Development and validation of a scale to measure attitude of people toward men in nursing profession

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Abstract:

BACKGROUND: Ancient history mentions the dominance of men in nursing; however, now nursing has a feminine image, and globally more than 90% of nursing workforce is females. Recently, more number of males are attracted to nursing, but there is a paucity of literature on the attitude of people about men in nursing may be because of a lack of measurement scales available for this purpose. The aim of this study was to develop and validate a new scale measuring attitude of people toward men in nursing.

MATERIALS AND METHODS: The present study was conducted at a tertiary care hospital and used an exploratory sequential design with an instrument development model. A total of 400 participants were selected using the simple random sampling technique. The reliability, content validity, face validity, and construct validity of this newly developed scale were computed. For data analyses SPSS AMOS version 23 was used for performing exploratory and confirmatory factor analyses.

RESULTS: The new scale “AMnQ” consists of 15 items under three factors: (I) nursing is feministic and professionally low, (II) higher suitability of male nurses in technical and challenging situations, and (III) synonymy of empathy and care with a female. The final model with 15 items of AMnQ scale was validated by confirmatory factor analysis and showed a good fit to data. The Cronbach’s α for the overall scale was 0.87, and for Factors I, II, and III, it was 0.80, 0.88, and 0.89, respectively.

CONCLUSIONS: The “AMnQ” is a valid, reliable scale to assess the attitude of patients, nurses, physicians, and nursing students toward men in nursing. There is an assumption that nursing is a feminine profession; therefore, a valid and reliable scale to measure the attitude of people toward men in nursing will help to generate pieces of evidence on this subject, so that policymakers can make unbiased decisions on liberalizing entry of men in nursing.

Keywords: Attitude scale, men in nursing, reliability and validity

Introduction

Nursing is an oldest art and a youngest science of caring. It is a vital component of health-care delivery system; however, this discipline has an inherent feminine image in society.[1] A female is believed to have an innate nature of care, compassion, sensitivity, sympathy, and attention in providing care to sick that has symbolized nursing as a profession of females.[2] However, males are believed to be more suitable for some of the clinical areas such as psychiatry, emergency, trauma, operation theater, and intensive care units. Nonetheless, since the last two decades, more number of males have started moving into nursing profession probably because of increasing job opportunities and handsome salary or wages. This growing trend of men entering in nursing profession reflects changing attitude of society toward men in nursing.[3,4] However, there are limited studies conducted to assess society’s attitude...
towards men in nursing as well as the perception of health-care professionals, nursing students, and students from different fields on this trend. Furthermore, there is a lack of valid and reliable objective scales to assess the attitude of people toward men in nursing; we could find only single 6-item scales developed for this purpose, which has limited scope to measure all the dimensions of this phenomenon.

Therefore, a valid and reliable scale is essential to precisely assess the attitude of people toward men in nursing, so that empirical evidences can be generated on this subject, which can help policymakers to take unbiased decisions on liberalizing entry of men in nursing. Men in nursing is a resurging phenomenon, however, there is a paucity of data on attitude of people toward men in nursing may be due to lack of valid and reliable scales to measure this attribute, especially in the South Asian countries. Though, there are few studies which attempted to measure the attitude of people toward men in nursing using self-structured scales, and evidences generated through these studies cannot be generalized due to not utilization of standard scales. Therefore, the authors decided to develop a comprehensive, valid, and reliable scale to measure attitude of people toward men in nursing profession.

Objective of the study

- To develop a comprehensive scale to measure the attitude of people toward men in nursing and evaluate its validity and reliability.

Materials and Methods

The present study was conducted using exploratory sequential design with an instrument development model. The study design consisted of two sequential phases: (I) First phase – instrument development phase where items were developed through literature search, brainstorming, and content and face validity was computed on feedbacks provided by a panel of 11 validators. The developed scale to measure attitude toward men in nursing was termed as “AMnQ.” Second phase – developed scale was field tested and psychometric analysis for contract validity and reliability testing was carried out using appropriate statistical methods.

