The Test-retest Reliability of a Body Posture Literacy Questionnaire Among Polish Teachers From Different Educational Levels

Marta Kinga Labecka
marta.labecka@swf.edu.pl

Department of Rehabilitation, Jozef Pilsudski University of Physical Education in Warsaw, Poland

Agnieszka Jankowicz-Szymańska
University of Applied Sciences in Tarnow, Faculty of Health Sciences, Department of Physiotherapy, Tarnow, Poland

Magdalena Plandowska
Faculty of Physical Education and Health in Biala Podlaska, Jozef Pilsudski University of Physical Education in Warsaw, Biala Podlaska, Poland

Elżbieta Olszewska
Józef Piłsudski Academy of Physical Education in Warsaw, Poland

Reza Rajabi
Health and Sport Medicine Department, Faculty of Physical Education and Sport Sciences, University of Tehran, Iran

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Abstract

To develop a reliable and valid Teachers’ Body Posture Literacy Questionnaire (TBPLQ) to examine their body posture knowledge. The tool was based on a Parents Body Posture Literacy Questionnaire (PBPLQ) and modified and validated through discussion with experts which were conducted in two rounds. Corrective gymnastics, physiotherapy, ergonomics, physical education (PE) experts and doctoral and postdoctoral scholars evaluated content validity. Test-retest repeatability was tested using Cohen’s kappa coefficient. The study used a convenience sample of 195 teachers from 3 different educational levels: PE, kindergarten, and primary education in two rounds of test-retest. The initial round encompassed 95 participants, with pre-test and post-test procedures applied using the original TBPLQ. Subsequently, the second round involved 100 participants and followed a similar approach, incorporating modifications to the TBPLQ based on the reliability outcomes observed in the first round. The results of the first-round test–retest TBPLQ reliability, with 95 samples resulted in an overall reliability of 0.77 (range 0.02 to 1). This indicated that the questionnaire still lacks sufficient reliability. Consequently, after the necessary amendments and modifications, the questionnaire’s reliability was tested for the second time with 100 samples. Notably, the overall reliability of 0.82 (ranging from 0.50 to 1) was established for the TBPLQ indicating that 87.5% of the questionnaire items achieved reliability scores within the substantial and almost perfect range and only 12.5% of the items attained moderate reliability scores. The questionnaire is a new self-report measure, reliable and relevant to effectively evaluating teachers’ literacy in postural health that can be applicable in both research and practical contexts, extending its use to larger and more diverse populations.

Introduction

Postural defects, deemed a contemporary pandemic and societal issue (Kolarová et al., 2019), affect 60–80% of children (Klimkiewicz-Wszelaki et al., 2019). Causes include congenital or acquired defects, exogenous factors (physical activity, eating habits, body position), and endogenous factors affecting general health (Modrzejewska & Malec, 2017). Noteworthy environmental factors involve prolonged sitting in classrooms, poor posture, inadequate furniture (Murphy et al., 2004), and the manner of carrying school backpacks (Minghelli et al., 2021). In particular, an inappropriate lifestyle and insufficient physical activity stand out as common causes (Skorupka & Asienkiewicz, 2014).

Given the risk of body posture defects at every child development stage, preventive measures are vital. Early diagnosis, especially in children under 15, is crucial for skeletal modifications and easier postural correction (Mitova, 2015). Untreated poor posture can lead to body static impairments, musculoskeletal disorders, pain, increased healthcare costs, and mental symptoms (Domljan et al., 2010; Hagner et al., 2010). Untimely correction significantly impacts life quality (Kędra et al., 2021).

The situation highlights the need for systematic diagnosis of children's locomotor apparatus development during early school years and preventive actions from early childhood (Kowalski et al., 2013). Preventive actions should include effective screening tests (Lipkin et al., 2020; Moment et al.).

Supporting child development extends beyond parents to those shaping the child's environment (Office, 2020). Family doctors, pediatricians, nurses, and especially teachers should pay attention to a child's body posture (Antczak-Komoterska & Lewińska, 2022). Primary education teachers play a crucial role as the first three years of schooling contribute to posture deterioration (Gesell, 2021; Nichele et al., 2016). They have the opportunity to observe changes and ensure a correct working environment. Teachers should shape correct sitting habits and posture (Gao et al., 2021).

