Research Paper: Designing and Psychometric Assessing of Physician-Patient Communication Skills Tool

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ABSTRACT

Background: Assessment of physicians' communication skills with patients is essential to ensure effective treatment. Achieving such a goal requires the use of a valid, native, and culturally-based tool. This study aimed to design a physician-patient communication skills assessment tool and evaluate its validity and reliability among the medical students of Guilan University of Medical Sciences, Rasht City, Iran.

Methods: In this cross-sectional, descriptive, and analytical study, out of 400 medical students (interns), 300 were selected by a stratified random sampling method. The initial tool with 30 items was evaluated by calculating the item impact index in the target group. Also, its ratio and content validity indexes were assessed by 10 experts' views and factor analysis. The reliability of the research tool was confirmed by assessing the internal consistency by calculating the Cronbach alpha value.

Results: Out of the 30 initial items, after calculating the item impact score index of higher than 1.5, the content validity ratio greater than 0.51, the content validity index higher than 0.79, and exploratory factor analysis,18 items remained and were considered suitable for the physician-patient communication skills assessment tool. Then, these variables were loaded considering the amount of special value greater than 1 under four factors. The reliability of the research tool was confirmed by calculating the Cronbach alpha coefficient of 0.92. The instrument was also confirmed by confirmatory factor analysis regarding its appropriate fitness indices. This study provided a proper and native instrument with 18 valid and reliable items for the assessment of physician-patient communication skills in medical students.

Conclusion: The results of this study could be of interest to researchers in evaluating physician-patient communication skills in other medical sciences universities of Iran.

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1. Introduction

Communication skills have been a key component of medical professional skills [1] and proper communication affects the performance of medical staff [2]. Regardless of a physician's academic knowledge, having good communication is a very critical factor in helping with patients' problems [3]. Effective communication between physicians and patients is a key clinical skill [4]. Good communication with patients is critical in achieving the right diagnosis and improvement of clinical outcomes. Communication skills, like other medical capabilities, must be respected and practiced [5]. Communication in human life is so crucial that some authorities believe the human growth, personal injury, and human development are all formed as a result of the communication process [6].

Successful application of communication skills has implications such as better diagnosis, reduced patient stress [7], fewer medical errors, improved disease progress [8], and higher physician's and patient's satisfaction [9]. Many experts consider the ability of proper communication as the most important feature of health care workers [10]. McGillton believed that communication skills are an important part of medical practice and effective communication was the basis for improving the quality of medical care [11]. To optimally deliver their professional services, medical students should be able to communicate well with their patients. On the other hand, poor communication skills have detrimental effects on various physical, psychological, social, and economic dimensions of health care [12].

Studies of complaints from medical teams show that many of these complaints are not related to the scientific and operational skills but rather to communication skills with the patient. In other words, the communication error causes most of the complaints and medical violations [13]. Parry argued for the importance of teaching these skills as communicative process training that leads to the improvement of expected outcomes in patient care [14].

Regarding the physician-patient communication skills, several tools have been used throughout the world, including the Calgary-Cambridge physician-patient communication skills assessment tool, which is a framework for accurate and exact physician-patient communication training programs. It has been introduced as a starting point for the program of researchers, facilitators, and learners at all levels and applicable to researchers. However, it is a non-Iranian [4, 15]. Patel Cole also focused on physician-patient communication skills tools based on the Cambridge Calgary instrument model and this is also a non-native tool [5].

Also, the World Health Organization has presented a model for physician-patient communication skills, which is a three-part checklist and assesses the level of physician-patient communication skills by the observer, including five domains (interpersonal communication skills, data collection skills, patient information skills, and patient education skills) and 42 items on communication skills assessment [16].

Considering what was said, the assessment of physicians' communication skills with patients is necessary to ensure effective care. According to the reports of medical students, as future physicians, appropriate tools for assessing the communication skills of this group are not available. On the other hand, because of the different cultural context of Guilan Province, the present study aimed to design a physician-patient communication skills assessment tool for Guilan medical students and psychometrically evaluate it.

2. Methods

In this cross-sectional, descriptive, and analytical study, the study population consisted of interns of Guilan University of Medical Sciences in Rasht City, Iran. The sample size was found 300 according to factor analysis and the number of variables (30 variables). The sampling method was stratified random.

