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BRIEF REPORT

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Hospital Performance Based on Pabon Lasso Model

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Abstract

Background and Objectives: Hospital is the largest and most costly operating unit of healthcare system. Provision of optimal care requires that hospital administrators identify hospital performance based on relevant indicators. This study used the Pabon Lasso analysis to assess the performance of hospitals and identify strategies towards an improved hospital performance.

Methods: This cross-sectional descriptive study involved all the eight general hospitals affiliated to Tehran University of Medical Sciences. Data on average length of stay, bed occupation and bed turnover rates were collected using questionnaire.

Findings: The overall average length of stay, bed occupation and bed turnover rates were 4.78 days, 79.95% and 28.36, respectively. One hospital demonstrated inefficiency and underutilization of resources by falling into Zone I, two hospitals located in Zone II, and five hospitals were placed in Zone IV. None of the hospitals were located in Zone III which represents a satisfactory level of efficiency.

Conclusions: The study showed the studied hospitals have generally low performance as indicated by Pabon Lasso analysis. The administrators should therefore seek a strategy for balancing average length of stay, bed occupation and bed turnover rates for an improved hospital performance.

Keywords: Hospital management; Performance assessment; Pabon Lasso Analysis; Average length of stay; Bed occupation rate;Bed turnover rate

Background and Objectives

Patient satisfaction is an outcome of various factors in a hospital [1]. It can be considered as a condition in which patients feel comfortable in their stay in the hospital. While medical care plays a vital role in patient satisfaction, other situational factors are important as well [2]. Some authors consider patient satisfaction as a key to the success of the hospitals [3]. Moreover, this variable is of absolute importance in quality-assessment activities as its comprehensive analysis can highlight noble and problematic aspects of each hospital.

In a study across 21 European countries, it was concluded that predictors of patient satisfaction with the healthcare system were *patient experience by responsiveness domains*, *patient expectations*, *self-reported health status*, *type of care by provider type*, *personality*, and *vignette score,* respectively [4]. High levels of satisfaction suggest physical and psychological improvement of the patients while low levels of satisfaction is predictive of agitation, anxiety, longer stay in hospital, and consequently, higher charges [5].

Patient satisfaction seems to be a continuous construct, resulting from emotional reactions and cognitive evaluations of the patient during his/her stay in the hospital. Nowadays, evaluation of the level of patient satisfaction is recognized as an important index of the healthcare quality, and plans for its improvement have increased [6].

From the viewpoint of hospitals, there are several reasons for the assessment of patient satisfaction [7]. Firstly, patient satisfaction is seen as a desired

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outcome of hospital services. Secondly, it can predict future behavior of the patients. And thirdly, it is directly related to the quality of care, in interpersonal and organizational areas, as well as its technical domains [8].

Therefore, precise assessment of patient satisfaction is a valuable source of information for hospital managers in order to identify shortcomings and develop plans of action accordingly. Data from patient satisfaction assessment may also be used for quality-improvement purposes in the medical settings. Recognizing and improving the problematic aspects of nursing and other factors should be considered by managers in the field [9].

In Iran, some hospitals and studies measure the level of patient satisfaction using non-validated instruments. Adopting haphazard measurement approaches runs the risk of yielding inaccurate data [10].

Assessment of patient satisfaction has gained much attention during the past few years in Iran. The Ministry of Health and Medical Education has imposed obligations on the hospitals to measure patient satisfaction and make plans for its improvement [11].

In this respect, validated Farsi instruments are currently lacking. Yet, translating the Western instruments appears to be inappropriate due to structural differences between the Western and Iranian healthcare systems and cross-cultural disparities.

The present study aimed to develop and validate a preliminary version of Brief Inpatient Satisfaction Scale (BISS) via exploratory methods. The primary taxonomy of items consisted of four parts, namely *physician care*, *nursing care*, *living arrangements*, and *communication*.

Methods

Item generation

Considering the European models of patient satisfaction assessment, a primary item pool of 32 items was generated. In the process of item generation, the comments of two head nurses, two hospital managers, one physician, and one psychometrics expert were taken into account. Some items were translated and reworded from a French study [8]. Results from the interviews with ten patients were also considered. These 32 primary items appeared to cover the factors presenting in the literature. The items were declarative statements using an eleven-point Likert type scale ranging from “Strongly agree” to “Strongly disagree”.