Physical Education, as a fundamental component of engaging in physical culture, significantly contributes to molding the character of young individuals. In this context, it is crucial for educators to acknowledge that PE facilitates holistic development, instills a sense of joy through physical effort, and supports overall health maintenance (Ruzimbaevich &
Ruzimbaev, 2021). PE teachers also contribute significantly to preventing body posture defects (Khakimovich & Rozmatovich, 2022).

To the best of the researcher's knowledge, no scientific studies exist on educational teachers' knowledge regarding recognition, prevention, correction, and the causes of body posture defects. Therefore, it is necessary to know about pro-health activities and the role of correct body posture and how to create it, as well as appropriate motivation for this type of action, skills, and actual preventive actions. As a result, this study aims to develop a valid and reliable questionnaire examining the level of teachers' literacy in postural health, including postural defeat recognition in pupils and its probable causes and solutions to prevent or correct it.

**Material and Methods**

This research included four phases. Phase 1 was from February to March 2023 and involved creating a questionnaire based on the Parents Body Posture Literacy Questionnaire (PBPLQ) (Labecka et al., 2023) and adjusted by expert consultation. Phase 2 was conducted in April 2023. The questionnaire was translated into Polish. Phase 3 was conducted in August 2023, as a first-round reliability (pilot reliability). Phase 4 was a survey to test the questionnaire's reliability of the questionnaire in November 2023 as a second-round reliability. This was done after revisions were made by the international committee of experts to the English version of the questionnaire based on the results of the first-round reliability study (Fig. 1).

The study was conducted by the Declaration of Helsinki and approved by the Ethics Committee of Jozef Pilsudski University of Physical Education in Warsaw (protocol code 01–07/2023, date of approval 18 February 2023). Participation in the study was voluntary. Respondents provided informed consent, and data privacy and confidentiality were assured by treating the data aggregately and coding the names.

Insert Fig. 1 near here

**Questionnaire development**

The questionnaire was based on the pool of items from previous questionnaires (Labecka et al., 2023; Rajabi et al., 2023). The majority of questions were obtained from the Parents Body Posture Literacy Questionnaire (PBPLQ) (Labecka et al., 2023). This questionnaire was chosen because it had high reliability and was relevant in assessing postural knowledge. In addition, it was scientific and was prepared according to rigorous questionnaire development procedures.

A committee of six experts in postural health (doctoral and postdoctoral scholars, physiotherapists, physical education teachers, and instructors of corrective gymnastics/exercises) evaluated the draft questionnaire in English for content validity. Based on literature from postural health and discussions between experts, questions were removed or reworded and new ones were added. Because the draft questionnaire was aimed at parents, the questions were modified to be appropriate for other audiences including teachers. The initial question pool contained 36 items divided into 3 sections: postural abnormality, postural ergonomics, and sociodemographic data. The experts individually wondered which questions were most important and assessed the questionnaire independently. Then they discussed together the formulation of the questions and answers, as well as the structure and format of the questionnaire in face-to-face and online meetings. A brainstorming session was conducted. The committee of experts was international, so discussions were conducted in English. Through multiple exchanges of information and revision of feedback, the elements of the Delphi method (McPherson et al., 2018) transformed the experts' opinions into a group consensus. Final recommendations were taken from the arguments most widely accepted by the participants and always to improve the
The original questionnaire was developed in English. The pool of questions turned out to be much larger than the final number of items that were included in the PBPLQ model questionnaire.

After determining the preliminary version of the questionnaire, it was translated from English into Polish using the guidelines recommended by Oxford University Innovation to ensure appropriate standards (Wild et al., 2005). Forward translation by two independent translators (Polish native speakers), discussion between ‘forward’ translators and the Polish research team, backward translation by two independent translators (English native speakers), and a review by a physiotherapist established the final Polish version of the questionnaire.

