patient care procedures were not noted because they were not relevant for the current research objectives. The shadower observed the patients during all hospital transfers and entered the patients' rooms only to verify their general state and to gather any statements about their experience. The shadower was mainly passive during the observation, but was active in informal conversations. This level of proximity made it possible for the patients not to perceive shadowers as intrusive or disrespectful of their privacy.

Between September 2016 and April 2017, four patients and sixteen healthcare professionals participated in face-to-face open interviews lasting 30–45 minutes and performed by the first and the third author. A few main open questions were identified by the research group in order to analyse the main steps of the patients' journeys, the patients' experiences, and their reported emotions. Patients were interviewed at the first outpatient follow-up visit (Fig 1), scheduled one month after discharge from the ward, in order to include their perceptions of discharge.

In order to capture viewpoints representing various different roles, a collaborative purposive sampling technique was used among professionals with different level of professional experience who take care of orthopaedic patients. In particular, according to Benner's stages of clinical competence [38], two nurses with experience of at least five years, identified as expert nurses by their managers, and three nurses with experience of up to four years, identified as

competent nurses, were selected. In addition, two orthopaedic surgeons and one medical doctor under training were involved. Finally, three members of the administrative staff, the director responsible for the quality of care processes, and the head nurses of the units involved in the patient journeys (i.e.: two Ward Units, one Surgery Room, one Rehabilitation Unit), were interviewed.

All interviews were audio-recorded and transcribed verbatim with participant permission. Data from the field notes and the interviews were transferred to an Excel spreadsheet database to systematize them and for the subsequent analysis.

Data analysis

Data analysis was performed on three levels as suggested by Ricoeur [30]: a naïve reading, a structural analysis and a critical analysis and discussion. The first author performed a thematic analysis of the text material. In the structural analysis, the units of meaning (what was said) were reflected in units of significance (what the texts were talking about) from which the key themes emerged (Table 1). Patients' emotions, reported or observed, were classified according to Plutchik's Wheel of Emotions [37]. After that, a critical analysis was carried out by the researchers in order to analyse the coding process, the categories and the meanings that emerged.

Results

The main characteristics of the participants involved in the study are reported in Table 2. Patients involved ranged in age from 56–78 years with an average age of 67.3 years, and they were hospitalized on average 4.4 days. All had a regular clinical trajectory with no noteworthy complications. Healthcare professionals ranged in age from 29–61 years with an average age of 38.8 years and a work experience average of 10.6 years.

The hospital patient journey

In the patient hospital journeys studied, seven main phases and forty-four consequent steps were traced by shadowing patients and interviewing the main actors. Table 3 shows which steps were identified from the interviews and which from the shadowing. In particular, the patient shadowing enabled more accurate reconstruction of all the steps, compared to what patients narrated after a period of time. This information can be obtained from the health professionals' interviews only by summarizing their different points of view. Furthermore, through shadowing it was possible to detect that within the hospital the patient went through eighteen different places and was in contact with more than fifty different health professionals. The patients' emotions as reported by the health professionals corresponded to what was

Table 1. Illustration of structural analysis.

Units of meaning What was said	Units of significance What the text was talking about	Themes Emergence of key themes
"At the time of admission you can see from the face of the patient that he is shaken; they are not always aware; unfortunately, they do not always know perfectly what they are going to do" (Healthcare professional 6).	Patient information does not seem to be effective.	The information gap
"When I went to the operating theatre I met the doctor who was treating me. When he is there I am calm about what I have to do" (Patient 2).	The presence of the surgeon in the operating theatre calms the patient.	The covering patient-professionals relationship

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Table 2. Main characteristics of participant involved in the study.

Patients (interviewed)				
Code	**Sex**	**Surgery***	**LOS**, days**	**Clinical course**
Patient 1	Female	TKA	6	Regular
Patient 2	Female	TKA	5	Regular
Patient 3	Female	TKA	2	Regular
Patient 4	Male	THA	6	Regular
Patients (shadowed)				
Code	**Sex**	**Surgery***	**LOS**, days**	**Clinical course**
Patient 5	Male	TKA	6	Regular
Patient 6	Male	THA	6	Regular
Patient 7	Female	THA	6	Regular
Patient 8	Female	THA	5	Regular
Patient 9	Male	TKA	3	Regular
Patient 10	Male	THA	4	Regular
Patient 11	Male	TKA	2	Regular
Patient 12	Male	TKA	2	Regular
Healthcare professionals				
Code	**Sex**	**Time from recruitment, years**		
Healthcare professional 1	Male	20		
Healthcare professional 2	Male	1		
Healthcare professional 3	Male	-		
Healthcare professional 4	Female	4		
Healthcare professional 5	Female	4		
Healthcare professional 6	Female	7		
Healthcare professional 7	Female	16		
Healthcare professional 8	Female	5		
Healthcare professional 9	Female	3		
Healthcare professional 10	Male	3		
Healthcare professional 11	Male	10		
Healthcare professional 12	Female	20		
Healthcare professional 13	Female	15		
Healthcare professional 14	Female	15		
Healthcare professional 15	Female	17		
Healthcare professional 16	Female	20		

* TKA = total knee arthroplasty; THA = total hip arthroplasty

**LOS = Length of Stay

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observed by shadowing, but they did not match the general state of serenity reported by patients when interviewed.

The three different standpoints, (i.e.: patient shadowing, healthcare professional interviews and patient interviews) allowed different issues to be captured at the various phases of the journey. In particular, the shadowing was able to capture the 'connections' between one stage and another of the journey, such as movement from admissions to the ward and transport from the ward to the operating theatre, while the journey narrated by each professional and patient allowed the most significant touchpoints to be identified (Table 3).

When interviewed about a month after discharge, patients remembered a generally positive experience, linked specifically to the success of surgery and to a good relationship with the

Table 3. Patient journeys' main steps and touchpoints.

Journeys'main steps and touchpoints	Touchpoints	Patients (Interviewed)	Patients (Shadowed)	Professionals (Interviewed)	Patient Main Emotions (shadowing and professionals interviews)
Outpatient visit					
Booking of the outpatient visit	●		-	●	
Arrival at the hospital and administrative processing	●		-	●	
Outpatient visit	●	●	-	●	
Exit from the Hospital			-		
Examination at outpatient clinic					
Call for pre-admission clinic	●		-	●	Annoyance
Arrival at the hospital and waiting for procedures	●	●	-	●	
Assistance procedures	●	●	-	●	
Exit from the Hospital			-	●	
Hospitalization and surgery					
Waiting for inpatient admission		●	-	●	Fear, Apprehension
Call for inpatient admission notice and confirmation	●		-	●	
Call for an informational meeting and evaluation of the therapy	●		-	●	
Execution procedure for blood request	●		-	●	
Informational meeting (when possible)	●		-	●	
Arrival at the hospital and waiting for admission	●		●	●	
Administrative admission	●		●	●	
Moving to the ward			●	●	
Waiting in front of the Ward entrance			●	●	
Entry into the Ward	●	●	●	●	
Arrival at the inpatient room	●		●	●	
Waiting in the inpatient room			●	●	
Assistance procedures	●	●	●	●	
Transfer to the Operating Theatre	●	●	●	●	
Waiting in the Transfer bay	●		●	●	
Assistance procedures	●		●	●	
Entry into the Operating Theatre	●		●	●	
Transfer to the induction room	●		-	●	
Surgery (unconscious patient)		●	-	●	
Transfer to the post anaesthetic care unit (partially conscious patient)	●		-	●	
Post-surgical care					
Transfer and entry to the Ward	●	●	●	●	Serenity, Fear, Apprehension
Assistance procedures	●	●	●	●	
Transfer and waiting for radiography	●		●	●	
Radiography	●	●	●	●	
Waiting for transfer			●		
Transfer to the Ward	●		●		
Post-surgery hospitalization	●	●	●	●	
Discharge					
Assistance procedures	●		●	●	Serenity
Transfer to the Rehabilitation Units	●	●	●	●	

(*Continued*)

Table 3. (Continued)

Journeys'main steps and touchpoints	Touchpoints	Patients (Interviewed)	Patients (Shadowed)	Professionals (Interviewed)	Patient Main Emotions (shadowing and professionals interviews)
Rehabilitation stay					
Arrival at the Rehabilitation Department	●		-	●	Apprehension, Acceptance
Assistance procedures	●		-	●	
Discharge	●		-	●	
Rehabilitation in Outpatient	●		-	●	
Follow-up visit					
Arrival at the hospital and administrative processing	●		-	●	Serenity
Outpatient visit	●	●	-	●	
Exit from the Hospital			-		

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professionals. They showed appreciation and satisfaction and they declared that there were no major problems to deal with. One patient reported *"I was fine, look, I have to say the night of the surgery I was fine, the next day they also made me get up. They made me sit in the chair, my head was spinning a little, so it's not that ehm . . . then nothing else, everything else went well"* (Patient 1); Another reported *"What can I say? Better than that I don't think it is; that. . . we may be worse, but I have not found that I was worse, and I have only good things to say about the professor and all his assistants"* (Patient 3).

However, when shadowed, some discrepancies emerged. When going independently to the ward patients experienced confusion and anxiety, due to not having clearly understood indications, and to the waiting times before entering the assigned ward (Patient 5, 6, 7, 8, 9,12). Another critical step was the transfer and waiting in the operating theatre. They felt 'lost' when they were transferred and emotions of fear and anxiety emerged (Patient 10; 11). These experiences also emerged from the interviews with professionals (Healthcare professional 4, 6, 8, 12, 14 16).

Some other interesting points, detected by the shadowing, reveal how the hospital environment and management of patient flow can affect the patient experience, in particular on the day of admission. After the administrative acceptance, one patient took the wrong elevator and did not immediately reach the indicated ward. When arriving at the entrance of the ward, he found it difficult to use the intercom. When entering the ward, he was dissatisfied with the lack of staff to welcome him. When waiting in the room for surgery he showed apprehension and he reported a desire to have more information and to have a family member nearby (Patient 9). Another patient reported having received incorrect information to reach the ward and that the hospital directional signs were too small and difficult to read (Patient 1).

During the journey it is possible to identify some key steps, though with different levels of importance from patients' and professionals' perspectives. From the patient perspective and by shadowing the journey, the day of hospitalization was the most critical, and they experienced mainly negative emotions (Patient 5, 6, 7, 8, 9,12). From the interviews with the professionals it emerges that when returning to the ward after surgery patients were calm (Healthcare professional 7, 8, 16) but in the following days, they began to experience a lack of autonomy and this could make them nervous (Healthcare professional 13). Professionals involved in the pre-hospitalization phase report that waiting in the days before hospital admission can negatively affect patient experience. Patients can feel abandoned, if no one gives them information on the outcome of the outpatient clinic examination, or if all the procedures related to hospitalization are not properly programmed (Healthcare professional 1, 9).

Through analysis of the data collected four main themes emerged underlying both the shadowing and the interviews: the information gap; the covering patient-professionals relationship; the effectiveness of family closeness; and the micro-integration of hospital services.

