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Development and validation of an instrument measuring deterioration in social and spiritual aspects among elderly patients in Indonesia hospitals[☆]

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Abstract
Objective: This study to develop a valid instrument in measuring the occurrence of deterioration in social and spiritual aspects of health among the elderly's patients.
Method: Using cross-sectional data of 130 respondents aged 60 and above, a *Confirmatory Factor Analysis* method (CFA) were performed to analyze the unidimensionality and significance of all items in the instrument.
Result: It was found that 10 of the initially 18 items measuring social aspects fix the unidimensional model CFA (RMSEA = 0.036 and CFI 0.995 all factors loadings coefficient were significant).
Conclusion: A set of instrument consisting of 10 items measuring social and spiritual aspects of health deterioration among the elderly patient has been proven to be valid and can be used in nursing practice. However, a technical manual for administers, scoring, and interpretation of the result are currently under development processes.
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Introduction

Baseline Health Research data reported that the growth of elderly Indonesian population has been, and continues to be, rapid. It is expected that the number of elderly people will grow more than four times within 35 years (years 1990–2025).[1] A number of elderly people are predicted to

be 36 million from 250 million people.[2] Increasing numbers of elderly people need to be wary of the possibility of an increase in health deterioration which could be due to various factors. These could be due to the shifting patterns of infectious disease to chronic degenerative or long-term conditions (multi-factorial conditions), the occurrence of various body organs functioning deterioration, together with symptoms and signs of the disease which are not typical, became the biggest cause of morbidity.[2–4] While any changes in psychosocial, social and spiritual health conditions will aggravate and influence the level of independence in the elderly, as a whole, this will lead to a variety of a more serious health deterioration.[5]

Health deterioration in the elderly in Indonesia are often not detected quickly.[2,3] Some hospitals are using the Early Warning System (EWS) for communicating any changes in the patient's health. Unfortunately, EWS measurement is only limited to physical deterioration, including vital signs, level of consciousness, and pain.[6] Physical, mental and cognitive deterioration proves to be the indicators of health deterioration for the elderly.[7–11]

Social and spiritual aspects concerning the deterioration of elderly clients who are hospitalized are still not getting enough serious attention.[12,13] The ability of the elderly to continue to foster good relations and carry out religious activities when they are ill is an intrinsic factor that must be maintained.[14–16] The quality and quantity in the relationship with others have a big impact on the health of the elderly.[5] Spiritual issues, on the other hand, are rarely researched, especially in Indonesia.[17] This is an opportunity for researchers to be able to explore spiritual issues and their impact on health deterioration in the hospitalized elderly.[17,18] Previous research shows that a quarter to a third of the elderly reported that their health problems, and the stress associated with age, were caused through religious beliefs and religious practices.[13]

This study is part of doctoral research with the title of ''The effectiveness of clinical judgment model in the delivery of nursing care for the elderly who suffered health deteriorations in Indonesia Hospitals''. Social and spiritual variables are assessed separately to ensure that these two variables can be used as a measure of health deterioration within the elderly. This measurement is expected to help nurses recognize quickly (early warning) the declining health in the elderly. Thus, the nurse may appropriately take a clinical judgment to avoid worsening of the condition of the elderly during the treatment. The construct test results of the instruments used in this study were Social Interaction Index/ISI for the social aspects and Faith, Importance, Community, and Address/FICA (11) for the spiritual aspect.[19]

Method

Design

Unlike a survey study in which the purpose is to describe and make a conclusion about the population, a validation study of an instrument is to describe and make a conclusion regarding the quality of instrument. There for, the design of study such as sampling design is not the primary determinant in achieving the purpose of study. In this regard, the focus of interest is the extent to which all the items in the instrument are valid in measuring what they supposed to measure. A method of analysis relevant to this purpose, among others, is what so-called Confirmatory Factor Analysis (CFA). Under this method, it is theorized that a set of items measuring a single construct such as ''health deterioration'', should be highly and positively correlated to its other. However, such correlations should this appear when they are computed in a homogenous sample regarding the construct. When this theory (model) fits the data well, it can be interpreted that all of the items are measuring only one construct which in this case is health deterioration. A theoretical model in which all items are assumed to be measuring only one construct is called a unidimensional model.[20]

In order to obtain a good estimate of parameters in the model, it is necessary that a relatively large sample of data is needed regardless of the sampling design.

Population and study setting

Since this instrument is intended to measure the construct in the elderly population, it is important that the instrument is tried out using elderly people. Responded for this validity study were those who are aged 60 and older.