Item review

The item pool was reviewed by the authors, and comments from the patients led to minor rewordings due to poor comprehension. No additional items were proposed in this stage. The final item pool consisted of 32 items relate to four dimensions; *nursing care*, *physician care*, *living arrangements*, and *communication* were four desired components of the BISS. Each part contained 8 items.

Item selection

The item pool was administered to 637 patients recruited from Moheb hospital (Tehran, Iran) in autumn 2013. Criteria for exclusion of items were then set: (1) proportion of missing values higher than 10%, (2) extreme deviation from the normal curve in response patterns using skewness and kurtosis indices, and (3) inappropriate loadings in Exploratory Factor Analysis (EFA).

Data transformation

Questionnaires with more than five missing values were excluded. Each item scored from 10 (Complete satisfaction) to 0 (Complete dissatisfaction). No reverse scoring was required. Overall patient satisfaction score was calculated by summing all of the items’ scores.

Content validity

Content validity is evaluated in two terms. One is that the instrument appears valid to an expert in the field, the other is that it covers all of the required facets of the concept being measured. The authors evaluated the content validity of the instrument. Two existing instruments were used to evaluate if the instrument covers the required aspects.

Construct validity

EFA was performed to identify independent components of the instrument. Before factor analysis, the items had to satisfy two of the above-mentioned criteria. Moreover, KMO measure was calculated to evaluate the sampling adequacy. Bartlett’s test of sphericity was also performed. Factoring method was principal axis factoring. Components with the Eigen values greater than one were rotated using the Varimax procedure. Since this study aimed to develop a preliminary version of BISS, two permissive criteria were set for reconsideration of items. Firstly, an item with the loading of 0.5 or greater was considered for strong attribution to that factor; however, the loadings smaller than 0.31 were suppressed. The items with the loadings between 0.31 and 0.5 were considered for rewording in order to be attributed only to one factor in the final version

Table 1 Hospital performance indicators in the studied hospitals

Hospital ID	Hospital name	ALS	BTO	BOR
1	Imam Khomeini	6.62	16.46	85.83
2	Baharlou	4.54	31.58	79.74
3	Hazrat Rasoul	4.51	28.28	77.36
4	Dr. Shariati	6.69	22.19	87.84
5	Sina	4.83	24.63	80.72
6	Ziaeian	2.82	37.57	57.17
7	Firouzgar	6.14	25.64	88.68
8	Vali -Asr	5.43	26.95	84.77
Mean		4.78	28.36	79.95

of the instrument. The homogeneity of the factors was evaluated using item-total correlation.

Reliability

Cronbach's alpha coefficient was used to assess the internal consistency of subscales and total scale as a measure of reliability. Value of 0.7 was considered minimum acceptable value for the alpha coefficient.

Ethics

The verbal consent of all participants was obtained before administering the questionnaires. Moreover, all respondents were assured of the confidentiality of their responses.

