

Validity and reliability of the Turkish version of the Essentials of Magnetism Scale (EOM II)

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Aim: To test the validity and reliability of the Turkish version of the Essentials of Magnetism II Scale (EOMII) for use by staff nurses as being essential to quality patient care.

Methods: This study consisted of 385 nurses from four joint commission internationally accredited hospitals. The EOMII scale was translated using a back-translation technique. The statistical analysis was carried out using Cronbach's alpha to test the internal consistency of the scale, while the factor analysis was carried out using the principal component analysis together with the varimax rotation and Kaiser normalization to test its construct validity.

Results: The total mean scores of all the items of the scale were found to be 155.33 (minimum 77 – maximum 219) and the standard deviation was 29.45. All the items showed a statistically significant correlation ($P < 0.01$). The Cronbach's α of the scale was 0.92, indicating a high level of reliability. Cronbach's alpha consistencies in subgroups were between 0.87 and 0.70. In this study, job satisfaction and quality results show the sign of convergence as in the original scale, which shows that the scale has a high construct validity ($P < 0.01$).

Discussions: Transcultural differences in the quality of nursing services can only be compared with reliable and valid instruments. This study shows that the Turkish version of the EOMII scale is a valid and reliable instrument to assess the nurses' working environment and to provide quality patient care in Turkey.

Keywords: Essentials of Magnetism II Scale, Instrument Validation, Magnet Hospitals, Nurses, Quality Assurance, Turkey

Introduction

During the last two decades, healthcare systems around the world have undergone profound change, driven by a complexity of economic and political factors. These stem from the greater use of new technology, off-shoring some services to developing countries, advances in medical knowledge, an aging population, more informed and critical users of the healthcare system, and

efforts by governments to further the control of healthcare expenditures (Carney 2010; Notara et al. 2010).

Nurses play a pivotal role in shaping health policy in any country by seeing the gaps in the healthcare systems and assessing their consequences. They see where improvements are needed to increase access, promote prevention, coordinate care, and improve the quality and efficiency of health care. Studies show that nurses have influence in a large number of areas including: reduction of medical errors; improvement of patient safety and quality of care; promotion of wellness and expanding preventive care; improvement of health care efficiency and the reduction of costs; coordination of care through the healthcare system; assistance towards the healthcare system adapting to an

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aging population; and increasing access to health care (Betihavas et al. 2011; Chipps et al. 2011; Thompson 2007).

Research on nurses' experience in many countries report that nurses face relatively high levels of job dissatisfaction, the burnout syndrome, low productivity, poor quality or even unsafe patient care, and intention to leave the profession because of the lack of a productive, healthy working environment (Cohen 2006; Gok & Kocaman 2011; Kramer et al. 1989, 2004; Lacey et al. 2006; Mark et al. 2004; Schmalenberg & Kramer 2008; Yildiz et al. 2009). Conversely, some USA studies have identified the characteristics of the hospital environments associated with high levels of nurse satisfaction, low nurse turnover, together with high levels of patient care quality (Cohen 2006; Kramer et al. 1989, 2004; Lacey et al. 2006; Schmalenberg & Kramer 2008). These hospitals were termed 'magnet hospitals' for their ability both to attract and retain nursing staff (Cohen 2006; Kramer & Hafner 1989; Lacey et al. 2006; Schmalenberg & Kramer 2008). Magnet hospitals define hospitals that recruit and retain nurses by providing a positive working environment, as well as their excellence in providing high-quality nursing care (Schmalenberg & Kramer 2008). They are international models for nursing standards. Other hospitals look to magnet organizations for ways to improve their patients' results, reduce hospital stays, in addition to attracting and keeping the most qualified nursing staff.

In the early 1980s, the American Academy of Nursing (AAN) appointed a task force in hospital nursing practice out of concern for the numerous workforce issues that the profession was currently facing (American Organisation of Nurse Executives 2006). The American Nurses' Association (ANA) had recognized that some hospitals were not experiencing any problems in attracting and retaining registered nurses despite the nursing shortage (ANA 2007; McClure et al. 1983). The AAN conducted a study of 163 hospitals to identify and describe the variables that created an environment that attracted and retained well-qualified nurses who promoted quality patient/resident/client care. Forty-one hospitals, which had high rates of nurse satisfaction, a low employee turnover rate, and the need for nurses, were taken as samples. From the study, these hospitals were recognized for their ability to retain professional nurses. They were referred to as 'magnet hospitals' and the factors that enabled them to retain the nurses were referred to as the 'force of magnetism'. The original *magnet* research study from 1983 first identified 14 characteristics that were best able to recruit and retain nurses during the nursing shortages of the 1970s and 1980s. These characteristics were determined to be 14 factors, which differentiated between the organizations as being magnet hospitals or not. The forces of magnetism were classified under three categories, which were administration, professional practice and professional development. Administration included the quality of leadership,

