

# Back Pain and Body Posture Evaluation Instrument for Adults: Expansion and Reproducibility



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## ■ ABSTRACT:

**Background:** The BackPEI questionnaire was developed and validated just exclusively to evaluate children. **Aims:** To propose, validate, and test the reproducibility of an expanded version of the Back Pain and Body Posture Evaluation Instrument (BackPEI), originally designed to assess back pain in school-aged children, for use with adults. **Design:** Validation Study. **Methods:** Five questions from the original BackPEI were replaced, resulting in the revised instrument (BackPEI-A) containing 20 questions. Three experts checked the content validity of the revised instrument, and the reproducibility was tested by trialing the questionnaire with 154 adults. **Results:** The reproducibility data for the questions regarding pain intensity, analyzed using the Wilcoxon test and intraclass correlation coefficient (ICC), indicated that (a) there was no difference between the medians and (b) the answers were highly correlated, both for lower back ( $p = .574$ ) (ICC = 0.908) and cervical ( $p = .968$ ) (ICC = 0.865) pain. The reproducibility data for the remaining questions analyzed using the  $\kappa$  coefficient were classified as moderate ( $0.4 < \kappa \leq 0.6$ ) or very good ( $\kappa > 0.8$ ). **Conclusion:** The BackPEI-A is a reproducible, valid, and reliable instrument for use in the evaluation of back and neck pain and their associated risk factors. The instrument also facilitates the evaluation of postural habits in activities of daily living in adults.

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The number of individuals reporting the occurrence of lower back pain, neck pain, and postural alterations in the spine has increased (Fejer, Kyvik, & Hartvigsen, 2006; Ferreira et al., 2011), leading to personal, economic, and social costs (Rubin, 2007). Because the evolution of pain and postural alterations are often asymptomatic (Gore, 2001; Jarvik et al., 2005), these pain-related problems affect the performance of activities of daily living (ADLs) (Noll, Candotti,

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Tiggemann, Schoennel, & Vieira, 2012) and may, as in the case of back pain, lead to temporary disability (Cromie, Robertson, & Best, 2000).

Despite being the focus of various studies (Ferreira et al., 2011; Noll et al., 2012), lower back and neck pain are not fully understood because they involve multiple causal factors. In the literature, both pain and postural alteration have been related to risk factors such as gender, age, anthropometric parameters, spinal mobility, vertebral degeneration, profession, the practice of physical exercise, time spent in front of a computer, time sleeping, automobile accidents; and postural habits adopted in ADLs (Cromie et al., 2000; Ferreira et al., 2011; Marshall & Tuchin, 1996; Rubin, 2007). However, there is no consensus (Lee et al., 2015; Rubin, 2007) regarding these risk factors, which justifies investigating the risk factors associated with lower back pain, neck pain, and postural alterations in distinct populations.

Most epidemiologic studies that seek to investigate pain and its associated risk factors are based on the use of questionnaires. Among those available and validated, most are restricted to evaluating the presence of pain alone (Smith et al., 1997), functionality (Noll, Candotti, Vieira, & Loss, 2013), or postural habits in ADLs (Karahan & Bayraktar, 2004). As far as we know, the Back Pain and Body Posture Evaluation Instrument (BackPEI) is the only instrument designed

to jointly evaluate the presence of back pain and its associated risk factors (demographic, socioeconomic, genetic, behavioral, and postural) (Noll et al., 2013). However, the BackPEI was developed and validated exclusively to evaluate school-aged children (11–16 years of age) and does not consider pain in the cervical region of the spine. Therefore, the aim of this study was to propose, validate, and test the reproducibility of an expanded version of the BackPEI, which besides evaluating lower back pain also evaluates neck pain and can be used with adults. Such an instrument could be used in cross-sectional, epidemiologic, longitudinal, or observational studies that seek to identify the risk factors associated with pain.

## MATERIAL AND METHODS

The expanded version of the BackPEI for adults (BackPEI-A) was developed in six stages: (1) modification of the original questions; (2) exclusion of some of the original questions; (3) inclusion of new questions; (4) revision of the questionnaire by experts from the area and elaboration of the final version; (5) verification of the instrument's reproducibility; and (6) translation to English.