The most significant issues are reported below.

The information gap

When interviewed, patients did not mention any problems with the information received in the course of their hospital journey. However, when patients were shadowed on arrival at the hospital, they did not seem to be aware of any information regarding their hospitalization (e.g. visiting hours for family members, the hospital route to the ward), but asked the first professionals they met. The patients seemed lost, especially after going through the admission process and on looking for their assigned wards. Moreover, when they arrived in the ward they needed information about their hospitalization, but healthcare professionals did not immediately assist them (Patient 5, 6, 9). This seemed to contribute to their state of anxiety about the surgery. This issue is confirmed by what the professionals reported. When they arrive at the hospital, patients put the same questions to any professional they come into contact with (Healthcare professional 4, 6). A nurse reports how each patient has *"so many anxieties, fears, uncertainties, questions, as soon as he steps into the ward and I follow him, until he leaves the ward"* (Healthcare professional 1). A head nurse reports *"Family members also ask many questions. Many times it seems that what was already explained by the doctor, actually, has not sunk in (. . .) And so here they repeat the same questions many times, in different ways. What worries them a lot (. . .) is what will happen after discharge, when 'I find him at home or in a rehabilitation clinic'"* (Healthcare professional 13). Apprehension before surgery was observed in one patient, even though the patient claimed to have received very good information on how the surgery would be performed (Patient 2).

The time of waiting while the patient is in the operating theatre seems endless for family members, and waiting without information is a cause of anxiety (Healthcare professional 6). Professionals recognize the importance of informing the patient and family members about procedures, clinical pathways and pain management, before surgery (Healthcare professional 1, 2, 4, 7).

The covering patient-professionals relationship

The relationship between patient and professionals is a key issue for the quality of the service perceived by the patient, even when the health care provider fails to respond immediately to the patient's needs. Indeed, as many as 35 touchpoints occur throughout the patient journey (Table 3). What the patient thinks and feels on this topic, emerges especially from the interviews, while the shadowing is not able to immediately capture thoughts or observations re-elaborated by the patient. In particular, when interviewed the patients remember, even after some time, some aspects of the relationship with professionals that are not directly related to clinical care, but which are perceived as being of value for the patients, since in these they receive attention as an individual. Even after some time, a patient remembered: *"Early in the morning the nurse came to say goodbye before she went off duty, because I was being discharged later that day, so she wouldn't see me again. Really good."* (Patient 3). A patient also remembered a rough response to a request for help to get dressed after the X-ray during outpatient clinic examination (Patient 2). Moreover, a patient pointed out how reassuring the relationship with the surgeon could be just before the surgery (Patient 3). One of the key moments appears to be the contact with the anaesthesiologist and the surgeon while the patient is waiting in the operating theatre: *"Then the anaesthesiologist told me 'Don't worry, my dear, we do*

the epidural, we will sedate you'" (Patient 1). From the professionals' perspective, the relationship with the patient is a key point to "buffer" a series of disruptions in the hospital journey and to reassure the patient: "*Patients always thank us because even if there is a gap in the organization and the patient has to wait a little, we apologize in the best way, with a smile"* (Healthcare professional 3). As the nurse is the first person patients encounter when entering the ward, she knows she has the important role of reassuring patients by explaining to them how to orientate themselves in the ward and which procedures will be carried out, even if patients should already have been informed about all these things (Healthcare professional 4). Professionals recognize the importance of calming patients through interaction with the surgeon especially when they are waiting just before surgery (Healthcare professional 3, 13). An orthopaedist reports, *"When you check or welcome the patient in the operating surgery where the surgeon and the anaesthesiologist are, the patient sees them and this helps him or her a lot, and so one thing that I think is in our favour (. . .) is communication, the possibility of having a point of reference"* (Healthcare professional 3).

The effectiveness of family closeness

Family closeness is felt to be important for both patients and professionals, if programmed at the right times of the clinical journey. From the patient interviews and from shadowing it emerges that patients like family members to stay with them when waiting for surgery (Patient 4, 9). Once the surgery has been performed, when fears are diminished and pain is controlled, patients do not consider the presence of family members necessary, in particular immediately after returning to the ward from the operating theatre (Patient 1, 4). From the shadowing it emerges that after the first few days, when patients have recovered from the post-operative stage and close assistance has diminished, they then like to be with their family without interruptions for clinical-assistance reasons (Patient 10).

For professionals, family presence is important especially shortly before and after surgery, to reassure family members that the patient is doing well (Healthcare professional 5, 7, 13). When possible, professionals try to facilitate this, even outside regular visiting hours (Healthcare professional 13). In the days after surgery, *"It is mainly relatives who come from outside the city who logically stay here, maybe in a hotel or some bed & breakfast, and would like to stay in the room all day; because they say–quite rightly, as I realize–: 'But I have nothing else to do; my husband, my wife, my son is there. I'm with him'"* (Healthcare professional 12). At this stage of the clinical journey, professionals do not see the closeness of family members as a need of the patient. Immediately after surgery, patients prefer to rest rather than having many people in their room. Conversely, the presence and closeness of family can greatly affect the patient experience in the rehabilitation period, especially when it comes to discharging elderly patients (Healthcare professional 15).

The micro-integration of hospital services

Even for a relatively simple routine surgical pathway, patients go through multiple stages. The behind-the-scenes coordination remains invisible to them and they are able to capture only some of the effects related to it. By contrast, professionals emphasize many critical issues in the management of the patient journey that affect the patient's experience.

When interviewed, patients reported the difficulty of having to move from one clinic to another during the outpatient clinic examination (Patient 1). Before hospital admission, an admissions office administrator shows how necessary it is to *"decrease calls to the patient (. . .), also depending on their age which is on average quite advanced . . .. cut out some calls that often from their point of view are unconnected. For instance, on one day I call you for admission, then*

the doctor calls you for blood tests, then another doctor calls you to arrange the meeting (. . .), then if you take cardioaspirin the doctor calls you to give you information on cardioaspirin . . . All these calls could be grouped into maybe one by the doctor and one by the administrative staff" (Healthcare professional 10). At the time of hospital admission some critical points are revealed by the shadowing. After arriving at the hospital, patients waited an average of 21 minutes before being taken in charge by the Administrative Office to carry out admission procedures. At the end of the administrative registration procedures, patients made their own way to the ward, taking an average of 11 minutes. In this time, patients could get lost; they experienced anxiety about not getting to the right place, and waited outside the closed door of the ward without knowing what to do (Patient 5, 6, 7, 9). During their hospitalization, patients reported a lack of communication: a drug intolerance reported in their previous admissions had not been recorded in the notes. Orthopaedists reported critical issues concerning the management of operating theatres, such as delays in transporting patients from the ward to the operating theatre or delays in preparing the operating theatre for the next operation (Healthcare professional 2, 3). The accumulation of such delays could lead to the cancellation of the last scheduled patient, with a negative impact on the patient who had been waiting in a state of anxiety for many hours (Healthcare professional 2). A head nurse reported that waiting for transport to and from the radiology department for the post-operative radiography could slow down all the care processes, make the patient wait unnecessarily, and increase the pain, due to the temporary suspension of the continuous-infusion pain-killer (Healthcare professional 12). Finally, a patient reported that she was offered no choice when she was transferred to the rehabilitation unit recommended by the doctors, and she expressed the desire for a follow-up visit by the same doctor who had operated on her (Patient 1).

Discussion

Exploring the individual patient journey can lead healthcare organizations to improve patient experience by focusing on the patient perspective, rather than the provider perspective [39]. Understanding what organizations can do to improve patient experience is critical [40]. However, the literature is still exploring the best methods to capture the patient's experience [17, 23, 30]. This study deals with the lived experience of orthopaedic patients by capturing the different points of view of patients and professionals on individual hospital patient journeys. Patients' reported experience is analysed by shadowing them during hospitalization and by interviewing them at the end of the whole journey.

Historically, researchers and health care managers have focused on the study of how to achieve effective care through the definition of clinical pathways and by increasing patient adherence to treatment. However, reducing the patient's path to the clinical perspective may fail to reveal aspects that are relevant to patients, that influence their experience and their perception of quality of service [42, 42]. In this study on patients' hospital journeys, some important issues emerged through the shadowing of the hospital journey of the patients, and interviews with the key players. With the integrated use of these methods it was possible to identify which touchpoints are most critical for the patient, when family closeness is most effective, and how professionals can provide for the needs shown by patients over the entire journey. If on one hand the study of clinical pathways is now heading towards the active involvement of patients in decisions related to their own health issues [43], on the other hand the analysis of the hospital journey from a patient perspective can lead organizations to improve cross-hospital processes by creating procedures and focusing healthcare professionals on overall patient experience.

In line with Liberati's analysis [30], the shadowing method can contribute to patient-centredness by considering all the aspects of service delivery, not just the clinical one. In this study, both interviews and shadowing are able to "see the world from someone else's point of view" [24]. However, the patient's observations, focused on the whole service experienced, can reveal areas of potential improvement of the patient experience not otherwise identifiable. Shadowing highlights what the patient experiences in the different contexts and when going through one service and on to another, which professionals do not see since this falls outside the scope of their direct responsibility. Moreover, unlike using diaries completed by patients [23], this methodology allows the patient to be observed in the moment and in the spaces in which the relationship with the professionals takes place. However, this necessarily determines a subjective interpretation of what the researcher observes with respect to what the patient affirms.

Unlike what was pointed out by Gill [44], when dealing with the patient journey perspective, shadowing has an important potential for revealing invisible steps and spaces of the journey, more than intimate spaces and micro-processes of the decision. It is true that even now, in the healthcare sector, the provider establishes the patient path, while the patient is 'carried forward' through processes designed and managed by others.

In this study, when interviewed after time, patients focused on the overall clinical experience, forgetting other issues related to their hospitalization. For example, when interviewed, patients reported that they had had all the information they needed, while when shadowed shortly before the surgery the same patients appeared lost and asked for information from all the professionals they met. These data are also confirmed by interviews with professionals, who reported how highly emotional touchpoints, such as telling the patient they needed an operation, or the time immediately before transfer to the operating theatre, may affect patients' perceptions and the effectiveness of the information [41, 45]. As suggested by Ziebland, there is a difference between what patients said they experienced and what they actually experienced in real-life settings [20]. In this sense, the use of shadowing helps to understand the experience in a real time context. Moreover, it is always useful to evaluate whether the tools and information methods used for giving information to patients are effective, and which is the best moment for each patient to receive all the information they need, by considering their ability to absorb the information in a stressful situation [46–48].