In this study, 130 elderly patients were selected using Non-Probability Sampling. Data collection took place from February 2016 to December 2017 in two General District Hospitals. The independent variables were social and spiritual aspects, and the dependent variable was the elderly patient health deterioration, without data treatment or manipulation of research objectives.

Data collection

The data were collected after the researchers had explained. Every time the researcher was informed by the hospitals the prospective respondents were available, the researcher will visit them for the data collection. In every data collection activities, the researcher explained the purpose and benefits of the study and asked them to participate by signing the informed consent sheets.

Data analysis

There were two steps to be carried out in CFA for validities study. Firstly, to test a hypothesis that a unidimensional model fit the data. Secondly, if the model fit the data well, then the hypothesis regarding the significant factor loading coefficient of each item is tested.

To analyze whether a unidimensional model fit the data statistically, there are several indices or measures available for this purpose. In this study, the researcher uses the two most popular measure of them: RMSEA (Root Mean Square Error of Approximation) and CFI (Cumulative Fit Index). The smaller the value of RMSEA the better the model fit (a value of 0.000 means a perfect fit). On the other hand, the higher the value of CFI the better the model fit (since its maximum value is 1.000; a CFI value greater than 0.900 is considered as a good model fit).

Table 1 The respondent's general view.

Variables	Frequency (n = 130)	Percentage (%)
Age		
60–69 years	90	69.20
≥70 years	40	30.80
Sex		
Male	53	40.80
Female	77	59.20*
Education background		
Illiterate	18	13.85**
Primary School	51	39.23**
Junior High School	35	26.92
Senior High School	20	15.38
University/College	6	4.62

Based on Table 1 above most respondents were female (*) with the lowest educational background (**). These means, women respondents with very low educational backgrounds have experienced health deterioration before being hospitalized.

Table 2 Social and spiritual aspects of the construct validity test.

Variables	p value	RMSEA	CFI
Social	0.000	0.036	0.995
Spiritual	0.000	0.022	0.964

Table 2 above illustrates that the *RMSEA < 0.05* and CFI: 0.995 and 0.964, or close to 1.000 then it means that this model was fit with the data. There were 10 out of 18 items out for social aspects, and 8 out of 11 items for spiritual were valid, but only the best five items will continue to be tested.

After a model fit is achieved, the significance of each item in measuring the construct is tested using a *t*-test. In this case, a *t*-value of 1.96 or higher ($p < 0.05$) is considered as statistically significant. All computation for CFA in this study were conducted using M Plus computer software version 8.0.[20]

Ethical approval

This study was approved by the Research Ethics Committee of the Faculty of Nursing - University of Indonesia and Medical Research Ethics Committee of the Regional General Hospital.

Results

Demographics background

The respondent's health deterioration experienced by the elderly patients following their admission to the inpatient unit can be seen in Table 1.

Since there were two aspects of health deterioration being measured in this study, the researcher conducted two separate unidimensional CFA model, it is for social and spiritual aspects. The construct validity of the social and spiritual aspects as explained in Table 2.
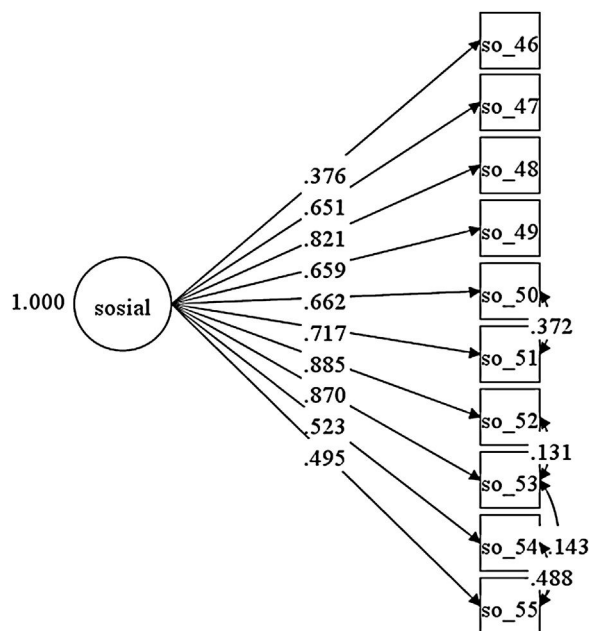

