

# Validity and Reliability of Egyptian Physiotherapists' Competencies Questionnaire (Short Form)

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## ABSTRACT

**Background:** Competence is a combination of knowledge, skills, values, behaviors, and attributes, enabling members to work safely, effectively, and legally within their specific scope of practice at any point in time. The purpose of this study is the development of a valid and reliable short form of the competencies questionnaire for physiotherapists.

**Methods:** The Egyptian Physiotherapists' Competencies Questionnaire (short form) was developed and approved by the Pediatrics departmental council. Three professors of physical therapy checked the validity. 30 physiotherapists were asked to answer the questionnaire. They were interviewed to explain the meaning of the questions review, the questionnaire, and write any comments they had about the nature and format of the items. This was done to detect any difficulties or unclear words. The internal reliability was measured using Cronbach's alpha. Inter-item correlations were calculated separately for each standard using SPSS (25) to identify redundant items and measure internal consistency.

**Results:** The findings of this pilot study provide the internal consistency, as measured by Cronbach's alpha, which ranged from 0.948 to 0.953 across the five competency standards. Moreover, the intra-class correlation coefficients (ICCs) for the EPTCQ (Short form) standards ranged from 0.793 to 0.969, with an overall ICC of 0.826.

**Conclusions:** This study confirms the questionnaire's validity and reliability for evaluating multidimensional PT competencies. Its implementation can enhance professional development programs and the quality of care.

**Keywords:** physiotherapists, competencies, questionnaire.

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**Conflict of interest:** None

## INTRODUCTION

Physical therapy is a service provided by physical therapists to individuals and populations to develop, maintain, and restore maximum movement and functional ability throughout the lifespan (Cech and Martin 2023).

Quality physical therapy care is defined as care that follows the Standards of Practice for physical therapy published by the Association of Physical Therapy (APT) (Angel-Garcia, Martinez-Nicolas et al. 2022).

In order to function safely, effectively, and legally within their particular area of activity at any given moment, members must possess a mix of knowledge, skills, values, behaviors, and traits known as competence. Members must participate in career, structured, and personalized learning to meet their defined development requirements, and it entails an understanding of the constraints of both professional and personal practice (Nurius and Kemp 2019).

The evaluation of competencies in clinical areas is essential for PT: it allows the Acquisition of competencies to be supervised, thus helping to improve competency levels and practice standards for PT (Torres-Narváez, Vargas-Pinilla et al. 2018).

The validity and reliability of the outcome measure determine the quality of the evidence. The consistency or repeatability of the measurement—that is, if it consistently yields the same answer when measuring the same object—is referred to as reliability. Whether the measurement accurately captures the content you wish to measure is known as validity. Because faulty measurements are ineffective, validity is a function of reliability; but, because of inherent sources of bias, trustworthy measurements may not be valid (Mohajan 2017). The creation of a valid and trustworthy competencies questionnaire for physiotherapists was the aim of this study. The purpose of this study is development of a valid and reliable competencies questionnaire for physiotherapists.

## SUBJECTS, INSTRUMENTATION, AND PROCEDURES

### I- Subjects

The current study is a cross-sectional pilot survey that was carried out from January 2025 to June 2025. A stratified and convenience sampling technique was used to select the study participants, taking into consideration the inclusion criteria.

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The sample of the pilot survey was composed of thirty physiotherapists of different specialties. It included 19 females and 11 males. They included PT practitioners (19), PT specialists (8), and PT consultants (3) of the participants represented various postgraduate degrees, including 10 who have an MSC in physical therapy, and 1 has a Ph.D. in physical therapy. They were recruited from health insurance.

All participants, both genders, from were approved by the General Physical Therapy Syndicate of Egypt Physiotherapists, working in health insurance hospitals of Egyptian governorates, who were on the job, had a good reputation, and were interested in participating in this study, were included. The following Physiotherapists who are working in academic institutions or police or armed forces hospitals contributed to an abroad mobility or partnership program, have violated legal and/or professional legislations and were excluded.

## II Instrumentations

• **The Egyptian Physiotherapists' Competencies Questionnaire (SHORT FORM)** was developed and approved by the Pediatrics departmental council after realizing its validity and reliability.

The questionnaire included the basic information as well as professional, intellectual, management, leadership, and transferable competencies, which were patient, research, and community-oriented (Dashash 2019).

The questionnaire was developed through six phases, namely, drafting, Expert review, First revision, pilot survey, Implementation of the questionnaire, data Analysis and Statistical Design.

• **The Egyptian Physiotherapists' Competencies Questionnaire (SHORT FORM) has the following standards:**

1. Delivering physiotherapy service
2. Professionalism, Autonomy, and Accountability.
3. Leadership and achieving excellence.
4. Documentations and Records.
5. Communication and working in partnership.

**Each standard was assessed with simple indicators.**

A Likert scale (5 levels) is used to measure indicators. For each of the indicators, the participants checked the box that best represents the frequency with which he/she demonstrate the behavior, where: 1 = Never; 2 = Rarely; 3 = Occasionally; 4 = Frequently; and 5 = Always (Meirovich and Goswami 2021).