In attempting to identify the risk factors of lumbar and cervical pain in adults, in stages 1–3 the decision to retain, modify, exclude, or include questions from the

TABLE 1.

**Description of Risk Factors Associated with Back and Neck Pain and the Reference Studies That Served As a Basis for Elaborating the Questions Contained in the Back Pain and Body Posture Evaluation Instrument for Adults (BackPEI-A) (Brazil, 2015)**

Risk Factors	Questions	Reference Studies: Neck Pain	Reference Studies: Back Pain
Demographic	Age and gender	Fejer et al. (2006); Rubin (2007)	Rubin (2007)
Behavioral	Regularity of physical exercise and whether practiced competitively	Rubin (2007)	Rubin (2007)
	The number of hours spent per day watching television and using the computer	Smith, Louw, Crous, & Grimmer-Somers (2009)	Kanchanomai, Janwantanakul, Pensri, & Jiamjarasrangsri (2015)
	The number of hours spent sleeping and the habit of reading in bed	Paris (1990)	Edwards, Almeida, Klick, Haythornthwaite, & Smith (2008)
	Posture in relation to sleeping, sitting in a chair to write, sitting in a chair to talk, using a computer, and lifting an object from the ground	Karahan & Bayraktar (2004)	Balagué, Mannion, Pellisé, & Cedraschi (2012)
Socioeconomic	Involvement in a car accident	Marshall & Tuchin (1996)	—
	Type of school and schooling of the parents and/or responsible adults	Rubin (2007)	Rubin (2007)

original BackPEI in the BackPEI-A was based on the practical clinical experience of the authors together with a bibliographic survey (Table 1). In the first stage, the modification of questions 1-20 from the original BackPEI involved substituting words referring to the school environment, such as “play” and “study,” with words such as “work” and “read.” In addition, the images of children in questions 9-12 of the original

BackPEI were substituted with images of adults and the number of postural options was reduced. Ten questions from the original BackPEI referring to the practice of physical exercise, life habits, and the presence, frequency, and intensity of back pain were maintained. In the second stage, questions 13-17 of the original BackPEI, referring to the transport of school material, parents’ education, and parents’

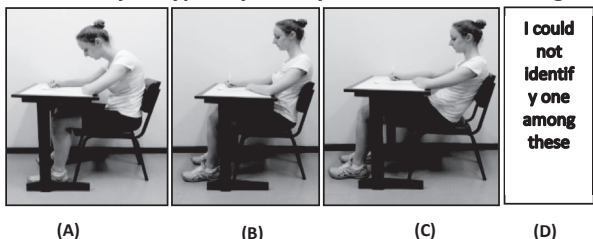
### Back Pain and Body Posture Evaluation Instrument for adults (BackPEI- A)

Read each question carefully and then select the best answer from the choices provided.

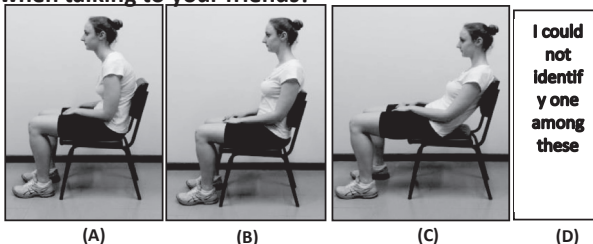
If you have any question, please do not hesitate to ask the evaluator in charge.

Name: \_\_\_\_\_ Date of birth: \_\_\_/\_\_\_/\_\_\_  
 Age: \_\_\_\_\_ Weight: \_\_\_\_\_ kg Height: \_\_\_\_\_ cm Sex:  Male  Female  
 Fone: \_\_\_\_\_ Work: \_\_\_\_\_  
 E-mail: \_\_\_\_\_

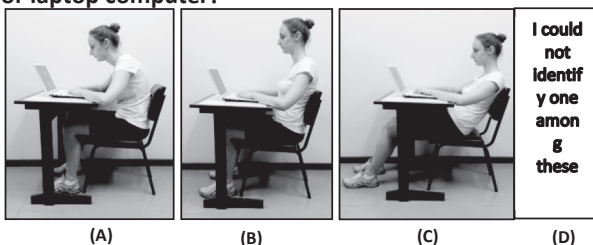
1. How do you typically sit at your desk when writing?



