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Designing and Psychometrics of “Nursing Students’ Communication Skills” Questionnaire

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ABSTRACT

This study aims at developing a questionnaire to measure nursing students' communication skills and determining its validity and reliability. This methodology was conducted in two stages. At the first stage, 51 questionnaire items were selected through former texts and studies. At the second stage, formal validity and content validity of the questionnaire was assessed quantitatively and qualitatively and the validity of the structure was evaluated using exploratory factor analysis. During the stage for determining the formal validity in the qualitative method, content validity ratios method and during the quantitative method of impact score, respectively 11; 8 and 4 items were excluded and finally 28 tool items were remained. These items lies in 5 factors: conscious start (3 items), verbal and nonverbal communication skills (9 items), external and internal coordination (6 items) and respect to client (5 items) and unconditional client acceptance (5 items). The designed questionnaire has the appropriate validity and reliability to be used for assessing nursing students' communication skills in the studied society.

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INTRODUCTION

The communicative skills is an important characteristic for nurses in nursing care and having the ability to interact appropriately with colleagues, patients and other health agents form the basis of clinical skills and is considered as the core of the optimal medical activities [4,6]. Communication skills, as an important part of medical and nursing services, include a variety of topics and these are regarded as the prerequisites for performing qualitative care on patients [10,11]. Strengthening the relationship leads to a closer affinity between nurses and patients and thus increasing their job satisfaction [14,1]. American Association of Critical Care Nurses specifies 6 standards for establishing and maintaining health care centers, one of which is “communication skills”. This Association believes that nurses, as the same as other clinical skills, must have good communication skills, too [7].

Poor communication skills among health workers reduce the chances of success and increasing the probability of facing litigation and complaints. Also, strong communication skills have a positive impact on patient satisfaction. Good communication skills, also, can improve the patient's psychological status as well as promoting satisfaction in a patient's family [17].

Nowadays, instrumental developing is the scientific basis of research all over the world. Researchers are unable to do accurate and scientific researches without access to appropriate and scientific tools and the results obtained from the unverified tools are subject to questions. So, in the first phase, in order to determine the accuracy of the study, the adequacy of the measurement tools is assessed, and if the tools are valid, validity of the research is confirmed [2]. In designing a new scale, it is expected to obtain sufficient information on the validity and reliability of the research through studying procedures which is used by the research to develop the scale [13] because of fundamental importance for assessing and reporting the content validity of using research tools [18]. Validity of research instruments refers to the elicitation of facts resulting from statements and shows that to what extent the results and interpretations derived from the findings of the evaluation are suitable, explainable, significant and connected [3].

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Improving nursing students' communication skills and finding their strengths and weaknesses to improve the quality of education as well as training qualitative nurses are ideal targets in all nursing schools. The only possible way to achieve this aim is via measuring, evaluating and determining the level of these skills with the use of standard and accurate instruments. So, designing and provision of a reliable and valid questionnaire, in which all standards and stages of producing a scientific questionnaire are taken into account, is necessary to assess nursing students' communication skills. Given that the communication skills assessment is often neglected in clinical assessments and the specialized tools are not available for this purpose, this study aims at developing a questionnaire to measure nursing students' communication skills and determining its validity and reliability.

Methods:

This methodology was conducted in two stages. At the first stage, 51 questionnaire items were selected through former texts and studies. At the second stage, formal validity and content validity of the questionnaire was assessed quantitatively and qualitatively and the validity of the structure was evaluated using exploratory factor analysis.

Formal validity:

Face to face interview was done with 15 nursing students to determine the formal validity as the qualitative method and the level of difficulty, the appropriateness and uncertainties of the questionnaire were evaluated. Quantitative method of "Impact score" was used to assess formal validity after correcting the issues considered by the students. The 15 students were asked to score to each of the five multiple choice items on the Likert scale from "very important" (5 points), "somewhat important" (4 points), "fairly important" (3 points), "slightly important" (2 points), and "not important at all" (1 point). Finally, the mean score of each item was calculated by multiplying the number of points assigned to each response by the frequency of that response and dividing the resulting number by 15. If the impact score was more than 1.5, the item was distinguished suitable and maintained for further analyses. Benchmarking 1.5 was based on the mean score 3 and a mean frequency 50% [8].

Content validity:

Qualitative and quantitative methods were used to determine the content validity. Qualitative content analysis was performed by 13 skilled nursing and psychology experts who were asked to offer their corrective views about the grammaticality, use of the suitable words, the position of items in the proper place and the way to score appropriately, in writing form in connection with the above mentioned issues. The two methods of content validity rate and content validity index were used in the quantitative method. 13 skilled nursing and psychology experts were asked to classify the necessity of each question into three categories of "Necessary", "Helpful but not necessary" and "Not necessary" to calculate content validity rate based on Waltz and Basel indicators. For each item, the three criterion "Simplicity", "Relevancy" and "Clarity" were separately examined in four -point Likert by 13 skilled nursing and psychology experts to determine content validity index. Items with scores less than 0.79 were excluded based on Waltz and Basel's content validity index scores [9].