In this study, both patients and professionals recognized the value of a personalized relationship in improving patient experience. Moreover, professionals report how a good relationship with the patient can compensate for the organization's inefficiencies. Interaction with the patient is especially important in the perceived patient-critical touchpoints. However, relevant steps of the journey are different from patients' and from professionals' points of view. From the patient's point of view, the most critical steps occur when entering the hospital and just before surgery, where their emotional involvement is greater. On the other hand, from the professionals' point of view, planning hospitalization and preparing patients for surgery is one of the most critical steps that affect patient experience. Indeed, patients, when interviewed, seem not to perceive critical issues in what happens 'behind the scenes', while professionals are able to identify issues related to the organization that can positively or negatively affect patients' experience. These results highlight how frontline professionals are the key players in transforming organizational procedures into personalized care pathways, but the misalignment of views should be considered when improving the hospital journey by including the patients' perspective.

The study has important limitations with respect to the sample and the setting considered and therefore its potential for generalization may be limited. The issues that emerged would need to be studied in depth in different care settings and with other types of patients to allow comparison of data and methodologies.

Conclusions

Patients' experiences have become increasingly central to assess the performance of healthcare organizations and to redesign the services around the real needs of patients [20, 41, 42, 45, 49]. In this study, the analysis of the hospital journey from the patient perspective and the integration of three different standpoints, patient shadowing, healthcare professional interviews and patient interviews, highlights important areas of improvement otherwise hidden by the analysis of the clinical pathway only.

The nature of the study and its originality by subject matter and methods adopted can stimulate both academics and healthcare managers to explore important new fields. On the one hand, it is important to further investigate methodologies for capturing the patient experience and use it deeply and effectively at various organizational levels. In this way, shadowing seems to give a more patient-centric perspective, but it raises questions about its effectiveness as a single methodology for gathering the whole patient experience within a complex hospital process. On the other hand, the results of this study are a starting-point for healthcare managers who want to improve a key cross-functional hospital process in which the patient is the main actor. By considering the overall patient experience, as well as services performance and clinical pathways, they will able to create a distinctive value both for the patient and for the organization.

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Challenges and potential improvements in hospital patient flow: the contribution of frontline, top and middle management professionals

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Abstract

Purpose – This study aims to describe and understand the contributions of frontline, middle and top management healthcare professionals in detecting areas of potential improvement in hospital patient flow and proposing solutions.

Design/methodology/approach – This is a qualitative interview study. Semi-structured interviews were conducted with twenty-two professionals in the Orthopedic Department of a 250-bed academic teaching hospital. Data were analyzed through a thematic framework analytical approach by using an a priori framework. The Consolidated Criteria for Reporting Qualitative (COREQ) checklist for qualitative studies was followed.

Findings – When dealing with a hospital-wide process, the involvement of all professionals, including non-health professionals, can reveal priority areas for improvement and for services integration. The improvements identified by the professionals largely focus on covering major gaps detected in the technical and administrative quality.

Research limitations/implications – This study focused on the professional viewpoint and the connections between services and further studies should explore the role of patient involvement. The study design could limit the generalizability of findings.

Practical implications – Improving high quality, efficient hospital patient flow cannot be accomplished without learning the perspective of the healthcare professionals on the process of service delivery.

Originality/value – Few qualitative studies explore professionals' perspectives on patient needs in hospital flow management. This study provides insights into what produces value for the patient within a complex process by analyzing the contribution of professionals from their particular role in the organization.

Key-words hospital patient flow improvement, quality improvement, front line professionals' involvement, middle managers' involvement, top managers' involvement.

Paper type Research paper

Introduction

The increasing demand for health care services leads organizations to face critical tensions between cost saving, services improvement and equity of access, while maintaining the central focus on increasing value for patients. In the hospital setting, the management of patient flow is a complex key business process which impacts both on hospital productivity and on patient outcomes (Jack & Powers, 2008; Crilly *et al*., 2015; Kane *et al*., 2016; Winasti *et al*., 2018). While ensuring that each patient arrives at each point of care as needed, the hospital has to effectively balance the increasing demands of an unknown and variable volume of patients with the hospital resources available (Litvak, 2010; Eriksson, 2017). Therefore, improving hospital patient flow has become a policy priority where strategic and operational hospital goals are achieved. On one hand, hospitals can increase levels of productivity, clinical outcomes, and patient safety through the effective use of resources (i.e. beds, operating theaters, availability of specialized professionals) (Kriegel *et al*., 2015; Elliott *et al.,* 2015; Borenstein *et al.,* 2016). On the other, hospitals can improve patient satisfaction and patient experience by focusing on the individual patient journey (Lutze *et al.,* 2014; Ponsignon *et al.,* 2018).

A key requirement for healthcare service quality improvement is to understand the circumstances surrounding the patient's value creation process (Batalden & Davidoff, 2007). Indeed, the way in which the work is organized can have an impact on the productivity and quality of the service provided (Broekhuis *et al.,* 2009). Studies emphasize that first-hand experience represents an important source of knowledge for a better design of a service, process or product (Steen *et al.,* 2011; Needleman *et al.,* 2016). Since most of the events that make up a service are invisible to the patient, professionals are better placed to detect quality gaps in the process (Locock, 2003; Wong *et al.,* 2011). For example, the patient does not see the steps needed to obtain the right surgical instruments for the operation, but experiences an unnecessary waiting time in his journey if any gaps occur. However, in a hospital-wide process, the integration of several services and the high number of professionals involved at all levels of the organization makes it difficult to identify whether and how important patient needs are fulfilled.

This study examined the lived experience of orthopedic patients with elective total hip or knee replacement from the point of view of frontline, top and middle management hospital professionals. The study is a part of a larger research and development project that aims to improve hospital patient flow by involving patients, professionals and researchers. This article focuses on what kind of patient needs and quality improvement solutions may be detected by healthcare professionals.

Background

Hospital patient flow can be defined as "how hospitals transfer patients between nursing units, and it is influenced by the levels of care required and the severity of patients' conditions" (Hendrich *et al.,* 2004). Patient flows are inherently subject to high variability, depending on the patient inflow at a given time, the nature of patients' needs, responses to treatment, and the state of medical knowledge (Bohmer, 2005). Currently, there is a lack of standard terms to define hospital patient flow performance, because of its intersection with other concepts such as hospital capacity management, bed management and demand variation management. Dagger *et al.* (2007) created a model in order to clearly link patient satisfaction and service quality. In this model, patients' perceptions of quality are based on four dimensions: interpersonal quality, defined as the relationship developed between a service provider and a user; technical quality, defined as the outcomes achieved and the technical competence of a service provider; environmental quality, defined as the environmental features that shape consumer service perceptions; and administrative quality, defined as the service elements that facilitate the production of a core service while adding value to a customer's use of the service. In a recent study, Gustavsson *et al.* (2016) add two more dimensions: family quality – the ability for the family to stay together; and involvement quality – the ability to handle the situation in terms of responsibility and capability.

Some important factors have to be considered when improving hospital patient flow. First, the person who knows most about the patient's perspective is necessarily someone who enters into a relationship with him (Locock, 2003). Second, the traditional approach of inviting contributions

from each medical or surgical division may not reveal disconnections between the stages of the process (Ben-Tovim *et al.,* 2008). Finally, this kind of cross-functional process, using a large amount of the hospital's human and technological resources, has to be managed at macro level by middle and top managers (Castillo *et al.,*2011; Jweinat *et al.,* 2013; Olsson *et al.,* 2017). Consequently, all the actors in the frontline, middle and top management should be able to capture important aspects of the quality of the service offered.

Many studies have emphasized the importance of involving the key representative professionals in patient flow improvement (Locock, 2003; Kriegel *et al.,*2015; Winasti, 2018). However, little is known about what contributions professionals can give as a result of the specific position they each hold in the organization. In particular, few studies consider which professionals to involve and how to involve them, at various levels of the organization, when studying a hospital-wide process.

Therefore, the aim of this study is to understand the contributions of professionals in identifying areas for improvement in hospital patient flow. In particular, this study seeks to answer the following questions. Which quality dimensions of healthcare services do different professionals identify in regard to improving patient flow? In which ways can frontline, middle or top management professionals help to identify solutions for improving patient flow?

Methods

Design and setting

This study was focused on data from a quality improvement project undertaken in the Orthopedic Department of a 250-bed Italian academic teaching hospital. The purpose of the whole project was to capture patients' experiences and needs in order to improve the hospital flow of orthopedic patients, while this study focuses mainly on the contribution of the healthcare professionals involved.

As no literature was found concerning the challenges and potential improvements of the hospital patient flow process in relation to the roles or functions of the professionals within the organization, a qualitative research design with a phenomenological-hermeneutic approach was chosen (Braun, 2013). Accordingly, the case was chosen as a purposive sample (Flick, 2009). The Consolidated Criteria for Reporting Qualitative Research - COREQ checklist was used as a guideline to report the study data (Tong *et al.,* 2007) (See Supplementary File 1).

Patient flow analysis was limited to scheduled patients treated surgically for total hip or knee replacement. Urgently admitted patients were excluded due to the different clinical path they followed. Consistently with the desire to analyze patient flow from the patient's perspective, the unit of analysis was the hospital patient journey starting from the first outpatient visit until the first follow-up visit.

The Orthopedic Department undertakes 1500 admissions per year in standard procedure (day surgery excluded) of which about 700 are for hip or knee replacement. It consists of two units located in two different multidisciplinary wards of the hospital, with a total of 22 beds. The management of hospital beds is centralized and entrusted to a team of nurses who, through administrative staff, operate patient calls, hospitalization and assignment of beds according to the complexity of care and bed availability in each ward.

Patients undergo a prehospitalization process about 2 months before admission, where the clinical examinations necessary for surgery are performed. They may be admitted on the day of the surgery or on the previous day according to the clinical examinations to be completed or re-evaluated. Patients receive surgery in two different surgery blocks according to the overall surgery plan for the hospital. The surgery blocks are located on two different floors of the Hospital with a total of 10 operating theaters. The average stay is 4 days in the absence of complications, and then the patient is transferred to rehabilitation. The Hospital includes a 20-bed rehabilitation located in a separate building where patients are transferred based on bed availability.

Participants

Between September 2016 and April 2017 a convenience sample of 22 key health professionals were selected by the first and the third author. The selection criteria were: hospital employees

willing to participate in and contribute to the project; able to give informed consent for participation in the study; able to communicate in Italian; and having at least two years' experience in the hospital. The corresponding author informed the professionals of the study via e-mail and invited participation. No employee refused the invitation.

Frontline professionals were selected among those employees who directly interact with patients during a total hip or knee replacement surgery. Middle management professionals were selected following the definition offered by Belasen & Belasen (2016), as those managers who "convert strategic goals into actionable improvement plans at the department or work unit level, engage employees in safety and quality assurance efforts (…), and identify processes for continuous improvement". Accordingly, 3 physicians, 5 nurses, 3 admissions officers, 2 patient transporters, 4 head nurses and 2 nurse bed managers were asked to participate. In addition, a member of the Medical Management Team, the Hospital Managing Director and the Hospital Clinical Director were included.

