Understanding the Challenges to the Safe Delivery of Care in the Mexican Healthcare System

Carlos D. de-Leon Zuloaga[1(✉)], Carlos Aceves-Gonzalez[1], Elvira Perez Vallejos[2], Rosa Rosales-Cinco[1], Alexandra Lang[3], and Sue Hignett[4]

[1] Centro de Investigaciones en Ergonomía, Universidad de Guadalajara, Guadalajara, Mexico
carlos.diazdeleon@alumnos.udg.mx, {c.aceves, rosa.rcinco}@academicos.udg.mx
[2] Nottingham Biomedical Research Centre, University of Nottingham, Nottingham, UK
elvira.perez@nottingham.ac.uk
[3] Nottingham University Hospitals Trust, Queen's Medical Centre, Nottingham, UK
alexandra.lang@nottingham.ac.uk
[4] Loughborough Design School, Loughborough University, Loughborough, UK
s.m.hignett@lboro.ac.uk

Abstract. Safety and quality challenges have been identified by national and global organizations highlighting the need for health sector improvements in Mexico. The current research investigates healthcare workers' perspectives of factors affecting their job performance and wellbeing, ability to provide effective care and overall patient safety culture within a public hospital in Guadalajara. A total of 30 hospital staff took part in a card sorting task to elicit the perceived impact of eight pre-identified organizational factors. Results showed that healthcare workers identified the top contributory factors as 'Finance/budget' and 'Resources'. 'Staff numbers and competency' was chosen for having more significant impact in delivering safe and effective healthcare, while 'Communication' was perceived to have more impact on the way their do their job. The findings from this study helped to identify areas for future applied research projects and provisional direction to the Hospital Quality Managers for targeted improvements projects.

Keywords: Healthcare · Quality improvement · Staff performance · Patient safety · LMIC

1 Introduction

Initiatives for improving healthcare staff and patient safety and wellbeing within Low and Medium-Income Countries (LMIC) are less well developed and established than in more developed countries. Over the last 20 years, the UK and US have developed

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programs for safety improvement that have, in varying degrees, started to improve the working conditions and demands on healthcare staff [1]. In contrast, some LMIC's are just starting on this journey. Mexico is one such example where safety challenges have been identified [2] and national and global organizations have highlighted the need for health sector improvements regarding quality and safe care provision [3].

In response to this need, the current feasibility study was conceived by collaborating research teams from the UK and Mexico to investigate healthcare staff perspectives of the challenges encountered in the safe delivery of care in regard to personal job roles, work environment and organizational structure.

According to the [3], Mexico's health system must change to deliver people-centered, high-quality care. It is also claimed that there is a need for higher standards for safe and effective care across all Mexican providers, including the private ones [3]. The PAHO [4] Latin American Study of Adverse Events (IBEAS) reported that up to 20% of patients experience at least one harmful incident during their hospitalization [4]. Additionally, the study acknowledged that more than half of these harmful incidents could have been avoided. This shows that the health system in Mexico still needs to increase awareness and implementation of an improved safety culture.

In Mexico, patient safety is a relatively new subject. [2] comments that although it is a known and discussed topic within the different healthcare institutions, associations, faculties, medical equipment and pharmaceuticals companies, and the diverse array of professions working in those institutions; to date there has been little action to address this issue and to embed patient safety culture in the healthcare practice. Around the same time [5] investigation into the nursing practices and environments evidences the need to fully understand the context of work and sign post to the need for further investigation.

In regards to staff wellbeing and performance [6] identified that healthcare staff in the north of Mexico presented with work-related injuries, which could have been avoided with the intervention of the human factors/ergonomics. Specifically in nursing staff, some of the factors linked to work-related injuries included the mobilization of overweight patients, excessive numbers of patients and the duration of postures sustained for long periods of time [7]. Healthcare workers reported that the lack of support from directive staff when presenting work-related injuries could affect also their mental wellbeing [7].

There is significant evidence that staff mental wellbeing is also diminished due to work overload, organizational culture and negative experiences in regard to patient interaction, all of which can contribute to stress [8, 9], fatigue or even burnout [10, 11].