The present study was an instrumentalization and localization study and the study procedure had the following stages. At first, after an extensive review of educational texts, models, and tools endorsed by accredited internal and external academic institutions and universities and reviewing the previous related studies and consultation with experts, two instruments which had already been translated into Persian i.e., the physician-patient communication skills measuring instrument with 25 items (Calgary-Cambridge) [4] and the 30-item interpersonal communication skills questionnaire for health interfaces standardized by Vakili et al. [17] were considered suitable for the present study.

In the next step, by consulting with a panel of experts, including specialized medical training experts (n=2), health education experts (n=2), psychiatrists (n=2), a clinical psychologist (n=1), a rheumatology subspecialist (n=1), an internist (n=1), and a forensic specialist (n=1), the required questions to design the new questionnaire

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were selected and after the consensus of the panel of experts and using nominal group method, the priority of the specific questions were determined. Next, 30 items were designed and grouped into seven main categories, and according to the content of items under the headings of communication skills, they were named as follows: session start, data collection, understanding the patient's perspective, structuring the interview, establishing communication, providing explanations, and planning, and the session end. The face and content validity and reliability of the instrument were then evaluated as follows.

Face validity determination

To determine the face validity of the research instrument, the main focus was on the target group. For this purpose, at first 10 samples from the population of the target group (clinical medical students of Guilan University of Medical Sciences) were given the questionnaire and after collecting the completed questionnaires, the face validity of the research instrument was assessed by two methods of quantitative (item impact index score) and qualitative. At this stage, a 30-item instrument was obtained. In this study, the Content Validity Ratio (CVR) and the Content Validity Index (CVI) for the items were obtained > 0.8, and from 0.9-1, respectively.

Content validation by the expert panel

To determine the content validity of the research tool, the related questionnaire was given to 10 experts with specialty in medical education (n=2), health education (n=2), psychiatrist (n=2), clinical psychology (n=1), rheumatology (n=1), internal medicine specialist (n=1) and forensic specialist (n=1) and the content validation of the instrument was obtained via qualitative and quantitative manners (content validity ratio and content validity index). In the next step, the validity of the instrument structure was investigated by exploratory and confirmatory factor analysis.

Structural validity determination by exploratory factor analysis

Factor analysis is one of the most validated methods for structure validation, especially in tools that measure psychological characteristics [18]. It tries to identify the underlying variables or factors to explain the pattern of correlation between the observed variables. In the present study, given that the investigation tool had been designed by the researchers for the first time, exploratory factor analysis was used to group items that have an intrinsic correlation. This type of factor analysis is often used in the early stages of research instrument design.

Before performing the principal components analysis, the fit of the data for factor analysis was assessed. The operable matrix should contain some relatively high correlations. Takahashi et al. showed that if none of the correlations reaches 0.3, the use of factor analysis would be in doubt [19]. The correlation values greater than 0.4 were considered in this study. First, the data were analyzed for normality to adopt an appropriate exploratory factor analysis. Finally, the structure validity was confirmed by confirmatory factor analysis.

Confirmation of structure validation via confirmatory factor analysis

To confirm the measurement tool derived from the exploratory factor analysis step and to present a model for measuring the physician-patient communication skills customized to use in Guilan region, we used the confirmatory factor analysis method via the maximum likelihood method. To perform the confirmatory factor analysis, after entering data in SPSS version 18 and importing it into LISREL8.80 software, the measurement model was obtained. After validating the instrument, the reliability of the instrument was assessed.

Determining reliability (internal cohesion) of physician-patient communication skills in medical students

One of the most common methods of measuring the reliability in questionnaire questions is the Cronbach alpha coefficient, which is based on the internal consistency of the scale within the questionnaire. In this regard, the Cronbach alpha internal consistency was used to determine the reliability of data collection tools. The reason for using the Cronbach alpha method was that since the concepts tested in this study, namely physician-patient communication skills, are considered to be a state rather than a feature, so variable states of these concepts may be observed over time [20, 21].

3. Results

After assessing the face and content validity of the mentioned tool, we analyzed it via exploratory and confirmatory factor methods for its localization process. For this purpose, the Kolmogorov-Smirnov test showed that data distribution was not normal, so in factor analysis using the unweighted least square method and with varimax rotation, factors were identified and the loading rate of the

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Table 1. KMO test and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's test of Sphericity Approx. Chi-Square	df	Sig
0.847	3662.658	435	0 .000

variables on each factor was evaluated. Based on the Kaiser-Meyer-Olkin test result (KMO=0.84) and Bartlett's test of sphericity (P=0.000), the sample size adequacy was confirmed for exploratory factor analysis (Table 1).

