



Physiotherapist Communication Skills Questionnaire (Polish Version): A New Scale for Assessing the Communication Skills of Physiotherapists and Physiotherapy Students

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
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Abstract

Objective: Optimal healthcare delivery relies on strong communication skills, which ideally are introduced in physiotherapy programs and honed with continuing vocational education. Existing general social skills tests do not have robust enough communication components to assess the communication skills of health professionals in clinical settings. The aim of the present study is to validate a newly created communicative skills questionnaire tailored to physiotherapists and physiotherapy students. **Methods:** In the first stage, 188 students aged 17–30 years ($M=19.95$; $SD=1.510$), including 80 males from the first ($n=110$) and second ($n=78$) years of undergraduate physiotherapy studies at Józef Piłsudski University of Physical Education in Warsaw (AWF), were included in the study to test reliability and determine the factor structure of the *Physiotherapist Communication Skills Questionnaire* being created (PCS-Q -17). In the second stage of the research, 109 physiotherapy students, including 47 males and 62 females aged 18–24 years ($M=20.68$; $SD=1.471$), were surveyed to determine test validity by establishing relationships with the results of questionnaires examining general social skills (the *Social Competence Questionnaire*, SCQ) and emotional intelligence (the *Emotional Intelligence Questionnaire INTE*).

Results: Based on the analysis of the communication process between the physiotherapist and the client, 17 statements were created describing behaviors that are a manifestation of communication skills in the therapeutic relationship. When assessing the reliability of items, two items with poor correlations with the overall score were removed. Based on the factor analysis using the principal component method with Varimax rotation and Kaiser normalization, three factors explaining 60.68% of the common variance were extracted. The final version of the PCS-Q contains 15 items with a five-point response format forming three scales: *Management Skills*, *Assertiveness*, and *Relationship-Building Skills*, with Cronbach alpha for the individual scales of 0.876, 0.808, and 0.739, respectively, and $\alpha = 0.908$ for the whole tool. The validity of the scale was confirmed by the expected correlations with the SCQ and INTE scales.

Conclusion: The Polish version of the *Physiotherapist Communication Skills Questionnaire* (PCS-Q) was found to be a reliable and valid tool for measuring the communication skills with the patient in clinical situations revealed by physiotherapists and physiotherapy students. It allows for assessing patient management, assertiveness, and relationship-building. At the individual level, the PCS-Q can be used as a self-assessment scale, or it can be used corporately by external raters to estimate skills via observation.

Keywords: survey, patient, interaction, research, education

Introduction

Physiotherapy has seen significant changes over the past 25 years, resulting in its autonomy among other health professions. In clinical settings, physiotherapists face not only medical challenges, but also have to adapt to changing circumstances, transfer knowledge, generate new solutions, improve performance, and meet new challenges. Therefore, they need not only medical knowledge and physiotherapy skills, but also social skills specific to their profession and clinical environment (Fraser et al., 2001; Ytreberg et al. 2015).

The specificity of the relationships between patients and physiotherapists requires specific social skills, including communication skills (Stovkov et al., 2017; Walicka-Cupryś, 2017; Ezenwankwoa, 2019; Silverman et al. 2018). In our understanding, the term “social competences” has a broader meaning and refers to many competences revealed in social situations. The term “communication skills” has a much narrower meaning; these skills are revealed in the process of communicating with other people. There is a strong body of evidence indicating that communication skills during consultations are important, as they are associated with patient satisfaction and adherence to recommendations, (Lonsdale et al., 2017; Tsvitman et al., 2021, Wuensch et al., 2022) and can influence clinical outcomes such as pain, functional capacity, or mood (Pincus et al., 2013, Tsvitman et al., 2021, Wuensch et al., 2022). The importance of communicative skills was emphasized within a model of basic social competences (Riggo, 1986) that includes sending, receiving, and controlling verbal messages and, analogously, sending, receiving, and controlling non-verbal messages.

Polish physiotherapists show a high level of social skills (Zborniak-Sobczak et al., 2014; Walicka-Cupryś, 2017). The factor that seems to be critical to obtaining such high competences is the duration of their professional training. After a five-year Master’s degree, physiotherapists have a higher competence than those after a Bachelor’s degree (Walicka-Cupryś, 2017). This is likely due to the more extensive social training that naturally occurs during their studies and relationships with peers and lecturers. The training programs for physiotherapists in Poland include dedicated subjects that aim to expand social competence, including communication skills, and the development of communication skills is now an integral part of physiotherapists’ preparation for their profession. To assess communication skills and monitor the progress of their development, scales are needed to measure the competences revealed in occupational settings.

