

The perception of crowding, quality and well-being: a study of Vietnamese public health services

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Abstract

Purpose—The current study examines to what extent does the perception of crowding by medical staff and patients impact on patients' perceived service quality, overall satisfaction and emotional well-being.

Design/methodology/approach—Data were collected from 258 matched pairs of medical staff and their patients at six public hospitals.

Findings—Medical staff-perceived crowding by negatively influence patients' perceived service quality. The perceived service quality then impacts on patients' overall satisfaction and emotional well-being. Patients' perceived crowding does not significantly impact their perceived service quality but increases the positive emotional well-being of patients.

Originality/value—Scant research has investigated a matched pair of service providers and their customers. This study concentrates on how individuals' perceived human crowding and medical staff service quality affect consumer emotional well-being. This research leads to the formulation of theoretical and public policy suggestions to improve the quality of interactive services with minimal cost and disruption.

Keywords Healthcare, Service quality, Perceived crowding, Well-being, Transformative service research

Paper type Research paper

Inadequate healthcare services have become a global issue faced by many countries (Vecchio *et al.*, 2018). In particular, the establishment of the ASEAN Economic Community (AEC) in 2015 created a single market of over 600 million people in the AEC countries¹. As a result, goods, services, and skilled labor flow among member countries. The rapid economic growth in this region has potential impacts on healthcare costs, including the service environment and the quality of the services delivered (Piabuo and Tieguhong, 2017). Hospital overcrowding has been mentioned as a major issue in healthcare systems (Wibulpolprasert *et al.*, 2014). Overcrowding indicators such as number of hospital beds, total patients, total numbers of patients admitted, longest admit time (in hours), and waiting room time of last patient given a bed (in hours) are used to further reform healthcare system policy (Bond *et al.*, 2007). When such indicators are used, the image or brand of a hospital will be negative. Although government agencies may try to increase (or decrease) these figures, the balance between demand and supply in the healthcare system may not be met. The quantitative indicators mentioned describe spatial crowding (Khanna *et al.*, 2016). However, whereas these quantitative indicators are useful, human crowding should also be considered to determine the effectiveness of healthcare services and provide further recommendations for improvement (Machleit *et al.*, 2000, Mehta, 2013).

The current study uses a health care service case in Vietnam. Medical service staffs in Vietnam are reported in the stress of overloaded and risky professional work (Nguyen, 2015). On average, there are only 26 hospital beds for 10,000 people in Vietnam (Worldbank, 2016), in comparison with the World Health Organization (WHO) standard of 33 beds, or 86 beds in Korea or 140 beds in Japan (Hau *et al.*, 2016). At many hospitals in the metropolitans, one physician has to examine 80 to 90 patients a day on average in 8 hours working (An, 2012).

¹ Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam

These features insinuate a tremendous challenge to the direct interaction between physicians and patients in the health care service.

Perceived crowding has been conceptualized as a combination of physical, social, and personal factors that sensitize the individual to actual or potential problems arising from the space (Stokols, 1972). Crowding consists of two dimensions: spatial crowding and human crowding (Machleit *et al.*, 2000). While the term *spatial crowding* refers to the non-human elements in the environment, such as the layout of fixtures or the distribution of space in a workplace, *human crowding* refers to the number of individuals and the rate and extent of social interaction among people in the service environment (Machleit *et al.*, 2000).

The contributions of this study are twofold. First, this study examines human crowding, in the hospital context. While studies of spatial crowding often use hospital records, perceived human crowding can be assessed when patients are physically present where the service is offered and when medical service staff are available to provide the service (Gourlay *et al.*, 2014). As such, an investigation of a matched pair of medical service staff member and their patients may provide insights into better understanding how patient's satisfaction and emotional well-being are improved. Yet, scant research has investigated the matched pair between patients and medical service staff or how this interaction affects patients' well-being.

Second, to the best of our knowledge, this study is among the first to target patient emotional well-being that refers to the moment-by-moment evaluation of an individual through the experiences (or service experiences) that they have in their life. Additionally, Lucas and Diener (2010) state that moment-to-moment affect is the most basic way in which an individual can evaluate the quality of his or her life. Therefore, both positive and negative emotions are used to represent emotional well-being in this research. This research will contribute not only to the transformative research paradigm but also to the literature on well-being. By looking at well-being from a new perspective—a momentary emotional well-

being—this study provides new insights and understanding about human well-being. The study thus asks the question “*To what extent does perceived crowding among medical staff and patients influence patient emotional well-being and overall satisfaction?*”

Theoretical foundation

Influence of the servicescape on feelings in both service providers and consumers

The servicescape (i.e., service environment) can be broadly characterized by its physical and human aspects (Turley and Milliman, 2000). The physical attributes include external variables, general interior variables, layout and design variables, point-of-purchase variables, and decorative variables. The human attributes view people as an environmental variable and include crowding, customer characteristics, and employee characteristics. Theoretically, servicescape influences not only customer social (e.g., adherence) and economic (e.g., repurchase) responses (Snell *et al.*, 2014) but also employees’ satisfaction, work engagement and work performance (Barnes and Collier, 2013, Parish *et al.*, 2008). More importantly, employees’ and customers’ responses towards the servicescape can critically affect their subsequent behavior towards each other (Lin and Lin, 2011).