Data collection

Professionals participated in face-to-face open interviews lasting 30–45 min. At the time of the initial call, participants were informed of the aims of the study and the conditions of participation, and given guarantees of confidentiality. They each signed a consent form. The interviews took place in identified and isolated hospital rooms where the interviewees could break away from ordinary hospital clinical activity. The first and third author led the interviews, with a trained nursing student present to note any events that occurred during the interview. The authors had a nursing background and knew the professionals because they worked in the same hospital with managerial functions. The authors did not play roles in delivery of care. Their interests in the research topic were motivated by the desire to conduct the research project and to improve the hospital patient flow within the organization. Any possibility of coercion was minimized by guaranteeing data anonymity and by requesting voluntary participation in the study.

The interviews were semi-structured in nature and were prepared by the whole research group, which drew up a few main open questions in order to leave the interviewees free to narrate their experience, and to facilitate broad answers. Questions aimed to gain an understanding of the main steps and gaps in the orthopedic patients flow from the patient perspective, and to identify which improvements each participant could suggest. Data saturation was achieved by considering the degree to which new data repeat what was expressed in previous data.

All data were treated as confidential. Physical data was stored under lock and key at the hospital and digital data was password-protected and stored in professionally maintained servers.

Research ethics approvals were obtained from the Hospital Ethics Committee and written informed consent from all participants was obtained and stored.

Data Analysis

Interview findings were analyzed by the first author using a thematic framework analytical approach (Pope *et al.,* 2000; Gale *et al.,* 2013) in which the framework was given a priori with reference to the work of Dagger and Gustavsson on quality dimensions of health services (Dagger *et al.,* 2007; Gustavsson *et al.,* 2016). This approach was chosen as the project had specific issues to explore, but also aimed to leave space to discover any unexpected issues of the participants' experience or the way they assigned meaning to phenomena (Gale *et al.,* 2013).

The interviews were audio-recorded and transcribed verbatim by a trained nursing student. After familiarization by reading the transcripts by the first author, data were coded and transferred to an Excel spreadsheet database to systematize them and for the subsequent analysis. During the analysis process, data were coded in Italian and then abstracted and summarized. In particular, the units of meaning (what was said) were reflected in units of significance (what the texts were talking about) from which the key themes emerged (Table I). Each theme relating to the quality of the service and to possible improvements was subsequently classified in the quality dimensions defined by Gustavsson *et al.* (2016) (Tables I-II).

Table I. Illustration of structural analysis

Units of meaning What was said	Units of significance What the text was talking about	Themes Emergence of key themes	Service quality dimensions
Head Nurse: "The difficulty is that in the morning the elderly, if they arrive early at seven, in short, this ... wait outside the ward, to prepare the bed, which physically is never free, so leaving them out of the ward is a bit unpleasant" (HD3; Record 266)	Waiting for an available bed	Waiting with no value for the patient	Administrative Quality - Timeliness

Table II. Service quality dimensions adapted from Dagger et al. (2007) and Gustavsson et al. (2016)

Interpersonal Quality	Technical Quality	Environment Quality	Administrative Quality	Family Quality	Involvement Quality
Interaction Relationship	Outcome Expertise	Atmosphere Tangibles	Timeliness Operation Support	Closeness Normality	Participation Responsibility Capability

Once all the data had been coded using this analytical framework, the data was summarized in a matrix for each theme using Microsoft Excel. Improvements identified by professionals were classified based on their applicability at unit, departmental and organizational level.

The main quotations reported in this work were selected depending on how illustrative the quotation was in relation to the theme.

Results

Between September 2016 and April 2017, 22 professionals were invited to participate and all agreed. Professionals ranged in age from 29–61 years with an average age of 38.2 years and average work experience of 10.3 years. The main characteristics of each participant are reported in the Table III.

Table III. Main characteristics of professionals included in the study

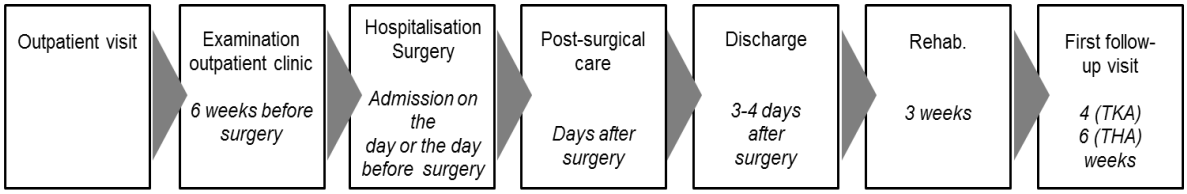
Frontline Staff			
Code	**Sex**	**Position**	**Time from recruitment, years**
Orthopedist 1	Male	Orthopedist Specialist	20
Orthopedist 2	Male	Orthopedist Specialist	5
Orthopedist 3	Male	Orthopedist Resident	3
Nurse 1	Female	Ward Nurse	4
Nurse 2	Female	Ward Nurse	4
Nurse 3	Female	Ward Nurse	7
Nurse 4	Female	Ward Nurse	16
Nurse 5	Female	Ward Nurse	5
Admissions Officer 1	Female	Admissions Officer	3
Admissions Officer 2	Male	Admissions Officer	3
Admissions Officer 3	Male	Admissions Officer	10
Patient Transporter 1	Male	Patient Transporter	12
Patient Transporter 2	Male	Patient Transporter	12

Middle Managers			
Head Nurse 1	Female	Head Nurse Ward	20
Head Nurse 2	Female	Head Nurse Operating Theater	15
Head Nurse 3	Female	Head Nurse Ward	15
Head Nurse 4	Female	Head Nurse Rehabilitation	17
Nurse Bed Manager 1	Female	Nurse Bed Manager	9
Nurse Bed Manager 2	Female	Nurse Bed Manager	11
Medical Management Team	Female	Member of Medical Management Team	5
Top Managers			
Managing Director	Male	Managing Director	9
Clinical Director	Female	Clinical Director	20

Detecting quality gaps in a cross-functional process

By asking professionals to take the patient's perspective over and above the provider's perspective, it is possible to map the entire journey as experienced by the patient. In the patient journey under study, seven main phases are identified (Figure 1). The whole process is composed of more than thirty-five consecutive and closely interconnected steps, and the correct execution of each step affects both the patient journey and the daily work of each service.

Figure 1 Flow of patients' pathway in total hip arthroplasty (THA)/total knee arthroplasty (TKA) programme and scheduled timing of the study



Frontline professionals accurately describe the steps in which they come into contact with the patient or for which they are responsible; they describe the main phases of the whole process; but their reporting on all the steps that the patient has to traverse is only partial. In some cases they are able to report steps antecedent to or immediately after the segment of the process in which they are involved (Table IV). For example, physicians focus on the steps needed for the patient's arrival in the operating theater, but they do not mention the patient telephone call at home for admission by the administrative office, or the transfer from the admission office to the inpatient unit on the day of admission. Similarly, nurses clearly describe all the steps related to admission and stay in the ward, but they do not report on when the patient is called for admission, what happens when the patient enters the hospital or what happens when he or she is transferred to the Rehabilitation Unit.

Table IV. Steps of the patient journey identified by the professionals

	Front line Staff				Middle Managers			Top Managers	
Patient Journeys' main steps	Orthopedist	Nurse	Administrative Staff	Patient Transport Service	Head Nurse	Nurse Bed Manager	Member of Medical Management Team	Managing Director	Clinical Director
Outpatient visit									
Booking of the outpatient visit		●							
Arrival at the hospital and administrative processing		●						●	
Outpatient visit	●	●	●		●		●	●	
Examination at outpatient clinic									
Call for pre-admission clinic	●				●		●		
Arrival at the hospital and waiting for procedures			●		●				●
Assistance procedures	●	●	●		●		●	●	●
Exit from the Hospital									●
Hospitalization and surgery									
Waiting for inpatient admission									●
Call for inpatient admission notice and confirmation	●	●	●		●	●		●	●
Call for an informational meeting and evaluation of the therapy		●	●						
Execution procedure for blood request			●						
Informational meeting (when possible)			●						●
Arrival at the hospital and waiting for admission						●			●
Administrative admission			●		●	●	●	●	●
Moving to the ward			●			●			●
Waiting in front the Ward entrance					●				
Entry into the Ward		●							
Arrival at the inpatient room									●
Waiting in the inpatient room						●			●
Assistance procedures	●	●		●	●	●			●
Transfer to the Operating Theatre	●	●		●	●	●			●
Waiting in the Transfer bay		●			●				
Assistance procedures					●				
Entry into the Operating Theatre						●			
Transfer to the induction room				●	●				
Surgery (unconscious patient)	●	●			●	●	●	●	
Transfer to the post anaesthetic care unit (partially conscious patient)	●	●			●			●	
Post-surgical care									
Transfer and entry to the Ward	●	●				●		●	●
Assistance procedures	●	●				●			●
Transfer and waiting for radiography		●							

Radiography	•	•		•					
Discharge									
Assistance procedures	•	•		•					•
Transfer to the Rehabilitation Units	•	•	•			•	•	•	•
Rehabilitation stay									
Assistance procedures	•	•				•			
Follow-up visit									
Arrival at the hospital and administrative processing	•								
Outpatient visit	•	•					•	•	•

The interviewees described different gaps occurring in the course of the whole process and involving almost all the quality dimensions. Most of them refer to administrative quality and technical quality.

Among the elements that make up administrative quality, gaps are pointed out in the operations and in the timeline. The lack of clear indications to the patient on where to go after administrative admission, the delay in transporting patients to the operating theater, the cancellation of surgery due to accumulation of delays in the management of the operating theater, impact both the work of the professionals and the quality of the service offered to the patient. For example, the time of the patient's entry into the hospital is critical both for the patient and for the operating theater. From one side, the patient experiences anxiety about the surgery and seems not to understand what to do. From the other, those working in the operating theater would like to have patients always immediately ready for surgery to avoid delays in operating schedules.

"It often happens that patients do not know where they are, what they can or cannot touch, who they can ask for help: 'Who is he?' 'Isn't he?', 'Who is that other person going around?', (...). Beyond that, there is the great fear that the patient faces ... about the surgery. So they begin to ask to you, as soon as they arrive 'When will I have the operation?', 'So what will happen to me?', 'When I get home I'll need help. Will I have to rely on my family or will you offer me assistance?'" (Nurse 1).

Middle management professionals mainly emphasize gaps in timeliness resulting in waits without added value for the patient. For example, the admission of patients when no bed is yet available in the ward, or delays in operating theater management, result in unnecessary waiting for the patient.

"The difficulty is that in the morning the elderly, if they arrive early at seven, in short, this ... wait outside the ward, to prepare the bed, which physically is never free, so leaving them out of the ward is a bit unpleasant" (Head Nurse 3).

Even from the point of view of an orthopedist, the management of the operating theater may significantly impact on the quality perceived by the patient.

"Ten minutes there, ten minutes there, ten minutes there, and then you get to half past six in the evening and the operating theater management staff says: 'We can't perform another surgery'. The patient feels this, because he has been fasting from midnight to half past six in the evening, ... with the anxiety of having the operation and then you tell him at half past six that ... you can't have the surgery!" (Orthopedist 2).