## III-Procedures

**The Egyptian physiotherapist's competencies questionnaire (SHORT FORM)** was developed according to Wood (Wood 2018). Seven distinct tasks were applied to develop a high-quality questionnaire.

Each of these tasks requires a series of decisions and activities which include:

1. Review the information requirements necessitating a questionnaire.
2. Develop and prioritize a list of potential questions that will satisfy the information requirements.
3. Assess each potential question carefully.

4. Determine the types of questions to be asked.
5. Decide on the specific wording of each question to be asked.
6. Determine the structure of the questionnaire.
7. Evaluate the questionnaire.

## I-Drafting

The first step in developing the questionnaire was to draft items of consideration for inclusion in the questionnaire (Carlton, Elliott et al. 2017).

The researcher developed the draft of the questionnaire taking into consideration the core values of the World Confederation of Physical Therapy(WCPT) (Dean, Skinner et al. 2019) and the Charter Society of Physical Therapy(SCPT) (Magnusson, Eisenhart et al. 2019), American Association of Physical Therapy (APTA)(Denton, Fike et al. 2017). In addition, the researcher made use of some valuable research papers on the assessment of physiotherapists' competencies. Extensive searching of the existing articles was carried out and resulted in a large number of articles related to physiotherapist competencies. Those articles were carefully read to determine any factor that could be related to the physiotherapist's competencies questionnaire.

Item creation and design:

1. Avoid the "measurement error" by constructing survey items so that they capture the concept of interest as accurately as possible.
2. Items should be relevant.
3. Items should be answerable by the respondents (knowledgeable & competent to answer the questions).
4. Items should be clear (simplest language possible) and concise (as short as Possible).
5. Items should not have double negatives.
6. Items should not have biased our leading phraseology.
7. Items should not have double-barreled questions – one point only.
8. Response categories must be mutually exclusive.
9. Response categories must be inclusive.
10. Response categories must be properly scaled for the level of data required.
11. Whenever appropriate and possible, items should be modeled after those on nationally recognized surveys (i.e., U.S. Census, NCES Surveys, etc.)
12. To the highest degree possible, reduce the psychological cost of completing the survey by (a) making it as interesting as possible, (b) making it as easy to complete as possible, and (c) making it as short as possible.
13. Open-ended questions and areas for respondent comments should also be Incorporated into survey instruments whenever appropriate.

**The questionnaire draft included the following aspects:**

Delivering physiotherapy service, Professionalism, Autonomy and accountability, Leadership, and achieving

excellence, documentation and Record, Communication, and working in partnership(20).

The gained items were collected and refined by the researcher, and a draft form of a fully organized questionnaire was developed. Which represented the first formed questionnaire

The supervisors reviewed the draft, edited and omitted some items on the evidence base, and sent the first version for expert review.

## II-Expert review

Three professors of physical therapy were selected with at least 5 years' experience, reviewed the draft form of the questionnaire, and checked the face and content validity.

The questionnaire was covered with a letter of request for review and followed by a form for review.

According to (Engström, Leksell et al. 2018), each expert was asked to determine if all important elements of the construct were addressed, if questions were understandable, and if terms were identified satisfactorily. In addition, their feedback about the contents of the questionnaire was provided on an individual basis.

## III-First revision

The researchers revised the questionnaire based on the feedback gained from the reviewers (Rubio, Marti-Oliet et al. 2020).

## Summary of revision

Q 2, 4, 5, 11, 22, , and 25 was edited, Q9, 10, 12, 13, 24, 28, 32, and 35 was deleted Q9 was merged with Q2, Q10 was merged with 5, Q12and13 was merged with 11, Q24 was merged with 22 and Q28 was merged with 25.

**The final version of the questionnaire was implemented for the pilot survey.**

## Review the questions for relevance.

A final review of the relevance of each question was carried out based on its goals (Wilson, Thorpe Jr et al. 2017), suggesting that a survey designer assess relevance by briefly describing how each item in a questionnaire was presented in the final report from the survey results.

## IV-Pilot test

The questionnaire was tested in the applied situation. As recommended, 30 physiotherapists (Paiva, Azevedo et al. 2021) will be asked to answer the questionnaire. The examiner has to conduct a questionnaire with the participants face-to-face and discuss the items with participants to determine difficulties when answering them alone. They were interviewed to explain the meaning of questions and review the questionnaire, and write any comments they had about the nature and format of the items. Respondents were encouraged to comment on any aspect of the questionnaire, including unclear or ambiguous questions, the completeness and clarity of the response categories, biased questions, sentence structure, and threatening questions. This was done to detect any difficulties or unclear words. This process checked content validity (Nguyen, Gabbe et al. 2020).

- Inter-item correlations were calculated separately for each standard using SPSS 25 to identify redundant items (Sokolovic, Brunsek et al. 2021).

- The researcher tested internal consistency between index items.
- The internal reliability was measured using Cronbach's alpha.
- Test-retest reliability was measured using interclass correlation (ICC).

## Scoring system of Egyptian Physiotherapists' competencies questionnaire (SHORT FORM)

- Each indicator equals a 5-point score according to the Likert scale

- standards score as follows:

Delivering physiotherapy service (40\150)

Professionalism, Autonomy, and Accountability. (40\150)

Leadership and achieving excellence. (30\150)

Documentations and Record .(20\150)

Communication and working in partnership.(20\150)

- The Egyptian Physiotherapists' Competencies Questionnaire (SHORT FORM) total score was 150 points.