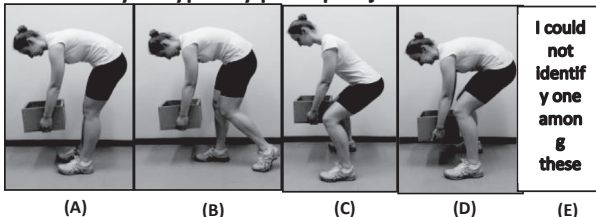
2. How do you typically sit on a chair or a bench when talking to your friends?



3. How do you typically sit when using your desktop or laptop computer?



4. How do you typically pick up objects from the floor?



5. Have you been involved in any car accident?

- a) yes b) no

6. Do you practice sport or physical exercise regularly?

- a) yes, please describe: \_\_\_\_\_
- b) no (go to question 9)

7. How many days per week do you practice sport or exercise?

- a) 1 - 2 days a week b) 3 - 4 days a week
- c) 5 or more days a week d) It varies by week

8. Do you practice this sport or physical exercise competitively?

- a) yes b) no

9. How many hours per day do you spend seated using your desktop/laptop computer?

- a) 0 - 1 hour a day b) 2 - 3 hour a day
- c) 4 - 5 hour a day d) 6 - 7 hour a day
- e) I don't know, it depends on the day

10. Do you usually read or study in bed?

- a) yes b) no c) sometimes

11. What is your favorite sleeping position?

- a) on my side b) face down (on my stomach)
- c) face up (on my back) d) it varies

12. How many hours do you spend sleeping in a day - 24 hour period?

- a) 0 - 6 hours b) 7 hours
- c) 8 - 9 hours d) 10 hours or more
- e) I don't know, it depends on the day

FIGURE 1. ■ Back Pain and Body Posture Evaluation Instrument for Adults (BackPEI-A). Questions 1 to 12 refer to the risk factors of back and neck pain.

**13. Have you felt (or have been) back pain in the last 3 months?**

- a) yes (please continue answering the questionnaire)  
b) no (go to question 17)  
c) I don't know

**14. How often do you feel (or felt) back pain?**

- a) only once                      b) once a month  
c) once a week                  d) more than once a week  
e) I don't know

**15. Does the back pain prevent (or have prevented) you from performing daily life activities, such as: working, reading, practicing sports?**

- a) Yes    b) no    c) I don't know

**16. On the scale from 0 to 10, please identify the intensity of your back pain for the last 3 months.**

(Please add a "X" along the line that corresponds to your pain intensity).



**17. Have you felt (or have been) neck pain in the last 3 months?**

- a) yes (please continue answering the questionnaire)  
b) no (you have finished the questionnaire, thank you)  
c) I don't know

**18. How often do you feel (or felt) neck pain?**

- a) only once                      b) once a month  
c) once a week                  d) more than once a week  
e) I don't know

**19. Does the neck pain prevent (or have prevented) you from performing daily life activities, such as: working, reading, practicing sports?**

- a) yes    b) no    c) I don't know

**20. On the scale from 0 to 10, please identify the intensity of your neck pain for the last 3 months.**

(Please add a "X" along the line that corresponds to your pain intensity).



**FIGURE 2.** ■ Back Pain and Body Posture Evaluation Instrument for Adults (BackPEI-A). Questions 13 to 16 refer to the presence, frequency and intensity of back pain, and questions 17 to 20 refer to the presence, frequency and intensity of neck pain.

history of pain were excluded. In the third stage, five new questions, one referring to automobile accidents and four referring to assessment of neck pain, were included. On completion of these three stages, the first revised draft of BackPEI-A was produced.

In the fourth stage, the first draft of BackPEI-A was sent to three professionals experienced in the areas of body posture, back pain, and biomechanics of human movement (two physiotherapists and one chiropractor). These experts analyzed the BackPEI-A based on the assessment standards proposed by Noll et al. (2013). Briefly, the experts analyzed (1) the clarity, ease of understanding, and general applicability of the expanded instrument; (2) whether the instrument achieved the objective of evaluating body posture in ADLs based on photographs; and (3) whether the instrument achieved the objective of assessing back and neck pain and their associated risk factors. Regarding each of these three analyzed items, the experts were asked to evaluate the BackPEI-A as being *well suited*, *suitable*, or *unsuitable* for use in research. In those cases where an expert assigned *unsuitable*, he or she had to justify that conclusion.