The transformative research paradigm has called for more attention to the design of servicescape and its potential impact on customer well-being (Anderson and Ostrom, 2015), particularly in the context of healthcare services (Mccoll-Kennedy *et al.*, 2017). For example, an improvement of the design of healthcare’s servicescape can significantly promote patients’ positive emotions (Mccoll-Kennedy *et al.*, 2017) and medical staff’s positive responses (Parish *et al.*, 2008). However, few studies have examined cues in the servicescape that may simultaneously affect both medical service staff and patient’s internal responses, which in turn has impact on patient’s well-being.

The role of crowding in the healthcare environment is a critical determinant of service quality (SQ). Among two forms of perceived crowding (i.e., spatial crowding and human crowding), Michon *et al.* (2005) demonstrated that human crowding is the most important component of crowding and has dramatic effects on customer perceptions of quality and on customers' behaviors. In particular, Hui and Bateson (1991) defined perceived crowding as the perception of excessive individuals within a given space. Perceived crowding may cause feelings of negative emotion such as unpleasantness and stress (Whiting, 2009). In the healthcare context, emergency room crowding, which is related to prolonged boarding times and prolonged treatment times predicted patients', lower satisfaction towards the department service as well as the overall hospitality of the hospital (Pines *et al.*, 2008). Research found that emergency room overcrowding results in patient and provider dissatisfaction, poorer quality of care, increased healthcare costs (Guttmann *et al.*, 2011), and even increased mortality rates (Richardson, 2006). This study focuses on perceived crowding during employee-consumer interactions. The perception of crowding can be seen outside the emergency department. For example Meister *et al.* (2016) examined perceived crowding at the hospital admission and revealed that perceived crowding at the hospital admission could increase patients' psychological distress. Another study showed that the perception of crowding in hospitals wards can hinder the communication quality between nurses and patients (Norouzinia *et al.*, 2016). Thus, the phrase *perceived crowding* is used to refer to human crowding in this research context.

A momentary feeling as subjective well-being

Well-being is a complex construct that concerns optional experience and functioning (Ryan and Deci, 2001). The existing research on well-being derives from two general perspectives: the *hedonic approach* and the *eudaimonic approach*. The hedonic approach focuses on

pleasure or happiness (Ryan and Deci, 2001) and defines well-being in terms of pleasure attainment and pain avoidance. On the other hand, the eudaimonic approach focuses on meaning and self-realization and defines well-being in terms of the degree to which a person is fully functioning (Ryan and Deci, 2001). This research approaches well-being from the hedonic perspective, in that it concentrates on human emotion and the preferences and pleasures of the mind, as well as the body (Kubovy, 1999), to build a conceptual foundation for emotional well-being. Well-being, in this case, consists of subjective happiness and concerns the experience of pleasure versus displeasure, broadly constructed to include all judgments about the good/bad elements of life (Ryan and Deci, 2001).

This study concentrates on the evaluation of a patient's well-being soon after (in the short term) the service interaction and focuses on neither overall treatment satisfaction nor life satisfaction. This momentary feeling may be a suitable measure of the immediate interaction between a service provider and a customer. To capture momentary positively or negatively valenced affect, the Positive Affect and Negative Affect (PANAS) measure is used (Watson *et al.*, 1988). Although negative affect may be closely linked to the concept of ill-being, ill-being generally refers to a psychological disorder such as neurosis or depression (Serafini *et al.*, 2016). Thus negative affect referring to a momentary feeling that is unpleasant is not the same as the concept of ill-being.

Service quality (SQ)

Patient-perceived interaction SQ includes two dimensions—technical interaction service quality (TISQ) and functional interaction service quality (FISQ)—that are suggested to be highly relevant to customers' views of healthcare services (Chahal and Kumari, 2011). TISQ refers to the expertise of the medical staff. In particular, TISQ refers to the provider's expertise, which reflects the provider's competence, knowledge, qualifications, and/or skill (Aharony and Strasser, 1993, Babic-Hodovic *et al.*, 2017). In other words, TISQ relates to the

content of a service interaction and reflects the material content and provider expertise involved in the service experience (Gallan *et al.*, 2013). FISQ refers to the manner in which service providers provide the service to the customer (Grönroos, 1984, Lien *et al.*, 2017, Meesala and Paul, 2018). In particular, FISQ measures whether the customer felt that a service interaction with a primary service provider was respectful, courteous, and friendly (Gallan *et al.*, 2013).

Hypothesis development

Previous research has largely focused on empirical measures that considered the effect of perceived crowding on attitudes and behaviors from only one perspective: that of the employee or of the customer. For example, studies have examined the effect of employee-perceived crowding on their attitude toward their job and behavior on the job (Ashkanasy *et al.*, 2014, Yoo and Arnold, 2016) and the effect of consumers' perceptions of crowding on their attitudes and behaviors (Li *et al.*, 2009). Ashkanasy *et al.* (2014) suggested that crowding as an element of the working environment can cause negative affective emotions (e.g., anger, frustration), contribute to negative attitudes, and reduce performance. Additionally, Yoo and Arnold (2016) demonstrated that employee-perceived crowding may lead to frequent "fake" emotional displays by employees toward customers that lead to reductions in customers' perceptions of SQ (Groth *et al.*, 2009) and in employee job satisfaction and job commitment, as well as employee burnout (Yang and Chang, 2008).