There are many concepts of social competence in the literature. Some authors include abilities in their scope, most often social and emotional intelligence (Czechowski

et al., 2015), while others emphasize the cognitive aspects that underlie behavior (Forbes et al., 2018). Matczak (2011) emphasized that social skills are acquired by the individual through social training. The effectiveness and type of social training depend on many intrapersonal factors, including social and emotional intelligence, temperament, and the personality of the individual, as well as interpersonal factors, i.e. intended and unintended environmental interactions. Consequently, social skills are formed in the course of different social experiences: natural, resulting from establishing contacts with other people, educational settings and professional experiences (Minney et al. 2019; Martowska 2012). In the training of medical professionals, special attention is also paid to these skills, and the Calgary-Cambridge model of patient communication (Silverman, et al., 2018) defines the necessary communication skills in medical relationships and is based on the aforementioned communication skills. It is also possible to develop communication skills using active methods such as simulating conversations with customers, modeling correct behavior, and giving feedback (Reith-Hall et al., 2019). Assessment of training of the skills’ effectiveness requires a tool that measures communication skills specific to physiotherapists.

Communication skills can be developed during academic education and professional work. Assessing the effectiveness of activities aimed at such development requires a scale for monitoring changes in the communication skills of physiotherapy students and physiotherapists. The aim of the study was to create a questionnaire to measure the communication skills revealed by a physiotherapist or physiotherapy student in the relationship with a patient.

Stage I – the Physiotherapist Communication Skills Questionnaire-17 (PCS-Q-17)

Methods

Theoretical basis for the PCS-Q-17 development

In the literature, there is an ongoing debate about whether social skills are generic or made up of many specific components. Many authors believe that social skills are a set of many components of specific social skills that do not have a hierarchical structure but are complex in nature. (Schneider, Ackerman, and Kanfer 1996; Matczak, 2011; Forbes et al., 2018). Real-life social situations require multiple social skills, not one abstracted from others (unrelated), such as only receiving or transmitting information, or setting boundaries. Social skills are usually determined by a combination of many elementary skills.

We adopted the model of the classification of difficult social situations developed by Argyle (1991), previously used by Matczak (2011) in the development of a questionnaire to measure general i.e. non-situation-specific social skills as a theoretical basis for the tool we have developed. According to Matczak (2011), social competence should be viewed as a set of skills that determine the effectiveness of coping with particular types of social situations. We also assume that social skills are specific to a certain type of situation and that each qualitatively different contact requires appropriate skills (Martowska 2012). A person who effectively handles public speaking is not necessarily equally effective in interpersonal situations involving intimate relationships (Andersen, 2004; Goleman, 1996).

We view physiotherapists' communication skills as a set of skills that determine the effectiveness of coping with clinical social situations, acquired by the individual in the course of social training. The understanding of social skills, including communication skills, determines the way they are measured. To measure social skills, one should use tools that measure the effectiveness of functioning in real social situations. Examples of such tools include observational techniques (e.g., scales referring to the perceptions of people who know the subjects) as well as self-report questionnaires (Lorr, Youniss and Stefic 1991, Karpinski et al., 2022; Riggo, 1989). As emphasized by Matczak (2011), the diagnostic factor here is the respondent's degree of satisfaction with his or her social (in our case, communication) behavior.

General social skills scales do not have a robust or sensitive enough communication component to assess the communication skills of health professionals in clinical settings. Communication skills can be assessed by analyzing video recordings (Fukkink et al., 2011; Bellier et al., 2023) or the results of questionnaires completed by patients (Ha et al., 2010; Traeger et al., 2015; Makoul et al., 2007). Some scales are even dedicated to specific patient groups, such as the *Com-On Questionnaire*, which allows cancer patients to assess physicians' communication skills (Wuenssch et al., 2022) or the *Consultation-based Reassurance Questionnaire*, designed to assess physiotherapists' communication skills during consultations with patients with back pain (Holt et al. 2016). Self-report scales exist to measure communication skills in various medical professions: nurses (Leal-Costa et al., 2019), medical students (Gärtner et al., 2021), and physicians (Makoul, 2001), including physicians in specialty practice (Engelberg et al., 2006). We did not find similar tools dedicated to physiotherapists in the literature. In our opinion, there is an urgent need to develop a tool to assess the communication skills of physiotherapists. The aim of the present study is to validate a novel communicative skills questionnaire tailored to physiotherapists and physiotherapy students.