In exploratory factor analysis, four factors with a cumulative variance of 41.19% (all four of which had a special value above 1) were able to detect physician-patient communication skills changes in the research population i.e., medical students of Guilan University of Medical Sciences (Table 2). Regarding the number of variables loaded under the relevant factors, four factors remained with 18 items:

Table 2. Exploratory factor analysis results for physician-patient communication skills questionnaire

Factor	Special Value	Explained Variance	The Cronbach Alpha Coefficient	The Relevant Variable	Loading Rate
Introducing and building trust	8.12	27.09	0.84	29. I will make the necessary appointments with the patient regarding future actions	0.672
				28. I encourage the patient to ask if they have more questions or requests	0.666
				24. I provide the patient with accurate, adequate, and appropriate information	0.656
				27. I do things like sorting, repeating, and evaluating the patient's understanding to help them remember and understand the information correctly	0.567
				30- I will conclude the meeting with a summary	0.533
				2. I introduce myself and explain my role	0.525
				25. I give proper feedback when appropriate and timely	0.518
Interacting with patient	2.66	8.87	0.77	5. I will be honest, confidential in communicating with the patient	0.600
				11. I avoid showing restlessness and nervousness	0.589
				10- I use intelligible questions and recommendations	0.579
				12. I review the patient's beliefs, concerns, and expectations	0.546
				19. I'll treat the patient with respect	0.516
				20. I do not judge the patient's views and feelings	0.516
Gathering information	1.99	6.33	0.71	7. I facilitate patient responses with appropriate verbal and nonverbal techniques	0.684
				6. I start off with open questions and move on to closed questions appropriately	0.617
				4. I encourage the patient to tell the story of their problems in their own language	0.528
Empathy with the patient	1.59	5.31	0.72	22. I show my empathy to the patient and provide the necessary support	0.779
				23. I will have appropriate non-verbal relationships with the patient	0.696

Table 3. Confirmatory factor analysis of fit indicators for physician-patient communication skills assessment tool

Chi-Square	Degree of Freedom	Goodness of Fit Index	Comparative Fit Index	Normed Fit Index	Non-normed Fit Index	Root Mean Square Error of Approximation	Standardized Root Mean Residual
432	129	0.91	0.92	0.89	0.90	0.08	0.07

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The first factor (introduction and trust-building) loaded with seven items with the highest impact on physician communication skills with the patient, the second factor (patient interaction) with six items under load, the third factor (data collection) consisting of three items, and the fourth factor (patient perception) including two loaded items. It should be noted that these four factors were selected with respect to their special value of above 1. Also, and for the selection of items (questions) factor loadings above 0.4 were accepted. Obviously, in the factor analysis after rotation, 12 items were not sufficiently loaded and eliminated. The validated questionnaire of physician-patient communication skills includes 18 items in the exploratory factor analysis stage at Guilan University of Medical Sciences. Therefore, in exploratory factor analysis, the four main components were identified in the order of importance (Table 2):

1. Introducing and trust-building with 7 items and variance of 27.09% and special value of 8.12.

2. Interaction with the patient with 6 items and variance of 8.87% and special value of 2.66.

3. Data collection with 3 items and a variance of 6.33% and a special value of 1.99.

4. Empathy with the patient with 2 items and a variance of 5.31% and a special value of 1.59.

The tool obtained from the exploratory stage (four factors with 18 items) was fit to the data of the research samples and finally, the proposed measurement model was obtained as shown in Figure 1. To select the most appropriate measurement model, we used t-statistic, factor loading rate, and correction and fit indices, in the way that the comparative fit index and goodness of fit indexes were equal to or greater than 0.90 indicating a good fit. Besides, the ratio of the Chi-square to the degree of freedom where the value of this index is less than 4 or 5 is adequate, and the root mean square residual and the root mean square error of approximation less than 0.8 indicates a good fit. Also, the normalized index of fitness was used of which a value higher than 0.9 is acceptable. The results of these indices are presented in Table 3.

As seen in Figure 1, the identified factors in the exploratory factor analysis stage were confirmed by confirmatory factor analysis, and four factors were obtained in the analysis:

The first factor with 7 items (between 0.58 to 0.77), the second factor with 6 items (between 0.50 to 0.73), the third factor with 3 items (between 0.41 to 0.83), and the fourth factor with two items (0.61 to 0.93) were loaded. According to the fit indices in Table 3, this model of measuring was considered suitable for the measurement of physician communication skills with local patients at Guilan University of Medical Sciences.