Phase I: Instrument development

Item generation

The first step in the way of developing the AMnQ was a thorough review of the available literature to know how the concept of attitude toward men in nursing had been used in current scales. We mainly searched PubMed, EMBASE, OVID databases, bibliographies, and related references for collecting information to generate a list of statements corresponding to AMnQ.

MeSH terms and free-text term such as “Person” OR “Patients” AND “Nurses, Male” AND “Attitude”, “Attitude” AND “Nurses, Male” AND “Health Personnel” were used for the purpose. Articles published in English language and studies assessed the attitude of people, health-care professionals, and students toward men in nursing were included. We excluded the editorial, review, and opinion articles.

All selected studies analyzed and 47 statements regarding the attitude toward men in nursing were identified. After consulting with experts and discussion among research team members, items were discarded, revised, and mixed. A scale with 28 items was included in this study. We followed the PRISMA guideline to search and select the related items [Figure 1].

Therefore, the first draft constituted of 28 items evaluating the attitude. This initial five-point Likert scale has both positive (23) and negative (5) items. Each item was rated as 1, 2, 3, 4, and 5 for strongly disagree, disagree, neutral, agree, and strongly agree, respectively, for positive phrasing statements, while for negative phrasing statements, scoring was done in a reverse manner. The total score is the sum of all item scores and higher scores suggested a positive attitude toward men in nursing.

Face validity

The face validity of this draft was then assessed by obtaining feedback from three nurses, two doctoral nursing students, two physicians, and four patients. For qualitative assessment, all validators were requested to evaluate the relevant wording, difficulty, and suitability of the items. In quantitative approach, they were asked to answer the item “to what level each item is necessary for assessing people’ attitude toward men in nursing?” A five-point Likert scale was used for each item, and the score ranged between 1 = completely unnecessary and 5 = completely necessary. The following formula (impact score = (total score) / (number of items)) was used to evaluate the item's importance. The face validity of this draft was then assessed by obtaining feedback from three nurses, two doctoral nursing students, two physicians, and four patients. For qualitative assessment, all validators were requested to evaluate the relevant wording, difficulty, and suitability of the items. In quantitative approach, they were asked to answer the item “to what level each item is necessary for assessing people’ attitude toward men in nursing?” A five-point Likert scale was used for each item, and the score ranged between 1 = completely unnecessary and 5 = completely necessary. The following formula (impact score = (total score) / (number of items)) was used to evaluate the item’s importance.
score = frequency (%) × necessary) was used to determine the effect of each item. The items which had a score ≥ 1.5 were retained for further process.\(^\text{[17]}\)

Desired modifications were done as per the feedback from experts and the opinion and impact score of the people who did face validity.

**Content validity**

To establish the validity of this scale, we carried out the following steps. First, content validity was assessed using both qualitative and quantitative methods. For qualitative assessment, validators were requested to evaluate the items in terms of wording, grammar, and word placement in the items. Then, for assessment of quantitative values of content validity, we used content validity ratio (CVR), content validity index (CVI) criteria, and kappa statistic. CVR evaluates the need of an item for the participants, while CVI investigates the items’ appropriateness, representativeness, and explicitness, and the initial draft of the scale was submitted to seven experts and four common people. This panel of experts comprised three nursing experts, two physicians, two sociologists, and four common people. The experts were requested to select among three options “necessary,” “useful but not necessary,” and “unnecessary.” We used “Lawshe table” to determine CVR value. As we sent it to eleven experts, therefore, items which had > 0.571 were retained in the study.\(^\text{[18]}\) For assess CVI, All seven experts and four common people (total eleven validators) were asked to evaluate each item of AMnQ and rate for its relevance on a five-point Likert scale (1 = not relevant and should be removed, 2 = somewhat relevant and needs major changes, 3 = relevant and requires small revisions, 4 = relevant but require modification in wording, and 5 = highly relevant).\(^\text{[19]}\) The items with a CVI of ≥0.78 were retained.\(^\text{[20]}\)

We also calculated kappa statistic, which is a consensus index of inter-rater agreement that adjusts for chance agreement. Kappa coefficient acts as a supplement to CVI because it provides information about degree of agreement beyond chance. After getting I-CVI value for all items of the scale, kappa statistic was calculated. The kappa coefficient values more than 0.74, between 0.74 and 0.60, and between 0.59 and 0.40 are categorized as excellent, good, and fair, respectively.\(^\text{[21,22]}\)

After this, a second draft of items was developed. A pilot study was done with this draft to collect data and measure the construct validity of the AMnQ using exploratory and confirmatory factor analyses.