Reliability Analysis

The first round of test–retest reliability as pilot reliability was conducted twice, with approximately 1 week between the first and second administration of the questionnaire to obtain information on how the BPLQT questionnaire was working, whether it was feasible to use it in a real-world setting and to complete it in a reasonable amount of time, assessing its ease of understanding, its acceptability and evaluating the initial test–retest reliability of the questionnaire. At that time, the respondents were not allowed to see the answers they gave when the questionnaire was first administered. The authors chose the interval between questionnaire administrations based on the concept that the time should be long enough that respondents would not remember previously selected answers, but short enough that the acquisition of new knowledge was unlikely (Parmenter & Wardle, 2000). The questionnaire was administered to 95 teachers of both sexes and of different ages. Respondents were recruited from all school types (kindergarten, primary, secondary, and high school) in various cities of Poland through various channels (e-mails, Facebook posts, etc.) where information with a link to an online preliminary version of the questionnaire was provided. Electronic questionnaires were checked by the researcher from backstage and invalid questionnaires would be eliminated. Respondents were invited to give opinions about the questionnaire, their difficulties in understanding the questions and answers, and comment on other aspects. Due to slight test–retest reliability results in some questions, and opinions of the experts and participants, the questionnaire was modified. Finally, the experts decided to carry out the test–retest again to check the reliability of the modified questionnaire. A second round of test–retest reliability was performed with 100 newly enrolled teachers who were unfamiliar with the content and structure of the questionnaire. The rules for conducting the test–retest remained unchanged (as in the first round).

Statistical Analysis

Data were analyzed using Microsoft Excel and were presented as the range, mean, or n (%). Cohen's kappa coefficient was applied to evaluate the test–retest reliability (data from the same rater at two different points in time). Values ≤ 0 indicating no agreement, 0.01–0.20 as none to slight, 0.21–0.40 as fair, 0.41– 0.60 as moderate, 0.61–0.80 as substantial, and 0.81–1.00 as almost perfect agreement (McHugh, 2012). To ensure the content validity of the questionnaire, experts from various disciplines and different international institutions reviewed and agreed upon the questionnaire's content coverage.

Results

Questionnaire development

The initial questionnaire was determined and formed based on previous questionnaires for parents and a total of 41 items. Based on the opinions of experts, in the first part of the questionnaire (postural abnormality), a fourth column was added containing graphics presenting corrective exercises of the abnormality. Also, in the third column (causes of the abnormality) an answer that is a combination of two or three correct answers was added (e.g. 1&2 or 1,2,3). In the second part of the questionnaire (postural ergonomics), in the second column, the 'All of the above' option was added.
The third part of the questionnaire was significantly modified (the question pool has been increased from 20 to 25 items) to include teachers’ socio-demographics, professional data, and educational status.

**Reliability Analysis**

Table 1 presents the socio-demographic and professional characteristics of the teachers. Ninety-five teachers completed the first questionnaire administered (I round), where the majority were female (76.8%). Respondents ranged in age from 26 to 58 years (38.20 ± 10.97) from different educational levels with over 10 years of work experience (11.59 ± 10.49). It was necessary to modify some questions and sub-questions to improve them based on respondents’ comments.

<table>
<thead>
<tr>
<th>Item</th>
<th>I round</th>
<th>II round</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>73</td>
<td>76.8</td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>23.2</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 35</td>
<td>20</td>
<td>21.1</td>
</tr>
<tr>
<td>36–45</td>
<td>47</td>
<td>49.5</td>
</tr>
<tr>
<td>≥ 46</td>
<td>28</td>
<td>29.4</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kindergarten</td>
<td>33</td>
<td>34.7</td>
</tr>
<tr>
<td>Primary school</td>
<td>30</td>
<td>31.6</td>
</tr>
<tr>
<td>Physical education</td>
<td>32</td>
<td>33.7</td>
</tr>
<tr>
<td>Work experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 10</td>
<td>19</td>
<td>20.0</td>
</tr>
<tr>
<td>11–20</td>
<td>55</td>
<td>57.9</td>
</tr>
<tr>
<td>≥ 21</td>
<td>21</td>
<td>22.1</td>
</tr>
</tbody>
</table>

n – number of participants; %- percent

The 100 teachers filled out the modified version of the questionnaire (II round) where the majority were female (58.0%). Respondents ranged in age from 25 to 48 years (30.24 ± 8.57) from different educational levels with under 10 years of work experience (8.54 ± 6.46). There was no adjustment to the questionnaire after the second-round reliability study as it seemed that the modifications of the questionnaire (content and graphics) after the second round were effective and in line with expert group expectations.