A perception of medical staff-perceived workplace crowding affects their emotions and behaviors (Yoo and Arnold 2016). Singh Gaur *et al.* (2011) empirically found that medical staff's interaction behaviors (e.g., listening and explaining) significantly influence patient evaluations of relationship satisfaction and loyalty. A study of a crowded working environment, Ashkanasy *et al.* (2014) showed the effect of crowding conditions and negative environmental variables (e.g., noise, distractions invasion) on employee attitudes (e.g., anger,

frustration) and thus employee performance and rates of turnover. They concluded that employee-perceived crowding may reduce service performance and thus customers' perceptions of SQ (Ashkanasy *et al.*, 2014).

This study argues that the medical staff-perceived crowding may impact their service performance (including attitude, behavior or emotion toward patients). For example, medical staff may be forced to shorten conversations with their respective patients by only inquiring bare essential medical information and thus keeping physician-patient interaction to a minimum. This interaction could arguably impact how patients perceive the SQ. Similarly, patients-perceived crowding service environment may influence their evaluation of SQ. Therefore, an investigation of both perceptions from medical staff and patients could further elucidate how patient satisfaction and emotional well-being are affected. As discussed previously, there is limited research using a matched pair approach, and collecting this type of data can be challenging². Therefore, this research proposes:

Hypothesis 1: Perceived crowding by (A) medical staff and (B) patients have significant negative influence on patient-perceived TISQ and FISQ.

Empirically, Ekinici and Dawes (2009) demonstrated that interaction quality is an antecedent affecting consumer satisfaction and SQ mediates the relationship of employee personality traits and consumer satisfaction. Chahal and Kumari (2011) demonstrated the effect of the ambient conditions, social and tangible attributes and interaction quality on patients' satisfaction and loyalty.

Additionally, SQ was found to directly influence consumer happiness (De Keyser and Lariviere, 2014) and quality of life (Dagger and Sweeney, 2006). The quality of consumer goods and services is a major factor in consumer well-being, which links consumer

² This research has been supported and endorsed by the hospital management and senior medical staff, thus the matched pair approach was feasible.

satisfaction and quality of life (Sirgy *et al.*, 2007). Thus, enhancements in consumer-perceived SQ might lead to an increase in consumer well-being. Dagger and Sweeney (2006) demonstrated that both TISQ and FISQ have direct effects on patient quality of life in a healthcare research context, but TISQ has a larger impact on patient quality of life than FISQ. In addition, De Keyser and Lariviere (2014) found that TISQ and FISQ directly influence consumer satisfaction with mail-order services in different channels, such as catalogs, telephone, and the Internet.

Although Dagger and Sweeney (2006) confirmed the effect of service quality perception on consumer quality of life, the term *quality of life* in their study referred to an overall evaluation of consumer life, not to the consumer's emotion or momentary evaluation. Additionally, De Keyser and Lariviere (2014) demonstrated that SQ directly influences consumer happiness with retail services. However, healthcare services are the most personal and important service that patients experience (Berry and Bendapudi, 2007), and they have a specific impact on consumer well-being. This study argues that it is necessary to test the effect of patient perceptions of interaction SQ on their emotional well-being in the healthcare context. Thus, this research proposes that:

Hypothesis 2: Patient-perceived TISQ significantly influences patient (a) overall satisfaction, (b) negative emotional well-being, and (c) positive emotional well-being.

Hypothesis 3: Patient-perceived FISQ significantly influences patient (a) overall satisfaction, (b) negative emotional well-being, and (c) positive emotional well-being.

Research showed that the service environment has an impact on consumer satisfaction (Turley and Milliman, 2000) and consumer well-being (Sheng *et al.*, 2016). The service environment also influences employee job satisfaction, job stress (Parish *et al.*, 2008), and engagement in work (Barnes and Collier, 2013) as a “form” of well-being. Thus, perceived

crowding may affect employees' and customers' satisfaction and well-being. Additionally, customers' evaluations of SQ mediate the relationship between their perceptions of the physical surroundings and/or employees' behaviors and their own attitudes (e.g., satisfaction) and behaviors (Bitner, 1992). However, during the same service encounter, employees also perceive the same service environment as their customers (Bitner, 1992); thus, if customers perceive a high level of crowding, employees will also perceive this. In linking this evidence with the previous three first hypotheses, this study predicts a mediating role of patient-perceived interaction SQ in the relationship between medical staff-perceived crowding and patient overall satisfaction and on the relationship between medical staff-perceived crowding and patient emotional well-being:

Hypothesis 4: The relationships between staff and patient perceived crowding and patient satisfaction and emotional well-being (positive and negative) are mediated by perceived TISQ.

Hypothesis 5: The relationships between staff and patient perceived crowding and patient satisfaction and emotional well-being (positive and negative) are mediated by perceived FISQ.

Figure 1 shows the proposed hypotheses to be examined.