The literature provides evidence for further investigation into these important issues and as such this study aims,

- to understand healthcare staff perspectives about the impact of different factors affecting their efficiency and wellbeing and patient safety within a public hospital in Guadalajara.
- to develop a framework for exploring healthcare challenges within a large teaching hospital in the city of Guadalajara.

2 Method

This feasibility study took place within a large teaching hospital in Guadalajara, Mexico. A total of 30 healthcare staff participated in the workshops. Five workshops took place on five consecutive days. Each workshop involved at least three moderators to coordinate the activities and a maximum of nine participants.

Participation in the workshops was completely voluntary. The study protocol was reviewed and approved by an Ethics Committee at the University of Nottingham, the UK academic institute co-leading the project. The invitation to healthcare workers to participate in the workshops came from the hospital Quality Management Office and was issued to each chief of service who then passed it onto their staff.

2.1 Study Design

Each workshop included a hybrid card sorting task, combining a closed card sorting activity (with categories provided to participants) with the opportunity for participants to produce their own categories, also known as open card sorting [12]. This method was implemented to enable participants to consider and reflect on their wellbeing and safety challenges present in their own healthcare system in relation to eight pre-identified categories. The eight factors used in the card sorting activity were previously identified from a thematic analysis of a data set in the UK [1]. The factors used as the card sorting categories were: 'Staff number and competency', 'Organizational culture', 'Risk management culture', 'Pressure of work', 'Communication', 'Finance/budget', 'Resources' and 'Patient complexity'. In order to avoid cultural limitations; in regard to UK specificity of the categories, and to explore the possible inclusion of different contextual factors in the card sorting, blank cards were provided to participants to give them the option of contributing factors not already listed in the pre-identified categories (open card sorting strategy). Participant proposed factors should relate to how healthcare workers carry out their jobs and the way they deliver care. This would then provide opportunity for the card sorting activity to not just be dictated by the findings of a study in a non LMIC healthcare service but to also be inclusive of and reflect experiences in Mexico.

2.2 Procedure

Participants were asked to provide informed consent and were asked to fill in a participant background questionnaire to obtain their demographic data and work role details. The workshop started with an introduction video about system thinking theory [13], a brief icebreaker activity encouraged healthcare workers to reflect on their job roles. This was followed by focus group discussions, which set the scene of the card sorting activity. The workshops and materials used were in Spanish. This paper only reports the findings of the card sorting activity, which was the final task within the workshop.

In the card sorting, participants were handed two sets of nine cards in which the eight categories (listed previously) were written. The remaining two cards were blank for participants to write any extra factors they considered important and relevant to the task.

Participants were able to ask for more blank cards if needed. Two grids were presented to the participants. See Fig. 1 for an example of the grids. The first grid asked the question (Q1) How do these factors impact the way I do my job? The second grid asked the question (Q2) How do these factors impact the delivery of safe and effective healthcare? These two questions would elicit reflections from participants on two levels, a personal individual work level and higher organizational level. The impact categories participants could allocate the cards were: high impact, medium impact, little impact, very little impact and no impact at all (Fig. 1).

How these factors impact the way I do my job?				
No impact at all	Very little impact	Little impact	Medium impact	High impact

Fig. 1. Example of one of the card sorting grid: how these factors impact the way I do my job?

2.3 Data Analysis

The factors were scored according to their perceived impact. Factors allocated in high impact category added four points; medium impact, three points; little impact, two points; very little impact, one point; and no impact at all that added no points. This means that the higher the total points on each factor the higher the perceived impact of the categories on each question (Q1 and Q2).

3 Results

The statistical analysis used IBM's SPSS software (version 21 for Windows) and Microsoft Office Excel (version 10 for Windows) to generate the database. Non-parametric tests were used in comparing results. When comparing results from Q1 with Q2 a Wilcoxon Signed Rank test was used. To compare between groups a Kruskal Wallis test was used; post-hoc analysis was made with a Mann-Whitney U test between pair groups with a Bonferroni adjustment applied (p = 0,025). All tests considered a p = 0,05 of significance level.