organizational structure, management style, staffing, and personnel policies and programmes. Professional practice included professional practice models, quality of care, quality assurance, consultation, resources, autonomy, community and the hospital, nurses as teachers, image of nursing and nurse-physician relationships. Professional development included orientation, in-service and continuing education, formal education and career development (Kramer & Schmalenberg 2004). Today, many health institutions have been accredited in accordance with the criteria of the Magnet Registration Programme by the American Nurses Credentialing Centre (ANCC) within the ANA (ANCC 2011).

The Essentials of Magnetism II instrument

The Essentials of Magnetism II (EOMII) instrument was developed to measure healthy, magnetic, productive, clinical unit work environments. The original form of the EOMII scale was developed by Kramer & Schmalenberg (2004) and revised in 2008 (Schmalenberg & Kramer 2008). In the development of the scale, in-depth interviews were conducted individually with the nurses who worked in hospital administration, educational and clinical departments within the magnet-approved hospitals. The 'Grounded Theory' approach was used in the analysis of the interviews (Glaser & Strauss 1967; Stange et al. 1994). The study focused on determining the indispensable administrative features and applications in the productive working environment to ensure that nurses provided quality patient care. The EOMII items were used to measure the attributes of the working environment as a functional procedure. The EOMII scale consisted of seven dimensions with 58 items. The dimensions were cultural values, nurse manager support, control of nursing practice, clinical autonomy, adequacy of staffing, nurse-physician relationships, and nurses' clinical competency and support for education. (Schmalenberg & Kramer 2008). The nurses were asked to evaluate their working environment by selecting a number for each of the items between 1 (never agree) and 4 points (definitely agree). Four was the highest score and one was the lowest score of the scale. Overall job satisfaction was measured using a 10-point single-item indicator. Nurses were asked to circle the number on the scale by considering all the aspects of their job, as well as their own values, ideals and goals, and how satisfied they were with their current nursing job. Benchmarks provided were 0 (It's terrible), 5 (I'm satisfied) and 10 (I love it). Nurses were asked to select a number that indicated the usual quality of care provided by them to patients. Benchmarks provided were: 0 (Dangerously low), 5 (It's safe but not much more) and 10 (Very high quality).

Reasons for the introduction of the EOMII in Turkey

A number of healthcare reform plans have been passed in Turkey, which aim to increase efficiency, effectiveness, transparency and

quality in healthcare services, as well as to reduce the costs of the health care provision (Badir 2009, Yasar 2011). In 2003, the Turkish Health Transformation Programme was started. One of its aims was to put quality and accreditation for qualified and efficient health services into practice. Formerly, Turkish citizens relied on a large, inefficient and fragmented public health system, which was beset by problems and continuously undergoing reform. In comparison to European Union (EU) countries, Turkey had the fewest health workers per capita and overall health status was the lowest among the EU. The expansion of Ministry of Health (MoH) hospitals (843), university hospitals (62), private institutions (489), in addition to the healthcare reforms prompted by economic globalization, promoted an interest in quality management (MoH 2010). A Performance Management and Quality Improvement Unit was established to provide in-service education to introduce quality management to medical and nursing staff in its MoH hospitals (Badir 2009).

Although there is a nursing shortage in Turkey, the cause of this situation is discussed as to whether it is from an inadequate number of nurses, a problem with the retention of nurses in hospitals, or as a result of embedded policies (Badir 2009). There are 101 nursing educational programmes in Turkey with more than 5000 nurses graduating annually (Higher Education Council Report 2010). According to the Turkish Nurses' Association, the number of nurses should be sufficient; but because appropriate nurse retention strategies have not been developed, the nurses not only leave the institution, they also leave the profession (Ülker et al. 2001). It is known that the nurse turnover rate from hospitals is very high; in some hospitals as high as 50% (Gok & Kocaman 2011). Although nurse turnover is an international problem, hospitals that develop effective nurse retention strategies are known to increase nurses' attachment to the institution and their co-workers, and to decrease the rate of attrition (Cohen 2006; Gok & Kocaman 2011; Holtom & O'Neill 2004; Lake 2002; Pallas et al. 2006; Yildiz et al. 2009).