## IIIV -Implementation of the questionnaire

The study was a Survey and conducted on the competencies of physiotherapists from the Ministry of Health hospitals.

The objectives of the pilot survey were explained to the selected physiotherapists.

All participants from the different hospitals of the Ministry of Health, the Arab Republic of Egypt, who expressed interest in more information were invited to answer the approved, valid Egyptian Physiotherapists' Competencies Questionnaire (SHORT FORM) from the review committee.

## IIIV-Data Analysis Statistical Design

The statistical analysis was conducted by using the SPSS statistical package program version 25 for Windows (SPSS, Inc., Chicago, IL). Quantitative data are reported as the mean and standard deviation for the PT participants' age. Qualitative data expressed as the frequency and percentage for distributions of basic information of PTs in the population and questionnaire axes. The internal construct validity is measured by Spearman's ranked correlation. The reliability of the questionnaire was statistically measured by assessment of the internal consistency by Cronbach's alpha and inter-class correlation coefficients (ICC). All statistical analyses were significant at the level of probability ( $P \leq 0.05$ ).

Gable et al (Gable and Wolf 2012) reported that reliability estimates of 0.70 or higher are acceptable for effective measures. We established a priori reliability of 0.70 on both the total EPTCQ (SHORT FORM) score and the subscale scores as sufficiently high for decision making.

## RESULTS

Basic information of physical therapists in the population study group is presented in Table (1). A total of 30 physical therapists (PTs) were participated in this survey and their age (year) ranged from 27.00 to 46.00years with mean value of PTs age  $29.97 \pm 5.44$ years.

The distribution of PTs gender for categories males and females were 11 (36.70%) and 19 (63.30%),

respectively. More than half of the PT participants belonged to females (63.30%) and then males (36.70%). Moreover, the distribution of university type showed that more than half of the PT participant's belonged to governmental university (63.30) followed by private university (36.70%). For the distribution of academic qualification degree, more than half of the PT participants obtained B.Sc. degree (63.30%), follow by M.Sc. degree (33.30%), and then Ph.D. degree (3.30%).

More than to half of the PT participants sample were PTs practitioner (63.30%), followed by PT specialist (26.70%) and then PT consultant (10.00%). The distribution of work setting recorded 100% of the PT participants sample working in health insurance organization. The greatest percentage of PTs sample working in pediatrics area (63.30%), followed by neurology (13.30%), orthopedic (10.00%), internal medicine (6.70%), women health (3.30%), and then weight management (3.30%).

**Table 1: Basic information of physical therapists in population study group (n=30)**

| Quantitative variable |                               | Mean $\pm$ SD    | Minimum    | Maximum |
|-----------------------|-------------------------------|------------------|------------|---------|
| Age (year)            |                               | 29.97 $\pm$ 5.44 | 27.00      | 46.00   |
| Qualitative variables |                               | Number           | Percentage |         |
| Gender                | Males                         | 11               | 36.70%     |         |
|                       | Females                       | 19               | 63.30%     |         |
| Type of university    | Governmental                  | 19               | 63.30%     |         |
|                       | Private                       | 11               | 36.70%     |         |
| Qualification degree  | B.Sc. Graduated               | 19               | 63.30%     |         |
|                       | M.Sc. Graduated               | 10               | 33.30%     |         |
|                       | Ph.D. Graduated               | 1                | 3.30%      |         |
| Current job           | PT practitioner               | 19               | 63.30%     |         |
|                       | PT specialist                 | 8                | 26.70%     |         |
|                       | PT consultant                 | 3                | 10.00%     |         |
| Work setting          | Health insurance organization | 30               | 100%       |         |
| Work area of interest | Pediatrics                    | 19               | 63.30%     |         |
|                       | Orthopedic                    | 3                | 10.00%     |         |
|                       | Surgery and burn              | 0                | 0.00%      |         |
|                       | Neurology                     | 4                | 13.30%     |         |
|                       | Woman health                  | 1                | 3.30%      |         |
|                       | Internal medicine             | 2                | 6.70%      |         |
|                       | Weight management             | 1                | 3.30%      |         |

Quantitative variable data are expressed as mean  $\pm$ standard deviation (SD); Qualitative variables data are expressed as frequency (percentage)

The distribution of physical therapy participants for each item and axis of questionnaire is shown in Table (2). There were significant differences ( $P<0.05$ ) among categories for each questionnaire question. Moreover, there were significant difference ( $P<0.005$ ) among questionnaire categories for delivering physiotherapy service axis ( $P=0.0001$ ), professionalism, autonomy

( $P=0.0001$ ), and accountability axis ( $P=0.0001$ ), leadership and achieve excellence axis ( $P=0.0001$ ), documentations and record axis ( $P=0.0001$ ), and communication and working in partnership axis ( $P=0.0001$ ).