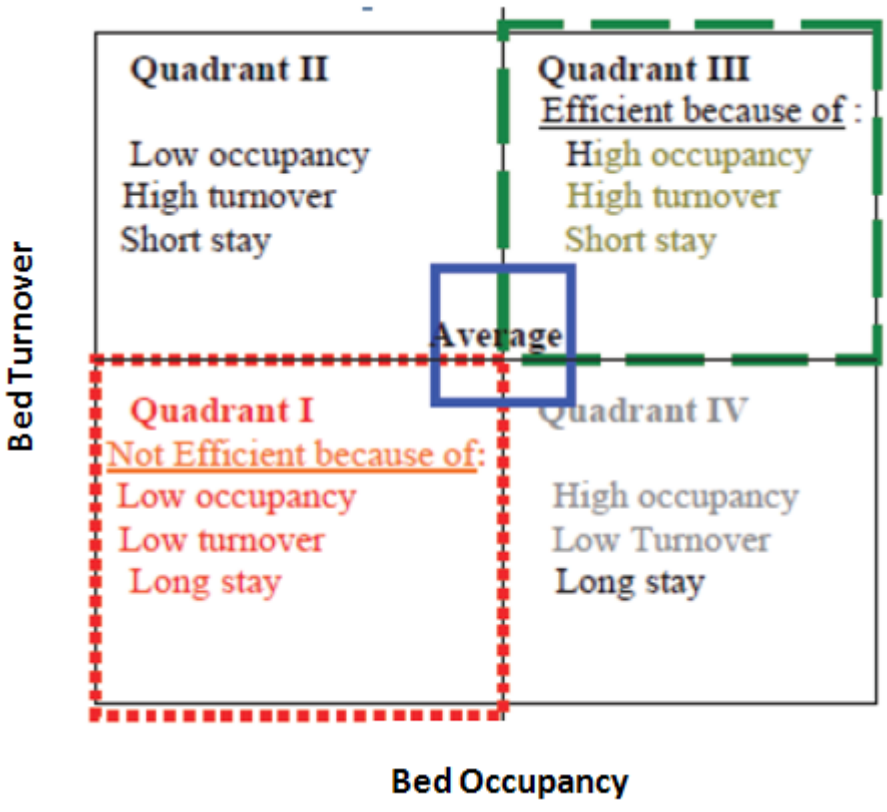

Figure 1 Pabon Lasso Performance graph

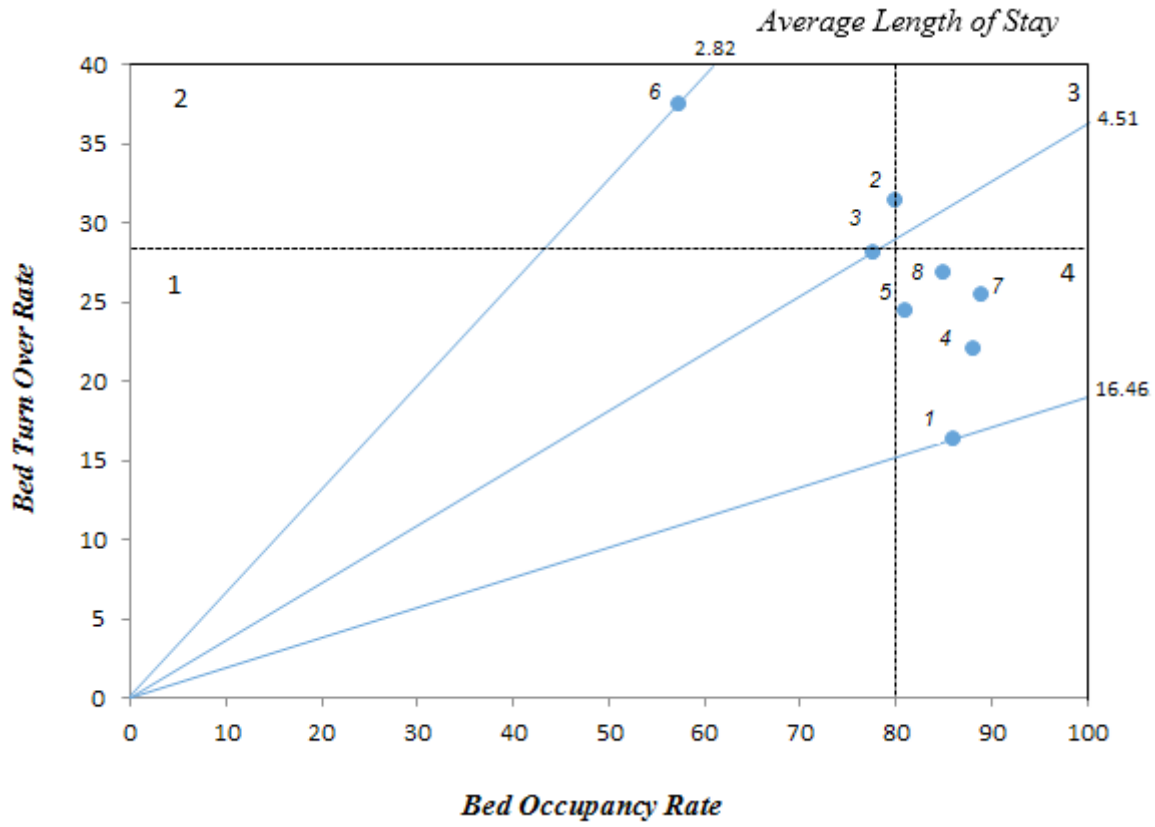

Figure 2 Pabon Lasso Performance graph for the studies hospitals

Statistical analysis

Data entry and analysis were performed in a blinded manner by the personnel who were not involved in the process of data collection. $P < 0.05$ was considered as statistical significance. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software (version 21.0; SPSS Inc, Chicago, Illinois).