Similarly, a head nurse reports the consequences of delays in transporting patients to radiology.

"The day after surgery, you suspend the pain therapy, the infusion therapy or any other therapy for these patients and they go down with the bed for the X-Ray (...). The patient is taken down, waits down there. It's cold, or it's hot, with the bed exposed, stuck in the corridor. I have never followed the path myself, but I can imagine it because I know radiology. Then while the radiology department calls you back, maybe the patient waits twenty minutes. So between the time of being called to go down and getting back, an hour and a half passes. In this way the patient suffers everything" (Head Nurse 1).

Professionals detect important areas for improvement in relation to technical quality. In particular, almost all frontline professionals report a lack of patient information and education. This is more evident when patients are admitted to the hospital: they arrive in the ward and do not seem aware of what they will need for the surgery and what will happen during the whole hospitalization period.

"For some elderly patients, and patients who have to have a prosthesis are elderly, maybe sometimes there is a bit of confusion (...). At the time of the prehospitalization visit the patient is told, 'Look, then, you will have to come to the transfusion center' (...); but at the time of admission it often happens that they tell us 'I should come and do this thing, but when, and why?' (Admissions Officer 1).

"Out of ten who are admitted, six don't even know what the compression or surgical stockings are, or the need for transfer to rehab after their hospitalization. You go and open their bags and they have flip-flops, slippers, pants, jeans – that, in short, for us then after the transfer becomes really complicated" (Nurse 3).

Middle managers mainly focus on everything related to taking care of the patient and his or her family members if nurses are not available to welcome patients when they enter the ward; lack of supervision when the patient is waiting in radiology to perform post-operative radiography; difficulties in communication between operating theater and ward which prevents them from responding to family members asking about patients' condition.

"The relatives are worried, because the patient doesn't return, because they are not clear about what steps take place from the beginning of anesthesia, to reawakening. We are called only when the patient has finished the surgery and we have to go and bring him back from the operating theater; therefore also there is little communication with the operating theater, to tell you "Look, everything is ok". Often relatives ask us: "But can you call them?" ... but physically we can't, and in any case ... colleagues don't give you much explanation" (Head Nurse 3).

One of the steps most frequently perceived as critical is that of the prehospitalization procedure. Orthopedists frequently mentioned a lack of coordination of the service as well as the need to make an overall assessment of the patient.

"It shouldn't be this way, but in fact, I recognize that maybe we have little global vision of the patient, our vision is very specialized; so, sometimes, it turns out more difficult to go and evaluate something on the first visit; when we see that there is serious arthrosis of a knee ... maybe we are unable to see that the patient has a chronic obstructive pulmonary disease " (Orthopedist 2).

A member of the Medical Management Team reports how patients risk being treated like cogs in a machine, because there is no time to explain to them what they would need to know.

"Actually, the indications you receive when you are told about the need of surgery and all the subsequent steps are like a machine gear, as a patient you are told: 'You have to do this', rather than explaining the whole path the patient will have to follow. And therefore it is like saying: 'Yes I will have surgery to put in a knee prosthesis, and that's it". You come, you perform the prehospitalization, you are left to yourself; after that you are called for hospital admission; you are admitted; and you feel abandoned, all the same" (Medical Management Team member).

This issue is also reported by one of the Hospital Directors, because of the impact both on costs and on the patient.

Another director highlights how the study of the prehospitalization path should consider that the patient has difficulty in mobilizing.

"Certainly, it is not optimal for patients with osteoarticular pathologies to move a lot inside the hospital during the prehospitalization process (...). Generally, patients who come for a hip or knee replacement, their hip or knee is painful, they have to have an operation because they are desperate, it hurts so badly that they no longer walk; the less they move, the happier they are. It is true that we have escalators, a lift, a wheelchair, etc., but people do not always take advantage of it" (Hospital Clinical Director).

With regard to the quality of the hospital surroundings, professionals also detect some gaps that affect the quality perceived by patients. Directions within the hospital, and the mixture of in-patients and outpatients in the radiology waiting room, are issues captured by frontline professionals.

"Orienting yourself, for those unfamiliar with the hospital, is quite complicated. For us who live here every day it is easy. But I admit that by putting ourselves in the patients' shoes, we can understand that they are already scared, the doors are opened and a world opens up" (Admissions Officer 3).

Micro and macro-system solutions for improvement

Despite their different roles, the solutions proposed by health professionals converge in a patient-oriented focus. Table V shows solutions proposed at the unit, department and hospital level regardless of the position that professionals have within the organization. However, each professional attributes a different reason to the need for possible solutions with reference to what they see of the patients.

For example, regarding administrative quality, the Hospital Managing Director explains how important it is to explain the reasons for waiting under any circumstances, given that in managing a complex process it is difficult to avoid delays. *"When dealing with an emotional component, time and communication are certainly two essential factors; so I can also make patients wait; however, I do it by explaining to them why they have to wait, because of programming times, waiting lists, emergencies; and also by putting things in a positive way" (Hospital Managing Director).*

All of the professionals suggest ways to improve operational efficiency in order to affect the quality perceived by the patient. Frontline professionals report the need to improve management at the hospital level of everything that takes place before admission, such as the outpatient booking or the waiting list management. An admissions officer points out how receiving multiple telephone calls from different staff members before admission, may confuse the patient.

The use of an IT communication system for managing patient transport is also identified as a way of reducing patient waiting times. Other solutions proposed to improve administrative quality have to be implemented at departmental level. Some of these are planning hospitalization according to the time of surgery, and spacing out the entry of incoming patients to decrease patient waiting; scheduling the elderly patients first, to ensure that their post-operative hours are during the day and reduce the risk of patient deterioration during the night; taking an X-ray in the operating room immediately after surgery and thus avoiding unnecessary transfer of the patient from the ward to the radiology department the next day.

In accordance with the gaps identified, many solutions are also offered to improve patient information and education, in the category of technical quality improvement. However, awareness that the patient experiences anxiety on the day of the surgery, leads professionals to ask themselves what is the best moment to inform and educate the patient successfully. The nurses suggest educating the patient during the first outpatient visit, possibly with a dedicated nurse, and sending the patient written information material. An orthopedist proposes the use of audiovisuals and a meeting with the physiotherapist before admission.

All these interventions can be carried out mainly at a department level and by involving different hospital services. However, some small but significant interventions at the level of the operating unit can improve the patient experience. For example, a nurse emphasizes how a simple reading of the therapy by the doctor together with the patient, can help the patient understand better what he or she will have to do after discharge. A head nurse emphasizes how at the time of admission a better explanation of the physical path the patient has to follow within the hospital, may help to reduce the patient's anxiety.

No action was suggested by professionals to improve environmental and involvement quality.

Table V. Summary of main improvement solutions suggested by participants

	Frontline	Middle Management	Top Management
Administrative Quality			
Unit			Explain the reason for the wait in a positive way to the patient (Managing Director)
Department	Post-surgery checking X-ray done in the operating room immediately after surgery (Nurse 1)	Planning the time of hospital admission according to the time of surgery (Nurse Bed Manager 2) Post-surgery checking X-ray done in the operating room immediately after surgery (Head Nurse 1)	
Hospital	Improve outpatient management (Orthopedist 3) Reorganization of waiting list (Orthopedist 2) Improve management of prehospitalization procedures (Admissions Officer 1) Reorganization of outpatient waiting lists for external and internal patients (Patient Transporter 1) Reorganization of outpatient booking reservations (Orthopedist 3) IT communication system for patient transport management (Orthopedist 3)	Have a dedicated gathering space for incoming patients scheduled for surgery (Head Nurse 3) IT communication system for patient transport management (Head Nurse 1)	Centralize the management of the patient's journey (Managing Director)
Technical Quality			
Unit	Improve time spent with patient by physician at the time of discharge: read therapy together (Nurse 5)	Give emotional support to the patient (Head Nurse 2) Inform patient on direct entry to operating theater the day of admission (Head Nurse 2)	
Department	Meeting for patient information and education before admission (during outpatient visit, by a nurse, with written material or audiovisuals, with physiotherapist) (Nurse 1, 2, 3, 4, 5; Orthopedist 2) Decrease telephone calls to patient before admission (Admissions Officer 2)	Patient information and education before admission (Head Nurse 1,3,4) Accompanying the patient from the reception service to the department (Nurse Bed Manager 2) Schedule elderly patients first (Head Nurse 3) Evaluation of the impact on the quality of life at home after discharge (Head Nurse 4) Clear reference telephone contact for the patient's needs after discharge (Head Nurse 3)	Meeting for patient information and education before admission (with anesthesiologist and orthopedist and other patients) (Clinical Director) Understanding if the patient needs a second opinion (Managing Director)
Hospital			Collect data on the welcoming aspect of the hospital and of each professional (Managing Director)
Family Quality			
Unit		Distribution of the ward visiting hours between morning and afternoon (Head Nurse 1)	
Interpersonal Quality			
Unit		Face contact with the surgeon in the operating theater before surgery (Head Nurse 2)	

Discussion

In this qualitative study, front line, middle management and top management professionals were involved in a wide-ranging project to study possible improvements to the hospital patient flow of orthopedic patients undergoing total hip or knee replacement surgery. The patient journey is a useful perspective from which to learn about the patient experience, since it consists of all the interactions the patient has with the provider across the continuum of care (Wolf *et al.,* 2014). However, when interviewing each professional from this perspective, a lack of knowledge of the whole process as experienced by the patient is observed. This confirms how the professionals focus on the piece of the process they are responsible for, rarely considering the other hospital services that patients have to go through (Ben-Tovim *et al.,* 2008). The inclusion of multidisciplinary, cross-continuum perspectives facilitated an understanding of the whole process and identified major challenges in improving a cross-hospital process.

Traditionally, processes that can be physically and/or temporally separated from the customer (back-office) are distinct from the processes that are performed when the customer is present (front-office). However, the way in which the work is performed in the back office significantly affects the quality of the service perceived by the patient in the front-office (Broekhuis *et al.,* 2009). In the patient journey studied in this study, many gaps, both in administrative quality and in technical quality, occur in components of the process that are invisible to the patient (i.e. the organization of the patient's stay, the preparation of the operating theater, the assignment of the bed) and under the eyes of those who work in the field. These gaps result in a lower quality perceived by the patient that can only partially be covered by the relationship between patient and professionals. By involving professionals with different backgrounds it is possible to understand what happens behind the scenes of a complex process and to identify gaps in the patient's journey under the lens of the distinctive characteristic of each professional's role. In this way it is possible to identify, for example, that important waiting times are not only those that the patient experiences between prehospitalization and hospitalization, but also when entering the ward or after performing radiology.