The Turkish health system needs magnet hospital assessment tools in order to influence the retention of nurses who provide quality patient care in the institution. Nurses, as key members of the health professions who provide direct patient care, affect the quality of the health care given by the hospitals. For this reason, not only nurse managers, but all health administrators, are responsible for improving the quality of nursing care. In Turkey, magnet hospital characteristics, which serve as guidelines for the delivery of quality nursing care by providing a positive working environment for the nursing staff, had not been clearly defined. For this reason, the magnet forces of the hospitals could not be measured. The aim of this study was to test the validity and reliability of the Turkish version of the EOMII for use by the staff nurses as being essential to quality patient care.

Methods

Ethical considerations

Permission for the translation into Turkish and use of the EOMII scale was granted by Dr Marlene Kramer, who was the developer of the scale. Written permission was obtained from the Directors of the Sampled Hospitals. The participating nurses were informed about the purpose of the study and that their involvement was voluntary. The anonymity and confidentiality of the participants were guaranteed.

Sample

The sample for this study consisted of four hospitals accredited by the Joint Commission of International Accreditation Standards for Hospitals (JCI). They were publicly funded teaching and community hospitals selected from across the province of Ankara. The total population of the hospitals' staff nurses (630 nurses) was invited to participate. Three hundred and eighty-five nurses completed the questionnaire with a response rate of 61%. Each nurse was given a copy of the EOMII survey form with the principles of anonymity and confidentiality explained. Data were gathered between February 2008 and April 2008. The EOMII was used 4 weeks later with 51 participants to determine the test/retest reliability.

Data collection instrument

The original English version of EOMII scale was translated into Turkish by a specialist, with both English and Turkish as native languages. The English statements that had been translated into Turkish were compared with the original statements and a Turkish form, after reviewing the translation of the language and compliance, was developed.

Content validity

Content validity was done to evaluate the English expressions translated into the Turkish language. The translated Turkish version of the scale was scrutinized by seven specialists with PhD degrees who were working in nursing management, fundamentals of nursing and nursing education. They were asked to evaluate every English item on the Turkish translation of the scale for its distinctiveness, understandability and appropriateness of the translation. Specialists evaluated each item as being 'very appropriate', 'material to be presented with the appropriate shape', 'appropriate but minor modifications are needed' and 'not appropriate'. In addition, suggestions were made for items requiring changes, or were not fit, and how the phrase should have been expressed.

The Turkish version was translated back into English by an academic nurse who knew English well and had not seen the

original English text. One item was changed because of the suggestions of the researchers who developed the English version of the EOMII scale. The researchers gave their final approval about the appropriateness of the item.

The prepared data collection tools were pilot tested with 19 nurses for understandability. The nurses completed all the items in an average of 15–20 min and did not make any recommendations for changes. After the translation and implementation phase had been completed, the validity and reliability study was conducted in order to determine the psychometric properties of the Turkish version of the scale.

Construct validity

For the construct validity, the factor analysis, multi-trait/multi-method matrix studies were carried out. To test the reliability of the scale (testing, examining), internal consistency, stability and sensitivity analyses were performed. The internal consistency of the total and subgroup of the EOMII scale was defined with the Cronbach's α -factor. Pearson's correlation coefficient was used for the analysis of the test and retest (Akbas & Korkmaz 2007; MacCallum et al. 1999; Munro 2005). The homogeneity of the Kaiser-Meyer-Olkin test was first used in order to evaluate the internal consistency of the 'EOMII' scale. The data which were to be used for the factor analysis were found to be homogeneous after assessing the test result as $0.899 > 0.5$ (Munro 2005). Similarly, Bartlett's test results of 58 items were found to be $\chi^2 = 8578.552$, d.f. = 1431, $P < 0.001$. Both analyses results indicated that there was a satisfactory level of correlations between the items which enabled them to perform a factor analysis on the sample. The internal validity of the EOMII scale was determined by using the factor analysis. Their own values and the described percentages were looked at in order to determine the items which had been collected for the factor analysis. As to how many factors and principal components the method used, that was to be determined by the factors.

Results

Demographic characteristics

The mean age of participants was 27.66 years [standard deviation (SD) ± 4.96]; total years of service were 6.07 years (SD ± 5.34); and years of service in the institution were 3.61 years (SD ± 3.46). Sixty per cent of respondents had baccalaureate degrees and 29% were associate degree graduate nurses. Most of the participating nurses were in-patient nurses (93%), and 61% of the in-patient nurses were doing shift work.