Results

After meeting the exclusion criteria for participants, 637 valid questionnaires were entered into the software. Demographic characteristics of the patients are present in Table 1.

Item selection

Two items had more than 10% of missing values. The response pattern of one item deviated significantly from the normal curve and presented ceiling effect. A ceiling effect is said to occur when a high proportion of subjects in a study have maximum scores in an item. Consequently, three items were excluded in the first stage of item analysis.

Content validity

The authors examined the remaining items for content validity. Four parts of the instrument were present and significantly correlated. The correlation coefficients between the subscales are present in Table 2.

Construct validity

EFA was performed on the remaining 29 items. The KMO measure of sampling adequacy was 0.941. Since, the minimum value of this measure for adequacy of data matrix for factorability is 0.6 [12], it can be cited that data matrix has the required assumptions for factor analysis. Bartlett's test was also significant. These tests suggest the factorability of the instrument. Scree plot revealed that four factors could be extracted as predicted. The extracted factor's structure was similar to the predicted parts of the scale. The four factors were named as *physician care*, *nursing care*, *living arrangements*, and *communication*. They explained 32.2%, 6.1%, 3.5%, and 2% of the total variance, respectively. Cumulatively, 43.8% of the total variance was explained by these four factors. The results of exploratory factor analysis are present in Table 3.

Reliability

The internal consistency coefficient was higher than 0.7 for four subscales and the total instrument. Considering all 26 remaining items, the total alpha coefficient was 0.91. Cronbach's alpha coefficients of subscales and their corrected item-total correlation coefficients are presented in Table 4.

Discussion

The purpose of this study was to develop and validate the preliminary version of Brief Inpatient Satisfaction Scale. Since the most common technique for collecting data on patient satisfaction is surveying, this short instrument would aid hospital managers for action-planning.

Primarily, 32 items were generated in an eleven-point Likert scale. Item analysis suggested that 6-point Likert scale would benefit the results of the survey. Psychometric reasons support the fact that the higher 6-point Likert scale would be more satisfactory in the hospitals of this quality. Since, the lower 5 points on the Likert scale did not earn much attention, it can be concluded that similar hospitals do not need to utilize the whole continuum of the Likert scale. In hospitals of different quality, symmetric 6-point Likert scale is suggested.

Two items were excluded for having more than 10% missing values. One item was excluded for ceiling effect. Content validity was insured. Then exploratory factor analysis was performed to extract the final factors. Four factors were, finally, identified as the primary taxonomy of items predicted. Due to inappropriate loadings, three other items were discarded as shown in Table 3. The remaining items constituted four subscales, which were named *physician care*, *nursing care*, *living arrangements*, and *communication*.

The items pertaining to *physician care* and *nursing care* were perfectly loaded as predicted by the primary taxonomy. The items of the third and fourth factors were a little interfered. They need reconsideration and rewording in order to be loaded in a satisfactory manner.

This scale is called brief because of its short length. Some similar questionnaires such as Patient Judgment Hospital Questionnaire [13], Lutheran General Health System [14], and British Survey of Hospital Patients [15] consist of 42, 44, and 57 items, respectively.

Using the Western literature may be a reason for inappropriate cross-loadings in the two factors. Utilizing qualitative methods to develop a scale is technically more precise and would lead to more accurate data; more importantly, developing an Iranian model based on qualitative methods would lead to an integrated theoretical framework. This methodology is strongly recommended for future studies.

It needs to be said that a U-shaped relationship between the length of time after discharge and patient satisfaction has been described in previous studies [16]. For this reason, it appeared inappropriate to assess test-retest reliability because the time period had to be sufficiently long to allow the effects of memory to fade but not too long to allow complex phenomenon of maturation to occur in patient satisfaction [17]. Therefore, only Cronbach's alpha coefficients were calculated to assess reliability. Alpha coefficients of two subscales were satisfactory, while two other coefficients were marginally appropriate. Edition of the items related to these factors would increase the internal consistency in the final version of BISS.