**Phase II: Testing the validity and reliability of AMnQ**

**Construct validity**

**Exploratory factor analysis**

The data collected from the participants were used for factor analysis. Before performing factor analysis, we carried out the Kaiser-Meyer-Olkin (KMO) test to determine the adequate number of samples and Bartlett’s test to confirm that the sample was adequate to carry out an acceptable factor analysis. A KMO value >0.7 suggests the adequacy of sample size, and a significant value (\(P < 0.05\)) of Bartlett’s test of sphericity suggests the valuable correlation among the items as per the correlations matrix.\(^\text{[23]}\) Researchers attain the correct number of factors using eigenvalues (more than 1) and scree plot. To determine the loading of each item in the extracted factors, researchers used an oblique (promax) rotation, and the items with factor loadings of ≥0.5 were retained.\(^\text{[24]}\)

**Confirmatory factor analysis**

We performed confirmatory factor analysis (CFA) using IBM SPSS AMOS (Analysis of Moment Structures) 23.0 to validate the results of the factor structure obtained from the exploratory factor analysis (EFA). We used a structural equation model to determine the factor structure. The fit of model was determined on the following criteria:\(^\text{[25]}\)

- Chi-square value <0.05 suggests evidence of poor model fit to the data
- Goodness of fit index (GFI) value 0.95 or greater suggests the good model fit
- Root mean square error of approximation (RMSEA) values 0.06 are acceptable. These smaller values indicate better model fit.

To attain a good model fit, we evaluated whether items met the desired standards and we discarded those items that could not meet the desired parameters. We revised the model until the final or better fit model was attained.

**Reliability**

We calculated the internal consistency of the items to assess the reliability of the scale. We measured the Cronbach’s \(\alpha\) coefficient for the items in each factor of the model and a value of 0.7 or greater indicates an acceptable internal consistency of the scale. We also measured the correlation between the factors to determine the overlapping factors. The item-total correlation (>0.3) and Cronbach’s \(\alpha\) value (0.7) should not drop significantly with the item elimination, and internal consistency was reassessed when an item with the lowest internal correlation was deleted.\(^\text{[26]}\)

We also assessed the test–retest reliability to determine the stability of the scale. In the present study, we distributed the same questionnaire to the participants after 2 weeks. Based on the allotted code of each participant, the same participant’s questionnaire could be identified and matched with their first one. Then, with the use of correlation coefficient, we measured test–retest reliability of the questionnaire.\(^\text{[2,26]}\)
Participants’ recruitment
This study was conducted in a tertiary care hospital and nursing college from January 2019 to April 2020. The population of the present study was composed of nurses and physicians working at a tertiary care hospital, the patients admitted to the same hospital, and nursing students of nursing college. A simple random sampling technique was used, and 140 registered nurses, 100 physicians, 160 patients, and 80 nursing students were selected as per prescribed inclusion and exclusion criteria.

Inclusion criteria
- Patients who received care from both male and female nurses, no psychiatric history, able to understand and communicate in Hindi or English, and were of more than 18 years of age
- Physician and nurses who have working experience with male nurse.

We selected 16 areas (medical-surgical wards, emergency department, intensive care units, and operation theaters) to collect data. The AMnQ was mailed to nurses, physicians, and nursing students while patients were contacted in-person in their respective ward and scale was handed over to them for their response. The response rate from nurses, physicians, and nursing students was 79.4% (254), while from patients, it was 97.5% (156). Total 410 participants returned the completed questionnaires; however, 10 questionnaires were dropped because of incomplete responses, and finally, total 400 participants’ questionnaires were considered for final analyses.