Construct validity of the scale

In the factor analysis used to test the construct validity of the scale, the own values of the 12 factors were found to be greater

than 1. When the distribution of the own values (screen plot) was examined, 12 factors were greater than 1, seven factors were greater than 3, and five factors had their own values between 1.72 and 1.01. Similarly, some explained variances of seven factors were found to be higher than those of the other five factors. It was seen that seven factors would be enough as they appeared in the original scale. For this reason, the seven-factor solution and varimax rotation were preferred. The own values of all the factors of the scale were found to be greater than 3 and the explanatory variance for the scale was 60.70%. (Supporting Information Table S1).

Factor 1 consisted of 12 items related to 'cultural values' (explanatory variance = 22.18%, Cronbach's $\alpha = 0.87$).

Factor 2 consisted of eight items related to 'nurse manager support' (explanatory variance = 11.94%, Cronbach's $\alpha = 0.86$).

Factor 3 consisted of seven items related to 'control over nursing practice' (explanatory variance = 8.34%, Cronbach's $\alpha = 0.76$).

Factor 4 consisted of eight items related to 'clinical autonomy' (explanatory variance = 5.05%, Cronbach's $\alpha = 0.72$).

Factor 5 consisted of five items related to 'adequacy of nursing staff' (explanatory variance = 4.95%, Cronbach's $\alpha = 0.71$).

Factor 6 consisted of eight items related to 'nurse-physician relationship' (explanatory variance = 4.51%, Cronbach's $\alpha = 0.72$).

Factor 7 consisted of eight items related to 'clinical competency and support for education' (explanatory variance = 4.1%, Cronbach's $\alpha = 0.70$).

The distribution of the factor structure of the Turkish version and original EOM II scale is shown in Supporting Information Table S2. After the factor analysis, many scale items showed similar results to those in the original scale. However, the item combinations were different from those in the original scale. In the literature, it is indicated that while the scale adaptation of different languages and cultures is done, some of the items contained in the original scale can be modified, replaced or completely removed from the scale (Erkus 2007; Munro 2005). In this study, two items (items 18 and 33) were removed from the scale because they had been included under two separate factors. In addition, the load of item 15 was under 0.30. For this reason, this item was excluded from the final form of the scale. However, eight items (items 19, 23, 27, 30, 41, 42, 44 and 53) were located under different factors according to the factor structure of the original scale. The Turkish version of the 'EOMII' scale consisted of seven subdimensions with 55 items according to the factor analysis results. The factor load values of the items were between 0.48 and 0.82.

The correlations of the factors with each other and the nurses' job satisfaction, in addition to the quality of nursing care variables in the scale, are given in Supporting Information Table S3. In this study, the job satisfaction and quality results show the sign

of convergence, as they do in the original scale, which, in turn, shows that the scale has a high construct validity (Burns & Grove 1993; Campbell & Fiske 1959; Erkus 2007; Tezbasaran 1997). According to the results, a higher correlation was determined between the nurses' job satisfaction and 'the support of nurse managers', 'cultural values' and 'clinical autonomy' when compared with other factors ($P < 0.01$). Similarly, a higher correlation was determined between the perception of the care quality of nurses and 'adequacy of nurse staffing', 'nurse-physician relationship' and 'control over nursing practice' when compared with other factors ($P < 0.01$). It was found that the factors in the scale had a statistically significant correlation with each other ($P < 0.01$) (see Supporting Information Table S3).

Reliability of the scale

The scale's reliability was measured by Cronbach's alpha (α) coefficient. The item-total score correlations of the scale were between 0.34 and 0.70. The total mean scores of all the items of the scale were found to be 2.79 (minimum 1.51 – maximum 3.78) and the SD was 0.47. There was no significant difference between the hospitals according to the magnet scores ($F: 1.991$; $P > 0.05$). All the items showed a statistically significant correlation ($P < 0.01$). The total internal consistency coefficient Cronbach's α of the scale was 0.92 (see Supporting Information Table S1). The consistency of the seven factors over time was looked at with the test and retest techniques (Munro 2005).

Pearson's correlation coefficients were calculated in the selected subsample of 51 persons. The following coefficients were found: the cultural values factor 0.81, the nurse manager support factor 0.78, the control over the nursing practice factor 0.77, the clinical autonomy factor 0.75, the adequacy of nursing staff factor 0.74, the nurse-physician relationship factor 0.71, and the clinical competency and support for education factor 0.72. These results showed that the Turkish version of the scale had an internal consistency and continuity.