**Table 2: Distribution of physical therapy participants for each and axis item of questionnaire**

| The indicator                                             | Never     | Rarely    | Occasionally | Frequently | Always     | P-value |
|-----------------------------------------------------------|-----------|-----------|--------------|------------|------------|---------|
| <b>Delivering physiotherapy service axis</b>              |           |           |              |            |            |         |
| Q1 (n=30)                                                 | 3 (10.0%) | 7 (23.3%) | 11 (36.7%)   | 8 (26.7%)  | 1 (3.3%)   | 0.002*  |
| Q2 (n=30)                                                 | 3 (10.0%) | 5 (16.7%) | 11 (36.7%)   | 6 (20.0%)  | 5 (16.7%)  | 0.008*  |
| Q3 (n=30)                                                 | 4 (13.3%) | 4 (13.3%) | 13 (43.3%)   | 7 (23.3%)  | 2 (6.70%)  | 0.0001* |
| Q4 (n=30)                                                 | 3 (10.0%) | 2 (6.70%) | 14 (46.7%)   | 8 (26.7%)  | 3 (10.0%)  | 0.0001* |
| Q5 (n=30)                                                 | 3 (10.0%) | 4 (13.3%) | 14 (46.7%)   | 5 (16.7%)  | 4 (13.3%)  | 0.0001* |
| Q6 (n=30)                                                 | 2 (6.7%)  | 7 (23.3%) | 9 (30.0%)    | 8 (26.7%)  | 4 (13.3%)  | 0.034*  |
| Q7 (n=30)                                                 | 2 (6.7%)  | 3 (10.0%) | 9 (30.0%)    | 9 (30.0%)  | 7 (23.3%)  | 0.008*  |
| Q8 (n=30)                                                 | 3 (10.0%) | 5 (16.7%) | 10 (33.3%)   | 12 (40.0%) | 0 (0.0%)   | 0.0001* |
| Axis Q1 – Q8 (n=30)                                       | 0 (0.0%)  | 5 (16.7%) | 14 (46.7%)   | 11 (36.7%) | 0 (0.0%)   | 0.0001* |
| <b>Professionalism, autonomy, and accountability axis</b> |           |           |              |            |            |         |
| Q9 (n=30)                                                 | 2 (6.7%)  | 7 (23.3%) | 11 (36.7%)   | 7 (23.3%)  | 3 (10.0%)  | 0.007*  |
| Q10 (n=30)                                                | 2 (6.7%)  | 2 (6.7%)  | 11 (36.7%)   | 10 (33.3%) | 5 (16.7%)  | 0.004*  |
| Q11 (n=30)                                                | 2 (6.7%)  | 4 (13.3%) | 7 (23.3%)    | 12 (40.0%) | 5 (16.7%)  | 0.0001* |
| Q12 (n=30)                                                | 1 (3.3%)  | 6 (20.0%) | 4 (13.3%)    | 14 (46.7%) | 5 (16.7%)  | 0.0001* |
| Q13 (n=30)                                                | 2 (6.7%)  | 7 (23.3%) | 10 (33.3%)   | 9 (30.0%)  | 2 (6.7%)   | 0.014*  |
| Q14 (n=30)                                                | 2 (6.7%)  | 4 (13.3%) | 12 (40.0%)   | 11 (36.7%) | 1 (3.3%)   | 0.0001* |
| Q15 (n=30)                                                | 4 (13.3%) | 6 (20.0%) | 7 (23.3%)    | 10 (33.3%) | 3 (10.0%)  | 0.002*  |
| Q16 (n=30)                                                | 1 (3.3%)  | 8 (26.7%) | 7 (23.3%)    | 11 (36.7%) | 3 (10.0%)  | 0.0001* |
| Axis Q9 – Q16 (n=30)                                      | 0 (0.0%)  | 5 (16.7%) | 11 (36.7%)   | 12 (40.0%) | 2 (6.7%)   | 0.0001* |
| <b>Leadership and achieve excellence axis</b>             |           |           |              |            |            |         |
| Q17 (n=30)                                                | 4 (13.3%) | 6 (20.0%) | 10 (33.3%)   | 5 (16.7%)  | 5 (16.7%)  | 0.017*  |
| Q18 (n=30)                                                | 3 (10.0%) | 6 (20.0%) | 9 (30.0%)    | 9 (30.0%)  | 3 (10.0%)  | 0.012*  |
| Q19 (n=30)                                                | 4 (13.3%) | 5 (16.7%) | 9 (30.0%)    | 8 (26.7%)  | 4 (13.3%)  | 0.031*  |
| Q20 (n=30)                                                | 2 (6.7%)  | 8 (26.7%) | 11 (36.7%)   | 8 (26.7%)  | 1 (3.3%)   | 0.006*  |
| Q21 (n=30)                                                | 1 (3.3%)  | 9 (30.0%) | 12 (40.0%)   | 5 (16.7%)  | 3 (10.0%)  | 0.0001* |
| Q22 (n=30)                                                | 1 (3.3%)  | 6 (20.0%) | 13 (43.3%)   | 9 (30.0%)  | 1 (3.3%)   | 0.001*  |
| Axis Q17 – Q22 (n=30)                                     | 1 (3.3%)  | 8 (26.7%) | 10 (33.3%)   | 10 (33.3%) | 1 (3.3%)   | 0.002*  |
| <b>Documentations and record axis</b>                     |           |           |              |            |            |         |
| Q23 (n=30)                                                | 8 (26.7%) | 4 (13.3%) | 10 (33.3%)   | 3 (10.0%)  | 5 (16.7%)  | 0.031*  |
| Q24 (n=30)                                                | 1 (3.3%)  | 4 (13.3%) | 12 (40.0%)   | 9 (30.0%)  | 4 (13.3%)  | 0.002*  |
| Q25 (n=30)                                                | 1 (3.3%)  | 5 (16.7%) | 14 (46.7%)   | 8 (26.7%)  | 2 (6.7%)   | 0.0001* |
| Q26 (n=30)                                                | 0 (0.00%) | 7 (23.3%) | 12 (40.0%)   | 8 (26.7%)  | 3 (10.0%)  | 0.0001* |
| Axis Q23 – Q26 (n=30)                                     | 0 (0.0%)  | 5 (16.7%) | 13 (43.3%)   | 9 (30.0%)  | 3 (10.0%)  | 0.0001* |
| <b>Communication and working in partnership axis</b>      |           |           |              |            |            |         |
| Q27 (n=30)                                                | 2 (6.7%)  | 4 (13.3%) | 12 (40.0%)   | 9 (30.0%)  | 3 (10.0%)  | 0.001*  |
| Q28 (n=30)                                                | 2 (6.7%)  | 6 (20.0%) | 11 (36.7%)   | 7 (23.3%)  | 4 (13.3%)  | 0.006*  |
| Q29 (n=30)                                                | 3 (10.0%) | 3 (10.0%) | 8 (26.7%)    | 6 (20.0%)  | 10 (33.3%) | 0.006*  |
| Q30 (n=30)                                                | 1 (3.3%)  | 4 (13.3%) | 6 (20.0%)    | 8 (26.7%)  | 11 (36.7%) | 0.002*  |
| Axis Q27 – Q30 (n=30)                                     | 0 (0.0%)  | 5 (16.7%) | 9 (30.0%)    | 12 (40.0%) | 4 (13.3%)  | 0.0001* |