Based on the assessment provided by the three experts, minor alterations were made to the first draft of the BackPEI-A, resulting in the second draft, which was

then resubmitted for assessment by the experts. The experts determined no further alterations were needed, and the second draft of the revised instrument was adopted as the final version. The final version of the BackPEI-A contains 20 questions. Eighteen questions are closed with multiple choice alternatives, in which the respondent is asked to only mark one alternative for each question. The remaining two questions (numbers 16 and 20), regarding the intensity of pain in the back and neck regions, are open and involve the use of a visual analogue scale (VAS).

Questions 1-12 refer to the risk factors of back and neck pain (Fig. 1). Questions 13-16 refer to the presence, frequency and intensity of back pain, and questions 17-20 refer to the presence, frequency, and intensity of neck pain (Fig. 2). Considering that gender differences have been identified in postural habits (Straker, O'Sullivan, Smith, Perry, & Coleman, 2008), and also to facilitate body awareness, as in the original BackPEI there are separate versions of the BackPEI-A for men and women. The full versions of the BackPEI-A in Portuguese (validated) and in English are available for download at [www.ufrgs.br/biomec](http://www.ufrgs.br/biomec).

The BackPEI-A applies a general scoring system that exclusively involves questions referring to risk factors. The overall score is obtained by adding together all the points (maximum 10 points). The higher the

**TABLE 2.**  
**Results of  $\kappa$  Coefficient for the Categorical Variables in the BackPEI-A**

Question	Description of Question	N (Missing Data)	Agreement (%)	$\kappa$ Value (CI 95%)	Bias Index
1	How do you typically sit at your desk when writing?	154 (0.0%)	85.7	0.648 (good) (0.506-0.783)	0.000
2	How do you typically sit on a chair or a bench when talking to your friends?	154 (0.0%)	81.2	0.653 (good) (0.538-0.756)	-0.001
3	How do you typically sit when using your desktop or laptop computer?	154 (0.0%)	73.4	0.550 (moderate) (0.419-0.674)	0.002
4	How do you typically pick up objects from the floor?	154 (0.0%)	80.5	0.667 (good) (0.559-0.769)	-0.002
5	Have you been involved in any car accident?	154 (0.0%)	96.8	0.919 (very good) (0.838-0.985)	0.001
6	Do you practice sport or physical exercise regularly?	154 (0.0%)	96.8	0.935 (very good) (0.866-0.987)	0.000
7	How many days per week do you practice sport or exercise?*	80 (0.0%)	87.5	0.805 (very good) (0.675-0.905)	-0.003
8	Do you practice this sport or physical exercise competitively?*	80 (0.0%)	100.0	1.000 (very good) (-)	0.000
9	How many hours per day do you spend seated using your desktop/laptop computer?	154 (0.0%)	85.1	0.805 (very good) (0.732-0.867)	0.000
10	Do you usually read or study/work in bed?	154 (0.0%)	86.4	0.789 (good) (0.699-0.868)	0.000
11	What is your favorite sleeping position?	154 (0.0%)	94.2	0.891 (very good) (0.812-0.952)	-0.001
12	How many hours do you spend sleeping in a day/24-hour period?	154 (0.0%)	83.1	0.745 (good) (0.643-0.835)	0.001
13	Have you felt (or have been) back pain in the last 3 months?	154 (0.0%)	93.5	0.840 (very good) (0.746-0.930)	-0.001
14	How often do you feel (or felt) back pain? <sup>†</sup>	108 (0.0%)	76.9	0.547 (moderate) (0.396-0.678)	-0.006
15	Does the back pain prevent (or has it prevented) you from performing daily life activities, such as: working, reading, practicing sports? <sup>‡</sup>	108 (0.0%)	90.7	0.735 (good) (0.565-0.880)	-0.005
17	Have you felt (or have been) neck pain in the last 3 months?	154 (0.0%)	92.2	0.843 (very good) (0.756-0.934)	0.002
18	How often do you feel (or felt) neck pain? <sup>‡</sup>	89 (0.0%)	76.4	0.609 (good) (0.488-0.729)	-0.007
19	Does the neck pain prevent (or has it prevented) you from performing daily life activities, such as: working, reading, practicing sports? <sup>‡</sup>	83 (6.7%)	95.2	0.694 (good) (0.340-0.928)	-0.015

BackPEI-A = Back Pain and Body Posture Evaluation Instrument for Adults; CI = confidence interval.