Discussion

This was the first study to measure the nurses' working environment in Turkey, where previously there was no tool to determine the characteristics of a productive and positive working environment for nurses to give quality patient care.

The findings related to the factor analysis showed that the scale had a multiple factor structure. This structure showed that the scale had more than one dimension such as cultural values, nurse manager support, control over nursing practice, clinical autonomy and nurse-physician relationship in order to provide the nurses with the opportunity of giving quality patient care and creating a productive, happy and positive working environment in the health institutions. Similarly, Lake (2002) indicated

that the nursing job indicators' scale, which was prepared for the characteristics of the magnet hospitals, had a structure with five factors. Dimensions in the scale were 'nurse's participation related to the hospitals' subjects', 'having committees for quality nursing care', 'nurse managers to be the leaders, who are accessible and supportive for nurses', 'adequacy of personnel and resources' and 'professional perspectives of physician-nurse relationships'.

In this study, the magnet work environment was found to be associated with the job satisfaction of the nurses and the nurses' perceptions of the quality of care variables. Different metrics that measure the same structure with one another to show a high correlation indicate the sign of convergence (Burns & Grove 1993; Campbell & Fiske 1959; Erkus 2007; Tezbasaran 1997). A magnet work environment showed a high correlation in the right direction with the job satisfaction of the nurses and the dimensions of the nurse manager support, cultural values and the clinical autonomy ($P < 0.01$). Similarly, it showed a high correlation in the right direction with the nurses' perceptions of the quality of care and the dimensions of the adequacy of nursing staff, the control over the nursing practice and the nurse-physician relationships ($P < 0.01$). These results were supported by the literature (Hall & Kiesners 2005; Larrabee et al. 2003; Mark et al. 2004).

Cronbach's alpha for the Turkish version of the EOMII scale had a value of 0.92 indicating a high level of reliability (Cronbach 1951; Tezbasaran 1997). In our study, the total correlation of the scale was found to be between 0.34 and 0.70 and Cronbach's alpha consistency in the subgroups was between 0.87 and 0.70. These results showed that the scale adequately met the required criteria (Bhatia et al. 2004; Bonomi et al. 1996; Erefe 2002). The alpha coefficients showed an adequate internal consistency of the scale and the test and retest correlations showed an appropriate consistency of the scale. The correlations of the subfactors with each other within the scale were between 0.61 and 0.22 ($P < 0.01$), which indicated that the measurement had been done at the same level. These results showed that the magnet characteristic perception recruited and retained the professional nurses in the institution and could be measured by a similar conceptual manner of the scale.

Conclusion

Results of this study provide evidence that the EOMII is a valid and reliable measurement of the work procedure and relationships that nurses identify as being essential to a productive and satisfying working environment in Turkey. We also recommend that it could be used in other countries where nurses are struggling to provide good health care in hospitals with out-of-date organizational policies for nursing. The EOMII consistently

identifies excellent working environments and differentiates magnet and comparison hospitals. In addition, this valid and reliable tool can be used by the Turkish health policy makers in order to group the hospitals according to their magnet status to assess the institutions' working environment.

As a summary, the factor analysis showed that the factor structure of the Turkish version of the scale was similar to the original scale and had construct validity. According to these results, the nursing service management structure of these hospitals prepared for concepts and applications. It can be said that the concepts and practices could be distinguished in a meaningful way by the nurses working in the hospitals with the JCI accreditation in Turkey. Alpha coefficients showed an adequate internal consistency, and the test and retest correlations showed an appropriate consistency of the scale. These results showed that the nurses' perception of the magnetic characteristics, that is, defined excellence in nursing service management and working in hospitals which had the quality approval by the JCI, could be measured as conceptually similar to the scale items.

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Author contributions

DY: Study conception/design, data collection/analysis, drafting of manuscript. SK: Study conception/design, data collection/analysis, drafting of manuscript. FH: Study conception/design, data collection/analysis.

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Supporting information

Additional Supporting Information may be found in the online version of this article:

Table S1 Factor loads of items left in the scale after removing items 15, 18 and 33

Table S2 Distribution of the items that constitute according to the factors in the EMO II scale and the Turkish version of the EOM II scale

Table S3 Correlations of the scale's subdimensions occur after the factor analysis with itself, quality and job satisfaction variables

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