Data are expressed as frequency (percentage) P-value: probability value \*significant: P-value&lt;0.05

## RESEARCH PAPER

The internal construct validity was measured by Spearman ranked correlation coefficients between questionnaire axes of PTs sample which illustrated in Table (3). The results of these correlational analyses revealed there were significantly ( $P<0.05$ ) positive strong relation between delivering physiotherapy service axis with professionalism, autonomy, and accountability axis ( $r=0.540$ ;  $P=0.002$ ), leadership and achieve excellence axis ( $r=0.558$ ;  $P=0.001$ ), positive moderate relation with documentations and record axis ( $r=0.440$ ;  $P=0.015$ ) and communication and working in partnership axis ( $r=0.391$ ;  $P=0.032$ ). Moreover, a significant ( $P<0.05$ ) positive strong relation between professionalism, autonomy, and accountability axis with leadership and achieve excellence axis ( $r=0.693$ ;  $P=0.0001$ ), communication and working in partnership axis ( $r=0.647$ ;  $P=0.0001$ ). While, no correlation ( $P>0.05$ ) between professionalism, autonomy, and

accountability axis and documentations and record axis ( $r=0.270$ ;  $P=0.150$ ). There were significantly ( $P<0.05$ ) positive moderate relation between leadership and achieve excellence axis and documentations and record axis ( $r=0.436$ ;  $P=0.016$ ) and positive strong correlation with communication and working in partnership axis ( $r=0.511$ ;  $P=0.004$ ). A significant ( $P<0.05$ ) positive strong relation between documentations and record axis and communication and working in partnership axis ( $r=0.405$ ;  $P=0.027$ ). These positive moderate strong correlations mean that change in each axis item of the questionnaire is consistent with change of each other axis item of questionnaire in PTs group. The direction of the relations between questionnaire axes showed that by increase each axis of questionnaire, the other axis increased (positive relations) in PTs group.

Table 3. Internal construct validity between questionnaire axes

| Axes                                               | Relation | Delivering physiotherapy service axis | Professionalism, autonomy, and accountability axis | Leadership and achieve excellence axis | Documentations and record axis |
|----------------------------------------------------|----------|---------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------|
| Delivering physiotherapy service axis              | r-value  | 1.000                                 |                                                    |                                        |                                |
|                                                    | P-value  |                                       |                                                    |                                        |                                |
| Professionalism, autonomy, and accountability axis | r-value  | 0.540                                 | 1.000                                              |                                        |                                |
|                                                    | P-value  | 0.002**                               |                                                    |                                        |                                |
| Leadership and achieve excellence axis             | r-value  | 0.558                                 | 0.693                                              | 1.000                                  |                                |
|                                                    | P-value  | 0.001**                               | 0.0001**                                           |                                        |                                |
| Documentations and record axis                     | r-value  | 0.440                                 | 0.270                                              | 0.436                                  | 1.000                          |
|                                                    | P-value  | 0.015*                                | 0.150                                              | 0.016*                                 |                                |
| Communication and working in partnership axis      | r-value  | 0.391                                 | 0.647                                              | 0.511                                  | 0.405                          |
|                                                    | P-value  | 0.032*                                | 0.0001**                                           | 0.004**                                | 0.027*                         |

r-value: Spearman ranked correlation coefficient; P-value: probability value ; \* significant at  $P\text{-value} < 0.05$ ; \*\* significant at  $P\text{-value} < 0.01$