The card sorting included 30 participants, 19 were women with an average age of 48 years old (±16) and ten were men with an average age of 46 years old (±12), one participant refrained from reporting the gender information. According to job role, ten participants were nursing staff, eight were medical staff, seven were allied health professionals (social workers, psychologists and dietitians), six were hospital operational staff (chiefs of operations, chief of floor, stretcher bearer), one participant was had a non-clinical management role and one participant did not record their job role. Before starting the card sorting activity one of the participants had to leave the activity due to an emergency.

The total points score that each card received were calculated and are presented in Table 1. According to the perceived impact to each question (Q1 and Q2) based on those score, the factors were ranked from first place (1) to last (8), with 1 being the top

factor with the highest impact and accumulation of points and the 8th factor indicating the one with smallest impact.

When comparing the impact of each factor from Q1 to Q2, a Wilcoxon Signed Rank Test revealed that participants perceived that 'Communication' impacts more in how they do their job than in providing safe and quality healthcare, z = −2,15, p = 0,032, with a small effect size (r = 0,28). In contrast, 'Staff number and competency' was perceived to impact more in providing secured and quality healthcare than in the way they do their job, z = −1,98, p = 0,047 (small effect size, r = 0,26). No other factor showed a statistical difference (Table 1).

Table 1. Aggregated value and rank of eight different factors in Q1 and Q2

	Q1		Q2		z	p
	Aggregated value	Rank	Aggregated value	Rank		
Finance/budget	88	1	91	2	−0,44	0,661
Resources	87	2	95	1	−0,99	0,320
Pressure of work	84	3	75	4	−1,86	0,063
Communication	71	4	55	8	−2,15	0,032
Organizational culture	68	5	59	6	−1,40	0,162
Staff number and competency	63	6	76	3	−1,98	0,047
Risk Management	62	7	72	5	−1,45	0,148
Patient complexity	54	8	58	7	−0,73	0,447

A comparison between the four staff groups was made in order to identify differences in the perceived impact of each factor regarding job performance (Q1) and safe and efficient healthcare (Q2).

The Kruskal-Wallis Test revealed a statistically significant difference in the impact of 'Patient complexity' in how quality and effective healthcare is provided to the patient (Q2) across four different staff groups (Nursing staff, n = 9: Medical staff, n = 8: Allied Health Staff, n = 6: Hospital Operational Staff, n = 6), x2 (3, n = 29) = 8.877, p = 0,031. Median values given by staff group to Q2 are presented in Table 2. The Nursing staff recorded the highest median score on impact (Md = 3) and the lowest recorded by Allied Health Staff (Md = 1) and Hospital Operational Staff (Md = 1). In post-hoc test (Mann-Whitney U test) when comparing Nursing staff (Md = 3,00, n = 9) to Allied Health staff (Md = 1,00, n = 6), results showed statistically significant difference in the impact of the 'Patient complexity' in how they provide safe and quality service to the patient, U = 6,50, z = −2,51, p = 0,012, r = −0,65. Nursing staff compared with Hospital Operational staff (Md = 1,00, n = 6) also showed significant difference, U = 8,50, z = −2,30, p = 0,021, r = −0,59.

Table 2. Median ranks of the impact of eight factors in delivering safe and effective healthcare according to staff groups (Q2).

	Nursing staff	Medical staff	Allied health professionals	Hospital operational staff
	n = 9	n = 8	n = 6	n = 6
Staff number an competency	2,0	2,5	2,0	2,5
Organizational culture	1,0	1,0	1,0	3,0
Risk management	3,0	3,0	3,0	2,5
Pressure of work	2,0	2,5	2,0	2,5
Communication	2,0	1,5	2,0	1,5
Finance/budget	3,0	3,0	3,0	2,5
Resources	4,0	4,0	3,0	4,0
Patient complexity	3,0	2,5	1,0	1,0

Only one blank card was used by a participant to add in a factor which they perceived impacted Q1. On the card the participant wrote "Patients with little or lack of general knowledge" (empathy).

In Q2 there was also only one blank card used with the statement: "Null or deficient assessment of the workers/professional profile for each role. Bad human resources", somewhat related to the 'Staff number and competency' factor already contained in the card sorting activity.

