

## CHAPTER III

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### MEASURING NURSING CARE QUALITY USING ENTROPY WEIGHT METHOD: A NEW PERSPECTIVE FOR HEALTHCARE MANAGERS

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#### 1. Introduction

As healthcare providers offer similar services, they face challenging competition (Chang et al., 2006: 1042; De Pietro, 2006: 57; Nunes et al., 2011: 355; Peng & Bourne, 2009: 380). Increased competition forces competitors to adopt various positive and distinctive courses of action such as closely monitoring developments in the sector, providing higher quality at lower prices to customers, delivering speedy and accurate patient services, and offering a broader range of services for customers (Beckert et al., 2012: 400; Bradley et al., 2012: 199; Chang et al., 2006: 1042; Sirgy et al., 2011: 462). Hospitals that are particularly aware of and able to correctly use their strategic competences have strong competitive advantage in the market (Douglas & Ryman, 2003: 336). Having competitive advantage enables hospitals to increase their market share, have favourable reputation among customers, position themselves as first-choice by customers and have a stronger economic say in the market (Sirgy et al., 2011: 462).

Nursing care constitutes an essential component of overall healthcare service as numerous studies emphasise the important role of nursing in the services provided by hospitals to patients (Merkouris et al., 2004: 355; Milutinović et al., 2012: 598; Otani et al., 2014: 370). As such, it should be obvious that nursing care quality is an essential component of healthcare service quality. There is a clear relationship between nursing care quality and patient satisfaction (Elder et al., 2004: 263; Johansson, 2002: 338; Mrayyan, 2006: 225). People consider important and demand

nursing care especially when they need healthcare (Johansson, 2002: 338; Jun & Faulkner, 2018: e1674). Nursing care provided at healthcare institutions also provides an opportunity for early diagnosis concerning any deterioration in the health of patients during hospital stay (Lucero et al., 2010: 2). In other words, nurses can be characterised as guards who control the course of healthcare provided (Jones et al., 2015: 1122). In addition, nurses are at the centre of the communication network and function as a bridge between patients, patients' relatives and healthcare team (Buchanan et al., 2015: 222). Nurses are expected to meet all physical, mental, social and psychological needs of patients effectively to provide quality care to patients (Van Leeuwen & Cusveller, 2004: 234).

Studies concerning nursing care quality generally fall into two categories. The first category involves the analyses of the factors affecting service quality from service providers', i.e. nurses', perspective (Aiken et al., 2002: 8; Bragadóttir et al., 2017: 1526; Burhans & Alligood, 2010: 1691). Such studies focus on the factors influencing nursing services rather than the components of these services. The second category includes studies focusing on service recipients', i.e. patients', views on various aspects of nursing service quality (Alasad & AbuRuz, 2015: 564; González-Valentín et al., 2005: 64; Suhonen et al., 2005: 285). In general, the latter studies deal with the question of how nursing care quality can account for patient satisfaction.

Studies investigating patient satisfaction with nursing services have different contexts and are often conducted with a view to targeting certain market segments. For instance, some studies focus on nursing services in certain clinics of hospitals (Charalambous et al., 2016: 176; Leinonen et al., 2003: 30; Radwin et al., 2003: 284). Some others divide the market based on certain demographic characteristics and analyse the satisfaction of patients of certain age groups with nursing services (Comparcini et al., 2018: 289; Pelander et al., 2009: 445; Stewart et al., 2005: 414).

There are also studies aiming at developing instruments for measuring nursing care quality (Dozier et al., 2001: 508; Kalisch & Williams, 2009: 212; Laschinger et al., 2005: 223; Liu & Wang, 2007: 267; Lynn et al., 2007: 161; McColl et al., 1996: 35; Parasuraman et al., 1988: 12). Some of such measuring instruments do not involve dimensions (Dozier et al., 2001: 510; Laschinger et al., 2005: 223; Milutinović et al., 2012: 598), while others contain several dimensions of nursing services. Chaaya et al. (2003: 439), Larrabee & Bolden (2001: 36), Liu & Wang (2007: 267), Senarath & Gunawardena (2011: 76) and Wolf et al. (1994: 110) emphasise the dimensions of professional competence, knowledge and skills of nursing services. Nurse characteristics is reported by many studies as a significant aspect (Leinonen et al., 2001: 302; Lynn et al., 2007: 164; Pelander et al., 2009: 446). Some studies emphasise the