Structural validity:

It was measured by exploratory factor analysis. At first, "Kaiser-Meyer-Olkin" index test of adequacy of sample size was used, which is variable between "zero" and "one". The higher the index shows the better factor analysis, and levels upper than 0.90 and upper than 0.80 are considered excellent and good, respectively [12]. Bartlett sphericity test was used to determine the correlation between the tool items and to justify the load factor measurement [19]. Then, some factors were determined and extracted through factor rotation method according to the results of the variables' correlation matrix, and variables highly correlated with each other were operated into a category or a factor. Load factor of each item in the rotated matrix was at least 0.3 and the factors were extracted in such way that included 3 items at least [9]. 300 nursing students (for at least 10 samples per any item considering the probability of loss 10% and non-responsiveness) were selected through random cluster sampling method from Tehran University of Medical Sciences, Baqiyatallah University, Aja University and Shahed University to determine the structure validity. After obtaining the necessary permissions from the authorities the researchers went to the mentioned Schools of Nursing and gave the questionnaire to nursing students (educating at most in third semester) and collected them after appropriate filling time.

Reliability:

Internal consistency test was used to determine the questionnaire reliability by calculating Cronbach's alpha and splitting-half.

Results:

During the stage for determining the formal validity in the qualitative method and during the quantitative method of impact score, because of getting impact score less than 1.5, 11 and 8 items were excluded respectively, and 32 items were maintained. The content validity ratios for 28 tool items were higher than the value given in Lawshe Table (0.5), and therefore 4 items were excluded. According to the results obtained from calculated content validity index, all the remaining values had values more than 0.79 and so at this stage no items were removed.

According to the results of the exploratory factor analysis, the calculated amount of sample adequacy (KMO) was 0.902, that was adequate for factor analysis. Also Bartlett's test of sphericity factor analysis was revealed suitable to identify the structure of factor model ($p < 0.0001$). By referring to the eigenvalues higher than 1 and the slope of the scree plot diagram as criteria, 5 factors were extracted with covering 52.4% of whole variance. The results of the exploratory factor analysis indicated extractive sharing values calculated for each item between 0.589 to 0.864 and in 5 factors (Table 1).

Table 1: Initial common and extracted amounts and variance percentage of each factor and congregational factor analysis-discovery of nursing students' communicative skills questionnaire.

| Factor | Initial eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Loadings | | |
|--------|---------------------|----------|----------------|-------------------------------------|----------|----------------|---------------------------|----------|----------------|
| | Total | Variance | Congregational | Total | Variance | Congregational | Total | Variance | Congregational |
| 1 | 8.604 | 30.730 | 30.730 | 8.604 | 30.730 | 30.730 | 4.113 | 14.689 | 14.689 |
| 2 | 2.254 | 8.050 | 38.780 | 2.254 | 38.780 | 8.050 | 2.949 | 10.534 | 25.223 |
| 3 | 1.461 | 5.217 | 43.997 | 1.461 | 43.997 | 5.217 | 2.824 | 10.087 | 35.310 |
| 4 | 1.254 | 4.478 | 48.475 | 1.254 | 48.475 | 4.478 | 2.477 | 8.845 | 44.155 |
| 5 | 1.120 | 4.000 | 52.475 | 1.120 | 52.475 | 4.000 | 2.330 | 8.320 | 52.475 |

Factor loadings of each item are provided after rotation at Table 2. The factors were as follows: The first factor (conscious start) including 3 items ($\alpha = 0.86$), the second factor (verbal and nonverbal communication skills) including 9 items ($\alpha = 0.80$), the third factor (external and internal coordination) with 6 items ($\alpha = 0.70$), the fourth factor (respect to client) including 5 items ($\alpha = 0.66$) and finally, the fifth factor (unconditional client acceptance) including 5 items ($\alpha = 0.70$). The total scale stability based on Cronbach's Alpha were 0.85 and by the splitting-half method with Spearman correlation test it was equivalent to $r = 0.73$ ($p < 0.0001$).

Discussion:

Most questionnaires used to assess communication skills have been designed not specifically for this purpose especially not for nursing students and sufficient information about reliability and validity of these instruments are unavailable. Some questionnaires are the researcher made that in such cases, necessary knowledge and certainty are not provided considering tool credit quality and its evaluation (Vakili *et al*, 2012). So, this study is an innovation because of designing and justifying "nursing students' communication skills" questionnaire.

The tool has been designed based on justifying process by utilization of target group views and considerable experts. Considering brevity, simplicity, eloquence and observance of a logical sequence of items are worth aspects of this tool. All items and titles of the domains were chosen based on important issues in psychological and communicative sciences. In this research, also, calculated Cronbach's Alpha coefficients for each factor and the whole questionnaire indicated high coefficient and, besides, internal consistency and questionnaire stability were confirmed.