Construction of PCS-Q-17

In the literature on the subject, we did not find a model of communication between a physiotherapist and a patient that could provide a theoretical basis for the tool we were creating. For this reason, we referred to the clinical experience of expert judges – active physiotherapists with many years of professional experience. The diagnostic items were prepared to take into account the situations in the physiotherapist's work involving direct interactions between the professional and the patient. The diagnostic statements included in the questionnaire were developed based on the analysis of the rehabilitation process and extremely valuable consultations with academic teachers who were professionally active physiotherapists teaching clinical classes with students as part of their studies at the Faculty of Rehabilitation.

Diagnostic items were in the form of descriptions of skills e.g., *I am able to help boost my patients' self-esteem in different ways* or specific behaviors e.g., *During the conversation, I use phrases like "you mean that...", "I understand that..."*.

The first version of the *Physiotherapist Communication Skills Questionnaire* (PCS-Q) was prepared in May 2020. It consisted of 17 statements on patient communication skills used in four areas distinguished by the opinions of expert judges (active physiotherapists who were academics providing clinical courses):

- in situations that require assertiveness (four statements):
 - *Even when I have an opposite opinion from that of the patient, I can tell the patient about it;*
 - *If I want something I care about during the work with the patient, I can ask for it;*
 - *In a situation where the patient fails to follow my instructions, I am able, without showing anger or resentment, to repeat the instruction and enforce it;*
 - *I can tell the patient that I like the way he or she exercises;*
- In situations of establishing rules of cooperation with the patient (four statements):
 - *I believe that I am responsible for implementing the principles in my patient group and in my individual work with patients;*
 - *I feel that I should make an effort to ensure that every patient knows the purpose of treatment;*
 - *I always ask the patient about their expectations of the therapeutic session;*
 - *I set tasks with the patient and then enforce them during the therapeutic session;*
- in guiding the patient through the therapy (four statements):
 - *I give space and time during exercises for freedom, making decisions, expressing expectations and the needs of the patient;*
 - *I inform the patient about the purpose of the session and its importance;*

- *When I intentionally give initiative to the patient, I am able to refrain from interfering with the patient's activity;*
- *I admit it when I make a mistake;*
- in situations requiring active listening (5 statements):
 - *During the conversation, I use phrases like “you mean that...”, “I understand that...”;*
 - *During the conversation, I give information to the interviewee/patient about how I perceive him or her: “I see that you like this solution”, “It seems to me that you are dissatisfied”;*
 - *During the conversation, I guide the interlocutor to the main themes, I summarize: “so far we have talked about ...”, “does this mean that ...”, “let's return to the main themes of our conversation”;*
 - *I am able to help boost my patients' self-esteem in different ways;*
 - *When I talk to the patient, I maintain eye contact with them.*

A five-point response format was adopted: *no, rather not, it's hard to say, rather yes, and yes*, scored from 1 to 5 points. The higher the score, the higher the level of communication skills.

The initial version of the tool was created in Polish, and all data presented in this article apply to this version. The Polish version will be available to potential users after the test manual is developed. An English version is also planned.

Reliability and Factor Structure

Respondents

According to the principles of constructing psychological tests (Hornowska, 2003), the assessment of psychometric properties should be carried out on the group

of people for whom the scale is intended. It is also recommended to examine 5 to 10 people for each test item. Following these principles, the first study of psychometric properties (reliability and factor structure) was conducted in October 2020 on a group of 188 students aged 17–30 years ($M=19.95$; $SD=1.510$), including 80 males from the first ($n=110$) and second ($n=78$) years of undergraduate physiotherapy studies at Józef Piłsudski University of Physical Education in Warsaw. The research was conducted during lectures with 1st and 2nd year physiotherapy students. The purpose and course of the research were explained and instructions were given on the voluntary nature of participation. Students completed declarations containing information on the research procedure. The questionnaires were coded. The research covered a total of 201 students. 188 fully completed questionnaires were qualified for analysis.

Data Analysis and Results

First, the reliability of the PCS-Q-17 was assessed by calculating Cronbach alpha coefficients. The reliability of the entire questionnaire was high at $\alpha = 0.904$. The coefficients of correlations between the scores of the individual items with the total score were then analyzed, as shown in Table 1. The item reliability threshold was set at 0.400, as suggested by Hornowska (2003). For two statements (*If I want something I care about during work with the patient I can ask for it* and *I admit it when I make a mistake*), the correlation coefficients were below 0.400 and their removal resulted in a slight increase in reliability. It was decided to remove them from the questionnaire. After excluding these two items, the reliability of the questionnaire was $\alpha = 0.908$.