Insert Table 1 near here

Table 2 presented the Cohen's kappa coefficient results for all items in the teachers' groups included in the study. After the first round of reliability (95 teachers out of 108), the reliability scores spanned a range from 0.02 to 1.00 overall, 0.74 for the postural abnormality questions and 0.80 for the postural ergonomics questions. In the first part of the questionnaire (postural abnormality items), sub-item 2 from question 1 (Cohen's kappa = 0.02), sub-item 2 from question 2 (Cohen's kappa = 0.37), sub-item 3 from question 5 (Cohen's kappa = 0.54), and sub-item 3 from question 8 (Cohen's kappa = 0.46) obtained slight reliability scores. In the 2 sections, sub-item 1 from question 9 (Cohen's kappa = 0.53), sub-
item 2 from question 11 (Cohen's kappa = 0.55), and sub-item 1 from question 13 (Cohen's kappa = 0.59) displayed moderate reliability. After analyzing the respondents' answers, the researchers observed was a lack of clarity resulting in multiple interpretations of selected questions, so modifications in the questionnaire were required. In the first part of the questionnaire, in column 3, the causes of abnormalities were reformulated into statements describing the abnormalities; in column 4, the answer "I don't know" was added, in column 2, in questions 1,2, the names of the abnormalities were changed; in column 3, in questions 5,8, statements describing the abnormalities were modified. The second part of the questionnaire (postural ergonomics items) remained unchanged. In the third part of the questionnaire (socio-demographic and professional characteristics), 1 question about external and internal factors affecting body posture was deleted, and question number 13 was modified. Finally, the total number of questions has changed (from 41 to 40).
Table 2
Data describing the reliability of questionnaire items.

<table>
<thead>
<tr>
<th>Question/item (Postural abnormality)</th>
<th>Sub-item1 (Recognition of abnormalities)</th>
<th>Sub-item2 (Naming of the abnormality)</th>
<th>Sub-item3 (causes of the abnormality)</th>
<th>Sub-item4 (corrective exercise for the abnormality)</th>
<th>Items average (range, mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 round</td>
<td>2 round</td>
<td>1 round</td>
<td>2 round</td>
<td>1 round</td>
</tr>
<tr>
<td>1 Forwarded head</td>
<td>1</td>
<td>1</td>
<td>0.02</td>
<td>0.82</td>
<td>0.70</td>
</tr>
<tr>
<td>2 Thoracic Kyphosis</td>
<td>1</td>
<td>1</td>
<td>0.37</td>
<td>0.69</td>
<td>0.80</td>
</tr>
<tr>
<td>3 Lumbar Lordosis</td>
<td>0.85</td>
<td>1</td>
<td>0.83</td>
<td>0.81</td>
<td>0.83</td>
</tr>
<tr>
<td>4 Scoliosis</td>
<td>0.90</td>
<td>1</td>
<td>0.78</td>
<td>1</td>
<td>0.62</td>
</tr>
<tr>
<td>5 Geno Varum</td>
<td>0.75</td>
<td>1</td>
<td>0.64</td>
<td>0.74</td>
<td>0.54</td>
</tr>
<tr>
<td>6 Geno Valgum</td>
<td>0.91</td>
<td>1</td>
<td>0.85</td>
<td>0.5</td>
<td>0.82</td>
</tr>
<tr>
<td>7 Feet abnormalities</td>
<td>0.73</td>
<td>0.81</td>
<td>0.66</td>
<td>0.81</td>
<td>0.64</td>
</tr>
<tr>
<td>8 Toe abnormalities</td>
<td>1</td>
<td>1</td>
<td>0.85</td>
<td>0.95</td>
<td>0.46</td>
</tr>
<tr>
<td><strong>Sub-items average</strong></td>
<td><strong>0.73–1.00 (0.89)</strong></td>
<td><strong>0.81–1 (0.98)</strong></td>
<td><strong>0.02–0.85 (0.63)</strong></td>
<td><strong>0.50–1 (0.79)</strong></td>
<td><strong>0.46–0.83 (0.68)</strong></td>
</tr>
<tr>
<td><strong>Postural Ergonomics Questions/items</strong></td>
<td><strong>Sub-item1 kappa value (Recognition)</strong></td>
<td><strong>Sub-item2 kappa value (Mechanism)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 round</td>
<td>2 round</td>
<td>1 round</td>
<td>2 round</td>
<td>1 round</td>
</tr>
<tr>
<td>9 Sitting posture on the floor while playing</td>
<td>0.53</td>
<td>0.7</td>
<td>0.77</td>
<td>0.84</td>
<td>0.53</td>
</tr>
<tr>
<td>10 Lifting and carrying postures</td>
<td>0.83</td>
<td>1</td>
<td>0.78</td>
<td>0.5</td>
<td>0.78</td>
</tr>
</tbody>
</table>