4 Discussion

The majority of the factors analysed in this study were perceived with a similar impact (no significant difference) on the two questions used in the card sorting activity in the way healthcare staff do their job and in delivering safe and effective healthcare.

'Finance/Budget' and 'Resources'. These were factors with more perceived impact on both questions, this could be due to the fact that those factors are related, less budget could translate to fewer resources in delivering healthcare services. Previous research by [14] in different regions of Mexico with high maternal mortality, collected the opinion of local practice communities, in some regions finance and resources came up as a top-level obstacle to improve maternal healthcare.

The Mexican health sector has presented funding cuts for around ten years, this issue when combined with the fact that some of the health centers were built in the 1950s, contributes to a system whereby healthcare institutions have to provide healthcare with less budget and resources [15]. Other problems arise when distributing the resources within healthcare institutions, the current distribution is based on the hierarchical order determined by profession (doctors on top) and other status markers (educational level, seniority), and not planned around the needs of a patient, type of unit or institution [16]. This situation is therefore a problem component of the

'Organizational Culture' factor. [15] and [16] show that facilities, equipment and furnishings in public healthcare institutions are usually not well maintained but still used and often staff has to improvise non-tested solutions, especially in the case of damaged equipment. These problems are compounded due to the culture which could promote the view that Mexican health authorities perceive this standard to be the norm for public healthcare services rather than perceiving it to be a substandard or unacceptable situation.

The current study is unable to change the funding system within the regional hospitals involved, however working towards a progressive strategic framework to improve education and implementation of patient safety and improved staff wellbeing and performance may positively impact through the avoidance of occupational health problems and costs associated with unsafe acts or errors.

'Pressure of Work'. Placed in overall third place and presenting as the most impact factor in Q1 and fourth in Q2. This result is in agreement with the Sociotechnical Systems Analysis in Healthcare proposed by [17]. The authors suggest that high workload or work pressure have detrimental effect in safe provision of care. It is also consistent with the thematic analysis performed by [1] in which 'Pressure of work' is ranked in third place in terms of impact on challenges to safe delivery of care.

'Pressure of work' may include full/blocked departments, time pressures, improved coping strategies and excessive workload to name a few [1]. In a Chilean study, it is mentioned in regard to an increasing number of patients and the understaffing to be linked to fatigue and burnout [11]. In a similar study carried out with nursing staff in Mexico staff reported workload as one factor that impacts in their wellbeing and can potentially affect their job performance [8]. An investigation with nursing staff at the same hospital in 2006 had reported similar outputs, with reported workload and lack of support from the organization as factors contributing to increased stress levels in their professional life [18]. In another study Mexican medical staff reported to have high and severe stress related to the excessive burden of supervision, medical workload, constrained freedom to perform their job, long shift hours and more patients than they can handle [9].

These references provide evidence of the excessive workload experienced by different healthcare professionals and it is reflected in a similar way in this study. It might be difficult to diminish workload due to the number of patients, some solutions can be proposed from the human factors perspective to improve work distribution through a healthcare staff centered solution.

'Staff Number and Competency'. Participants reported that this factor significantly impacts more on the way they deliver safe and effective healthcare to patients than on a personal job role level. According to [3], Mexico is the country with the lowest number of nursing staff compared to other OECD countries, with 2.6 nurses per 1000 population compared to an average of 9.1. Medical staff has similar numbers with 2.2 per 1000 compared to the OECD average of 3.2. It is not a problem specific to Mexico, in the UK [3] reports 2.8 doctors per 1000 habitants. The number of nurses per 1000 population in UK is higher than in Mexico, 7.9 per 1000 population, but not as high as Denmark, Switzerland and Norway whom double the number (at least 16.9 per 1000 population) [3]. This finding is also exacerbated by non-clinical workers within

hospital settings, for example the work of [19] highlighted how poor administration and processes of human resources within healthcare systems led to inefficiency.

Less experienced staff will have fewer established competencies than more experienced staff and so could need more time and resources to perform their tasks and this may affect the patients perceived quality of healthcare provided to patients as reported by [20] in Mexican ambulatory health services. This could be one of the reasons for which the participants in this study suggested that the competency and amount of coworkers affects their job performance at a personal level but it affects more how the system works and could translate to an unsafe and inefficient health care.