Table 1. Correlation coefficients of individual statements of the PCS-Q-17 questionnaire with the total score

Statement	Item correlation	Cronbach's alpha after removal of items
1. Even when I have an opposite opinion from that of the patient, I can tell the patient about it	.485	.901
2. If I want something I care about during the work with the patient I can ask for it*	.313	.906
3. In a situation where the patient fails to follow my instructions I am able, without showing anger or resentment, to repeat the instruction and enforce it on him or her	.619	.897
4. I can tell the patient that I like the way he or she exercises	.666	.895
5. I believe that I am responsible for implementing the principles in my patient group and in my individual work with patients	.682	.894
6. I feel that I should make an effort to ensure that every patient knows the purpose of treatment	.603	.897
7. I always ask the patient about their expectations of the therapeutic session	.577	.898

Statement	Item correlation	Cronbach's alpha after removal of items
8. I set tasks with the patient and then enforce them during the therapeutic session	.701	.894
9. I give space and time during exercises for freedom, making decisions, expressing expectations and needs of the patient;	.655	.896
10. I inform the patient about the purpose of the session and its importance	.710	.893
11. When I intentionally give initiative to the patient, I am able to refrain from interfering with the patient's activity	.446	.902
12. I admit it when I make a mistake*	.323	.905
13. During the conversation, I use phrases like "you mean that...", "I understand that..."	.487	.901
14. During the conversation, I give information to the interviewee/patient about how I perceive him or her: "I see that you like this solution", "It seems to me that you are dissatisfied"	.495	.900
15. During the conversation, I guide the interlocutor to the main themes, I summarize: "so far we have talked about ...", "does this mean that ...", "let's return to the main themes of our conversation"	.559	.898
16. I am able to help boost my patients' self-esteem in different ways	.639	.896
17. When I talk to the patient, I maintain eye contact with them	.650	.895

* Bolded statements were removed to create the PCS-Q-15

In order to check whether the structure of the tool is consistent with the initial assumptions about the four areas in which communication skills are revealed (assertiveness, establishing rules of cooperation with the patient, guiding the patient through the therapy, active listening), a principal component factor analysis was carried out using the Varimax rotation method with Kaiser normalization. Figure 1 shows the scree plot, which is one of the criteria for selecting the number of components in principal component analysis. The moment when the graph breaks down is defined as the end of the scree. At this point, introducing another component will not

result in a sufficiently large explained variance. As can be seen in Figure 1, the graph breaks down with three components. Table 2 shows the factor loadings for each statement. The analysis did not confirm the four skill areas considered at the stage of questionnaire item formulation. Three factors were found to explain 60.68% of the common variance. The first factor was made up of six statements explaining 22.33% of the common variance. The second factor formed five statements and explained 21.43% of the common variance. The last factor combined four statements that explained 16.92% of the common variance.

Table 2. Rotated component matrix (principal component method, Varimax rotation with Kaiser normalization) PCS-Q-15

Item	Component		
	1*	2**	3***
1. I always ask the patient about their expectations of the therapeutic session	.775	.012	.320
2. I inform the patient about the purpose of the session and its importance	.748	.390	.141
3. I set tasks with the patient and then enforce them during the therapeutic session	.730	.322	.231
4. I feel that I should make an effort to ensure that every patient knows the purpose of treatment	.640	.490	-.028
5. I give space and time during exercises for freedom, making decisions, and expressing the expectations and needs of the patient;	.624	.279	.335

Item	Component		
	1*	2**	3***
6. I believe that I am responsible for implementing the principles in my patient group and in my individual work with patients	.589	.481	.162
7. In a situation where the patient fails to follow my instructions, I am able, without showing anger or resentment, to repeat the instruction and enforce it	.171	.735	.236
8. When I talk to the patient, I maintain eye contact with them	.241	.716	.234
9. I am able to help boost my patients' self-esteem in different ways	.155	.676	.375
10. I can tell the patient that I like the way he or she exercises	.435	.649	.132
11. Even when I have an opposite opinion from that of the patient, I can tell the patient about it	.268	.550	.095
12. During the conversation, I guide the interlocutor to the main themes, I summarize: "so far we have talked about ...", "does this mean that ...", "let's return to the main themes of our conversation"	.246	.137	.791
13. During the conversation, I give information to the interviewee/patient about how I perceive him or her: „I see that you like this solution“, „It seems to me that you are dissatisfied"	.070	.249	.768
14. During the conversation, I use phrases like " you mean that...", „I understand that..."	.184	.118	.745
15. When I intentionally give initiative to the patient, I am able to refrain from interfering with the patient's activity	.196	.286	.420

*Component 1: Management Skills (6 Items - #1-6);