The Cronbach alpha coefficient was used to determine the internal consistency and confirming the reliability of the tool. The internal consistency between the first factor items was 84%, among the second factor items 77%, among the third factor items 71%, and among the fourth factor items 72% (Table 2).

4. Discussion

In order to evaluate medical students' communication skills when no suitable localized tool is available and considering the different cultural context of Guilan Province and the necessity for physicians' special attention to Guilani patients, this study was carried out to design a physician-patient communication skills assessment tool and psychometrically evaluate it. Finally, we produced an 18-item physician-patient communication skills assessment tool localized at Guilan University of Medical Sciences.

These 18 items include four factors: introducing and trusting with 7 items; patient interaction with 6 items; data collection with 3 items; and empathy with the patient with 2 items. The important and noteworthy results of this study are the remarkable similarity of this research tool with the other designed tools of physician-patient communication in factors such as the way of collecting information, building trust and building communication, and planning and interaction with patients. These factors are common in most standard physician-patient communication tools such as 'physician-patient communication skills Calgary Cambridge tool' with 25 items [4], the
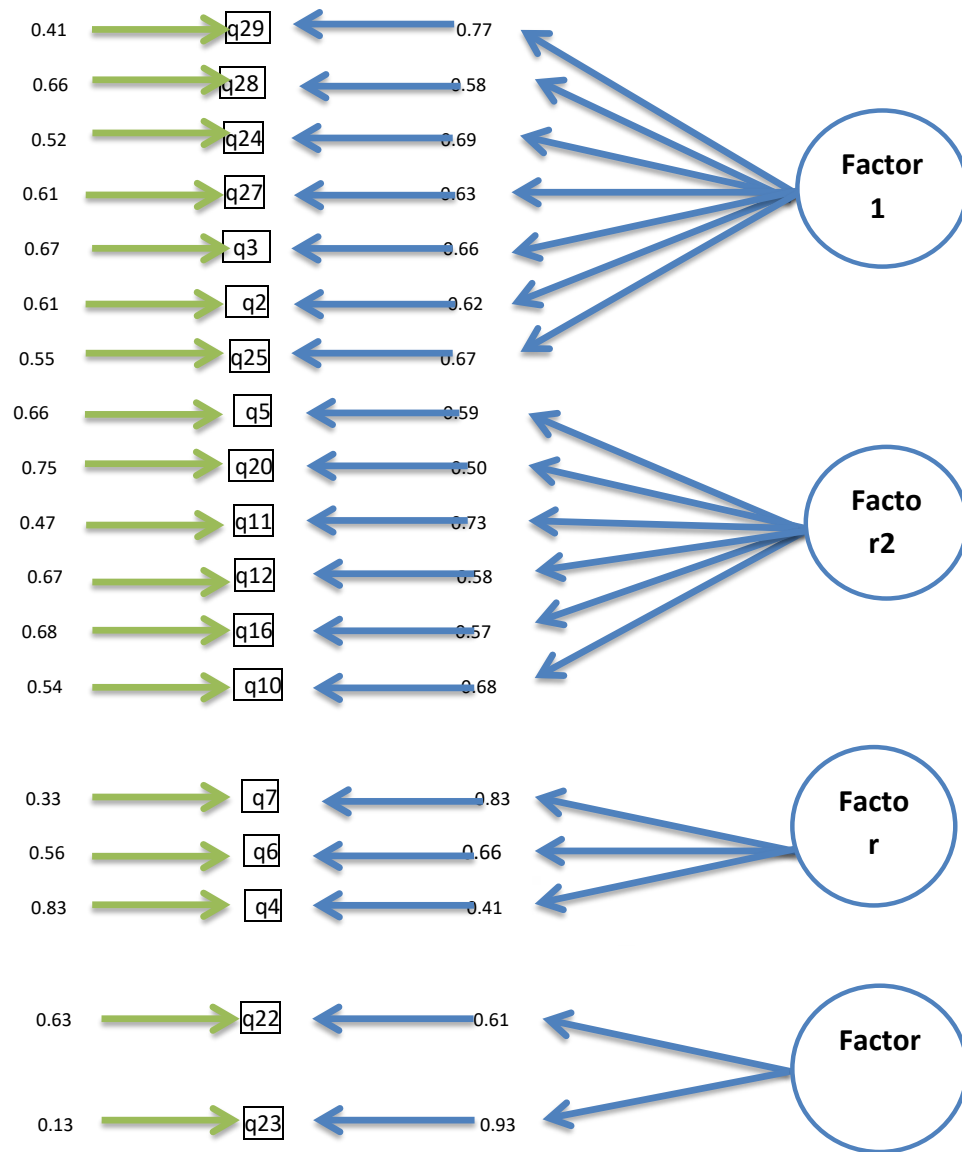
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Figure 1. Physician-patient communication skills fitting measurement model at Guilan University of Medical Sciences