**Scheme 1** First order social aspects items.
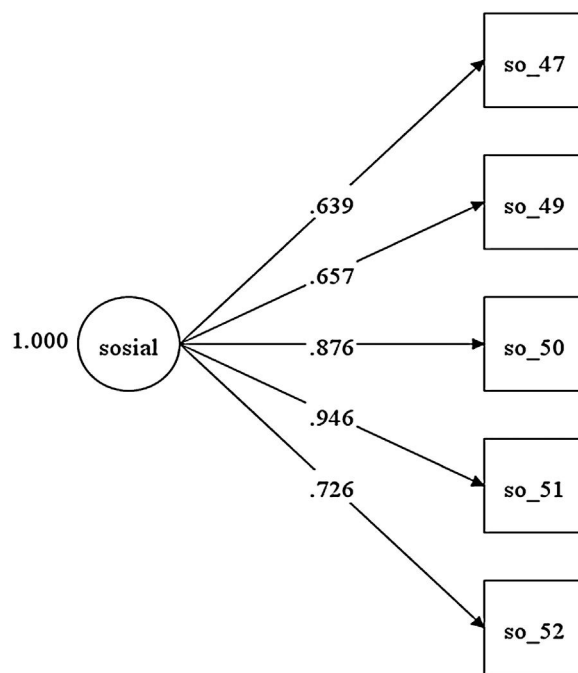
Scheme 2 Second order social aspects item.

At the initial stage of the analysis of the social aspect, the author omitted eight items through back-translation mechanism so that they were 10 remaining items (Schemes 1 and 2).

The tenth items were re-tested, and the researchers found five items that were correlated with complex patterns. The results showed that all these items which only measured one factor (unidimensional). Thus, there were only five items that are unidimensional i.e. hobbies (so_47), communicating with family (so_49), communicating with other than family (so_50), interacting with other than family
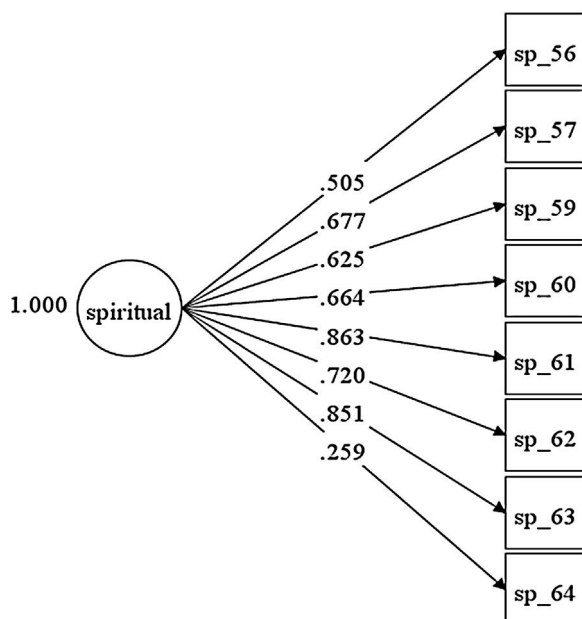
Scheme 3 First order analysis of spiritual items.
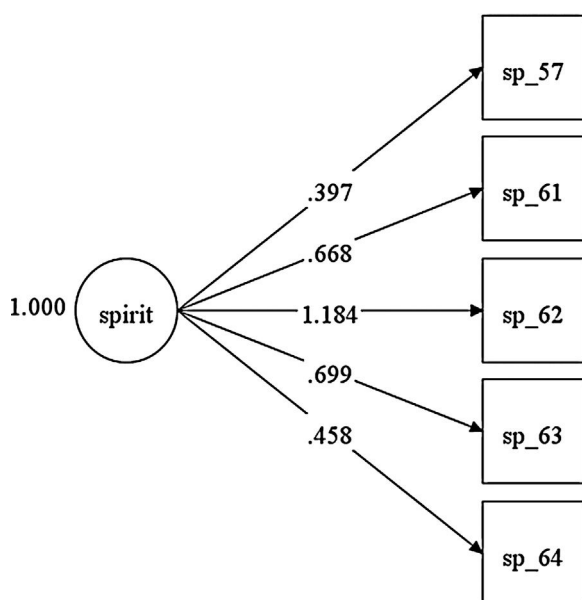
Scheme 4 Second order analysis of Spiritual items.

(so_51) and participating in activities in the hospital environment (so_52) (Schemes 3 and 4).

Furthermore, from the rest of the initial stage items, there were five items that are correlated with the item itself (unidimensional). Mean that the religion can help to cope with stress (sp_57), the role of faith in the recovery of health (sp_61), becoming parts of a religious community before being treated (sp_62), support from the religious communities (sp_63) and the presence of important religious communities while being treated (sp_64) will continue to be tested.

Discussion

This study is focused on developing social and spiritual aspects as an instrument for measuring the deterioration of the health of elderly patients. Previous research related to social and spiritual aspects showed that the interactions among elderly patients during treatment were ably improved their functional status. Changes to social and spiritual aspects are positively significant to increase the health status of the elderly. While in Indonesia, nursing research rarely highlighted the fulfillment of social and spiritual needs as a focus for measuring deterioration in elderly health.