Multidisciplinary does not necessarily mean conflicting solutions. For example, the need to better educate and inform the patient before surgery is one of the main issues raised by the professionals. However, each professional enriches the reason for the need of improvement by highlighting how this impacts on the patient from his or her own professional perspective. In this way, admissions officers highlight the benefit to the patient in receiving less fragmented information; nurses aim to reduce the patient's lack of awareness of what will happen during hospitalization; while physicians are more focused on getting the patient the right clinical information during prehospitalization. Furthermore, converging solutions have emerged to reduce waiting times and to improve operational efficiency for the benefit of the patient. These results show how when dealing with a hospital-wide process, the involvement of all professionals, including non-health professionals, can reveal priority areas for improvement through integration between different actors and services. Consequently, hospital managers should consider that pieces of knowledge supplied by different professionals would be an added value not only for care improvement, but also for the redesign of the service delivery. In particular, this approach could help them to plan interventions at department and hospital levels and to design patient-centred operational processes.

Since the barriers to effective patient flow occur mainly at the point of delivery, middle management professionals stand at a focal point of observation of the patient's journey. Previous studies have shown middle managers' role in mediating between strategy and day-to-day activities. However, their role in quality improvement project implementation has not yet been described (Zjadewicz *et al.,* 2016; Olsson *et al.,* 2017). In this study, quality gaps and connected improvement proposals by those identified as middle managers, are focused on attaining improvements so that the final service results in better value for the patient. In particular, this study shows how those with a nursing background (i.e. head nurses and nurse bed managers) are able to match both patients' and providers' needs in order not to delay patient care and treatment. Their vision of the level of services integration and their simultaneous high awareness of the patient's needs highlights their role in improving both the quality and the efficiency of hospital

care (Needleman & Hassmiller 2009). Considering the involvement of the nursing role at different levels of the organization, further studies should investigate how having a nursing background can contribute to redesigning processes in accordance with a patient-centred perspective.

Hospital patient flow is a sensitive instrument for evaluating a hospital's performance. In this study top managers know the main steps involved, and the consequences of poor management of this process. Top management professionals are able to detect gaps and suggest solutions that benefit both the patient and the organization. However, the global vision of a processes that contain multiple steps and involves different actors can make people lose sight of how, in practice, to integrate different professionals into the daily process.

This study focused on the professional viewpoint and the connections between services, and some areas of the patient journey may therefore remain in shadow. In fact, when considering the patient flow process, the patient is the only actor who goes through all the steps and, therefore, is able to capture what happens between one service and another. Further studies should evaluate whether patient involvement may overcome the high level of fragmentation that characterizes the healthcare system.

This study was designed to inform ongoing local quality improvement in the hospital setting. This could limit the generalizability of findings. However, few qualitative studies explore professionals' perspectives on patient needs in hospital flow management. Additional research should look more deeply at how different professionals could proactively help in quality improvement by focusing on how achieve better value for patients in different settings and situations.

Conclusions

Providing high quality, efficient health care cannot be accomplished without taking into account the perspective of healthcare professionals on the process of service delivery. The results of this study show that when dealing with a cross-hospital process, redesign efforts focused on a single professional group might not detect important areas for improvement.

The study provides useful insights for healthcare practitioners caring for patients in hospital and for those responsible for planning and designing the hospital patient journey. In value based health care, involving professionals and using their time for improvement processes can be cost effective, and, still more importantly, can raise the value of the service received by patients. Convergent solutions can emerge from different perspectives which can help to integrate the different services at the various levels of the organization around patients' needs.

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Enhancing the patient perspective of the hospital journey: what does the patient have to say?

The Patient - Patient-Centered Outcomes Research. Advanced working paper

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Abstract

Background Patient-reported data – satisfaction, preferences, outcomes and experience – are increasingly studied to provide excellent patient-centred care. However, little is known about how the patient perspective can produce actionable data to improve the delivery of healthcare services.

Aims This study aimed to explore whether real-time patient feedback could capture relevant issues to improve the quality of hospital patient journeys.

Methods Both qualitative and quantitative data were collected between January and February 2019 from patients admitted for surgery in the Orthopedics department of a 250-bed Italian university hospital. Participants completed a questionnaire evaluating their hospital journey with both closed and open questions at two different points in time: when entering the ward and at discharge. Data from the hospital's customer satisfaction questionnaire, administered at the end of hospitalization, were also analysed.

Results A total of 254 patients completed the questionnaires. Patient-experience data offer a more comprehensive view of the patient hospital journey if integrated with open questions and customer satisfaction data. The patient experience changes along the journey and can be captured in real time by considering their needs, the environment and the emotional states they traverse. The patients' experience of their journey seems to be modified by specific conditions such as diagnosis, surgery, clinical path and age.

Conclusions By contributing to the debate on how patient feedback could be used to improve cross-hospital processes, this study provides insights for healthcare practitioners caring for patients in hospital, and for those responsible for planning and designing the hospital patient journey. Further studies should explore how to effectively use patient-reported data, including patients' positive feedback, to improve hospital processes, by profiling patients' needs and by defining appropriate methodologies to capture the experiences of vulnerable patients.

Key Points for decision markers

- As the patient is the only actor who experiences the whole hospital journey, his/her perspective makes it possible to identify inter- and cross-organizational gaps in the hospital journey.
- As the patient's needs and the context play a key role in his/her experience, experience data should be captured in real time. Nurses' competences are fundamental to capturing these real-time experience and needs, and in translating patient feedback into improvements.
- Patient's positive feedback should be better explored to understand what works and how to motivate healthcare professionals to maintain a high quality level.

1. Introduction

Patient feedback is widely recognized as a key component to quality improvement of the service provided [1]. In particular, patient-reported data (satisfaction, preferences, outcomes and experience) have been increasingly studied, and the literature agrees on their role in excellent patient-centered care [2, 3]. In particular, patient-experience data collection is emerging as an increasingly key component in assessing the quality of health service delivered [4]. Some authors have emphasized how understanding patient experience represents an opportunity to design healthcare service delivery [5, 6]. However, healthcare professionals need to understand whether and how patient-experience data can inform the design of service delivery from a patient-centred perspective more than other indicators [7-10].

Studies from the service management literature show that it is possible to understand the experience starting from the customer journey. The term 'customer journey' refers to 'the processual and experiential aspects of service processes as seen from the customer viewpoint' [11]. Kankainen et al. [12] describe it as 'the process of experiencing service through different touch-points from the customer's point of view'. Customer experience is shaped before, during and after interactions with the service provider. Moving from services to healthcare, the experience of care is not only a matter of interaction but a multi-faceted and complex phenomenon in which the health status, the context of care and the presence of different health staff play an important role in achieving clinical outcomes [9].

In the hospital context, the requirements of responding rapidly to acute needs of patients through the integration of multiple actors and services, increase this complexity. Timely movement of patients from one service to another is a necessary condition both for managing the volume of patients with different pathologies, and for obtaining better clinical outcomes. Consequently, the patient experience of care and service delivery is the result of many successive touch-points across services to receive care from different units, the totality of which constitutes the hospital patient journey. Therefore, the patient's perspective should make it possible to evaluate inter- and cross-organizational gaps such as data flow, availability of relevant information at points of intervention, and services synchronization. However, few studies have analyzed how to improve the patient journey starting from the patient perspective [13]. In particular, most of them focus only on a single step of the hospital journey, without identifying which are the meaningful touch-points for the patient [14-16].

The goal of this study is threefold. Firstly, to explore which data collected directly from the patient could be useful in improving the hospital patient journey. Secondly, to analyze whether gathering real-time patient feedback can capture areas for improvement in the hospital patient journey.

Finally, to understand whether the experience of hospital patient journeys may differ depending on the patients' conditions and emotional status.

2. Methods

2.1. Design and setting

A longitudinal survey was conducted in the Orthopedics department of a 250-bed Italian university hospital between January and February 2019. The study was part of a larger hospital project to redesign the orthopedic patient journey for hip or knee replacement surgery, starting from patient experience. Accordingly, the unit of analysis was the path of the orthopedic patient from the first outpatient visit to discharge.

The Orthopedics Unit has 34 beds for ordinary hospitalization or day surgery and is divided into two multispecialty wards, one for ordinary admissions and one mainly for day surgery recovery. Some of the healthcare staff working within the various services are specialized, and a large part is composed of staff in training (residents and degree-course students of medicine, nursing, and physiotherapy). The admissions calls and reception procedures are managed by a centralized team that includes administrative staff and bed-manager nurses.

The study received ethical approval from the organization's Ethics Committee (Protocol n.: 25/16 OSS ComEt CBM).

2.2. Instruments

Consistent with the need to capture patient feedback during a relatively rapid surgical pathway, the researchers chose to develop a short self-administered questionnaire focused on key themes that emerged from the previous phase of the project. Indeed, as there are no standardized methods for creating short questionnaires for administration during the patient's journey, a qualitative study was first conducted to map the main touch-points and assess this specific hospital patient journey [17]. In this phase, the journey of hip- or knee-replacement surgery patients was explored by analyzing the service quality dimensions indicated by Dagger [18] and Gustavsson [19]: interpersonal quality, technical quality, environmental quality, administrative quality, family quality and involvement quality. The international literature was then reviewed by the first and the second author to develop a set of criteria including relevance, importance, and comprehensiveness. Finally, a 52-item questionnaire (37 to be administered when patient enters the hospital room, 15 when the patient is discharged) was designed, including closed and open questions. The analysis of the internal consistency of the questionnaire showed a high level of reliability (Cronbach's alpha >0.7).

The questionnaire consisted of four main sections: i) evaluation of the perceived importance by the patient of the different aspects related to the journey experience (e.g., indications on how to get to the hospital or in case of waiting; not feeling pain; trusting professionals, etc.); ii) evaluation of the experience before admission to hospital (e.g., visit, examinations in preparation for the surgery, etc.); iii) evaluation of the experience after admission to hospital and before surgery (e.g., being involved in decisions about his/her care, being able to have family members nearby, etc.); iv) evaluation of the experience of hospitalization after surgery (e.g. understandable explanations on hospitalization and discharge; being treated with respect and courtesy, etc.). The patient evaluated the experience before and after surgery by marking responses on a scale of five values represented by emoticons. The patient also marked degrees of positive or negative emotions from

among those on Plutchik's Wheel. The final question was 'What can we do better?' The questionnaire was administered on arrival in hospital (sections 1-3) and on discharge (section 4). Additionally, data from the hospital's customer satisfaction questionnaire, administered at the end of hospitalization, was considered. This self-report questionnaire included demographic data (age, gender, education, and region of origin) and assessed patient satisfaction with 28 items divided into 7 macro-areas: admission and organization; medical assistance; nursing and other healthcare personnel; services and comfort; religious assistance (if requested); post-hospitalization; other information. The responses were a 5-point Likert scale (from 'not at all satisfied' to 'very satisfied'). A final question was 'Would you recommend the hospital to others?'

Data collection

An exploratory sample was used, including all orthopedic patients admitted for surgery during the study period. Patients were recruited at the time of administrative admission for hospitalization, from among those who could understand and assent, speak Italian fluently, and write. A trained research assistant asked them for consent to participate by explaining the study's purpose, that participation was voluntary, and the anonymity of data collection.