Finally, this scale may be used with caution to measure inpatient satisfaction in hospitals because the psychometric properties were not strong enough. The preliminary version of BISS consists of 26 items measuring four distinct subscales. The items pertaining to living arrangements and communication need to be reworded or otherwise edited to yield satisfactory results in the final version of the instrument.

Study Limitations

Since the sampling method of the current study was convenience sampling method from one hospital, external validity of the instrument may not be adequate. Further research in various hospitals would insure the external validity of the scale in future. While preliminary results from this study are promising, it is important not to overgeneralize the findings. It is recommended that future research investigate the properties of BISS using confirmatory factor analysis (CFA).

Conclusions

The results of this study support the reliability and validity of BISS. Factor structure supported the presence of four factors as predicted. More research is required for further development and validation of this instrument in other settings.

Abbreviations

(BISS): Brief Inpatient Satisfaction Scale

(EFA): Exploratory Factor Analysis

(KMO): Kaiser-Meyer-Olkin

Competing Interests

The authors declare no competing interests.

Authors' Contributions

MA made substantial contribution to conception and designing of the reseach. SAZ provided some methodological suggestions and constributed to analysis of the results, MA was involved in interpretation of the results and drafting the manuscript, NN critically revised the manuscript. All authors read and approved the final manuscript.

References

1. Qureshi W, Nazir AK, Ajaz AN, et al. A case study on patient satisfaction in SMHS hospital, SRINGAR. J Hosp Today 2005; **12**(3): 154-155.
2. Grogan S, Conner M, Willits D, Norman P. Development of a questionnaire to measure patients' satisfaction with general practitioners' services. Brit J Gen Pract 1995; **45**(399): 525-529.
3. 3. Mosadegh Rad A M. The evaluation of the degree of satisfaction of patients from admission services in Razi Hospital in Qazvin. Health INF Manage 2004; **1**(1): 28-32.
4. World Health Survey. Geneva: World Health Organization; 2003. Available from: http://www.who.int/healthinfo/survey/en/index.html.
5. Bahrami M, Nagy E. Patient satisfaction in attending to emergency services representative Medical Sciences Medical Center. Iranian J Nursing Midwifery Res 2001; **15**(1): 45-40.
6. Bredart A, Coens C, Aaronson N, Chie WC, Efficace F, Conroy T, et al. Determinants of patient satisfaction in oncology settings from European and Asian countries: Preliminary results based on the EORTC IN-PATSAT32 questionnaire. Euro J Cancer 2007; **43**(2): 323-30.
7. Cleary P, McNeil B. Patient satisfaction as an indicator of quality of care. Inquiry 1988; **25**(1): 25-36.
8. Labarere J, Francois P, Auquier P, Robert C, Fourny M. Development of a French inpatient satisfaction questionnaire. Int J for Qual in Health Care 2001; **13**(2): 99-108.
9. Gholjeh M, Ghaljaee F, Mazloom AR. Correlation between nurses' practice ability and patient satisfaction of nursing care. Pub Shahid Beheshti School of Nursing and Midwifery 2008; **18**(63): 12-19.
10. DeVellis R. *Scale Development: Theory and Applications* (3rd Ed). California: Sage publications, 2012.
11. Jafari GA, Khalifegari S, Danaii k, Dolatshahi P, Ramezani M, Roohparvar R, Sabaghiyan PA. Hospital accreditation standards in Iran. Tehran: Sound Publication Center. 2010.
12. Tabachnick, B.G. & Fidell, L.S. *Using Multivariate Statistics* (5th Ed.). New York: Allyn and Bacon, 2007.
13. Hays R, Nelson E, Rubin H, Ware J, Meterko M. Further evaluations of the PJHQ scales. Med Care 1990; **28**: 29-38.
14. Carey R, Seibert J. A patient survey system to measure quality improvement: Questionnaire reliability and validity. Med Care 1993; **31**: 834-845.
15. Bruster S, Jarman B, Bosanquet N et al. National survey of hospital patients. Brit Med J 1994; **309**(1): 1542-1549.
16. Rubin H. Patient evaluations of hospital care: A review of the literature. Med Care 1990; **28**: 3-9.
17. Carr-Hill R. The measurement of patient satisfaction. J Public Health Med 1992; **14**(1): 236-249.