**Component 2: Assertiveness (5 Items - #7-11);

***Component 3: Statements of Relationship Building (4 Items - #12-15)

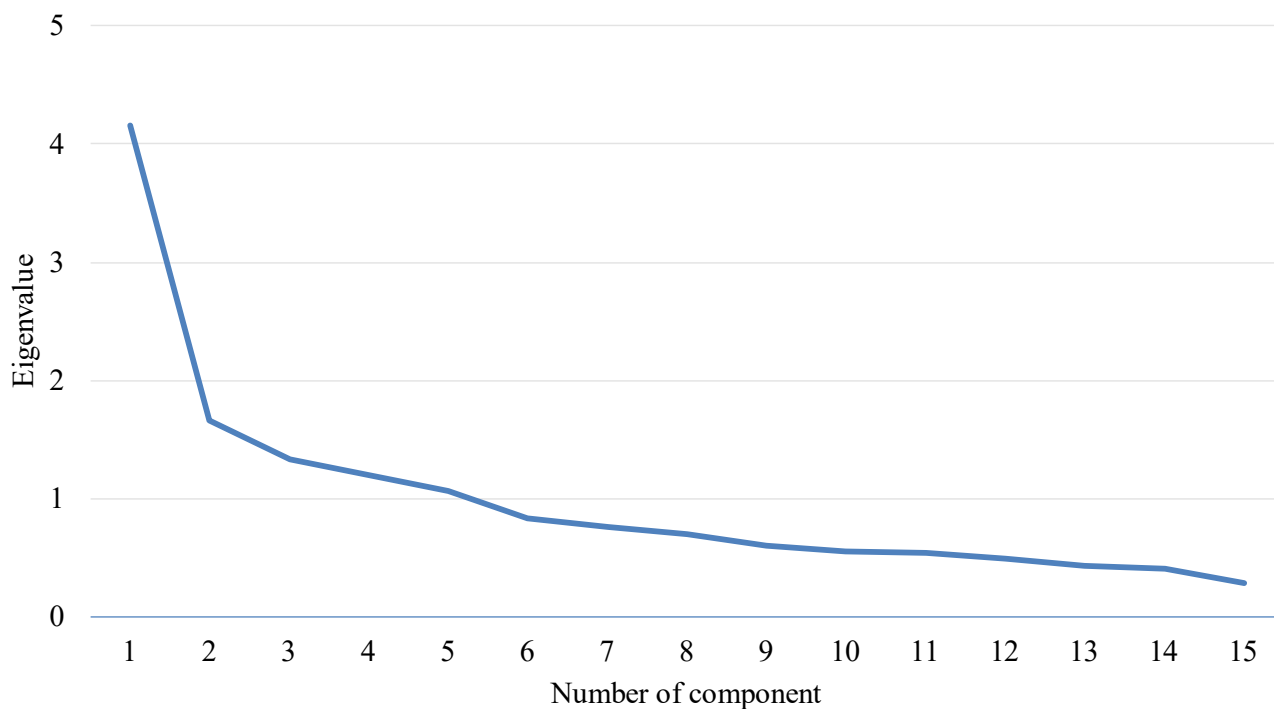


Figure 1. Scree plot showing the explained variance per principal components

Based on the factor analysis, three scales in the questionnaire were separated. Based on a content analysis of the statements in these scales, the following names have been proposed: *Management Skills* (6 statements), *Assertiveness* (5 statements), and *Relationship-building Skills* (4 statements).

The reliability of the individual scales was also established. For the *Management Skills* scale, Cronbach alpha was 0.876 and the coefficients of correlation of individual item scores with the overall score ranged from 0.628 to 0.769. For the other two scales, the coefficients were slightly lower: 0.808 and 0.453–0.638 for the *Assertiveness* scale, and 0.739 and 0.371–0.624 for the *Relationship Building* scale, respectively.

Stage II – the *Physiotherapist Communication Skills Questionnaire-15 (PCS-Q-15)*

Methods

Modification from PCS-Q-17 to PCS-Q-15

The final version of the questionnaire contains 15 items with a five-point response format for three scales. Indices of the skills tested are the total scores obtained on each scale. Their theoretical variance ranged from 6 to 30 points for the *Management Skills* scale; from 5 to 25 points for the *Assertiveness* scale, and from 4 to 20 points for the *Relationship Building* scale. The total communication skills index ranged from 15 to 75 points.

To compare the indices for each scale, arithmetic averages can be calculated for the statements making up the scale by dividing the sum of the scale scores by the number of statements. It is also possible to calculate a physiotherapist's communication skills index, which is the mean of the indices from each scale. The theoretical variance of all the indices calculated in this way was 1 – 5.