Data Analysis

Quantitative and qualitative findings were merged into a joint analysis. Quantitative data were analyzed with descriptive statistics, including mean, standard deviation, and median; and by analysis of significant difference between groups. A score was created for each quantitative item of the questionnaire by coding the item response from '1' if the experience was considered completely negative, to '5' if it was considered completely positive. A higher score indicates a positive experience and satisfaction with the hospital patient journey. Statistical analyses were performed using SPSS 17.0™. Qualitative data were analyzed through content analysis and categorizing the improvements and gaps reported through the service quality dimensions of Dagger [18] and Gustavsson [19].

3. Results

3.1. Sample characteristics

A total of 255 patients were included in the study; of them, only one patient refused to participate due to the limited time available to prepare for surgery upon entering the hospital. Table 1 shows the main characteristics of the participants. Participants had mean age of 62 years (SD:14; range:18-96) and were classified in 4 groups. The sample was equally distributed between men and women. The most frequent major surgical operations were knee replacement (53% of major surgery) and hip replacement (29%). The most frequent minor surgical procedures were knee arthroscopy (39% of minor surgery) and shoulder arthroscopy (36%). Of the patients admitted for major surgery, 49% had been admitted to the same hospital in the past, while 70% of patients who had to undergo minor surgery were admitted to the hospital for the first time.

Table 1 – Main characteristics of patient included in the study

Characteristic	Major Surgery n *(%)*	Minor Surgery n *(%)*	Total n *(%)*
Gender			
Male	88 *(55,7)*	39 *(40,6)*	127 *(50,0)*
Female	70 *(44,3)*	57 *(59,3)*	127 *(50,0)*
Age			
18-30	1 *(0,6)*	10 *(10,4)*	11 *(4,3)*
31-50	16 *(10,1)*	24 *(25,0)*	40 *(15,7)*
51-70	75 *(41,1)*	55 *(57,2)*	120 *(47,2)*
>70	66 *(48,1)*	7 *(7,2)*	83 *(32,6)*
Highest qualification			
Intermediate	51 *(32,2)*	10 *(10,4)*	61 *(24,0)*
Higher school	79 *(50,0)*	61 *(63,5)*	140 *(55,1)*
University degree	28 *(17,7)*	25 *(26,0)*	53 *(20,8)*
First admission			
Yes	80 *(50,6)*	68 *(70,8)*	148 *(58,2)*
No	78 *(49,3)*	28 *(29,1)*	106 *(41,7)*
Local health district			
Regional	131 *(82,9)*	78 *(81,2)*	209 *(82,2)*
Extra-regional	27 *(17,0)*	17 *(17,7)*	44 *(17,3)*
Unknown	0 *(0,0)*	1 *(1,0)*	1 *(0,3)*

3.2. Patient's perspective of hospital journey

All patients completed the quantitative items of the experience questionnaire, administered on arrival and on discharge, and of the satisfaction questionnaire, administered on discharge. On admission, 147 patients (58%) answered the open question 'what can we do better?', and 172 patients (68%) answered the same question administered on discharge.

Comparison of the level of importance of the aspects related to the experience reported by patients on arrival in the ward shows no significant differences between major and minor surgery patients or between patients of different age groups. The results show that the five aspects considered most important for a good hospital journey experience are: 'Receive the best treatment for the related health conditions' (MS:4.8, SD:0.4); 'Have clear indications on how to prepare for surgery (therapy, fasting, surgery aids)' (MS:4.8, SD:0.4); 'Have clear indications on how to check in at the hospital' (MS:4.7, SD:0.5); 'Have clear indications on the treatment pathway I will have to take' (MS:4.7, SD:0.5); and 'Receive explanations from staff in case of waiting' (MS:4.7, SD:0.5). The least important aspects among those listed are: 'Have explanations and understand everything that happens to me' (MS:4.0, SD:0.7); 'Be involved in all decisions concerning my care' (MS:3.9, SD:0.8); 'Feel comfortable in the environments where I have to be' (MS:3.9, SD:0.9); 'Wait as little time as possible for a visit or for assistance' (MS:3.9, SD:0.9); 'Have a room where I am not disturbed and with hotel services (TV, landline, etc.)' (MS:3.8, SD:0.9). When asked if other aspects were important, one participant added 'Empathic relationship with all the staff', while another added 'Admission in a clean facility like this'.

Table 2 reports the answers to the questions on patient-reported feedback. With regard to the closed-answer items on patient experience, an average of high scores, with a slight difference between the time of entry into the ward and the time of discharge, is reported. On discharge, the hospital experience is rated with lower average scores than customer satisfaction. The customer satisfaction relating to hospitalization shows significant high scores: on a score from 1 to 5, 97% of patients rate 4 (22.8%) or 5 (74.4%). Additionally, 95% of patients would recommend the hospital to other patients.

Table 2 – Patient-reported feedback: answers to overall questions

Patient-reported feedback	**At the time of arrival** MS (SD)			**At the time of discharge** MS (SD)		
Question *(scale)*	*Major Surgery*	*Minor Surgery*	*Total*	*Major Surgery*	*Minor Surgery*	*Total*
Experience						
How would you asses your overall experience so far? *(1 = negative - 5=positive)*	4.4 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.8)	4.5 (0.6)	4.4 (0.7)
Outcome						
Are you satisfied with your health? *(1 = not at all - 5 = a great deal)*	3.7 (0.8)	4.0 (0.7)	3.8 (0.8)	4.0 (0.6)	4.2 (0.6)	4.1 (0.6)
SMark with an 'x' the level of pain you are experiencing now (0 = absent - 10 the greatest pain)	5.5 (2.7)	2.8 (2.4)	4.5 (2.9)	3.8 (2.6)	2.6 (2.7)	3.4 (2.7)
Satisfaction						
Overall, how satisfied are you with your stay at this hospital? *(1 = not at all - 5 = a great deal)*				4.7 (0.6)	4.7 (0.5)	4.7 (0.5)
Preferences						
Would you recommend this hospital to others? *(0 = definitely not - 10 = definitely)*				9.4 (1.0)	9.5 (0.8)	9.5 (1.0)

Table 3 and 4 report the lowest score obtained in each dimension of the perceived quality of the service and the main topics identified by the answers to the open questions.

ata on experience and satisfaction show differing information around some key topics. At time of discharge, customer satisfaction reported high scores for the quality and cleanliness of the environment (respectively MS:4.8, SD:0.4 and MS:4.8, SD:0.5). However, upon entering the ward patients rated the comfort of the room at one of the lowest experience scores (MS:4.3, SD:1.0). Answers to the open questions give the reason for this. Patients wished to have a TV inside the wards, and to have larger wards so as to move more easily with the orthopedic aids they have to manage (wheelchair, crutches, etc.). One of them suggested the following solution: 'Small hospital room for physiotherapy: creation of a dedicated space' (Code: ORTO 63).

In 'Satisfaction' items, patients recognized a high level of professionalism and competence in the healthcare staff (MS:4.8, SD:0.5). However, in the 'Experience' questionnaire, items concerning information received before surgery received a low score (Table 3). The answers to open questions show that 29 patients would have liked more information concerning the different aspects of hospitalization, including the necessary aids for surgery, and the post-surgery path. Two patients emphasized the need for more communication with family members when the

patient is in the operating theatre. One patient expressed how this issue can always be improved: 'In my opinion, improve the information given to patients on the path they have to take inside the hospital. I have been hospitalized 5 times and I always see an improvement, thanks for everything' (Code: DS36).

Table 3 – Patient-reported lowest score on experience and satisfaction

Question *(1 = negative - 5=positive)*	**Service quality dimensions**	**At time of arrival** MS (SD)	**At time of discharge** MS (SD)
Experience Items			
How useful was the information you received to organize hospitalization?	Administrative	4.5 (0.8)	-
How do you feel inside the room you were assigned to?	Environment	4.3 (1.0)	-
Were you able to be with your family when you wanted to?	Family	4.4 (0.9)	4.7 (0.6)
Did the doctors give you the time you needed?	Interpersonal	4.4 (1.0)	4.3 (1.1)
Did the nurses give you the time you needed?	Interpersonal	4.6 (0.7)	4.5 (0.9)
Have you been involved in decisions about your care?	Involvement	4.0 (1.1)	4.3 (0.9)
Did the doctor give you an understandable explanation of everything you needed to know about surgery, length of stay and the post-surgery period?	Techinical	4.3 (0.9)	-
Did the anesthesiologist give you an understandable explanation of everything you needed to know about surgery and pain treatment?	Techinical	4.3 (0.9)	-
Were the indications on the post-surgery clinical path useful?	Techinical	-	4.4 (0.8)
Satisfaction Items			
Waiting times and procedures for hospital admission	Administrative	-	4.5 (0.8)
Quality and variety of menu	Environment	-	4.6 (0.7)
Availability of the doctor for you and your family members	Interpersonal	-	4.7 (0.7)
Presence and availability of nurses and health personnel	Interpersonal	-	4.7 (0.7)
Attention and care of the patient's needs	Interpersonal	-	4.7 (0.7)
Clarity and timeliness in providing information on care and on the state of health	Technical	-	4.7 (0.6)
Clarity of information received at time of discharge	Technical	-	4.7 (0.6)

Table 4 – Patient-reported improvements

What can we do better?	Service quality dimensions	At time of arrival N (%)	At time of discharge N (%)	Total N (%)
Room comfort (TV, spaciousness, temperature, etc.)	Environment	72 (28)	49 (19)	121 (48)
Management of pre-hospitalization	Administrative	13 (5)	-	13 (5)
Waiting times from the moment of arrival at the hospital to the moment of entering the operating theater	Administrative	37 (15)	16 (6)	53 (21)
Availability of nursing staff	Interpersonal	9 (4)	29 (11)	38 (15)
Availability of medical staff	Interpersonal	5 (2)	21 (8)	26 (10)
Information on the clinical path	Technical	12 (5)	17 (7)	29 (11)
More frequent physiotherapy	Technical	-	28 (11)	28 (11)
Better pain control	Technical	-	20 (8)	20 (8)

The customer satisfaction questionnaires reported a high score on the availability of doctors and nursing and care staff. In the experience items, patient rated these aspects at 4.4 and 4.6 respectively at the time of entering the ward. The median score decreased to 4.3 and 4.5 regarding the post-surgery stay. More specific data emerged from the open questions. Patients reported the need for more presence of and contact with doctors (38 quotes) and nurses (21 quotes), and this need is reported in particular regarding the post-surgery stay: 'More time spent by staff in the post-operative period' (Code: ORTO2). Twenty-one patients reported a lack of interaction with healthcare staff as a staff shortage problem: 'Nurses are very professional and well-trained but there should be more of them' (Code: DS37); 'Too few nurses during the shift to answer the call bells quickly' (Code: ORTO 151). Other patients add that the presence of so many students decreased their confidence in being properly cared for. For example, a patient said: 'Stay longer with the patient without rushing, too many students unable to solve certain problems and too few nurses and doctors' (Code: ORTO 116).