dimensions of nursing activities and nursing environment (Leinonen et al., 2001: 296; Liu & Wang, 2007: 269; Lynn et al., 2007: 164; Pelander et al., 2009: 443; Senarath & Gunawardena, 2011: 76). Other significant aspects of nursing services are reported to be personalised nursing services and communicative skills (Liu & Wang, 2007: 267; Lynn et al., 2007: 165; Senarath & Gunawardena, 2011: 76; Wolf et al., 1994: 110). There are also studies which contain the basic dimensions of the SERVQUAL (Parasuraman et al., 1988: 12) as part of nursing care quality. Responsiveness (Lynn et al., 2007: 164; Radwin et al., 2003: 287) and promptness (Larrabee & Bolden, 2001: 36; Liu & Wang, 2007: 268) are examples in this context.

Different expectations of people may affect their satisfaction, and different levels of satisfaction may arise for the healthcare services they demand (Wu & Lu 2018: 79). For this reason, it is not always possible to meet all patient expectations of quality healthcare service and satisfy patients on every aspect (Ferreira et al., 2018: 60). Therefore, hospitals need to identify the most important demands, by studying patient expectations and/or rank-ordering the importance of expectations. The aim of this study is to identify the most important aspects of nursing care quality based on patient expectations of and satisfaction with nursing care; determine the relative weights of each aspect in the overall nursing service quality; and measure in numerical terms the gap between patient expectations of nursing care and their evaluations of the actual nursing care received. Using the entropy weight method (Delgado & Romero, 2016: 111) to determine the weights of aspects of nursing care quality with a holistic perspective, this study further reduces the uncertainty of information on relative importance of aspects, and improves on earlier studies that have employed conventional methods, e.g. scoring based on a 5-point scale. Given the importance of nursing care quality, the knowledge of aspects and their relative weights as well as the magnitude and nature of the gap between patient expectations and satisfaction with actual nursing service should have some guiding value for hospital administrators in terms of increasing nursing care quality.

In the present paper Section 2 elaborates the methodology as to research design, measuring instrument, administration and respondents and analysis method. Section 3 consists of results data collection and analysis followed. Section 4 gives discussion of results. Section 5 presents the limitations and finally Section 6 gives conclusion.

## **2. Methods**

### **2.1. Research Design**

This study represents a cross-sectional analysis. Participants were over 18 years old and they received nursing care at least once either at state

hospitals. Those persons who did not recipient of nursing care during that day were not included in the study. In order to reduce the internal bias of the participants, they were asked to evaluate the nurses they received service for the first time. In addition, none of the respondents worked as a nurse. There are 54 public hospitals in the city (Ankara Medical Chamber, 2019: 4). Questionnaires applied to the participants in the hospitals garden. This scale developed by the authors and inquire patient expectations of and satisfaction with nursing care quality. The data were collected in December 2018 and January 2019. The aim and procedures of the study were explained to respondents who agreed to participate in the research. Study participation was optional for respondents.

## **2.2. Measuring Instrument**

A comprehensive literature review was conducted to examine various aspects of patient expectations of and satisfaction with nursing care quality with a view to developing a measuring instrument on sound theoretical grounds (Charalambous et al., 2016; Eriksen, 1987; Kemppainen, 2000; Lucero et al., 2009; Lucero et al., 2010; Lynn & McMillen, 1999; Mrayyan, 2006; Norman et al., 1992).

Following the review, a focus group study was conducted. Focus group discussions are frequently employed in different disciplines, and involve group discussions to reveal the views, experience, satisfaction, attitudes and beliefs of the group members on a specific topic (Massey, 2011: 23). A focus group was formed consisting of eight patients who received nursing service at least once in the that day. The group had an average age of 34, equally distributed by sex, and was all university graduates. They were asked to answer the items about their expectations from nursing services and indicate which services were important for them. Two moderators facilitated the focus group discussions: one a mid-level hospital manager and the other an academician who studied healthcare management. Group discussions continued until consensus was reached on twenty-seven aspects of nursing care.

The survey questionnaire was developed by transforming the outputs of the focus group discussions into questionnaire items. The first part of the questionnaire included five items on demographics namely age, gender, marital status, educational status, monthly income of respondents. The second and third parts included 27 items each, with identical main clauses. The second part inquired patient expectations, labelled "importance-to-patient" with the prelude "It is important that ..." whereas the third part investigated actual patient satisfaction of nursing care based on personal experience, with the prelude "I am pleased that ..." (for details see Table 2). The response choices included a typical 5-point Likert scale with 1= "strongly disagree" to 5 "strongly agree".