$\kappa$  Classification:  $\kappa = 0-0.200$  (poor),  $\kappa = 0.201-0.400$  (fair),  $\kappa = 0.401-0.600$  (moderate),  $\kappa = 0.601-0.800$  (good),  $\kappa = 0.801-1.000$  (very good).

\*Refers to respondents who answered "yes" in question 6 (n = 80).

<sup>†</sup>Refers to respondents who answered "yes" in question 13 (n = 108).

<sup>‡</sup>Refers to respondents who answered "yes" in question 17 (n = 89).

score obtained, the lower the exposure to the risk factors of pain. In questions 1-4, the appropriate postures score 1, whereas inappropriate postures score 0. In these questions, only one option is considered appropriate. In questions 5, 8, and 10, affirmative answers score 0 and negative answers score 1. In question 6,

an affirmative answer scores 1 and a negative answer scores 0. Questions 7 and 9 are not scored. In question 11, the option "face down (on my stomach)" scores 0, whereas the other options score 1. In question 12, options 7, 8, or 9 hours of sleep score 1, whereas the other options score 0.



The fifth stage in the development of the BackPEI-A consisted of evaluating the reproducibility of the instrument using a test and retest procedure. The questionnaire was applied on two distinct occasions separated by a 7-day interval (Pedhazur & Schmelkin, 1991; Staes, Stappaerts, Vertommen, Everaert, & Coppieters, 1999). The questionnaire was applied by the same researcher who, after receiving consent from the participants, merely instructed them how to correctly complete the questionnaire. The participants were only informed about the retest process once they had completed the questionnaire on the first day, thus minimizing the possibility of memorizing their answers.

The test and retest procedures were conducted from October to December 2014 in four different regions of Rio Grande do Sul, Brazil. The present study is in accordance with the Helsinki Declaration and was approved by the ethics research committee from the university where it was carried out (number 1.582.062). A sample calculation was conducted according to Sim and Wright (2005). To detect a  $\kappa$  value of .80, we assumed the null hypothesis value of  $\kappa$  to be .40 (on the basis that any value lower than .40 might be considered "weak"), 90% of power, and the worst scenario of proportion of positive ratings equal to 10%. Accordingly, a minimum of 136 individuals would be necessary to achieve the aims of the present study. Allowing for losses and discontinuance, a convenience sample composed of 154 individuals was selected. The inclusion criteria were age 17-80 years and capacity to read and understand the questionnaire unaided.

### Statistical Treatment

The data from the BackPEI-A test and retest procedures for questions 1-15 and 17-19 were analyzed using the unweighted  $\kappa$  coefficient for nominal scales (unordered categories) (Sim & Wright, 2005). This statistical test has been widely recommended to evaluate consistency between categorical data (Cohen, 1960). The results were classified as:  $\kappa = 0-0.200$  (poor),  $\kappa = 0.201-0.400$  (fair),  $\kappa = 0.401-0.600$  (moderate),  $\kappa = 0.601-0.800$  (good), or  $\kappa = 0.801-1.000$  (very good) (Schlademann, Meyer, & Raspe, 2008). For a question to remain included in the BackPEI-A, a minimum value of  $\kappa \geq 0.5$  was considered satisfactory (Kramer & Feinstein, 1981; Staes et al., 1999). The agreement between the test and retest of questions 16 and 20 (pain intensity) was measured in terms of the relationship between the answers, as revealed using the intraclass coefficient ( $ICC_{2,2}$ ).  $ICC_{2,2}$  was based on a 2-way (random effects) repeated measures analysis of variance model with absolute agreement. The values found in the ICC were classified according to

the literature (Fleiss, Levin, & Paik, 2004) as weak ( $ICC < 0.40$ ), moderate ( $ICC = 0.40-0.75$ ), and excellent ( $ICC > 0.75$ ). The level of significance adopted was .05. The Statistical Package for the Social Sciences (Version 18.0; SPSS Inc., Chicago, IL) was used for all the analyses.