Data presented as range and mean; n – number of participant
<table>
<thead>
<tr>
<th>Question/item (Postural abnormality)</th>
<th>Sub-Item1 (Recognition of abnormalities)</th>
<th>Sub-Item2 (Naming of the abnormality)</th>
<th>Sub-Item3 (causes of the abnormality)</th>
<th>Sub-Item4 (corrective exercise for the abnormality)</th>
<th>Items average (range, mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with correct posture while working with computer</td>
<td>1</td>
<td>1</td>
<td>0.55</td>
<td>0.6</td>
<td>0.55–1 (0.78) 0.60–1 (0.8)</td>
</tr>
<tr>
<td>Walking posture</td>
<td>1</td>
<td>1</td>
<td>0.78</td>
<td></td>
<td>0.78–1 (0.89) 0.70–1 (0.85)</td>
</tr>
<tr>
<td>Smart phone using posture</td>
<td>0.59</td>
<td>1</td>
<td>0.70</td>
<td>0.73</td>
<td>0.59–0.70 (0.65) 0.73–1 (0.86)</td>
</tr>
<tr>
<td>Writing posture</td>
<td>1</td>
<td>1</td>
<td>0.85</td>
<td>0.58</td>
<td>0.85–1 (0.93) 0.58–1 (0.79)</td>
</tr>
<tr>
<td>Back pack carrying posture</td>
<td>1</td>
<td>1</td>
<td>0.78</td>
<td>0.97</td>
<td>0.78–1 (0.90) 0.97–1 (0.98)</td>
</tr>
<tr>
<td>Sleeping posture</td>
<td>0.76</td>
<td>0.81</td>
<td>0.80</td>
<td>0.89</td>
<td>0.78–0.80 (0.78) 0.81–0.89 (0.85)</td>
</tr>
<tr>
<td>Sub-Items average</td>
<td>0.53–1.00 (0.84)</td>
<td>0.55–0.85 (0.75)</td>
<td></td>
<td>Total = 0.80 Total = 0.83</td>
<td></td>
</tr>
</tbody>
</table>

Data presented as range and mean; n – number of participant

In the second round of reliability of TBPLQ, (100 teachers out of 118) were assessed using 16 questions with 48 sub-questions, 32 sub-questions related to postural abnormalities, and 16 sub-questions related to postural ergonomics. The overall reliability (16 questions) of the TBPLQ was demonstrated as 0.82 (range 0.46 to 1.00), with 54.1% demonstrating almost perfect reliability (range 0.81 to 1.00), 31.2% demonstrating substantial reliability (range 0.61 to 0.80) and 14.6% demonstrating moderate reliability (range 0.41 to 0.60). More detailed results regarding reliability for postural abnormalities and postural ergonomics are presented in Table 2.

Insert Table 2 near here

**Final questionnaire**

After refinements and modifications were made as a result of the validation process and the first round of reliability tests, the final questionnaire (validated Polish version, and English version) was formulated [Supplementary material]. The second round of reliability of TBPLQ indicated a substantial improvement. The first and second round reliability test comparison is provided in Figs. 2 and 3. Finally, the questionnaire took the form of a self-administered document that was easy to complete and not time-consuming; it consisted of three parts (40 questions – including 8 questions for postural abnormality with 32 sub-items, 8 questions for postural ergonomics with 16 sub-items, and 24 questions about socio-demographics, professional data, and educational status).

Insert Figs. 2 and 3 near here
Discussion

The primary aim of this study was to assess the test–retest reliability of a self-reporting questionnaire designed to evaluate the level of teachers’ literacy in postural health, encompassing aspects such as recognition, naming, describing, selecting an appropriate corrective exercise for postural abnormalities, and the ergonomics of daily activities.