The draft questionnaire was administered to 20 volunteer patients in a pilot study to test intelligibility of them, 12 were female and 8 male and their ages ranged between 18 and 60 years. Based on the findings of the pilot study, the questionnaire was revised and finalised for administration.

### 2.3. Administration and Respondents

The survey questionnaire was distributed personally to 2,000 people at state hospitals in a major city with more than 5 million in population. The response rate was 36.75% as 735 responses were returned on a voluntary basis. DeVaus (2000) stated that within a 95% confidence level, an assumption of more than 10 million customers per year and a 5% error margin, the suitable sample size was 370. The aforementioned “customers” constitute the “patients” in our study. Therefore, the number of responses was sufficient in the study. Respondent demographics were as follows by largest subgroups: age 18-28 (43.5%), female (65.9%), married (51.3%), university graduates (57.3%) and monthly income 316,46\$ (2,000TL/6.32) or less (44.4%) (See Table 1). The Cronbach's alpha coefficient of the questionnaire was found to be 0.90. It is reported that the Cronbach's alpha coefficient higher than 0.70 indicates that the instrument is reliable (DeVellis, 1991: 85).

Table 1: Respondent Demographics

|                   | <b>Category</b>                   | <b>N</b>   | <b>%</b>   |
|-------------------|-----------------------------------|------------|------------|
| Age (Years)       | 18-28                             | 320        | 43.5       |
|                   | 29-39                             | 159        | 21.6       |
|                   | 40-50                             | 150        | 20.4       |
|                   | 51-60                             | 57         | 7.80       |
|                   | 61 and above                      | 49         | 6.7        |
|                   | <b>Total</b>                      | <b>735</b> | <b>100</b> |
| Gender            | Male                              | 251        | 34.1       |
|                   | Female                            | 484        | 65.9       |
|                   | <b>Total</b>                      | <b>735</b> | <b>100</b> |
| Marital Status    | Single                            | 377        | 51.3       |
|                   | Married                           | 358        | 48.7       |
|                   | <b>Total</b>                      | <b>735</b> | <b>100</b> |
| Educational Level | Less than high school             | 125        | 17.0       |
|                   | High school                       | 130        | 17.7       |
|                   | University                        | 421        | 57.3       |
|                   | Postgraduate                      | 59         | 8.0        |
|                   | <b>Total</b>                      | <b>735</b> | <b>100</b> |
| Monthly Income    | 316,46\$ minimum wage or less     | 326        | 44.4       |
|                   | 316,46\$ to 632,91\$ minimum wage | 239        | 32.5       |
|                   | 632,91\$ to 949,37\$ minimum wage | 89         | 12.1       |
|                   | Higher than 949,37\$ minimum wage | 81         | 11.0       |
|                   | <b>Total</b>                      | <b>735</b> | <b>100</b> |

## 2.4. Analysis Method

An exploratory factor analysis was conducted, using SPSS Statistics for Windows version 23.0, to group the aspects of patient expectations of and satisfaction with nursing care quality. Factor analysis is a relatively strong statistical technique that classifies relevant items in a questionnaire, creates relatively independent subgroups and supports the establishment of predictive, content and construct validity (Nunnally & Bernstein, 1994: 263; Wilska, 2003: 451).

Following the exploratory factor analysis, a confirmatory factor analysis was performed using AMOS Statistics for Windows version 23.0. The confirmatory factor analysis is a technique used to validate the model obtained based on theoretical foundations, develop or reinforce the evidence by analysing previous research (Harrington, 2009: 7; Yuan et al., 2011: 252).

At the confirmatory factor analysis to evaluate nursing care quality, the entropy weight method was used, and weights were determined by making numerical calculations for each item. This weight method is used to measure the weights of indices in multi-criterion decision-making problems, and highly advantageous for researchers in that it offers possibility to calculate the weights of indices objectively (Delgado & Romero, 2016: 111). In addition, the entropy weight method reveals the hidden information in the data in the most efficient way and enables researchers to determine the differences between indices (He et al., 2016: 399; Yang et al., 2018: 271). Therefore, it can be argued that the results obtained through the entropy weight method better reflect the real situation (Toumi et al., 2017: 879). The Spearman correlation analysis was performed to determine the relationship between the expectations and satisfaction of respondents after the determination of the item weights by entropy weight method.