Considering communication skills measurement in nursing, we can point to Takahashi *et al.* (2006) that have studied the tool's validity and reliability to provide new and easy way to measure communication skills as self-assessment or evaluation by the patient's family. Takahashi *et al.* [15] divided 29 items through factor analysis to 3 categories including general communication skills (6 items), interaction communication skills (17 items) and assertive skills (6 items) based on content validity process. Factor analysis results indicated that designed tools can predict changes up to 63% and has 0.91 stability, calculating Cronbach's Alpha coefficient. Although some statements of the questionnaire are, probably, not applicable because of the cultural mismatch, however at this study, the researchers offered complete and accurate information to determine the validity and reliability of their own designed instruments. Contents of item factors of general communication skills of the mentioned questionnaire are consistent with item factors of verbal & nonverbal communication skills in this questionnaire and in the same way, the item factors of interaction skills with item factors of respect to the client.

Another study about designing & justifying the communication skills questionnaire is Vakili *et al.* [16] study in which a questionnaire of the interpersonal communication skills for health agents has been designed and justified. In this study the items were classified in 7 factors of general communication skills and 6 factors of private communication skills. Reliability was reported 0.91, calculated by Cronbach's Alpha coefficient. The mentioned tool can predict 68.5% of changes of the whole communication skills. Contents of general communication skills of Vakili's questionnaire are, also, consistent with verbal & nonverbal communication skills of the present questionnaire.

Engelberg *et al.* [5] has designed and justified a questionnaire including 13 items to measure communication skills in care of COPD patients and hospitalized elderly people in nursing homes, in which the items of communication are consistent, according to the purposes, with this questionnaire.

Since the questionnaire relies on general skills for communicating with a patient, investigation of the possibility of the use of this tool for another medical group, undertaking the duty to the patient, is suggested.

Table 2: The rotated matrix factor analysis-discovery of nursing students' communicative skills questionnaire.

| No. | Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|-----|---|----------|----------|----------|----------|----------|
| 1 | I begin the communication with saying hello and greetings. | - | - | 0.357 | - | - |
| 2 | I introduce myself to the client at the start of communication. | - | - | - | 0.716 | - |
| 3 | I call the client in full name and respectfully. | - | - | 0.569 | 0.452 | - |
| 4 | I explain to the client's family the goal and reason for establishing the communication | - | - | - | 0.731 | - |
| 5 | I have to speak firmly with the client so that he/she listens to my words. | - | - | - | 0.586 | - |
| 6 | During communication, I encourage the client to express his/her problems. | - | 0.347 | - | 0.520 | - |
| 7 | I inform the client of my understanding by showing verbal or non-verbal responses. | - | - | 0.645 | - | - |
| 8 | I hesitate after responding and give the client time to show reaction to my response. | 0.323 | - | 0.321 | - | 0.408 |
| 9 | At the end of the communication, I try to convey a positive and happy feeling. | - | 0.413 | 0.365 | - | - |
| 10 | At the end of communication, I give the client time to pose his/her probable questions. | - | 0.441 | - | 0.340 | 0.435 |
| 11 | At the end of communication, I ask for the patient's view and feelings | - | 0.351 | - | 0.448 | 0.498 |
| 12 | To confirm, admire and praise, I use verbal reinforcements such as well-done, good, great, etc. | - | 0.355 | - | - | 0.342 |
| 13 | During communication with the client, I try to avoid using sarcastic or threatening or humiliating words. | - | - | 0.662 | - | - |
| 14 | To emphasize my speech, I use general words like never, not at all, etc. | - | - | 0.363 | - | 0.594 |
| 15 | I try to use words and expressions understandable for the client. | - | - | 0.658 | - | - |
| 16 | When I know what the client is going to say, I don't wait for his/her speech to be completed and respond immediately. | - | - | - | - | 0.726 |
| 17 | I tidy my clothes and appearance before starting communication. | - | 0.663 | - | - | - |
| 18 | I maintain a suitable eye contact while communicating. | - | 0.757 | - | - | - |
| 19 | To convey a message, I use appropriate body gestures or facial expressions. | - | 0.684 | - | - | - |
| 20 | While communicating with the client, I maintain the adequate distance (from 30 to 100 cm.). | 0.525 | - | - | - | - |
| 21 | I avoid rough and coarse language. | 0.543 | - | - | 0.337 | - |
| 22 | While communicating with the client, I always stay calm. | 0.660 | - | 0.358 | - | - |
| 23 | While communicating with the client, I observe rules regarding polite non-verbal behaviors (such as shaking hands, manner of sitting, standing, entering and leaving the room, etc.). | 0.568 | - | 0.373 | - | - |
| 24 | I change the intonation and rhythm of my speech in accordance with the client. | 0.430 | - | - | - | - |
| 25 | I present a situation-dependent facial expression (happiness, smiling, etc.). | 0.711 | - | - | - | - |
| 26 | I re-state the client's words in my own words according to my understanding. | 0.563 | 0.447 | - | - | - |
| 27 | I use my verbal and non-verbal messages to show I am listening to the client's speech (by saying aha, yeah, or nodding). | 0.669 | 0.335 | - | - | - |
| 28 | Even if a subject is not important for me, I pretend that I am listening. | 0.570 | - | - | - | - |

Conclusion:

The designed questionnaire has the appropriate validity and reliability to be used for assessing nursing students' communication skills in the studied society.

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