Strong correlation ( $\pm 0.50$  to  $\pm 1$ ); Moderate correlation ( $\pm 0.30$  to  $\pm 0.49$ ); Low correlation ( $< \pm 0.29$ )

Cronbach's alpha coefficient measures the internal consistency, or reliability, of a set of survey items (Table 4). Use this statistic to help determine whether a collection of items consistently measures the same characteristic. Cronbach's alpha quantifies the level of agreement on a standardized 0 to 1 scale. Higher values indicate higher agreement between items. The reliability of the questionnaire was assessed by using the Cronbach's alpha

for each item of scale, as well as, the value for the overall axis of questionnaire. The overall Cronbach's alpha  $\geq 0.70$ , it's minimally acceptable by most standards. The reliability analysis by Cronbach's alpha for 30 questions more than 0.70 and ranged from 0.948 to 0.953, therefore, the questionnaire satisfied the reliability criteria.

Table 4: Internal consistency reliability for each item and axis of questionnaire

| The indicator | Cronbach's Alpha if item deleted |
|---------------|----------------------------------|
| Q1 (n=30)     | 0.951                            |
| Q2 (n=30)     | 0.951                            |
| Q3 (n=30)     | 0.949                            |
| Q4 (n=30)     | 0.951                            |
| Q5 (n=30)     | 0.953                            |

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|                       |       |
|-----------------------|-------|
| Q6 (n=30)             | 0.950 |
| Q7 (n=30)             | 0.951 |
| Q8 (n=30)             | 0.950 |
| Axis Q1 – Q8 (n=30)   | 0.950 |
| Q9 (n=30)             | 0.949 |
| Q10 (n=30)            | 0.950 |
| Q11 (n=30)            | 0.950 |
| Q12 (n=30)            | 0.950 |
| Q13 (n=30)            | 0.950 |
| Q14 (n=30)            | 0.950 |
| Q15 (n=30)            | 0.950 |
| Q16 (n=30)            | 0.951 |
| Axis Q9 – Q16 (n=30)  | 0.949 |
| Q17 (n=30)            | 0.948 |
| Q18 (n=30)            | 0.948 |
| Q19 (n=30)            | 0.950 |
| Q20 (n=30)            | 0.950 |
| Q21 (n=30)            | 0.950 |
| Q22 (n=30)            | 0.950 |
| Axis Q17 – Q22 (n=30) | 0.948 |
| Q23 (n=30)            | 0.952 |
| Q24 (n=30)            | 0.951 |
| Q25 (n=30)            | 0.950 |
| Q26 (n=30)            | 0.950 |
| Axis Q23 – Q26 (n=30) | 0.951 |
| Q27 (n=30)            | 0.949 |
| Q28 (n=30)            | 0.950 |
| Q29 (n=30)            | 0.952 |
| Q30 (n=30)            | 0.952 |
| Axis Q27 – Q30 (n=30) | 0.950 |

Cronbach's alpha coefficient (internal reliability coefficient) it should be  $\geq 0.70$

**Table 5: Internal consistency reliability for each axis and of questionnaire**

| Axes                                                      | Questions        | No. of items | Cronbach's Alpha if item deleted |
|-----------------------------------------------------------|------------------|--------------|----------------------------------|
| <b>Delivering physiotherapy service axis</b>              | <b>Q1 – Q8</b>   | <b>8</b>     | <b>0.950</b>                     |
| <b>Professionalism, autonomy, and accountability axis</b> | <b>Q9 – Q16</b>  | <b>8</b>     | <b>0.949</b>                     |
| <b>Leadership and achieve excellence axis</b>             | <b>Q17 – Q22</b> | <b>6</b>     | <b>0.948</b>                     |
| <b>Documentations and record axis</b>                     | <b>Q23 – Q26</b> | <b>4</b>     | <b>0.951</b>                     |
| <b>Communication and working in partnership axis</b>      | <b>Q27 – Q30</b> | <b>4</b>     | <b>0.950</b>                     |
| <b>Cronbach's alpha of axes as total</b>                  | <b>Q1 – Q30</b>  | <b>30</b>    | <b>0.952</b>                     |

An intra-class correlation coefficient (ICC) is used to measure the reliability of ratings in studies. The value of an ICC can range from 0 to 1, with 0 indicating no reliability

and one is perfect reliability. According to **Terry and Mae (2016)** poor reliability (ICC less than 0.50), moderate reliability (ICC from 0.50 to 0.75), good reliability (ICC

from 0.75 to 0.90), and excellent reliability (ICC greater than 0.90). The ICC for each questionnaire axis is presented in Table (6). The ICC value for overall questionnaire axis is 0.826 (95% CI 0.703-0.908). This indicated that acceptable questionnaire and an excellent reliability ( $P=0.0001$ ). The ICC for delivering physiotherapy service axis was 0.821 (95% CI 0.705 – 0.903;  $P=0.0001$ ), professionalism,

autonomy, and accountability axis 0.857 (95% CI 0.766 – 0.923;  $P=0.0001$ ), leadership and achieve excellence axis 0.863 (95% CI 0.769 – 0.927;  $P=0.0001$ ), documentations and record axis 0.793 (95% CI 0.641 – 0.891;  $P=0.0001$ ), and communication and working in partnership axis 0.969 (95% CI 0.476 – 0.839;  $P=0.0001$ ).