'Organizational Culture'. In this study 'Organizational culture' was ranked in fifth place for Q1 (how I do my job) and sixth in Q2 (delivery of safe and effective care). A possible explanation for this is suggested by [16], since the health sector has experienced funding cuts it has led to continuing to provide healthcare but with fewer and less functional resources. At the same time informal practices (such as hierarchical resource and workload distribution) have been created within healthcare institutions in order to keep up with healthcare demand but do not address the real problems causing pressure in the system. The distribution of workload is distributed according to a hierarchical order instead of the needs of healthcare [16]. The hierarchical order is first defined by profession (with doctors having more power, and influence within the hierarchy), other status markers that could influence hierarchy are educational level, seniority, type of employment and proximity to authorities. This kind of work and role distribution is one of the contributors to conflict creation among healthcare staff and departments. Without evidence for novel approaches for improving quality and safe delivery of care the current status quo will continue as it is currently embedded in the hospital culture as the only way to reach suggested productivity goals.

'Risk Management Culture'. This feasibility study supports this finding and coincides with the experiences of [1], with participants reporting that this factor has more impact in the delivery of safe and efficient healthcare than in the way they do their job. 'Risk management culture' include proactive safety processes such as risk assessments and baseline knowledge of safety by all workers in an organization [1]. It is known that Mexican risk management culture does not focus on prevention, for example there are documents and procedures for the analysis of root causes of adverse events in Hospitals [21] but not for fostering a pervasive risk management culture [22]. According to healthcare institutions' normative operations and policies [21], there should be records of all accidents and adverse events in Mexican hospitals in order that action can be taken to protect against repeat occurrences. However, in practice this does not always happen [22] compared five Mexican studies about the perception on safety culture, and found that the majority of accidents and adverse events are not reported due to fear of punishment, blame culture or participants not considering or understanding the need to report. Recommendation was made to sensitize Mexican healthcare staff on the importance of this issue in order to host and promote a more safety oriented culture in health institutions. These recent findings align with the current study, whereby human factors and systems thinking are being utilized with a sample of hospital staff (clinical and non-clinical) to encourage transparent working, communication and awareness of risks to safe and effective healthcare delivery.

'Communication'. This factor was identified as impacting significantly more on the way participants do their job than the provision of effective and safe care to patients on a macro scale. In contrast with this, other studies have identified 'Communication' to have more impact in the latter, safe delivery and care on an organizational level. [23] mention that failing to have appropriate ways of communicating with the patient and between the services/staff represents an inadequate use of resources, loss of efficiency and may affect service quality. [24] indicates that effective communication could avoid accidents or harm to patients. The [3] recommends improving information systems in order to standardize communication templates and tools in order to improve and effective communication.

[25] concludes that information and communication technologies (ICT) could help to restructure processes in health services and may represent a cost-effective intervention to improve quality and safety in healthcare. Since then much work has been done to understand how those ICT tools can help to support communication and effective teamwork in improving patients outcomes [26], better work [27], to deliver safe and high quality healthcare [26, 27].

The current landscape of health information technologies (HITs) in Mexico is limited and still in infancy, with a sustained interest from 2001 but with ups and downs on its implementations or creation of official norms regarding the use of HIT [28]. The implementation of HIT in Mexico has been focused on administrative and management areas [28], on implementing electronic patient records [28, 29] and the creation of an e-Health portal initiative [29]. Even though some strategies are implemented, they are not fully established due to the unequal use of HIT tools and software caused by the lack of coordinated actions of the institutions taking part on these strategies, constrained in part by the Mexican legal framework [29]. This study highlights the need for further investment and research into the impact of ICT in the Mexican healthcare system.

'Patient Complexity'. Nursing staff participating in this study identified 'Patient complexity' as one high level factor that impacts the way they deliver effective and quality healthcare in compared to two other groups of healthcare workers. Overall it was ranked as the least impactful factor (8th place) in Q1 and 7th place in the Q2, similar to the UK results of [1] study.