The algorithm for obtaining entropy weights is as follows (Shemshadi et al., 2011: 12161):

*Step 1:* Compose the normalized matrix.

The normalized matrix is demonstrated by  $[X]$  and it is shown as follows:

$$[X] = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix}$$

Where  $x_{ij}$  ( $i = 1, 2, \dots, m$   $j = 1, 2, \dots, n$ ) is  $i$ -th respondent's value to  $j$ -th item.

*Step 2:* Find the normalised matrix.

The element of the normalized matrix is  $p_{ij}$  and it is computed as follows:

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad i = 1, 2, \dots, m \quad j = 1, 2, \dots, n$$

Where  $p_{ij}$  is normalised value for  $i$ -th respondent's value to  $j$ -th item.

*Step 3:* Calculate the entropy information for each item.

Entropy information of  $j$ -th item is demonstrated by  $e_j$  and it is computed as follows:

$$e_j = -\frac{\sum_{i=1}^m p_{ij} \ln p_{ij}}{\ln(m)} \quad i = 1, 2, \dots, m \quad j = 1, 2, \dots, n$$

*Step 4:* Find weight for each item.

Entropy weight of the  $j$ -th item  $w_j$  is computed as follows:

$$w_j = \frac{1 - e_j}{\sum_{j=1}^n (1 - e_j)} \quad j = 1, 2, \dots, n$$

### 3. Results

Average scores on the 5-point scale and entropy weight scores were computed on the responses to "Importance-to-Patient" items or "Importance Scale", and to "Patient Satisfaction" items or "Satisfaction Scale", which included identical main clauses but different preludes (see Table 2).

Item weights were computed using the entropy weight method. When the entropy value of an index increases, the weight of the entropy becomes smaller. Such a case suggests that the index provides less information needed to make decisions and lead to uncertainty (Wang & Lee, 2009: 8982; Yang et al., 2019: 1181). On the other hand, when the entropy weight of an index is high, it provides all necessary information to make decisions indicating that it has a significant role in a study.

Table 2: Questionnaire Items, Scores and Inter-Item Ranking

| Statement in the Item                                             | Item Label                  | Importance to Patient<br>Qi..: “It is important that ...” |                      | Patient Satisfaction<br>Qs..: “I am pleased that ...” |                      |
|-------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------|----------------------|-------------------------------------------------------|----------------------|
|                                                                   |                             | Avg. score (5-point scale)                                | Entropy-weight score | Avg. score (5-point scale)                            | Entropy-weight score |
| 01: ... nurses are keen on patient room hygiene.                  | Patient room hygiene        | 4.63 [15]                                                 | 0.037040 [20]        | 3.74 [12-13]                                          | 0.037061 [12]        |
| 02: ... nurses are well-dressed and clean-looking.                | Overall personal appearance | 4.68 [12-13]                                              | 0.037069 [13]        | 4.20 [1]                                              | 0.037206 [1]         |
| 03: ... nurses ensure undisturbed patient rest                    | Ensuring undisturbed rest   | 4.33 [25]                                                 | 0.036998 [24]        | 3.68 [16-17]                                          | 0.037044 [13]        |
| 04: ... number of attending nurses is adequate.                   | Number of nurses            | 4.58 [16-17]                                              | 0.037058 [17]        | 3.63 [19-20]                                          | 0.036982 [20]        |
| 05: ... nurses perform treatment-related actions as they promise. | Delivery as promised        | 4.73 [8]                                                  | 0.037093 [10]        | 3.85 [8]                                              | 0.037105 [6]         |
| 06: ... nurses are trying to solve patient problems.              | Solving patient problems    | 4.58 [16-17]                                              | 0.037067 [14]        | 3.74 [12-13]                                          | 0.037068 [11]        |
| 07: ... interventions of nurses are reliable.                     | Reliable intervention       | 4.67 [14]                                                 | 0.037066 [15]        | 3.99 [4-5]                                            | 0.037143 [3]         |
| 08: ... nurses adequately inform patients on upcoming treatment.  | Informing patients          | 4.47 [22]                                                 | 0.037023 [22]        | 3.61 [22-23]                                          | 0.036968 [22]        |