Figure 1 about here

Method

This study focuses on medical service staff and patients with non-communicable diseases (non-infectious causes) or chronic diseases which is classified by World Health Organization

(2015). It concentrates on publicly owned hospitals (city, state, and/or district authorities) managed and operated by governmental authorities in Vietnam; thus, all these hospitals are managed following the same standards. These hospitals accept all kinds of patients and national health insurance payments. Fifteen hospitals met this requirement. A researcher contacted the 15 hospitals, and six hospital³ directors agreed that their hospital would take part in the survey (40% acceptance rate).

The dyadic survey was used to collect the data in this research. Becker and Useem (1942) defined a *dyad* as “two persons . . . when intimate, face-to-face relations have persisted over a length of time sufficient for the establishment of a discernible pattern of interacting personalities.” In this research, the terms *dyadic* and *dyad* represent a matched pair of service provider (medical service staff member) and their customer (patient) from two different populations (the hospitals and their customers).

Participants and procedures

A total of 258 pair surveys (medical staff member and patient) were recruited for this research. Although there were more patients than medical service staff, medical service staff members participated in the survey only once (i.e., one interaction). This was to avoid response bias from medical service staff that might arise if they had to fill in one survey repeatedly. The medical service staff completed the survey first; following this, the researcher chose one patient in the staff member’s ward and asked the patient to fill in the patient survey.

In the final data set, the medical service staff comprised 30% males and 70% females, aged from 22–58 years old, with 39% being **physicians**, 40% nurses, 8% therapists, 8.5% technicians, and 11% psychologists. Of the patients in the final data, 43% were male and 57% were female, aged 18–74 years old; 22% were unemployed, 2% were employed part-time,

³ Details of the six participating hospitals can be requested from the authors.

and 76% were employed full-time; 19% had been educated no further than high school, 37% held college degrees, 36% university degrees, and 8% a master's or higher degree.

Measures

The respondents were asked to rate the following constructs based on 7-Likert scale (1=Never Disagree and 7 Always for PANAS measure; 1=Strong Disagree and 7 Strong Agree for all other measures). *Perceived crowding* refers to medical service staff and patient perceptions and evaluations of excessive individuals within a hospital space. This construct was evaluated with three items adopted and modified from Bateson and Hui (1992) to determine staff perceptions: (1) "To me, the hospital is crowded"; (2) "I feel that there are too many people in our hospital"; and (3) "I feel that there is no space for me in our hospital." The Cronbach's alpha is .865 (Table 1).

Patient-perceived interaction SQ Two constructs were measured: TISQ and FISQ (Gallan *et al.*, 2013). The three items related to TISQ are: (1) "My medical service staff at hospital X are very capable of doing their job"; (2) "My medical service staff at hospital X are highly trained in their specialty"; and (3) "My hospital X medical service staff are quite skilled in their job." The three items used to measure FISQ are: (1) "My medical service staff at hospital X treated me with respect"; (2) "My medical service staff at hospital X provided courteous and friendly service to me"; and (3) "My hospital X medical service staff was considerate of my needs." Cronbach's alpha values are .875 for TISQ and .834 for FISQ.

Patient overall satisfaction was measured with four items adopted and modified from Oliver (1993): (1) "I am very satisfied with the attention given to what I had to say by my medical service staff at hospital X"; (2) "I am very satisfied with my experience at hospital X"; (3) "I am pleased with the way I was treated at hospital X"; and (4) "Overall, my medical service staff at hospital X have been very helpful to me." The Cronbach's alpha is .789.

Patient positive and negative emotional well-being was measured using the brief Positive and Negative Affect Schedule (PANAS) (Watson *et al.*, 1988), which has been confirmed to be reliable and valid. Ten items were used, with patients indicating various possible emotions, including “Inspired” and “Upset.” The Cronbach’s alphas are .835 for positive affect and .887 for negative affect.

Results

Hypothesis testing

To test the validity, confirmatory factor analysis (CFA) was used to validate the measurement model of the 23 observed variables, which reflected six factors: perceived crowding, TSQ, FSQ, overall patient satisfaction, negative affect, and positive affect. To establish reliability and internal consistency, Cronbach’s alpha coefficients were calculated in SPSS, and composite reliabilities were calculated from the CFA in AMOS. This conclusion is further supported by the bivariate correlations between the composite variables (Table 1), all of which are below the threshold of .7 (Hair *et al.*, 2009). Drawing from Table 1, the perception of crowding between staff and patient are mildly correlated ($r = .126, p < .05$). Perceived crowding from staff moderately correlated with technical interaction service quality ($r = -.335, p < .01$), functional interaction service quality ($r = -.223, p < .01$), patient satisfaction ($r = -.251, p < .01$) and patients’ negative emotion ($r = .371, p < .01$). Perceived crowding from patient moderately correlated with patients’ positive emotion ($r = .177, p < .01$). The average variance extracted (AVE) assesses discriminant validity of constructs. Our AVE of each of the latent constructs were higher than the highest squared correlation with other latent variable. This means discriminant validity was established on the construct level. Composite reliability (CR), ranging from .789 to .887, also demonstrated high level of internal consistency of the constructs.