A study carried out in another state of Mexico suggest that nursing staff experience stress as a result of workload and possibly exposure to patient suffering [8]. This idea may explain to some degree the difference found in this study, whereby exposure to patient suffering may be linked with the concept of 'Patient complexity'. The same author suggests that there is null or little concern regarding staff health from the institutions they work for, highlighting the need for occupational health and psychological support programs within the same institutions. This aligns with the idea that better support to staff from governance structures, appropriate training programmes and ongoing systematic support mechanisms can enhance the performance of healthcare staff, can lower cost and improve satisfaction rates. One notable example of this practice is the strategy used within Norwegian healthcare service providers [3] and whilst this exemplar of best practice cannot be lifted into the Mexican system there are points of learning which can be considered in the Latin American context. Even as the least impact factor of the eight, the difference found among staff groups suggest an

initial pathway to action and evidence the idea that some factors have not the same impact among all the hospital staff.

4.1 Limitations

One limitation in the ranking of the cards was that there was not possible to allocate more than two cards by a participant in each impact category, this included the blank cards to be written in. The no impact at all category was the only one with no minimum or maximum of necessary cards. This was perceived to be a limitation by some participants however the study was designed in this way to force participants to prioritize the factors against each of the two research questions.

There is the possibility that participants were reluctant or did not have time to consider what factors above and beyond those presented may be relevant to the Mexican healthcare service in which they worked. Whilst the opportunity was presented via the blank cards for participants to offer their own suggestions, only two acted on that opportunity. This may be due to the fact that participants needed to return to their clinical and non-clinical work activities or that they did not feel empowered in offering up their own suggestions.

Another limitation of this study might be that not all of the studies used in the discussion section were from a human factors perspective, thus these comparisons should be taken with caution.

4.2 Future Work

This study only reports hospital staff perspectives about the impact of how the eight factors presented impact their work and the delivery of safe and effective care. Whilst they do not have full insight into the operationalization of the hospital and the factors which influence healthcare staff work, the experiences of patients are an important contributor to developing and improving health service delivery. Patients could potentially have insight into and assess some of the factors such as 'Communication', 'Risk management', 'Resources' and 'Organizational culture'. According to [20], patient perceived quality of service is ordinarily reported by factors like type of institution, waiting time, time in consult and improvement of health after consultation. In further research, it would be important to elicit patient perspectives in order to provide a more complete and inclusive view of the challenges experienced within the Mexican healthcare system.

This study provided insight into the current challenges faced and future opportunities for improvement within the hospital. The findings provide a pathway for further research using human factors methods to improve design of work and the whole system, additionally continued collaboration will see not only research pathways but also applied targeted projects to develop better ways of working. More analysis is needed to clarify possible hypothesis about the differences found between staff groups. Further work analyzing the other activities in the focus groups needs to be done in order to corroborate some of the findings of the card sorting activity.

A natural progression of this study is to explore the relationship between job performance and patient safety in the Mexican context. Here those concepts were

explored as separate but related topics. Follow on enquiries would take a systems thinking approach to understand the inter-relationships between how work is done in the hospital by staff, the efficiency and performance of the system and the resulting patient outcomes and safety.

5 Conclusion

This feasibility study has investigated challenges to the safe delivery of care in a Mexican hospital. It has provided understanding of how staff perceives those challenges in regard to their personal experiences of providing care and what they think are the priorities at an organizational level. Whilst the findings do not contribute applied interventions, they provide knowledge from which the research team and hospital collaborators can focus resource and capacity for future safety and quality improvement initiatives.

The impact of factors affecting care delivery were prioritized, this allowed comparison with other Mexican studies in order to corroborate our findings and add to the limited existing literature specific to a Latin-American context. Where staff groups identified different factors as impacting them in their job there is a call to investigate these differences further so that work design and organizational policies can meet the needs of a wide range of staff groups and not just those who are 'higher up' in the hierarchical standing of Mexican healthcare institutes.

The study has introduced HF/E to the hospital Quality Managers and healthcare staff as a discipline which can contribute to their internal improvement processes by taking a systems approach and through understanding the needs of workers within the system.

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