Validity of PCS-Q-15

The *Physiotherapist Communication Skills Questionnaire (PCS-Q-15)* is designed to measure selected communication skills that are revealed when interacting with patients during therapy. These skills develop from the general ability to establish social relationships (Matczak, 2011). Both general social competence and emotional intelligence are likely to play a role in their development. It is therefore to be expected that there are links between the skills assessed using the *PCS-Q* questionnaire and indices of social competences and emotional intelligence. For this reason, to establish the theoretical validity of the tool, a survey was conducted in which, in addition to the *PCS-Q-15*, the *Social Competence Questionnaire (SCQ)*

by Matczak (2011) and the *Emotional Intelligence Questionnaire (INTE)* by Schutte et al., with a Polish adaptation by Jaworowska et al. (2008), were used.

Social competence, as measured by the SCQ, is viewed as 'complex skills determining the effectiveness of coping with certain types of social situations, acquired by an individual in the course of social training' (Matczak, 2011, p. 7). They determine the effectiveness of behaviors in intimate situations, social exposure, and situations that require assertiveness. Underpinning the theoretical basis of *INTE* was Salovey and Mayer's definition of emotional intelligence, who defined it as a person's ability to keep track of their own and others' feelings and emotions, differentiate between them, and use the information they provide in guiding thought and action (after Jaworowska et al., 2008).

Respondents

The study included 109 physiotherapy students, with 47 males and 62 females aged 18–24 years ($M=20.68$; $SD=1.471$). The research was conducted in March 2022 during lectures and included first- and second-year physiotherapy students. The students were familiarized with the purpose and course of the research and completed a written declaration of consent to participate in it. The questionnaires were coded. A total of 136 students participated in the study. 109 fully completed sets of questionnaires were qualified for analysis.

Data Analysis and Results

Since the requirements of normality of distribution were not met, non-parametric tests were used to establish relationships between the scores of the scales. Table 3 shows Spearman's rho correlation coefficients between the scales. Of the *PCS-Q-15* scales, only *Management Skills* revealed no statistically significant relationship with emotional intelligence and social competence. Furthermore, *Assertiveness* showed the strongest positive relationships with all *SCQ* and *INTE* scales, but their strength was moderate. Interestingly, Spearman's rho showed larger values for correlations with emotional intelligence and social competence in intimate situations compared to those with the assertiveness scale score on the *SCQ*.

Relationship-building skills were significantly yet less strongly correlated with emotional intelligence and social competence in intimate situations and social exposure. The relationship with the *SCQ* assertiveness scale did not reach the level of statistical significance.

The correlation coefficients between the *PCS-Q-15*, *SCQ*, and *INTE* scales established in the study met the expectations formulated based on their psychological relevance and demonstrated the theoretical relevance of the tool.

Intercorrelations between the *PCS-Q-15* scales were moderately strong, with the weakest relationship between management skills and assertiveness, confirming that the scales provide indices of different but correlated variables.

A comparison of male and female results was also carried out using the Mann-Whitney U-test. No statisti-

cally significant differences were found ($p > 0.05$). There were also no significant associations of *PCS-Q-15* scores with age. For this reason, it is planned to create sten score standards for students regardless of gender and age. They will be presented in the *PCS-Q* manual.

Table 3. Spearman's rho correlation coefficients between *PCS-Q-15*, *INTE* and *SCQ* scores

Questionnaire	Variable	Management	Assertiveness	Relationship building	Communication skills: total
<i>PCS-Q-15</i>	Management	-	-	-	-
	Assertiveness	0.427a	-	-	-
	Relationship building	0.518a	0.551a	-	-
	Communication skills: total	0.802a	0.747a	0.865a	-
<i>INTE</i>	Emotional intelligence	0.151	0.402a	0.388a	0.350c
	Intimate situations	0.101	0.380a	0.253b	0.272b
<i>SCQ</i>	Situations of social exposure	0.039	0.294b	0.231c	0.215c
	Assertiveness	0.034	0.287b	0.154	0.175
	Social competence: total	0.077	0.380a	0.248b	0.261b

PCS-Q-15 – the *Physiotherapist Communication Skills Questionnaire*

INTE – the *Emotional Intelligence Questionnaire*

SCQ – the *Social Competence Questionnaire*

^a $p < 0.001$; ^b $p < 0.01$; ^c $p < 0.05$

Discussion

The profession of physiotherapist requires constant social interaction with patients, their relatives, and other members of the therapeutic team. Effective interpersonal relationship building is largely determined by the physiotherapist's social skills, including his or her communication skills. These skills should be developed during their university studies. This requires the use of active learning methods (Bušelić et al., 2019; Nizami et al. 2017; Kuk et al., 2015). Classes aimed at training communication skills are based on workshops that use methods such as simulated conversations with customers, modeling correct behavior, and giving feedback (Reith-Hall et al. 2019). Monitoring the effects of such training requires the use of tools that measure communication skills specific to physiotherapists, providing information on practical skills rather than declared knowledge. Communication skills are important in all health professions. Recognition of their role is evidenced by the development of tools to measure these skills in physicians of various specialties or nurses. However, we did not find a description of a reliable questionnaire dedicated to physiotherapists in the available literature. To fill this gap, we designed the *Physiotherapist Communication Skills Questionnaire*.