**Table 6: Inter-class correlation coefficients (ICC) for each axis of questionnaire**

| Axes                                               | Questions | CC    | 95% CI        | SEM | P-value |
|----------------------------------------------------|-----------|-------|---------------|-----|---------|
| Delivering physiotherapy service axis              | Q1 – Q8   | 0.821 | 0.705 – 0.903 | .41 | .0001*  |
| Professionalism, autonomy, and accountability axis | Q9 – Q16  | 0.857 | 0.766 – 0.923 | .71 | .0001*  |
| Leadership and achieve excellence axis             | Q17 – Q22 | 0.863 | 0.769 – 0.927 | .57 | .0001*  |
| Documentations and record axis                     | Q23 – Q26 | 0.793 | 0.641 – 0.891 | .56 | .0001*  |
| Communication and working in partnership axis      | Q27 – Q30 | 0.969 | 0.476 – 0.839 | .09 | .0001*  |
| ICC of axes as total                               | Q1 – Q30  | 0.826 | 0.703 – 0.908 | .02 | .0001*  |

## DISCUSSION

Assessing clinical competencies is important when preparing PT for clinical practice (Wolden, Hill et al. 2020). A range of tools has been used to evaluate competencies (Hu, Jones et al. 2020). The literature on the assessment of the competence of physiotherapists in the Egyptian context is limited.

The present study evaluated the psychometric properties of a questionnaire assessing professional competencies among physical therapists (PTs) in key standards: service delivery, professionalism/autonomy/accountability, leadership/excellence, documentation, and communication/partnership. Our findings demonstrate robust reliability and validity, supporting the instrument's utility for assessing PT competencies in clinical and research settings. This study conducted in Egypt to develop a concise (short form) assessment tool of competence in physiotherapy among physiotherapists in Egypt.

The tool used in this pilot survey was mapped to a competence framework developed for physiotherapy in Egypt. As such, this provided a novel way to understand current competence in PT. However, a limitation of this study is the reliance on self-reported competence, recognizing the possibility of social desirability bias.

The assessment tool of competence in the clinical field is essential for PT: it allows monitoring the acquisition of competence, helping to improve the competence and standards of practice of PT (Bielli, Bozzolan et al. 2011). The tool for evaluation of competence takes into account the performance of the professional during interaction with the patient or client, involving clinical reasoning applied to decision-making. The evaluation self-assessment tool includes the conceptual commands necessary to provide health services, expert judgment, teamwork,

communication, cultural skills, and professionalism (Roach, Frost et al. 2012).

The dominance of female PTs (63.3%), B.Sc. holders (63.3%), and practitioners in pediatrics (63.3%) reflects regional workforce trends. These demographics highlight the need for tailored continuing education, especially for specialists (26.7%) and consultants (10.0%) in underrepresented areas (e.g., internal medicine, women's health).

In this article, we report on the development of a standardized tool of PTs' self-reported Professionalism attitudes, values, communication, and behaviors concerning competence in Physiotherapy. The pilot survey was conducted using a specifically designed tool, to measure self-reported competence of Physiotherapy across 5 standers of physiotherapist competencies. The questionnaire used in this pilot survey based on world configuration (WCPT) of physical therapy and charters society for physiotherapy (CSP) and American physical therapy association (APTA) (Mwololo 2021).

Strong to moderate positive correlations (Spearman's  $r = 0.391-0.693$ ;  $*p < 0.05$ ) were observed between all axes except professionalism-autonomy-accountability and documentation ( $*r = 0.270$ ,  $*p = 0.150$ ). This indicates that improvements in one competency standard (e.g., leadership) consistently align with enhancements in others (e.g., communication), validating the questionnaire's internal coherence. The non-significant correlation between professionalism and documentation warrants further investigation, but may reflect distinct skill sets requiring targeted training.

Evidence from the present pilot survey supported the initial validation of the newly developed EPTCQ(short form) for measuring PT competencies among PTs. EPTCQ (short form) may be used to measure professional growth in



practicing PTs, who may be practitioners or may have post-graduate studies. The findings also supported the hypothesized developmental nature of PT competencies, that is, PT competencies are associated with the acquisition of knowledge and accumulated experiences over time.

Professionalism attitudes, values, and behaviors gained popularity and interest in the health care community over the past two decades due to reports of unprofessional behaviors among workers and demands for higher levels of professionalism from consumers (Anderson and Hall 2018). Within the physiotherapy profession, physiotherapists identified professionalism as one of the main requirements needed to gain public trust and rise to the status of a "doctoring profession" (Timmerberg, Dole et al. 2019). Anderson et al (Lefebvre, McKinney et al. 2020) reported that PT exhibits responsibility, self-awareness, and timeliness during clinical education experiences. The focus on professionalism among medical and health professionals resulted in significant discourse on how to define, identify, and measure this construct.