|                                                                                              |                             |              |                |              |               |
|----------------------------------------------------------------------------------------------|-----------------------------|--------------|----------------|--------------|---------------|
| 09: ...after informing patients on upcoming treatment, nurses request permission to proceed. | Requesting permission       | 4.56 [18]    | 0.037050 [18]  | 3.68 [16-17] | 0.036983 [19] |
| 10: ... nurses keep reliable patient records.                                                | Reliable patient records    | 4.80 [4]     | 0.037101 [5]   | 3.99 [4-5]   | 0.037135 [5]  |
| 11: ... nurses serve responsively and skilfully.                                             | Responsive, skilful service | 4.72 [9-10]  | 0.037098 [7-8] | 3.82 [10]    | 0.037093 [7]  |
| 12: ... nurses pay full attention to individual patient.                                     | Full attention              | 4.24 [26]    | 0.036974 [25]  | 3.49 [27]    | 0.036938 [26] |
| 13: ... nurses speedily analyse patient problems.                                            | Speedy analysis of problems | 4.52 [20]    | 0.037074 [12]  | 3.62 [21]    | 0.037015 [15] |
| 14: ... nurses are ready to help when needed.                                                | Ready to help               | 4.68 [12-13] | 0.037098 [7-8] | 3.70 [15]    | 0.037006 [16] |
| 15: ... nurses are willing to help patients.                                                 | Willing to help             | 4.71 [11]    | 0.037083 [11]  | 3.55 [24]    | 0.036944 [25] |
| 16: ... nurses are accessible.                                                               | Nurse accessibility         | 4.75 [7]     | 0.037099 [6]   | 3.64 [18]    | 0.036992 [17] |
| 17: ... nurses consider patient/family suggestions and complaints.                           | Heeding patient feedback    | 4.54 [19]    | 0.037059 [16]  | 3.51 [26]    | 0.036949 [24] |
| 18: ... nurses have adequate professional knowledge.                                         | Professional knowledge      | 4.83 [1]     | 0.037110 [3]   | 4.00 [3]     | 0.037139 [4]  |
| 19: ... nurses have necessary abilities and skills.                                          | Abilities and skills        | 4.82 [2]     | 0.037107 [4]   | 4.03 [2]     | 0.037158 [2]  |

|                                                                        |                                   |             |               |              |                 |
|------------------------------------------------------------------------|-----------------------------------|-------------|---------------|--------------|-----------------|
| 20: ... nurses are diligent on treatment.                              | Diligence on treatment            | 4.79 [5]    | 0.037115 [1]  | 3.84 [9]     | 0.037090 [8]    |
| 21: ... nurses make adequate effort to ensure patient privacy.         | Ensuring patient privacy          | 4.81 [3]    | 0.037114 [2]  | 3.98 [6]     | 0.037089 [9-10] |
| 22: ... nurses care for patient comfort and feelings.                  | Empathy with patient              | 4.46 [23]   | 0.037035 [21] | 3.61 [22-23] | 0.036991 [18]   |
| 23: ... nurses are responsive to patient's special needs and requests. | Responsive to patient needs       | 4.04 [27]   | 0.036889 [26] | 3.52 [25]    | 0.036960 [23]   |
| 24: ... nurses are respectful to patients.                             | Respectful to patients            | 4.76 [6]    | 0.037096 [9]  | 3.87 [7]     | 0.037089 [9-10] |
| 25: ... nurses are women.                                              | Preferring female nurses          | 4.72 [9-10] | 0.036420 [27] | 3.78 [11]    | 0.036844 [27]   |
| 26: ... nurses help alleviate patient fears.                           | Alleviating patient fears         | 4.38 [24]   | 0.037021 [23] | 3.63 [19-20] | 0.036979 [21]   |
| 27: ... nurses provide comfortable environment.                        | Providing comfortable environment | 4.48 [21]   | 0.037045 [19] | 3.71 [14]    | 0.037031 [14]   |

\* Figures in square brackets immediately after scores denote the item's rank by descending order in that

Table 2 provides a list of all questionnaire items and shortened labels that represent aspects of nursing care, item average scores based on 5-point scale, item entropy weights, and inter-item rankings. Top three items with highest entropy weights on the Importance Scale are Qi20: Diligence on treatment, Qi21: Ensuring patient privacy, and Qi18: Professional knowledge; whereas the bottom three with lowest entropy weights are Qi12: Full attention, Qi23: Responsive to patient needs, and Qi25: Preferring female nurses. On the Satisfaction Scale, top three items are Qs02: Overall personal appearance, Qs19: Abilities and skills, and Qs07: Reliable intervention; and bottom three are Qs15: Willing to help, Qs12: Full attention, and Qs25: Preferring female nurses.

The Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) values were used to see whether or not the values were eligible for factor analysis. The former value was found to be significant ( $p=0.000$ ), whereas the latter value was found to be 0.97, indicating that the sample was suitable for factor analysis (Field, 2009). Then, an exploratory factor analysis was performed based on principal components analysis using varimax rotation on 27 items.

The exploratory factor analysis revealed two factors accounting for 59.7% of the variance. The labels were assigned to these factors based on the qualitative assessment of the item contents. There were fourteen items in Factor 1, all of which individually and collectively were associated with reliable practice of the nursing profession; hence Factor 1 was labelled "reliability" of the nursing care. There were thirteen items in Factor 2, all of which individually and collectively related to nurse-patient personal relations; hence Factor 2 was labelled "individuality" of the nursing care. The Cronbach's alpha was 0.89 for each of the two factors (see Table 3).

As regards the confirmatory factor analysis, absolute fit measures (AFM), incremental fit measures (IFM), and parsimonious fit measures (PFM) were utilised to examine the model fit (Yoon & Uysal, 2005: 52). A good model fit requires that the Root Mean Square Error of Approximation (RMSEA) be lower than 0.10; and Confirmatory Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Goodness of Fit Index (GFI) be higher than 0.90 (Hu & Bentler, 1998: 449; Steiger, 1990: 177).

Table 3: Results of Exploratory and Confirmatory Factor Analyses

| <b>Factors</b> | <b>Patient Satisfaction Items</b> | <b>Factor Loadings</b> | <b>Cronbach's Alpha</b> | <b>AVE</b> | <b>CR</b> |
|----------------|-----------------------------------|------------------------|-------------------------|------------|-----------|
| Reliability    | Qs05: Delivery as promised        | 0.773                  | 0.89                    | 0.526      | 0.939     |
|                | Qs07: Reliable intervention       | 0.772                  |                         |            |           |
|                | Qs06: Solving patient problems    | 0.681                  |                         |            |           |
|                | Qs10: Reliable patient records    | 0.673                  |                         |            |           |
|                | Qs18: Professional knowledge      | 0.663                  |                         |            |           |
|                | Qs03: Ensuring undisturbed rest   | 0.662                  |                         |            |           |
|                | Qs19: Abilities and skills        | 0.652                  |                         |            |           |
|                | Qs08: Informing patients          | 0.652                  |                         |            |           |
|                | Qs11: Responsive, skilful service | 0.644                  |                         |            |           |
|                | Qs04: Number of nurses            | 0.643                  |                         |            |           |
|                | Qs01: Patient room hygiene        | 0.633                  |                         |            |           |
|                | Qs09: Requesting permission       | 0.629                  |                         |            |           |
|                | Qs02: Overall personal appearance | 0.627                  |                         |            |           |
|                | Qs20: Diligence on treatment      | 0.592                  |                         |            |           |

|                                |                                         |       |      |       |       |
|--------------------------------|-----------------------------------------|-------|------|-------|-------|
| Individuality                  | Qs22: Empathy with patient              | 0.721 | 0.89 | 0.609 | 0.953 |
|                                | Qs25: Preferring female nurses          | 0.703 |      |       |       |
|                                | Qs24: Respectful to patients            | 0.690 |      |       |       |
|                                | Qs26: Alleviating patient fears         | 0.687 |      |       |       |
|                                | Qs27: Providing comfortable environment | 0.680 |      |       |       |
|                                | Qs23: Responsive to patient needs       | 0.678 |      |       |       |
|                                | Qs17: Heeding patient feedback          | 0.631 |      |       |       |
|                                | Qs15: Willing to help                   | 0.631 |      |       |       |
|                                | Qs14: Ready to help                     | 0.619 |      |       |       |
|                                | Qs12: Full attention                    | 0.605 |      |       |       |
|                                | Qs13: Speedy analysis of problems       | 0.580 |      |       |       |
|                                | Qs16: Nurse accessibility               | 0.561 |      |       |       |
| Qs21: Ensuring patient privacy | 0.515                                   |       |      |       |       |

The theoretical model ( $\chi^2/df = 2.997$ ) indicated that its goodness of fit was reasonable ( $\chi^2/df < 3$ ). AMOS 18.0 was used to analyse CFA results and all CFA factor loading over 0.5 ( $>0.5$ ). The overall fit statistics of the measurement model is suitable (Chi-Square ( $\chi^2/df$ ) = 2.997, RMSEA = 0.052, CFI = 0.962, NFI= 0.944, IFI=0.962) and these results show that two-dimension model provided an acceptable fit (Bentler, 1990; Browne & Cudeck, 1993; Hair et al., 2017). The average variance extracted (AVE) and composite reliability (CR) were used to establish the convergent validity (See Table 3). The CR above 0.70 and AVE above 0.50 were considered acceptable (Hair et al, 2017).