The *PCS-Q* is a self-report questionnaire in which the respondent makes a self-assessment of their level of communication skills with the patient. It is designed to measure the specific communication skills that determine the effectiveness of building the relationships between the physiotherapist and the patient.

Research has shown that, in the long term, self-report forms used in psychometric tools are more effective than those based on external assessment (Grol, 1994; Butterfield et al., 2012). Self-assessment makes it possible to provide feedback to oneself, thus developing awareness of actual learning or work outcomes (Kluger 2010). In contrast to external assessment, self-assessment instills self-regulation and responsibility. Furthermore, it allows one to consciously choose and strive for professional standards, which is crucial for the development of professional competence (Bandura, 1997; Ajzen 2001).

The content of the statements used in the *PCS-Q* refers to specific professional activities performed by the physiotherapist during therapy. In formulating them, we kept in mind the specifics of the cooperation between the physiotherapists and their patients. Therefore, this is a dedicated tool for this professional group.

Social competence in general, especially patient communication skills, can be tested in various ways, using

not only self-report scales (Matczak, 2011; Makoul, 2001; Gärtner et al, 2021) but also observational scales or analysis of behavior recorded during visits or consultations (Fukkink et al, 2011; Bellier et al, 2023; Ha, et al, 2010; Traeger et al, 2015; Makoul et al, 2007). In our opinion, the choice of the first method is supported by its ease of use and the short duration of the survey. It takes approximately 10 minutes to complete the *PCS-Q*. The statements describe specific behaviors often occurring during therapy, which facilitates self-assessment. The scale provides quantitative indices, which makes it possible to compare the scores of different individuals and to establish skill levels by relating the scores to norms. It also offers the possibility of repeated measurement, so that changes occurring in, for example, skills trained during workshops can be monitored. After modification of the instructions, this type of tool can be used for self-assessment of the skills demonstrated during a consultation or a therapeutic session and their assessment by observers.

In formulating the statements that make up the original version of the scale, we took into account behavioral indices of the skills of physiotherapists in four areas: situations of establishing rules for cooperation with the patient, situations that require assertiveness, guiding the patient through the therapy process, and situations that require active listening. The factor analysis did not confirm the assumed four-element structure of the tool, but the results are partly in line with the assumptions made when developing the statement pool of the original version. It can also be assumed that the scales in the final version of the *PCS-Q* are at least partly consistent with the classification of social skills proposed by Matczak (2011).

The *Management Skills* scale included all statements that were indicators of the ability to establish rules for cooperation with the patient and two statements on managing this cooperation. One statement from the latter area was removed from the questionnaire due to a low Cronbach's alpha, whereas one was included in the *Relationship-building Skills* scale. The term 'patient management skills' was considered to aptly name the behaviors described in the statements.

The *Assertiveness Scale* is made up of all four statements from the group of behaviors considered behavioral indicators of assertiveness and one statement (*When I talk to the patient, I maintain eye contact with them*) as an indicator of active listening skills. Maintaining eye contact can be considered a non-verbal manifestation of an assertive attitude: this behavior, therefore, remains linked to the content of the scale.

The *Relationship-building Skills* scale consists of three statements from the area of active listening and one statement (*When I intentionally give initiative to the patient, I am able to refrain from interfering with the patient's activity*) from the area of patient management skills. The

more general name of *Relationship-building Skills* allows, in our opinion, the content of all four statements to be encompassed. One of the statements from the area of active listening was included in the *Assertiveness Scale* and the last one was removed from the questionnaire due to a low Cronbach's alpha.

We consider the psychometric properties of the *PCS-Q* as satisfactory. The reliability of the entire questionnaire determined by establishing internal consistency is good, whereas the reliability of the individual scales is satisfactory. The theoretical validity of the *PCS-Q* was confirmed by the correlations of the results of the individual scales with the results of the *Social Competence Questionnaire (SCQ)* by Matczak (2011) and the *Emotional Intelligence Questionnaire (INTE)* by Schutte et al. (Jaworowska and Matczak, 2006).