Internal Consistency: Cronbach's  $\alpha$  values for individual items (0.948–0.953) and axes (0.948–0.951) exceeded the 0.70 threshold, confirming excellent homogeneity. The overall  $\alpha$  (0.952) for the 30-item instrument further underscores its reliability.

-Test-Retest Reliability: ICC values for axes ranged from 0.793 (documentation) to 0.969 (communication), with an overall ICC of 0.826 (95% CI: 0.703–0.908), indicating "good" to "excellent" reproducibility per Terry and Mae (2016).

This pilot survey is both timely and useful, as it provides baseline data for the sample and demonstrates the importance of understanding the level of competence in Physiotherapy that Egyptian PTs have. The study also offers an assessment tool that subjects upon further testing and validation, could be used for further research and evaluation of competence in Physiotherapy.

To further improve the validity and reliability of the instrument, we recommend investigating the scale in other institutional settings in order to ascertain whether its validity and integrity remain intact in different clinical settings. Based on these applications, a confirmatory factor analysis should be conducted to confirm that the items on the adjusted scales accurately reflect the underlying constructs.

The validated questionnaire enables standardized assessment of PT competencies, aiding institutions in identifying gaps (e.g., low scores in leadership or documentation) and designing targeted interventions.

- High reliability supports its use for longitudinal tracking of competency development, credentialing, and benchmarking across settings (e.g., health insurance vs. private practice).

- Future studies should explore causal factors behind standard-specific variations (e.g., why professionalism and documentation were uncorrelated).

Assessing clinical competencies is a cornerstone in preparing physiotherapists (PTs) for effective clinical practice. The Egyptian Physiotherapists' Competencies

Questionnaire (EPTCQ) Short form to assess self-reported competencies among PTs. The tool was designed in alignment with international standards, including frameworks from the World Confederation for Physical Therapy (WCPT), the Chartered Society of Physiotherapy (CSP), and the American Physical Therapy Association (APTA), ensuring both global relevance and local applicability.

The findings of this pilot study provide strong evidence for the **validity and reliability** of the EPTCQ Short form. The internal consistency, as measured by Cronbach's alpha, ranged from **0.948 to 0.953** across the five competency standards, indicating **excellent reliability**. These results are consistent with those reported by Torres-Narváez et al. (2018), who found similarly high reliability ( $\alpha > 0.90$ ) in their tool for assessing clinical competencies in physical therapy students. Moreover, the **intra-class correlation coefficients (ICCs)** for the EPTCQ Short form standards ranged from **0.793 to 0.969**, with an overall ICC of **0.826**, reflecting **excellent test-retest reliability**. These values align with the standards proposed by Landis and Koch (1977), and are comparable to the ICCs reported in studies such as Anderson & Hall (2018), who validated the APTA Core Values Self-Assessment Tool.

The **construct validity** of the EPTCQ Short form was supported by significant positive correlations among the questionnaire's standards. For instance, the "Delivering Physiotherapy Services" domain showed strong correlations with "Professionalism, Autonomy, and Accountability" ( $r = 0.540$ ) and "Leadership and Achieve Excellence" ( $r = 0.558$ ). These findings echo those of Roach et al. (2012), who emphasized the interdependence of clinical reasoning, leadership, and professionalism in physiotherapy practice.

A notable strength of this study is its **novelty and contextual relevance**. While tools like the PT CPI (Clinical Performance Instrument) and the APTA Core Values Self-Assessment have been widely used in Western contexts, few tools have been adapted or developed for the Egyptian or broader Middle Eastern context. This study fills that gap by offering a culturally and professionally tailored instrument that reflects the competencies expected of Egyptian PTs.

However, the study also has limitations. The reliance on **self-reported data** introduces the potential for **social desirability bias**, a concern also noted by Denton et al. (2017) in their evaluation of professionalism tools. Additionally, the **sample size** ( $n = 30$ ) and the **homogeneity** of the participants (from health insurance hospitals) may limit the generalizability of the findings. Future studies should aim to validate the EPTCQ Short form across a broader and more diverse sample, including PTs from academic, military, and private sectors.

In comparison to international studies, the EPTCQ Short form demonstrates comparable psychometric properties. For example, Hu et al. (2020) validated a Chinese version of the Assessment of Physiotherapy Practice and reported similar reliability and validity metrics. This suggests that the EPTCQ Short form could serve as a robust tool not only

within Egypt but potentially in other Arabic-speaking or culturally similar regions.

In conclusion, the EPTCQ Short form is a promising instrument for assessing physiotherapist competencies in Egypt. It provides a foundation for future research, professional development, and policy-making in physiotherapy education and practice. Further validation through **confirmatory factor analysis** and **cross-institutional studies** is recommended to enhance its applicability and robustness.

## CONCLUSION

This study confirms the questionnaire's validity and reliability for evaluating multidimensional PT competencies. Its implementation can enhance professional development programs and the quality of care. Future research should expand demographic diversity and investigate cross-cultural applicability.

## Declaration of Conflicting Interests

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## Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics approval and consent to participate

This study was approved by the Research Ethics Committee of the Faculty of Physical Therapy, Cairo University with register number P.T.REC/012/004331 and followed all the national and international standards that apply to research with human participants by the Declaration of Helsinki.

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