Finally, a Spearman correlation analysis was conducted on entropy weights to determine the relationship between the expectations and satisfaction of respondents. The results indicated that the relationship between respondents' expectation of nursing services and their satisfaction with such services is significant ( $p = 0.01$ ), positive and at the moderate level ( $r = 0.606^{**}$ ). In other words, patient expectations are moderately satisfied.

#### **4. Discussion**

The findings suggest that patient satisfaction with nursing services is moderately consistent with their expectations.

The most important expectation of patients from nurses is careful/attentive treatment which falls within the reliability dimension. It may be thought that a careful treatment may have satisfactory effects on patients' recovery. For this reason, it is reasonable that patients whose primary goal is to improve their health expect nurses to perform the most attentive treatment first. Studies by Larrabee & Bolden (2001: 34) and Radwin, et al. (2003: 283) evidenced that the treatment applied by nurses should be done carefully to meet the needs of patients effectively and contribute to the healing process. While careful treatment is so important for patients, they are not satisfied with the thoroughness of actual treatment practices. The reason for such inconsistency between patient expectations and satisfaction seems attributable to the relatively low number of nurses per patient (OECD, 2017). It is also supported by another finding of the study in that patients are not pleased with the number of nurses at the hospital. Kol et al. (2018: 55) also suggest that a smaller number of nurses at a hospital may result in less service to patients. To improve this situation, healthcare facilities should increase their nursing staff size, which may have further implications for the national education system and labour market, e.g. more nursing schools should be opened, the labour supply of nurses be increased.

Another finding is that patients have significant expectation about their privacy which falls in the individuality dimension. This finding is

consistent with previous studies (Alasad et al., 2015: 565; Laschinger et al., 2005: 224). National culture and religion can also be effective on this practice. Various measures are in place at hospitals in Turkey to ensure the privacy of patients such as regulated visit hours, limited number of family attendants and private rooms. However, patients still attach importance to activities by nurses to protect their privacy. On the other hand, respondents are not so satisfied with the activities by nurses to protect their privacy. To improve this situation, the physical environment and conditions in hospitals can be controlled to provide desired protection of privacy. In addition, other staff such as technicians can assist nurses in this regard. On the other hand, during the in-service training activities or other training activities, administrators may emphasise the significance of activities relating to protection of patient privacy.

In addition, respondents find it important for nurses to have sufficient professional knowledge and skills, which falls in the reliability dimension. Adequate knowledge and necessary skills of nurses builds patient's trust in nurses and contributes positively to healing processes (Radwin, 2000: 189). Similarly, previous findings suggest that good nursing service requires that nurses have adequate knowledge, skills and abilities (Kol et al., 2018: 53; Larrabee & Bolden, 2001: 36; Liu & Wang, 2007: 269). In the present study, patients think that the knowledge, skills and abilities of nurses are satisfactory.

Moreover, patients are satisfied with the overall personal appearance of nurses. Pelander et al. (2009: 448) covered nurses' appearance (colourful clothes) as an item to measure nursing care quality which was included in the dimension of nurse characteristics. However, it was later excluded due to criticism over its analysis of the reliability and validity. In the present study, the item about nurses' personal appearance is placed in the reliability dimension. Although this item is considered moderately important by respondents for nursing care quality, it is one of the aspects where respondents are highly satisfied. The reason for this finding may be related to the fact that there is a regulation in Turkey which prescribes nurse uniforms (Republic of Turkey Ministry of Health, 1983). Hospitals generally prefer one colour (white) uniforms for nurses which may positively affect the satisfaction of respondents. Gupta et al. (2016: 92) also argue that nurses wear uniform protective clothing against external pollutants and the fact that these clothes are usually white colour contribute to the good and clean appearance of nurses. Another related factor is that nurses are trained on the significance of cleanliness for the nursing profession (Republic of Turkey Ministry of Health, 2011). The integration of cleaning education in the healthcare education for nurses may have caused nurses to attach importance to their appearance and cleanliness, and therefore, patients may be satisfied with it here.