The results of the first-round test retest TBPLQ reliability resulted in overall substantial reliability. However, some questionnaire items showed slight to moderate reliability, which indicated that the questionnaire still lacked sufficient reliability. Upon closer examination of sub-items 9 and 13, it became apparent that these sub-items contained misleading and ambiguous elements. For example, in the first sub-item of item 9, variations in graphic patterns (some depicting a child and others an adult) were identified. Similarly, the first sub-items of item 13 presented graphics with striking similarities, making it challenging to select the correct response. It is important to note that certain refinements were necessary to enhance reliability and to address the observed discrepancies between expected and actual outcomes, so specific modifications to the final questionnaire were made. These adjustments included the redesign of specific items and their sub-items based on experts’ and participants’ opinions. Consequently, after the necessary amendments and modifications, the questionnaire’s reliability was tested for the second time. Notably, overall almost perfect agreement reliability was established for the TBPLQ indicating that 87.5% of the questionnaire items achieved reliability scores within a range of substantial to almost perfect, and only 12.5% of the items attained moderate reliability scores. This nuanced assessment aligns with the findings of a recently published study (Rajabi et al., 2023).

Owing to the development of modern civilization, it seems reasonable to pay attention to the position of the body adopted by children during various everyday activities. School should be the first environment for preventing postural issues, which involves eliminating factors that negatively affect the development of the child’s body (Skorupka & Asienkiewicz, 2014). The school is responsible for creating such conditions for the functioning of the child within it, which will prevent the formation and spread of body posture defects. One of the tools in these activities is conducting active education among school principals, teachers, and parents, as well as children and youth. It should be obvious that posture defects should be detected as early as possible; however, information and educational activities undertaken in the field of postural defects prevention have not been fully effective (Office, 2020). There may be several reasons for the lack of effectiveness of educational activities: difficulties in reaching recipients, or financial problems. However, attention should also be paid to the substantive preparation of early school and preschool education teachers, as well as teachers of other subjects to conduct education in this area, as it is currently not done adequately. In this regard, one of the obstacles to assessing the level of theoretical and practical abilities of teachers regarding students’ postural abnormalities is the absence of a comprehensive yet simple and practical questionnaire. Such a tool is needed to examine and evaluate the literacy of teachers in common body posture abnormalities among students in schools. So, the current questionnaire, called TBPLQ, is addressed to PE, kindergarten, and primary education teachers: people who, at various stages of education, are particularly responsible for caring for the quality of the body posture of children and youth and for developing in children and youth the care for the quality of body posture and healthy lifestyle.

The study has two limitations: technical terminology and sample size. Despite our conscientious efforts to simplify the terminology used in the questionnaire, it is worth noting that the incorporation of technical and medical language relating to postural abnormalities may inadvertently have led to responses that were less reliable. Although our study adhered to the standard recommendation of utilizing a minimum of 100 participants for a robust reliability estimate (as consistent with our sample size), it is important to acknowledge that this represents the bare minimum necessary to achieve reliable outcomes.

In contrast, the study’s strengths are rigorous questionnaire development involving multiple rounds of pretests, meticulous item selection, extensive expert reviews to ensure the content validity and clarity of the questionnaire; and
comprehensive content discussion of all the issues of the questionnaire.

The results of the research, which will be carried out with the use of the questionnaire, will not only help to assess teachers' literacy about postural health but will also enable the preparation of a package of ergonomics and other recommendations for educational institutions in these fields. It will also be possible to prepare an auxiliary package (brochures, electronic materials) supplementing teachers' knowledge, or workshops to improve their practical skills. The findings will complement evidence-based knowledge that takes into account the social and health needs of different society groups.

Conclusions

The Teachers' Body Posture Literacy Questionnaire (TBPLQ) demonstrated commendable overall reliability, encompassing substantial and almost perfect scores, signifying its potential to assess teachers' knowledge of postural health in school-age students effectively. The TBPLQ is a newly established self-report questionnaire, proven to be both valid and reliable, making it suitable for application in both research and practical settings. Its adaptability extends its utility to broader and more diverse populations.

Declarations

Acknowledgments

The authors would like to show gratitude to Mr. Piotr Tabor from Józef Piłsudski University of Physical Education in Warsaw who helped collect the survey for the second round of pretest.

Declaration of interest statement

The authors report there are no competing interests to declare.

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References


Figures

Figure 1

Phases of developing the Teachers’ Body Posture Literacy Questionnaire (TBPLQ).
Figure 2

Item by item reliability improvement of the TBPLQ.

Figure 3

Overall Reliability Improvement of TBPLQ.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.
• Supplementarymaterials.docx