Table 1 is about here

Path analyses were performed using AMOS to test three comparative models: the proposed full-mediated model (Figure 1), the non-mediated model, and the revised partial-mediated model (Figure 2). The full mediation model demonstrated the impact of perceived crowding affected patients' outcomes via service qualities (technical and functional). To confirm if the service qualities fully mediated the relationship between perceived crowding and patients' outcomes, the model 1 (full-mediated model) is compared with model 2 non-mediated model (where perceived crowding and service qualities directly impacted on patients' outcomes). If the model 2 does not significantly improve the overall fit statistics of model 1, then the proposed fully-mediated model is accepted. If there is additional significant path showed in model 2, we could add this additional path for testing in model 3. If model 3 significantly improve the overall fit statistics of model 1, then it is suggested partial mediated model.

To determine the best fit model, we use commonly reported fit statistics as Normed Fit Index (NFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), (Standardized), Root Mean Square Residual (SRMR). To demonstrate the good model fit, NFI and CFI should be equal or greater than .90; RMSEA and SRMR should be less than .08.

The full-mediated model (Model 1) demonstrated an inadequate fit ($\chi^2=61.205$ [10], $p<.001$, NFI = .737, CFI =.758, RMSEA = .141, SRMR = .089). The paths between (a) PC-patient and patient-perceived TISQ and FISQ, (b) patient-perceived TISQ and patient positive well-being, and (c) patient-perceived FISQ and patient positive and negative well-being were

all nonsignificant. The non-mediated model (Model 2), compared to Model 1, showed nonsignificant improvement ($\Delta\chi^2=30.392$, $df = 30$, ns). Nonetheless, it suggests a direct path between (a) medical staff-perceived crowding and customer negative well-being, and (b) medical staff-perceived crowding and customer positive well-being. The revised model (Model 3) demonstrated a good fit ($\chi^2=9.326$ [7], ns , $NFI = .960$, $CFI = .994$, $RMSEA = .025$, $SRMR = .031$). This model showed significant improvement over Models 1 and 2 (Table 2)

Table 2 and Figure 2 are about here

Post-hoc analyses

An examination of control variables for perceived crowding showed that only staff employment status⁴ was positively associated with perceived crowding, where full-time permanent staff tended to perceive a higher level of hospital crowding than contract staff ($r = .139$, $p < .05$). An additional model was examined (Model 3, with an additional path between staff employment status to perceived crowding by staff). After controlling for employment status, the significant paths remained as listed above in (1) to (4). Multi-group analyses were also performed to examine whether the revised model would differ across the six hospitals; there were no significant differences across hospitals.

Customer emotion may lead to satisfaction (Martin *et al.*, 2008). Hence, an additional model was used to test whether emotional well-being could potentially mediate the relationship between SQ and customer satisfaction. The model showed an inadequate fit ($\chi^2=95.868$ (8), $p < .001$, $NFI = .589$, $CFI = .586$, $RMSEA = .207$, $SRMR = .114$).

In sum, hypothesis 1(A) (Medical staff-perceived crowding affects patient-perceived TISQ and FISQ) was supported. Medical staff-perceived crowding significantly affected the

⁴ We also tested the occupation types (e.g. physicians, nurses, etc) but it was not significant)

service quality. However, 1(B) (Patients-perceived crowding affects patient-perceived TISQ and FISQ) was not supported.

The second hypothesis (PATIENT-PERCEIVED TISQ affects patient overall satisfaction, negative emotional well-being, and positive emotional well-being) was partially supported. Only patient-perceived TISQ influenced overall satisfaction and customer negative emotional well-being.

The third hypothesis (PATIENT-PERCEIVED FISQ significantly affects patient overall satisfaction, negative emotional well-being, and positive emotional well-being) was not supported.

The fourth hypothesis (The relationships between staff and patient perceived crowding and patient satisfaction and emotional well-being [positive and negative] are mediated by perceived TISQ) was partially supported. The partially mediated model was significant for medical staff-perceived crowding but not for patients.

The fifth hypothesis (The relationships between staff and patient perceived crowding and patient satisfaction and emotional well-being [positive and negative] are mediated by perceived FISQ) was not supported. Only medical staff-perceived crowding decreased FISQ.

Discussion

To address a call among transformative service researchers in relationship to consumer well-being, this study explored ways to improve healthcare customer well-being through the dyadic relationship between staff and customer perceived workplace crowding. This study also evaluated to what extent these perceptions impact SQ and customer satisfaction and emotional well-being. The findings show that:

(1) Medical staff-perceived crowding was found to affect patient's perception of TISQ. Medical staff who reported a high level of crowding within a hospital were associated with patients who reported a lower level of TISQ (e.g., staff expertise and skills). This relationship

reflects previous findings show that overcrowding in hospitals lead to dissatisfied patients (e.g., Pines and Hollander, 2008, Wang *et al.*, 2017). Why does medical staff-perceived crowding can impact patients' perceived SQ? It could be the case that medical staff have to reduce the conversation with their patient to the bare essentials. The less talk by medical staff, the more patients may believe that such staff do not know enough to explain a situation. It is worthy to note that these results are in the context of Vietnamese patients, who culturally do not ask questions and prefer to be told everything they need to know by medical staff. This is because patients in Vietnam believe and highly respect medical professionals, which also applies to Southeast Asian healthcare sectors (Claramita *et al.*, 2013).