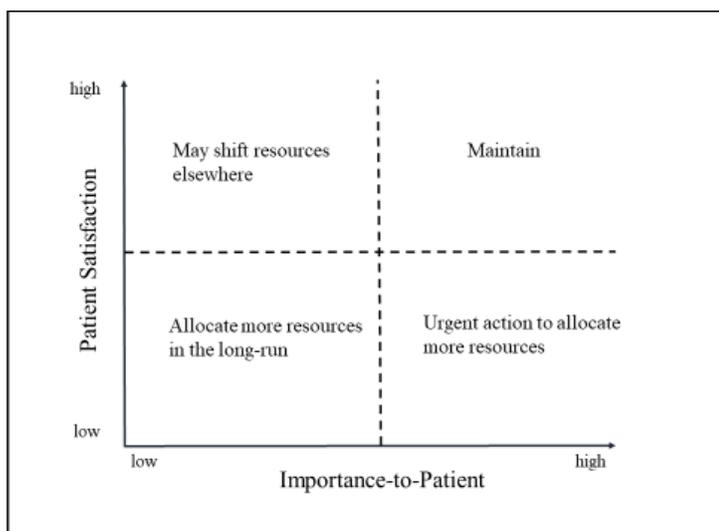
Another finding is that the reliability of nursing interventions is not much important to respondents. In other studies, trusting nurses is found to be a critical factor (Comparcini et al., 2018: 292; Lynn & McMillen, 1999: 69; Radwin, 2000: 179). On the other hand, it is found in the present study that respondents are highly satisfied with the reliability of nursing interventions. Charalambous et al. (2016: 184) argues that patient satisfaction with nurse competence is a precursor of patient's trust in nursing interventions. This finding is similar to the current one in that respondents find nurses competent and are satisfied with the reliability of their interventions.

Respondents are found to attach less importance to the gender of nurses in evaluating the nursing services. On the other hand, in many countries including Turkey and Israel which are more traditional societies, there is widespread expectation among people that nurses must be women (Aul, 2017: 36; Romem & Anson, 2005: 173; Yi & Keogh, 2016: 102). In addition, there are many studies suggesting that in Turkey, male patients want to be served by male nurses and female patients want to be served by female ones due to some factors such as shyness (Kahraman et al., 2015: 115; Orhan & Yucel, 2017: 57). This dimension can be further analysed in future studies. On the other hand, boys can be supported and encouraged to be nurses and given more opportunities.

Finally, the findings are not without management implications. It is common sense that more effort and resources should be devoted to the aspects of nursing care which are important to patients rather than to those relatively less important. Figure 1 offers practical guidance to healthcare operators and professionals as to where they should devote efforts and resources.

Where “importance” to patients and patient “satisfaction” are high, they should maintain the state of affairs (top-right). Where importance is low but satisfaction is high, they may consider shifting resources elsewhere (top-left). Where importance and satisfaction are both low, they may need to allocate more resources in the long run (bottom-left). Finally and most importantly, where importance is high but satisfaction is low, they must take urgent action to improve satisfaction which in turn requires urgent allocation of more resources (bottom-right).

Figure 1: Resource Prioritisation Guidance



## 5. Limitations

The number and geographic distribution of respondents may represent some limitation for the study. In addition, respondents were not asked which department of the hospital they were treated. Since the quality of treatment received from nurses may vary by department, such inquiry may be included in future studies. Another limitation is that there is no distinction between the types of healthcare facilities where the subject-matter nursing services were received. Therefore, future studies may focus on the expectations of and satisfaction with nurses working at private healthcare institutions, and reveal differences in nursing services based on types of facilities. The administration of the developed questionnaire in different countries may reveal cultural differences by country. On the other hand, the results that may arise depending on the gender differences of the participants can also be discussed in future studies.

## 6. Conclusion

As nursing care quality is crucial both as competitive advantage to healthcare institutions and as part of healthcare infrastructure, it is important for healthcare operators and professionals to identify the most important aspects of patient expectations of and satisfaction with nursing care quality so that they can enhance quality through efficient use of scarce resources.

A method called “entropy weight” was used in this to improve the accuracy in quantifying patient expectations of and satisfaction with nursing care quality in order to ultimately identify and rank-order quality

aspects by importance. The study identified two factors namely reliability and individuality of nursing care through factor analyses based on scores of improved accuracy. The knowledge of what aspects of nursing care are important to patients as well as how a healthcare institutions perform on those aspects should definitely provide decision guidance to healthcare operators and professionals. Thus they can allocate more resources to aspects important to patients on which performance is relatively poor.

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