### Translation to English

The sixth and final stage of the process of developing the BackPEI-A involved translating the questions to English. This was done in accordance with the recommendation of Beaton, Bombardier, Guillemin, and Ferraz (2000) and followed the steps performed in earlier studies (Noll et al., 2013). Initially, the BackPEI-A was translated to English independently by three English language teachers. Later, the three versions were reviewed, compared, and merged into a single version by a fourth English language teacher (T4) with extensive experience in translating health-related papers, resident in Brazil, and originally from the United Kingdom. Having the original Portuguese version of BackPEI-A and the final English version, two English-speaking Brazilian doctoral researchers, specialized in physical education, physiotherapy, and public health, who had lived in English-speaking countries for a minimum of 4 years, analyzed the semantic, cultural and conceptual equivalence of the two versions of the BackPEI-A, which can be considered equivalent to a back-translation step. Based on this process, minor adjustments were made to the English version of the BackPEI-A, which was then returned to the T4 for grammatical analysis. Only after completion of this process was the final English version of the BackPEI-A produced. The aim in having an English version of the questionnaire is, as with the original BackPEI, to ensure the instrument greater visibility. It is important to point out that the English version has not been validated.

## RESULTS

The BackPEI-A was completed by 154 adults, of whom 94 were women (61%) and 60 were men (39%). The average age was  $32.2 \pm 13.5$  years, average weight  $159.6 \pm 33.7$  pounds ( $72.4 \pm 15.3$  kilograms), and average height  $66.6 \pm 3.9$  inches ( $169.2 \pm 9.9$  centimeters). Regarding occupation, 18.8% ( $n = 29$ ) of the respondents were students, 3.9% ( $n = 6$ ) were retired, 74.0% ( $n = 114$ ) were workers (e.g., bank employees, teachers, systems analysts, lawyers, and engineers) and 3.2% ( $n = 5$ ) did not report any occupation. The prevalence of back pain was 74.0% (average intensity of 4.5 centimeters on a 10-centimeter scale for both first and second evaluation), and the prevalence of neck pain was 60.4%

(average intensity of 4.3 centimeters on a 10-centimeter scale for both first and second evaluation). Regarding question 19, six answers were left blank and consequently were considered missing data.

The  $\kappa$  scores for the instrument's categorical variables (questions 1-15 and 17-19) indicated that two questions were classified as moderate, 8 as good, and 8 as very good (Table 2), so that all the questions could be included in the BackPEI-A. In relation to the reproducibility, the results referring to question 16, regarding intensity of back pain, indicated the answers provided in two assessments were highly correlated with an excellent ICC (ICC = 0.908; confidence interval [CI]: 0.868-0.936;  $p < .001$ ). In question 20, which refers to intensity of neck pain, the answers provided in two assessments were also highly correlated with an excellent ICC (ICC = 0.865; CI: 0.802-0.909;  $p < .001$ ).

## DISCUSSION

Although various instruments can be used to assess the presence of back pain (Samaei, Mostafae, Jafarpoor, & Hosseinabadi, 2017; Schlademann et al., 2008; Smith et al., 1997), the posture adopted in ADLs as a risk factor is rarely addressed. Although the methodologic quality of the original BackPEI is excellent, the instrument is limited in use to the lumbar region and the school environment (Noll et al., 2012). Therefore the purpose of the present study was to expand its application. Thus the BackPEI-A has been conceived to permit the assessment of both back and neck pain in adults, unrelated to any particular professional environment.

The main results, with high rates of agreement between test and retest (Table 2), indicate that the BackPEI-A provides clear and specific data and is applicable for use in an adult population. One of its advantages is that it can be used to evaluate the presence of back and neck pain and their associated risk factors in one single questionnaire.