(2) Patient-perceived TISQ was found to affect customer satisfaction and negative emotional well-being. As defined, technical interaction quality relates to the content of a service interaction and reflects the material content and provider expertise involved in the service experience (Gallan *et al.*, 2013). While a patient's knowledge level is different (and/or lower than) from medical service staff, a feeling of vulnerability can ensue due to the content within the overall service exchange process with medical service staff. Therefore, a patient's stress while interacting with medical service staff can be predicted (Gruber and Frugone, 2011). Meuter *et al.* (2000) argue that when a customer receives inadequate information on a product or service (especially a sophisticated product/service that needs more knowledge to use), their use intention can decrease. The findings provide further understanding of the importance of professional service knowledge exchange and customer satisfaction and emotional well-being within the healthcare context.

(3) Medical staff-perceived crowding had negative impact on patient perceived FISQ (e.g., courtesy and friendliness of interactions). Workplace crowding could generate time pressure to service patients. The interactions between medical staff and patients can be quick.

In Vietnam, a friendly interaction is expected in many occupations, including medical professions (Hằng *et al.*, 2017).

(4) There is not a significant relationship between medical staff-perceived crowding and patients-perceived crowding. The mean values for perceived crowding by staff ($M=2.77$, $SD=1.23$) and patients ($M=3.47$, $SD=0.99$) are not particularly high. Perhaps this can be explained as a function of Vietnamese personal space, or the lack thereof. One characteristic of living in Asia is close living quarters. People tend to live with extended family, particularly in Vietnam where there is a socialist influence. All belongings including spaces are to be shared, thus there is less of a sense of personal space (Drummond, 2000). This could explain a higher threshold for perceived crowding in the Vietnamese context.

(5) An interesting finding is that patients-perceived crowding improved positive emotional well-being. It is possible that the perception of crowding could trigger positive assumptions concerning a product or service. For example, in hospitality research, customers rate crowded restaurants, prior to an actual visit, as having high quality and delicious food (Kim *et al.*, 2010, Ryu *et al.*, 2012); fully booked hotels are perceived as good-quality value options (Toh and Dekay, 2002). Most recently, Hock and Bagchi (2018) found that consumers' perception of human crowding leads to their greater calorie consumption in the restaurant context. Similarly, a crowded hospital may signal high quality with efficient [physician](#) and staff. Patients may feel happy or relieved to use a service from such a hospital.

Overall, the findings of this research extend the current knowledge that service employee perceived crowding can have effect on their service performance (Li and Hsu, 2016), which in turn, negatively affects customer perceptions of SQ (Hartline and Jones, 1996, Salanova *et al.*, 2005). Examining the relationship between employee and customer perception of crowding allows us to understand both the positive and negative aspects of perceived crowding in the Vietnamese medical context. The economy of the Asia Pacific

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region is growing and changing rapidly. The presence of the AEC will increase the movement of people and goods across regions, which can spread disease, leading to greater demands on healthcare systems. With limited funds for Vietnamese healthcare, policy makers and relevant agencies may need to find creative ways to improve patient satisfaction and well-being. The findings showed that perceived hospital crowding is not an issue for patients; rather, it is viewed positively as it can be a performance cue (Hartline and Jones, 1996) that indirectly affects patients' perceived hospital SQ. Yet, how medical staff perceive their work environment is an important factor in the dyadic relationship between healthcare medical staff and patients. Policy makers and relevant agencies can adopt interior design principles that directly influence human responses to perceived crowding. In the context of hospital management, interior design may be perceived as less important than factors such as hygiene or compliance with health and safety regulations. However, changes to interior design can be incremental, improving the working environment with minimal cost and disruption. While governmental agencies seek large sums to expand healthcare facilities (which can take years), a small budget can be allocated to immediate improvements in the hospital environment through interior design.

Vietnam's health system consists of a highly unregulated public–private mix (Hort *et al.*, 2017). This could spark competition between public and private medical and pharmaceutical practices. Public hospitals are also forced to increase revenues to attract and retain their staff (Nekoei-Moghadam and Amiresmaili, 2011). The findings can be used to further develop hospital performance indicators (from the perspectives of both patients and medical staff). Generally, hospitals in Vietnam measure patient overall satisfaction, complaints, and incidents, and medical staff overall satisfaction, absenteeism, and turnover. Perhaps by monitoring perceived crowding as well as patient emotion after receiving a service (beyond asking how they were satisfied overall with the service) as additional

indicators, this additional information can help management and policy makers to better understand the interactions between staff and patients. Perhaps this information can help management and policy makers to allocate budget/resources optimally, which may have a greater impact on patient-employee outcomes.

Theoretical implications

This research empirically validates the model of service environment design and consumer well-being. By measuring emotional well-being, this research addresses a form of consumer well-being that is the most critical part of the service ecosystem view (Anderson *et al.*, 2013). Previous research has targeted many forms of well-being, such as quality of life, happiness, life satisfaction, and financial well-being (see in Anderson and Ostrom, 2015). However, it is surprising that, to the best of our knowledge, this is the first research targeting the emotional well-being of patients immediately after service interactions. This research provides a new understanding of human well-being. That is, human well-being can be examined not only over a long period, but also in individual moments.