WHO 42-item tool [16], Takahashi 29-item tool [19], Atari Moghaddam et al. 21-item tool [3], 30-item tool of communication skills of the health communicators of Vakili et al. [17], nursing students' communication skills tool with psychiatric patients of Namdar et al. [22] and the 15-item tool of Gregory Makoul and associates [23].

Regarding the importance of the tool designing process, we now briefly describe the process of tool designing for communication skills in Iran and in the world and compared them with the present tool designing process.

Vakili et al. study aimed to design and psychometrically evaluate an interpersonal communication skills tool among the Zanjan health communicators' popula-

tion. The researchers described enough data upon the process of evaluation of the validity and reliability of the tool and psychometric process by utilization of the opinions of the target group and a significant number of experts. Ultimately they produced a tool with 30 items that would assure the reader of the quality of the designed tool's credibility and the way of evaluating it. However, despite the tool's positive points and good proof in standardization, it is only applicable in health communicators' groups and other personnel of the same level and it could not be generalized to other groups [17].

In another study by Hossein Chari and Fadakar [24] using a revised version of the communication skills test (Revised by Queen dom), aimed to examine the impact of

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the university on communication skills. The tool was first translated into Persian and after using a panel of three experts, the content validity of the variables was considered in accordance with Iranian culture. Then, using a confirmatory analysis factor and calculation of the Cronbach alpha, the validity and reliability of the above translated tools were confirmed. It seems that the ambiguity in the calculation of the ratio and content validity index and having three members of the expert panel are the limitations of this study. But this study evaluated the validity and reliability of the tool based on the psychometric process.

In a study by Namdar et al. [22] to assess nursing students' communication skills with mental patients, first by integrating the skill tool communications of Takahashi et al. [19] and Kjellberg et al. [25], a 43-item checklist was prepared. Then they determined the validity of the tool in three domains of general, verbal, and, nonverbal skills. Also, the use of the non-Iranian items which led to the failure of the provision of the necessary information regarding instrument validity measurement would be considered as a limitation for this tool.

In another study by Zighami Mohammadi and Haghighi to investigate the relationship between applying communication skills with physician-nurse collaboration, several non-Iranian questionnaires were used and the content validity measurement was used to determine the validity of the tool. Although the information on how to conduct validity has not been mentioned, the necessary information is provided on how to determine the reliability of the research instrument [26].

One of the relatively common features of other Iranian studies is that, based on the purpose of the study, researchers designed study tools without providing sufficient information on its validity. For example, two studies were conducted by Managheb et al. to evaluate the effect of communication skills training through video feedback on interns' clinical ability and also to evaluate the effect of communication skills training on knowledge, attitude, and practice of family physicians. In the first study, a researcher-made checklist and in the second study a questionnaire was used and the researchers in both studies without providing details of the method of work stated that the validity and reliability of the research tool had been determined by using a three-member panel of experts and calculation of the Cronbach alpha value [27, 28].

In the study of Aghabarri et al., the relevant information upon the process of determining the validity of the content of the research tool has not been mentioned, but the determination of the validity and reliability of the tool has been described [29].

Also, in the study of Atari Moghaddam et al, in which a 21-item questionnaire was used to evaluate the effect of physician-patient communication skills on medical students, nothing has been said about the method of determining the validity and reliability of the research instrument [3].

But in foreign studies, unlike the Iranian ones, the researcher often makes the reader aware and sure of the quality of the validity of the instrument used, either by citing the source related to the standardization of the instrument used or by providing details related to its validity and reliability assessment process. For example, Gregory Makoul et al. aimed to design and test a physician-patient communication tool to measure the patient's view of physician communication skills.