Ethical consideration
The research project was approved by the institutional ethical committee of All India Institute of Medical Sciences, Rishikesh vide letter no. AIIMS/IEC/19/1142. Informed written consent for voluntary participation was obtained from each study participant, and they were assured for the confidentiality of information and anonymity of informants.

Results

Content and face validity
The scale with initial 28 items was sent for face validation, and all items had an impact score more than 1.5. Only minor modifications in the wording were done as per expert’s qualitative suggestions. This procedure ended up with a draft of 28 items in the scale. This draft with 28 items was validated by the expert panel, and nine items were deleted as they had a CVI and CVR value <0.78 and 0.571, respectively. While kappa coefficient for all items in the scale ranged from 0.83 to 1.

Reliability
We measured the Cronbach’s $\alpha$ using the statistical computer program IBM-SPSS statistics. The measured value of Cronbach’s $\alpha$ was 0.87, which suggested that the scale has a good internal consistency. Karl’s Pearson’s correlation of the AMnQ’s items ranged from 0.23 to 0.94. Therefore, three items were dropped from AMnQ scale and a final draft of 16 items was prepared.

We mailed the scale after 2 weeks, and each participant was requested to complete it the second time. One hundred and fifteen study participants completed and sent back the scale. The test–retest reliability of 16 items AMnQ scale was measured, and the measured reliability was 0.93.

We measured the internal consistency of all three factors with 15 items scale. All of the correlations between each item ranged from 0.49 to 0.89, suggesting that the items in the final model had the ability to discriminate participants with positive attitude from those with negative attitude. The Cronbach’s alpha coefficient for Factor I (nursing is feministic and professionally low), Factor II (higher suitability of male nurses in technical and challenging situations), and Factor III (synonymy of empathy and care with female) was 0.80, 0.88 and 0.89, respectively. These values indicated good internal consistency of scale items.

Construct validity
Exploratory factor analysis
The KMO value was 0.883, and the values of the Bartlett’s test was significant ($\chi^2 = 3564.88; P < 0.001$). The results of both tests suggested that the sample was adequate to carry out an acceptable factor analysis and the sample size adequacy for a 16-item scale’s psychometric testing. After that, all 16 items were tested using principal component analysis. Table 1 shows that three factors were extracted which have an eigenvalue >1. The values of rotational variances of Factor I, Factor II, and Factor III were 21.51, 20.84, and 19.89, respectively. The cumulative value of postrotational variances was 61.89%, which suggested that all three factors cumulatively explained 61.89% of variances.

After the factor analysis, we assigned the names to all three factors and these factors with their items presented in Table 2:
- Factor I: Nursing is feministic and professionally low
- Factor II: Higher suitability of male nurses in technical and challenging situations

| Table 1: The principal component factor analysis for attitude scale for men in nursing (n=400) |
| Number | Eigenvalue | Postrotational variance (%) | Cumulative (%) |
|--------|------------|----------------------------|---------------|
| Factor I | 3.227 | 21.512 | 21.512 |
| Factor II | 3.073 | 20.484 | 41.996 |
| Factor III | 2.983 | 19.889 | 61.885 |
Confirmatory factor analysis

- Model 1: The results of EFA were cross-validated through CFA, and this three-factor model did not have a good fit, as shown in results with value of Chi-square = 2111.015 (df=87; P = 0.001), GFI = 0.89, and RMSEA = 0.07. It was assessed that item 8 in Factor I had a high value (3.65) of residual covariance with item 2 in Factor II. Therefore, item 8 removed and we tested the model again.

- Model 2: Three-factor model with 15 items were retested, and this showed a better model fit according to the predefined standards as all fits shown that this model had a better goodness of fit ($\chi^2 = 2048.57$, df – 72; P = 0.12, GFI = 0.95, and RMSEA = 0.06). Therefore, this model was accepted as a satisfactory model [Figure 2].

Discussion

The aim of this study was to develop and evaluate the psychometric properties of a new scale for assessing the attitude of patients, nurses, physicians, nursing students, and people toward men in nursing profession. Content validity was assessed using a panel of experts and face validity by administering the scale to nurses, physicians, nursing students, and patients while construct validity was determined by EFA and CFA. The internal consistency and stability of the scale were measured to determine the reliability of the scale.