Further, this research applies the dyadic approach to examine the relationship between crowding and interaction SQ. By measuring medical service staff-perceived crowding, in addition to patient-perceived crowding, this research enhances our current understanding of the interaction between medical service staff and patients and its effect on patient perception of SQ. From the service profit chain perspective (Heskett *et al.*, 1994), service employees satisfaction towards internal management (e.g., the design of work environment and the practice of human resource management) critically affect their work performance, which in turn, influences customer retention. Previous research also stressed employee performance as an important cue in the servicescape that affect customer perceived hotel SQ, and/or value, which has a consequent effect on customer word-of-mouth behavior (Hartline and Jones,

1996). Although researchers investigated the relationship between perceived crowding, consumer emotion and/or behavior (Mehta, 2013, Palcu *et al.*, 2015), they did not focus on the relationship between crowding perception and the nature of interactions between service staff and customers, particularly in the healthcare service context.

Managerial implications

Drawing from the current findings, it is essential that healthcare service managers not only concentrate on patient perceptions of crowding in the service environment; they must also consider their employees' perceptions of workplace crowding. This research shows that medical service staff-perceived crowding influences patient satisfaction and well-being, both directly and indirectly. Thus, it is imperative to ensure that healthcare managers understand the importance of medical staff perceptions about their working environment. Accordingly, healthcare managers should investigate solutions to reduce crowding in their hospitals.

In addition, the crowding perception in medical services may come from an overload of medical service staff versus patients. To solve this problem, healthcare managers may need to employ a recruitment strategy suitable for the development of the hospital. Generally, healthcare managers may apply the concept of internal marketing to the hospital's administration. Communication with medical service staff to listen to their perceptions of their working environment, workplace crowding, and/or stress can help hospital managers provide a better strategy for the business side of a hospital and its development. In particular, within special fields such as healthcare, medical service staff with strong service-oriented behaviors and customer-oriented attitudes may provide better healthcare services, helping to improve patient well-being and, in turn, improve the quality of life of individuals and society.

Further, the findings suggest that **medical and administrative staff** can create and cultivate patient well-being by delivering excellent TISQ and FISQ. **For example, medical**

staff may interact with patients with respect (FISQ), and use simpler terms instead of medical jargon in explaining the health issues (TISQ). Hospital administrators may interact with patients with friendliness and courtesy (FISQ). Admission process can contribute to the well-being of patients, which in turn will increase feelings of comfort and happiness.

Administrative staff may use visualization such as diagram, picture along with verbal explanation of procedure to their patients (TISQ).

Limitations and future research directions

This research has some limitations. First, the data were collected within a Vietnamese healthcare context that creates generalizability concerns. Nonetheless, the findings may serve as a basis for similar studies in other countries/cultures. As discussed previously, due to the culture and political context of Vietnam, the threshold of perceived crowding by Vietnamese is relatively high. It is possible that similar results could be generated by similar studies in similar cultural and political contexts such as in Southeast Asia. Therefore, there may be generalizability within the collective and socialist context. Second, the fields to collect data were public hospitals. The generalizability of findings may or may not be applicable as the business model of public and private hospitals can be differently. For example, while the customers in public hospital may perceive crowding as a good quality hospital (therefore many customers), private hospital customer may perceive crowding as less value for money (customer may have a high expectation for excellent service and environment). Future research may compare between private and public hospital in collective culture such as in Vietnam or Thailand. Third, this research did not assess the individual medical records of each patient who participated in the data collection and thus cannot classify the condition of each patient. This may have contributed to bias in the measurement of well-being. Future research could use personal medical records as another means of measuring patient well-

being. Lastly, the individual perceived crowding among medical staff members may vary, which could have an impact on the staff-patient interactions. Future research may employ both quantitative and qualitative research to triangulate this aspect.

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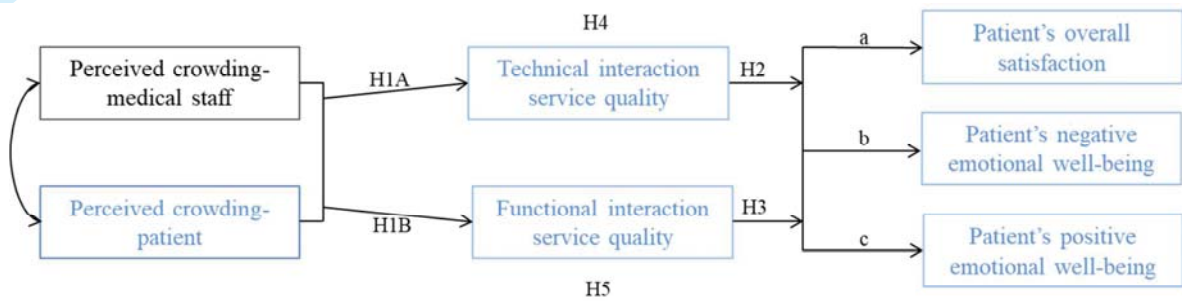
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Note: H2 and H3 hypothesize the mediation effects of service qualities (technical and functional) on the relationship between perceived crowding and patients' satisfaction and emotional well-being.

Figure 1 Proposed research model and the hypotheses.