In designing a physician-patient psychiatric communication assessment tool process, after reviewing approved communication skills training models and tools from accredited scientific institutions such as SEGUE and the four habits model and the satisfaction questionnaire of the American Board of Internal Medicine (ABIM) and the Cambridge Calgary Toolkit and evaluation of the Client Health Systems and Providers (CAHPS), a 30-item list of physician-patient communication tasks was provided and after content validity, and using exploratory factor analysis, a 15-item communicative assessment tool was obtained to measure the patient's deduction of the interpersonal performance and physician communication skills. The reliability of the instrument in this study was determined by calculating the Cronbach alpha above 96%. Researchers in this study have provided complete and clear information on how to determine the validity and reliability of their designed tools [23].

Also, in Takahashi et al. study, the validity and reliability of the instrument were investigated to present a new and easy method for measuring communication skills, in a way that is applicable by the individual or their family members. In this study, 29 items were formulated based on the content validity process, and by using factor analysis, they were divided into three factors of general communication skills, cooperative skills, and expressive skills. Factor analysis results showed that the designed tool can predict 63.4% of changes. The reliability of the tool was also confirmed with a Cronbach alpha of 91% [19].

In this study, the researchers provided complete and accurate information about the method used to determine the

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validity and reliability of their designed tools. Therefore, it seems that even if the research instrument is provided with valid and reliable reliability, due to the lack of information related to the evaluation process, the reader may not gain the necessary confidence or knowledge about the quality of the research instrument. Given the direct relationship between the validity of the findings of each study and the validity of the research instrument, it would be necessary for researchers to pay more attention to this issue.

In the present study, along with the design of a valid tool for evaluating physician-patient communication skills, we tried to give the readers the awareness and reassurance needed by providing sufficient information on the process of the assessment of the validity and reliability of the tool. Designing this tool with 18 variables for the first time in our country, based on the psychometric process, taking advantage of the opinions of the target group, and a considerable number of experts, as well as attention to maintaining simplicity and cleanliness, are the positive points of this tool. The results of this study show that the designed tool has the necessary strength and validity to measure communication skills in the studied community.

5. Conclusion

The results of the present study on the communication showed the high strength of the design of the tool, which could evaluate the key factors of communication skills at a high level and to include the main items of communication skills. With the 18-item tool of the present study, the medical education system can evaluate medical students' communication skills with the patients. Certainly, enhancing communication skills is one of the essential skills necessary for physician's contact with the patient. With a stronger communication with patients, physicians can collect sufficient information about the problems and sufferings of their patients which leads to reaching the diagnosis and appropriate treatment. These are the expectations of the therapy and the improvement of the clinical outcomes that patients ultimately seek from their physicians.

But the major and obvious difference between the tool and some of the related designed tools is the removal of the items related to the factors of starting the session, understanding the patient's perspective, and structuring the interview. However, some items of which are included as greetings with the patient, paying attention to appearances and uniforms during communication with the patient, maintaining the structure of the interview, scheduling the interview components, understanding the patient's position, paying attention to the patient's verbal and nonverbal cues and interrupting the patient's speech.

Most of which are about compliance with the rules and regulations of the workplace, the necessity of communication skills training, and monitoring the evaluation of these skills in the medical education system, which are believed to be important in some way. These items could, in some cases, greatly influence the process of physician-patient communication, diagnosis, and patients' treatment. They would have consequences such as increased medical errors, a decrease in the course of the disease, stress increase, and a decrease in the patients' satisfaction.

According to what was discussed, physician-patient communication skills training is a necessity for medical students and should be given special consideration in educational environments and medical education centers. According to the results of the present study, paying attention to teaching physician communication and consulting skills with the patient is important for medical students as well as devoting sufficient time to the patient visit and wearing a uniform during the visit. However, the lack of access to similar studies at the national level and the lack of evaluation of the tool mentioned in other health care providers to ensure of its generalizability can be one of the limitations of the study.

Although other research limitations including the mental status of students as well as some crowded major hospital wards sometimes influenced the process of completing the questionnaire, with regard to the type of study they were inevitable. Given that the tool obtained in the present study was based on self-report units, the tendency for desirability and bias in the recall are the problems of this type of data collection. Because the physician's communication with the patient is a behavior, it is recommended that some research be conducted to provide a checklist tool for behavior observation. Also, the tool of this study is not necessarily flawless or appropriate for other target groups. Considering the necessity of obtaining a valid national instrument for measuring communication skills and evaluating the effectiveness of communication training programs, the authors emphasize the need to repeat the study in other target groups. The results of this study could be of interest to researchers in other educational centers and medical universities of Iran in achieving.

Ethical Considerations

Compliance with ethical guidelines

Ethical approval for this article has been registered under license No. 99/D/300/8665.

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