Although on admission, patients declared that waiting for procedures was one of the least important aspects, the satisfaction score on waiting times and admissions procedures was among the lowest. Reasons for these scores were expanded by the answers to the open questions captured immediately after entering the ward: 53 patients reported that waiting times between arrival at the hospital, admission procedures and room assignment were too long. One of them pointed out that hospital discharges and new entries needed to be better coordinated; another suggested that the patient should not come too early in the morning if admission was scheduled during the day; some patients asked for a reduction in the time between entering the hospital and actually entering the operating theatre.

Involvement in decisions relating to one's own care was reported by patients as less important than other aspects such as path information (MD:3.9; SD:0.8). The question 'Were you involved in decisions about your care?' obtained the lowest score. Specifically, the average rating is 4.0 upon

arrival in the ward and increases to 4.3 upon discharge. However, only one participant suggested greater patient involvement.
Some hidden but not openly stated needs for adaptation by the patient to hospital rules are evident in this quote: 'I found everything well, no complaints, I understood that having a relative's personal assistance is impossible but I would have liked it' (Code: ORTO 26). In the pre-surgery period, patients reported the desire for family members to be nearby when they wanted (MS:4.4, SD:0.9), but only 9 patients stated they wanted more time with their families, with more flexible visiting hours and with their presence before surgery.
Although unsolicited, feedback on what works, in addition to what needs to be improved, was given. For example, one patient reported: 'I did not expect to find such a comfortable environment with such professionalism from all the staff. Nothing is perfect, therefore everything is perfectible, but here, in this hospital, we are at a good point' (Code: ORTO16). Another said: 'Nothing to improve, on the contrary I would like to point out the particular care, attention and professionalism of the student F.A.' (Code: ORTO 33).

3.3. Following the patient journey: the influence of patient situations

Analysis of the variance between patients of different age-groups (One-way ANOVA with post-hoc Tukey HSD Test) shows significant differences in items related to post-surgery experience and satisfaction with medical care. Specifically, the perceived experience after surgery is worse for patients over 70 years than for patients aged 51 to 70 ($p=0.005$; 95% CI: 0.68-4.57). Moreover, patients over 70 are less satisfied with medical care received during hospitalization than patients between 50 and 70 years ($p=0.007$; 95% CI: 0.21-1.64). There are evident differences in the mean scores for each item evaluated from 1 to 5 in major surgery patients over 70. In particular, these patients show lower average scores than minor surgery patients in the following questions related to post-surgery experience: 'Did the doctors give you the time you needed?' (MS:3.9, SD:1.3 vs MS:4.7, SD:0.5); and 'Have you been treated with respect, courtesy and attention by nurses?' (MS:4.4, SD:1.0 vs MS = 4.9, SD:0.4). The difference between these same groups is also present in the following satisfaction items related to medical care: 'Professionalism and dedicated attention during hospitalization' (MS:4.7, SD:0.7 vs MS = 5.0, SD:0.0); 'Protection of confidentiality and privacy during visits' (MS:4.7, SD:0.6 vs MS = 5.0, SD:0.0).
The clinical outcome indicators change between the time of entry and the time of discharge with a different trend between major and minor surgery patients. Upon arrival at the hospital, orthopedic patients who need major surgery have significant pain, rated on a scale of 0 (absent) to 10 (the strongest pain), that decreases after surgery (MS:5.5, SD:2.7 vs MD:3.8, SD:2.6). Pain remains constant and not particularly high in minor surgery patients (MS:2.8, SD:2.4 vs MD:2.6, SD:2.7). The self-reported state of health assessed on a scale of values between 1 (not at all satisfied) to 5 (very satisfied) shows a more evident improvement in patients with major surgery between the time of arrival in the hospital and the time of discharge (MS:3.7, SD:0.8 vs MD:4.0, SD:0,6). Minor surgery patients report a generally higher level of health than major surgery patients (MS:4.0 SD:0.7 vs MD:4.3, SD:0.6). In these items, the age group does not seem to be significant.
Table 5 reports how patients' emotional status changes along the hospital journey. Trust and apprehension are the prevailing emotions at the time of arriving in the ward (respectively 37.8% and 20.5% of patients). Apprehension decreases noticeably among patients after surgery (6.3%), and serenity increases (from 21.7% before surgery to 46.1% at the time of discharge). The change

is more evident in major surgery patients: 32.7% of them experience apprehension or fear before surgery, decreasing to 13.1% at the time of discharge, and an increase in serenity from 5.8% to 14.8% of patients.

Table 5 – Patients' emotional status

Question	**At the time of arrival** Frequency (%)			**At the time of discharge** Frequency (%)		
What do you feel now?	*Major Surgery*	*Minor Surgery*	*Total*	*Major Surgery*	*Minor Surgery*	*Total*
Serenity	36 (22.8)	19 (19.8)	55 (21.7)	72 (45.6)	45 (46.9)	117 (46.1)
Trust	51 (32.3)	45 (46.9)	96 (37.8)	40 (25.3)	38 (39.6)	78 (30.7)
Anticipation	21 (13.3)	21 (21.9)	42 (16.5)	27 (17.1)	8 (8.3)	35 (13.8)
Apprehension	45 (28.5)	7 (7.3)	52 (20.5)	11 (7.0)	5 (5.2)	16 (6.3)
Fear	5 (3.2)	4 (4.2)	9 (3.5)	2 (1.3)	0 (0.0)	2 (0.8)
Anger	0 (0.0)	0 (0.0)	0 (0.0)	6 (3.8)	0 (0.0)	6 (2.4)

4. Discussion

Many studies have explored how different types of feedback collected directly from patients can improve the quality of care, while few studies analyze whether data reported by patients on a cross-hospital process can be useful to improve the process itself [20-21]. This study was designed to explore whether the patient perspective is able to identify inter- and cross-organizational gaps in the hospital journey.

By analysing the orthopedic surgical path with a short questionnaire administered to the patient on admission and on discharge, it was possible to understand the different patient experiences along the journey, and to better study the differences between customer data and experience data. In particular, while the customer data measure an aspect considered more or less important by the patient, the experience data show the patient's circumstances and present conditions. For example, more or less negative satisfaction data on the comfort of the room may not reveal the pathology-related needs that cause greater difficulty in moving pre- and post-surgery. Likewise, perceived unavailability of health professionals may not reveal the need for information before the surgery or the desire for entertainment while waiting.

Some authors suggest that the patient remembers his/her experience differently depending on the time of the interview [22]. This study shows how by capturing real-time patient feedback it is possible to understand some important conditions of the context that influence his/her experience. In particular, data show that aspects that are important for patients change if measured at the beginning of the journey or after surgery. When the patient experiences a new condition linked to the specificity of the orthopedic surgery clinical pathway, he identifies some gaps that were not initially considered important (e.g., adequate space to move around the room, waiting times from the moment of admission to the moment of surgery, lack of TV in the room).

In this study patient feedback was significantly positive (average score between 4 and 5 on a scale of 1 to 5) in almost all the items investigated. This result is in line with the literature that showed how a little variation occurs in the answers to questions about the quality of care with high patient satisfaction scores [23,24]. However, when analysing experience data and the answers to the open question 'What can we do better?', it is possible to understand what happened to the patient that

may have influenced his/her experience (e.g. apprehension and pain before surgery, pathology and age-related needs, fast-track recovery, waiting without entertainment). Moreover, one patient may reveal important needs made impossible by circumstances (e.g. need of having family member close to patient before surgery made impossible by hospital organization). These data emphasize how personalized medicine should no longer refer only to the targeted therapy. This requires management teams to be able to customize the patient journey, identifying different patient profiles, which should not be reduced to the clinical pathway. For example, when redesigning fast-track recovery from major orthopedic surgery, significant touch-points for the patient should be treated with respect to his/her need for interaction with professionals, his/her emotional state and social conditions, and by considering the changing circumstances he/she will face along the journey [17, 25, 26]. In particular, the emotional state should be better explored to understand how this variable affects patient experience along the journey, and to improve ways of interacting with the patient: by giving more information, by offering support, or simply by accompanying him/her in critical moments of the pre-surgery period. Even if related to a very specific case, the results of this study show that patients do not have the technical competence to predict what needs will be compromised before and after surgery, and thus nursing competence is needed to effectively anticipate patient needs and attend to the organization of patient journeys to improve experiences of care. These data support the claim of a recent NHS report in which nurses play an essential role in the way in which data are collected, interpreted and used to improve care [27].

When exploring the patient experience of the whole journey, the length of questionnaires may limit their use because of clinical conditions that can significantly affect patients' ability to respond in writing to specific questions. In this study, to encourage patient response, the authors preferred to administer fewer questions at two critical moments of the journey: that of arrival in the hospital ward before surgery, and that of discharge. In this way, a high rate of responses was achieved. Despite the reference population, with the elderly included among major surgery patients, the simplicity of the questionnaire, even using emoticons, made it possible to capture the experience of patients able to read and write. Further studies should investigate how to collect real-time feedback from vulnerable patients by considering those patients who are unlikely to be able to describe their own experience [28]. Moreover, as data were collected in paper format, the process of returning data to the management team and front-line professionals to stimulate quality improvement was slowed down due to the necessary data analysis times. The effectiveness of these data to bring about change in the field should be demonstrated and studied in wider areas [29-31].

Although unsolicited, some positive feedback was captured. This led nursing teams to study not only what does not work, but also what works and why. This new perspective offers new horizons, driving the improvement of processes differently from the customer satisfaction perspective. Further studies should analyse whether positive patient feedback may explain what factors produce a good patient journey experience, and how patient feedback may reinforce the quality improvement solutions adopted, and may influence health professionals' behavior [32].

The limits of this research are, in large part, connected with the nature of the original project that, first of all, aimed to produce local actionable improvements in the setting considered. For this reason, the results cannot be generalized but offer a stimulus for the debate of the use of patient-experience data for the design of service delivery.

Several issues would benefit from further exploration. These include the impact of the patient-healthcare staff relationship on the hospital journey experience; the opportunity of bringing

patients' and professionals' experiences together for joint knowledge of improvements solutions; and the study of new methodology to capture the real-time experience of vulnerable patients.

5. Conclusions

Providing customers with quality experiences is a key competitive advantage in a range of service sectors, including the healthcare service. Researchers and managers are now seeking to understand how to use the patient's perspective to improve service delivery.

This study provides insights for healthcare practitioners caring for patients in hospital and those responsible for planning and designing the hospital patient journey. By contributing to the debate on how patient feedback could be used in the improvement of cross-hospital processes, it should also initiate a dialogue about the use of in-depth 'remembered' experience rating scales, versus real-time focused data. Further studies should explore how to effectively use patient-reported data to improve hospital processes, including positive patient feedback, by profiling patients' needs, and by identifying appropriate methodologies to capture the experiences of vulnerable patients. These topics may offer new frontiers of research to achieve a patient-centered healthcare system.

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