In this study, data analysis is done using three criteria namely: 1. RMSEA (Root Mean Square Error of Approximation) the smaller the value of RMSEA the better the model fit (a value of 0.000 means a perfect fit); 2. CFI (Cumulative Fit Index) the better the model fit (since its maximum value is 1000; a CFI value greater than 0.900 is considered as a good model fit). After a model fit is achieved, 3. The significance of each item in measuring the construct is tested using a t-test. In this case, a t-value of 1.96 or higher ($p < 0.05$) is considered as statistically significant.

The social aspect and health deterioration

The results of the CFA analysis on social aspects show that 10 items related from the second order, indicate that all items of the RMSEA < 0.05 and CFI that closed by 1.000 namely: interaction with others (CFI = 0.968); participate to the environment (CFI = 923); hobbies (CFI = 0.807); communication with other people (CFI = 0.661); communication with family (CFI = 0.595) and lifestyle (CFI = 0.585). The six items of this social aspect show a high level of significance and are suitable as a fit model because they are easily observed and can be accessed by patients and nurses. While the other four items are life motivation, feeling important, interaction with other people, active role in society and have discoveries that still need an understanding of the meaning of the word.

The five items that have a high loading factor coefficient show their strength in measuring the decline of social aspects. It means that the model is fit and significant with the data. These items indicate that social aspects validly measure what should be measured. The five items have a very strong and valid influence in measuring the health deterioration of elderly patients.

Spiritual aspects and health deterioration

Measuring the spiritual item validation indicate that two out of nine-item were not fit namely: consider spiritual/religious (RMSEA > 0.05, CFI = 0.246) and self-care effect (RMSEA > 0.05, CFI = 0.272). Both of these items are invalid and do not measure deterioration in elderly health. This is likely because the use of these two terms cannot be translated into situations in hospital nursing practice. A clear understanding is needed to get answers to these statements.

However, the seven out of nine items were fit namely: cope with stress (RMSEA < 0.05, CFI = 0.667); life

meaning (RMSEA < 0.05, CFI = 0.999), the importance of faith (RMSEA < 0.05, CFI = 0.798); health regaining (RMSEA < 0.05, CFI = 0.794); part of a spiritual or religious community (RMSEA < 0.05, CFI = 0.995); religious support group (RMSEA < 0.05, CFI = 0.753) and group of important people (RMSEA < 0.05, CFI = 0.446). The seven spiritual items above are valid and have a high significance in measuring the decline of elderly health. However, cultural adaptation is needed so that an understanding of statement items can measure things measured.

The overall results of the analysis obtained, the model fit to the data. This statement means that there is a model fit for the spiritual and social variables in measuring the health deterioration of elderly who are in care.

Implications of nursing: health recovery of the elderly who are hospitalized will be more rapid if social function and spiritual needs can be identified and intervened proportionately. The faster the recovery period, the shorter the time of client care and the quality of life of the elderly during care will be increasing. Elderly limitations in social relationships and religious activities indicate that the condition began to decline.

The deterioration of elderly health characterized by the inability to perform social activities such as hobbies communicates with family, friends and general people who interact with others and participate in activities in the hospital environment. On the other hand, deterioration can be prevented if the elderly are convinced religious activity can be persisted during the treatment. Confidence needs to be strengthened during the treatment is: religious activity helps cope with stress and improve health recovery, bringing religious groups will support healing and increase feelings of being accepted or important.

By considering the busyness of nurses and the elderly patient who are easily tired, the instrument should be short and easy to implement. Therefore, only 10 items are used for further testing. The instruments produced by five items both in social and spiritual aspects. However, this instrument needs a manual, technical guide consisting of administrative, scoring and interpretation instructions that are currently under construction and validation. This instrument is expected to be used by nurses throughout Indonesia.

Healthy older people who had soured prior to admission showed the family has not been able to detect any health problems and should be immediately brought to the hospital. Research related to the family role in identifying health deterioration in elderly people through social and spiritual aspects before taken to the hospital needed to be developed. In addition, the seriousness of nurses to observe the patient's condition during care is beyond the reach of researchers control.

This study focuses on developing instruments that measure the deterioration of the health of elderly patients using social and spiritual aspects. Both aspects show positive results. That is, social and spiritual aspects have high significance and are proven valid and fit able to measure the deterioration of the health of elderly patients. Therefore, social and spiritual aspects can be used to measure health deterioration in the elderly during care at the hospitals in Indonesia.

Conflict of interests

The authors declare no conflict of interest.

Acknowledgements

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