Schlademann et al. (2008) also developed a back pain evaluation questionnaire for an adult population, which includes questions regarding the occurrence, frequency, and intensity of pain; whether the pain impedes any activities; and whether medical advice was sought because of the pain, among others. A total of 179 German adults responded to the questionnaire on two distinct occasions (test and retest) with a 2-week interval. The results indicated that all evaluated questions obtained satisfactory  $\kappa$  coefficients. However, some questions can be raised regarding the authors' proposed questionnaire: (1) There are no questions specifically designed to assess neck pain, (2) there

are no questions specifically designed to assess postural habits during ADLs, and (3) the test and retest interval was longer than the recommended 1 week (Pedhazur & Schmelkin, 1991). One week is considered sufficient time for individuals to forget the answers they gave in the previous week but insufficient for them to change their daily habits (Pedhazur & Schmelkin, 1991; Staes et al., 1999).

The classic Oswestry Disability Index (ODI) questionnaire, originally described by Fairbank, Couper, Davies, and O'Brien (1980), is composed of several items that assess functionality. It has become one of the main instruments for measuring back pain and is designed to identify the extent to which pain in the back and legs affects one's ability to perform ADLs. Although to a lesser degree than the lumbar region, the evaluation of the cervical region has been the focus of interest for some researchers (MacDermid et al., 2009). The Neck Disability Index (NDI) questionnaire, for example, which is based on a modification of the ODI, is composed of 10 questions designed to identify the extent to which neck pain affects the performance of daily activities (Vernon & Mior, 1991). Both the ODI and NDI questionnaires present a high degree of reliability and internal consistency. However, they are directed exclusively for patients with lumbar pain and neck pain, respectively. In contrast to the ODI and NDI, the BackPEI-A can be seen as an instrument to identify first the presence or absence of pain, but above all to identify postural habits and risk factors related to the presence of pain, whether located in the neck or back. Moreover, it is important to point out that this characteristic of the BackPEI-A, which makes it useful in epidemiologic studies, does not impede its use in clinical studies. It can be used to select individuals with pain and also as a screening instrument. In fact, the psychometric properties of the BackPEI-A, regarding both questions based on categorical and interval variables, suggest its applicability in a wide variety of situations—for example, to perform a study that aims to correlate cervical morphology with behavioral factors and/or neck pain. This type of study could help guide the choice of therapeutic procedures.

## Limitations

The BackPEI-A has some limitations regarding behavioral risk factors related to ADLs. (1) It does not assess the posture adopted when carrying bags or suitcases, and (2) it does not assess posture during activities such as watching television or using tablets and smartphones, which are common nowadays. Moreover, the questionnaire may not be useful for patients whose disabilities or health status prevents them from making

changes to their behavioral habits, such as patients with sclerosis, dementia, and neuromuscular disorders.

### Implications for Nursing

The BackPEI-A can be used as an additional tool in nursing practice focused on pain relief. In the clinical environment, where the nurse is in contact with the population, be it in health centers, for periodic worker health assessments, or while conducting screenings in hospitals, the first assessment of patients can be made using the BackPEI-A. Besides identifying the presence, frequency, and intensity of pain in the back and neck in the previous 3 months, the nurse will also be able to identify the main risk factors for the pain as well as the behavioral aspects involved. In addition, the nurse will be able to provide guidance regarding self-care in managing the pain, based on the results obtained from the instrument. Thus the instrument can be considered a valuable tool for the patients themselves, because once informed of the risk factors by the qualified professional, they will be in a better position to manage their ADLs. The results of our expansion and

reproducibility study suggest that the revised instrument may also prove useful in the conduct of future research such as in case studies, comparative gender studies, and interventional studies.

### CONCLUSIONS

Considering that the classification of  $\kappa$  coefficient should be moderate for each question to remain included in the questionnaire, it was concluded that all the questions, whether new or adapted, should be included in the revised version of the instrument (BackPEI-A). Therefore the BackPEI-A is considered a reproducible, valid, and relevant questionnaire for the evaluation of back and neck pain and their associated risk factors, which also allows for the evaluation of postural habits in ADLs. In summary, the BackPEI-A permits the assessment of both back and neck pain in most adults and may be applicable to any particular professional environment where back and neck pain are a focus of practice.

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