Table 1 Descriptive statistics and correlations between study variables (N=236)

Variable	Mean	SD ^a	AVE	CR	PC-staff	PC-patient	TISQ	FISQ	PS	Pos.Emo	Neg.Emo
PC-staff	2.77	1.23	.566	.865	.836^b						
PC-patient	3.47	.99	.695	.872	.126*	.811					
TISQ	5.33	1.00	.700	.875	-.335**	-.095	.793				
FISQ	5.20	.93	.629	.834	-.223**	.002	.391**	.746			
PS	5.35	.99	.556	.789	-.251**	.042	.519**	.598**	.751		
Pos.Emo	5.29	.72	.564	.838	.014	.177**	-.052	-.051	.086	.783	
Neg.Emo	2.85	.93	.613	.887	.371**	-.062	-.361**	-.217**	-.276**	.063	.752

^aSD = standard deviation; AVE = Fornell and Larcker's average variance extracted (pvc); CR = composite reliability; PC-staff = perceived crowding by medical staff; PC-patient = perceived crowding by patients; TISQ = technical interaction service quality; FISQ = functional interaction service quality; PS = patient satisfaction; Pos.Emo = patient positive well-being; Neg.Emo = patient negative well-being.

^b Values in the diagonal line in bold are square root of the AVE of the variables; sub-diagonal is the absolute value of the correlations.

*Correlation is significant at the .05 level (2-tailed).

**Correlation is significant at the .01 level (2-tailed).

Table 2 Model comparisons between the proposed full-mediated model (Model 1), non-mediated model, and revised partial-mediated model (Model 3).

Model/fit indices	χ^2	df	<i>p</i>	Comparison	$\Delta\chi^2$	Δdf	NFI	CFI	RMSEA	SRMR
<i>Model 1 full-mediated model: PC (patient and staff) → interaction quality (mediators) → outcomes (patient satisfaction and well-being)</i>										
	61.205	16	.000	--	--	--	.737	.758	.141	.089
<i>Model 2 non-mediated model: PC (patient and staff) → interaction quality (mediators) → outcomes (patient satisfaction and well-being)</i>										
<i>PC (patient and staff) → outcomes (patient satisfaction and well-being)</i>										
	30.392	4	.000	model 1 vs model 2	30.813	6	.870	.876	.160	.064
<i>Model 3 revised partial-mediated model: PC (patients and staff) → interaction quality (mediators) → outcomes (patient satisfaction and well-being)</i>										
<i>PC-staff → patient negative well-being</i>										
<i>PC-patient → patient positive well-being</i>										
	9.326	8	.316	Model 1 vs Model 3	51.879***	2	.960	.994	.025	.031
				Model 2 vs Model 3	21.006***	4				

Notes: *** = $p < .001$. PC-staff = perceived crowding by medical staff; PC-patient = perceived crowding by patients; TSQ = technical interaction service quality; FSQ

= functional interaction service quality; PS = patient overall satisfaction; Pos.Emo = patient positive well-being; Neg.Emo = patient negative well-being.

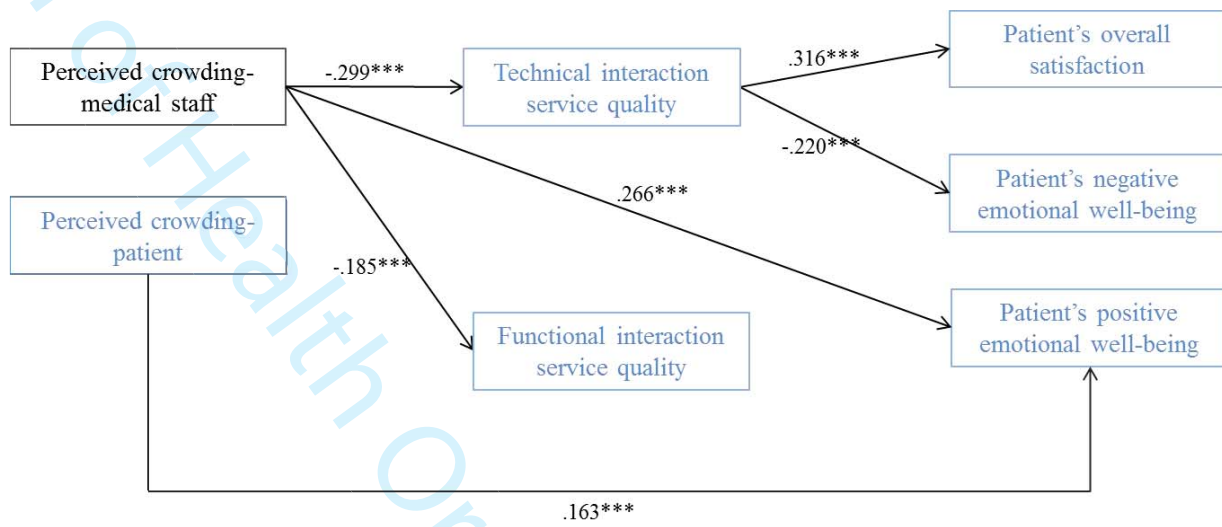


Figure 2 Illustration of relationship among variables as a final model. → represents significant paths as a result from the current study