The theoretical validity of the *Relationship-building Skills* scale was confirmed both by its links with emotional intelligence and social competence in social situations and the lack of significant associations with assertiveness. The scores on the *Assertiveness* scale correlated significantly with those on all the *SCQ* and *INTE* scales. Interestingly, these correlations were stronger for the *Social Competence in Intimate Situations* scale than for the *Assertiveness* scale of the *SCQ*. The statements of the *PCS-Q Assertiveness* scale included feedback and valuing, which may explain the observed relationship. As expected, no statistically significant relationships were found between the results of the *Management Skills* scale and the results of the *SCQ* and *INTE* scales. Statements from this *PCS-Q* scale are linked directly to behaviors related to agreeing on goals and principles of physiotherapy and determining the tasks to be carried out. We found no indicators of behavioral skills in managing other people in either *SCQ* or *INTE* scales (Jaworowska, Matczak, 2008; Matczak, 2011).

The lack of age- and gender-specific variation in *PCS-Q* scores remains to be clarified. Social skills develop through experiences in social interactions (Martowska, 2012; Matczak, 2011). The physiotherapist develops communication skills with the patient during his or her clinical practice (Zaborniak-Sobczak et al., 2014; Walicka-Cupryś, 2017). The homogeneous (in terms of age and clinical experience) groups of first- and second-year physiotherapy students who took part in our study aimed to establish the psychometric properties of the *PCS-Q* questionnaire. Their age ranged from 18 to 24 years. Their experiences related to communicating with patients were very similar. The respondents acquired them during clinical courses and internship programs carried out during their studies. It is reasonable to assume that with a greater variation in age, and especially in work experience, the communicative skills of physiotherapists will be positively related to age (Zaborniak-Sobczak et al., 2014; Walicka-Cupryś, 2017).

The results of population-based studies have demonstrated differences in social skills between men and women, as well as among Polish physiotherapists and physiotherapy students. Men revealed higher levels of skills in situations that require assertiveness and in situations of social exposure (Zaborniak-Sobczak et al., 2014; Walicka-Cupryś, 2017), while women revealed higher levels of skills in intimate situations (Tyszkiewicz-Bandur et al., 2017). No such differences were found for communicative skills as measured by the *PCS-Q* in physiotherapy students. This lack of variation is likely due to the above-mentioned similarity in patient relationship experiences gained by women and men during their physiotherapy studies. It would be interesting to compare the communicative competence of physiotherapists of both genders with different professional experiences (work experience, place of work, most common patient problems).

Further research is needed to evaluate the *PCS-Q* questionnaire, especially its suitability for measuring communication skills in people already working as physiotherapists, with different work experiences, providing rehabilitation to people with different health problems in different healthcare settings. We hope that this research will confirm that the *PCS-Q* questionnaire can successfully achieve the objectives for which it was developed.

Conclusion

The findings of the present study lead to the conclusion that the Physiotherapist Communication Skills Questionnaire (*PCS-Q*) is a reliable and valid tool for measuring the communication of physiotherapists and physiotherapy students with patients in clinical situations via self-report. It allows for assessing patient-management and relationship-building skills and assertiveness. In its basic version, it is a self-assessment scale and may potentially also be used by observers (patients, other physiotherapists, or other students) to estimate skills.

While looking to the future, it is already possible to consider the changing role of physiotherapists today, which requires sophisticated client communication skills and advanced cooperation within healthcare teams (Van der Wees, et al. 2014). This also means that educational institutions training future physiotherapists should ensure that they offer high-quality assessment procedures for their students. The tools used for this purpose should have an acceptable level of reliability. Few studies have evaluated the reliability of tools assessing physiotherapists' competence, and those already published confirmed a very low level (Lucy, et al., 2008). The *PCS-Q* bridges this gap in the case of communication skills, as it is an uncomplicated and reliable tool that can be used to objectively assess

students and the effectiveness of programs dedicated to the development of such competences.

In the future, it will be possible to construct an observational version of the tool, in which skills assessment would be made by an individual who knows the respondent, for example, a person from the same student group. Utilizing the *PCS-Q* may be valuable for both the assessed and the assessor and may have a positive impact on student engagement and improvement during clinical courses (Maas, 2018). The presented tool is currently undergoing translation so that it can be used in English-speaking regions, which will make it a potentially useful tool internationally.

Ethics Approval and Informed Consent

Ethical approval was obtained by the Senate's Research Bioethics Committee at the University of Physical Education in Warsaw SKE 01-05/2022. All participants gave written informed consent before data collection began. The research was carried out in accordance with the approved procedure. The study manuscript adheres to the Declaration of Helsinki. All authors read and approved the final manuscript.

Competing Interests

All authors certify that there is no actual or potential conflict of interest in relation to this study

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