One of the important prerequisites for the development of a scale is to measure the content validity. It is used to assess the degree of appropriateness and relevancy of the construct assessed by an instrument. We measured the content validity of the first draft of the scale on the basis of feedback of eleven experts. This corresponds with the suggestions of a study, which recommended a minimum of three experts for assessment of the content validity. Furthermore, it was also essential to determine the face validity of an instrument, so we administered it to the participants who had close attributes with the target population. Items were modified as per their suggestions.

We used EFA and CFA to test the factor structure of the scale. EFA is used to extract factors from a set of items, but it is not utilized to confirm factor structure as it is based on data instead of theory. Therefore, CFA was used to validate whether the hypothesized model developed from EFA fits for data because the basis of CFA is a theoretical and empirical foundation. In the present study, we identified a final model with 15 items and 3 factors such as Factor I is measured feministic characteristics and professional values of nursing, Factor II is related to the acceptance and suitability of male nurses in different situations and profession, and Factor III is concerned about the care preference with female nurses and their quality.

Another important issue during the development of an instrument was to determine the homogeneity or unidimensionality of the items. The Cronbach’s $\alpha$ for the AMnQ overall scale was 0.87, and for each of the three subscales, it ranged from .80 to .89, which have shown good internal consistency for newly developed and validated AMnQ scale.

Based on this final scale, attitude toward men in nursing can be measured by summing the item scores and the minimum total possible score is 15 and maximum total possible score is 75. Higher total scores suggest a more favorable attitude toward men in nursing, while lower scores reflect negative attitude.

The present study verified the validity (content, face, and construct) and reliability (internal consistency and stability) of the AMnQ in the Indian context. Therefore, this AMnQ scale can be used to assess the attitude of patients, nurses, physicians, and nursing students toward men in nursing.

Limitations

The present study was limited to one particular geographical area, and patients visiting a single public tertiary care hospital may not be a true representation of people of the region. However, the present study recommended that further researches should be carried...
Table 2: Rotated component matrix of the attitude scale for men in nursing

| Factors                                                                 | Component |
|-------------------------------------------------------------------------|-----------|
| **Factor I: Nursing is feministic and professionally low**              |           |
| People prefer to be cared by female nurses only                         | 0.717     |
| Nursing is suitable only for the females                                | 0.715     |
| Male patients also prefer to be cared by the female nurses only         | 0.702     |
| Nursing is considered as low-level occupation for the males             | 0.643     |
| Nursing is considered as purely a female profession                     | 0.634     |
| Hospitals prefer to appoint female nurses                               | 0.611     |
| Nursing is very challenging and frustrating occupation for males        | 0.573     |
| **Factor II: Higher suitability of male nurses in technical and challenging situations** |           |
| Male nurses are more supportive and helpful in crisis                   | 0.957     |
| Male nurses are more confident and technically sound than female nurses | 0.944     |
| Male and female nurses both are equally required in nursing profession  | 0.940     |
| Male nurses are more suitable for some of the hospital units such as psychiatry, emergency, operation theater, and critical care units | 0.522     |
| **Factor III: Synonymy of empathy and care with female**               |           |
| People do not prefer to send males for the nursing profession           | 0.874     |
| Female patients do not prefer to be cared by male nurses                | 0.847     |
| Female nurses are more caring and tender heart than male nurses         | 0.825     |
| Female nurses are more polite and courteous in patient care            | 0.819     |

out on developing and validation of attitude toward men in nursing in different populations as there are differences in belief, culture, language, and health-care systems in the manner of attitude. We also recommended that other researchers use this scale to validate the model with other populations and settings.

**Conclusions**

The “AMnQ” is a comprehensive, valid, and reliable scale for assessing attitude toward men in nursing. The scale can be used to determine the attitude of people toward this issue, and this information can be used by administrators and policymakers to make unbiased decision on entry of men in nursing profession. Furthermore, they plan and implement strategies to mitigate gender bias in nursing discipline.

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**Conflicts of interest**
There are no conflicts of interest.

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