



# Intra- and inter-rater reliability of the Individual Lifestyle Profile (ILP) questionnaire for individuals with musculoskeletal pain

*Confiabilidade intra e interexaminador do questionário Perfil do Estilo de Vida Individual (PEVI) em indivíduos com dor musculoesquelética*

*Confiabilidad intra e interevaluador del cuestionario Perfil de Estilo de Vida Individual (PEVI) en sujetos con dolor musculoesquelética*

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**ABSTRACT** | The aim of this study was to test all the reliability properties of the Individual Lifestyle Profile (ILP) in patients with musculoskeletal pain. A total of 105 patients with musculoskeletal pain participated in this study after being recruited from a public secondary physical therapy care. ILP was applied by Rater 1 at the initial assessment and by Rater 2 after one hour. After three to seven days of the initial assessment, Rater 1 reapplied ILP. ILP and its components showed internal consistency from 0.27 to 0.61 and intra- and inter-rater reliability values from moderate to excellent (ICC=0.68 to 0.90) and from moderate to almost perfect (K=0.59 to 0.83). Percent agreement was 61% to 98%, the SEM of ILP was 4.1 points and the MDC was 5.7 points. We conclude that ILP is a reliable instrument to assess the lifestyle of patients with musculoskeletal pain.

**Keywords** | Reproducibility of Results; Musculoskeletal Pain; Lifestyle.

**RESUMO** | O objetivo do estudo foi testar todas as propriedades de confiabilidade do Perfil do Estilo de Vida Individual (PEVI) em pacientes com dor

musculoesquelética. Participaram desse estudo 105 pacientes com dor musculoesquelética, recrutados de um serviço público de fisioterapia de nível secundário. O PEVI foi aplicado pelo Examinador 1 na avaliação inicial e pelo Examinador 2 após uma hora. Após três a sete dias da avaliação inicial, o Examinador 1 reaplicou o PEVI. O PEVI e seus componentes apresentaram consistência interna de 0,27 a 0,61 e valores de confiabilidade intra e interexaminador de moderado a excelente (CCI=0,68 a 0,90) e de moderado a quase perfeito (K=0,59 a 0,83). A porcentagem de concordância foi de 61% a 98%, o EPM do PEVI foi de 4,1 pontos e a MMD foi de 5,7 pontos. Concluímos que o PEVI é um instrumento confiável para avaliar o estilo de vida de pacientes com dor musculoesquelética.

**Descritores** | Reprodutibilidade dos Testes; Dor Musculoesquelética; Estilo de Vida.

**RESUMEN** | El objetivo del estudio fue poner a prueba todas las propiedades de confiabilidad del Perfil de Estilo de Vida Individual (PEVI) en pacientes con dolor musculoesquelético. Participaron en este estudio 105 pacientes con dolor

Study developed at the School Health Center (CSE Cuiabá) of the Faculdade de Medicina de Ribeirão Preto of Ribeirão Preto of the Universidade de São Paulo (USP) - Ribeirão Preto (SP), Brazil.

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musculoesquelético, provenientes de servicios públicos de fisioterapia de nivel secundario. El evaluador 1 aplicó el PEVI en la evaluación inicial, y el evaluador 2 lo aplicó después de una hora. Después de 3 a 7 días de evaluación inicial, el evaluador 1 reaplicó el PEVI. La consistencia interna del PEVI y sus componentes fue de 0,27 a 0,61; y los valores de confiabilidad intra e interevaluador fueron de moderada a excelente (CCI=0,68 a 0,9), y de moderada a casi

perfecta (K=0,59 a 0,83). El porcentaje de concordancia fue de entre un 61% y un 98%, el EPM del PEVI fue de 4,1 puntos, y el CMD fue de 5,7 puntos. Se concluye que el PEVI es un instrumento confiable para evaluar los estilos de vida de pacientes con dolor musculoesquelético.

**Palabras clave** | Reproducibilidad de los Resultados; Dolor Musculoesquelético; Estilo de Vida.

## INTRODUCTION

Lifestyle, according to the Pan American Health Organization, represents the set of daily actions that reflects the way people live and the choices they make<sup>1</sup>. Thus, lifestyle is considered one of the dominant factors in the maintenance of quality of life and health<sup>2</sup>, as the adoption of a certain behavior can bring risks or benefits to health<sup>3</sup>.

Musculoskeletal conditions are the most common cause of severe long-term pain and years of life with disability on all continents<sup>4</sup>, besides being the second most common reason for the use of health services in most countries<sup>5</sup>. Evidence that lifestyle behaviors are associated with musculoskeletal pain and may influence its prevalence over time<sup>4,6,7</sup> supports the incorporation of lifestyle assessment through physical therapy in individuals with chronic musculoskeletal pain<sup>7</sup>.

The Individual Lifestyle Profile (ILP) questionnaire has been commonly used in lifestyle assessments of students, professors<sup>8,9</sup>, sports practitioners<sup>10</sup> and other professionals<sup>11</sup>. The measurement properties of the ILP questionnaire were tested in individuals without injury and in Physical Education teachers. The instrument was validated by factor analysis<sup>2,12</sup>, multi-item correlation matrix analysis<sup>12</sup> and Item Response Theory (IRT)<sup>13</sup>. However, the internal consistency of the items was questionable<sup>2,12</sup>, and Nahas et al.<sup>14</sup> report only values of test-retest percent agreement and standard error of measurement.

Considering that ILP is not adequately tested for reliability as defined by the recommendations of COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN)<sup>15</sup> and that reliability is not a fixed property of the instrument, but dependent on the sample's profile, the objective of this study was to test all the reliability properties of ILP in individuals with musculoskeletal pain.

## METHODOLOGY

### Participants

Patients with musculoskeletal pain were recruited for convenience from a secondary physical therapy care. Individuals with any musculoskeletal pain diagnosed or described in the medical record, of both sexes and over the age of 12 years were included to ensure an understanding of the interview with the questionnaire. Absence of diagnosis in the medical record and presence of cognitive deficit or some difficulty in understanding the questionnaire constituted the exclusion criteria. The study was approved by the Research Ethics Committee in accordance with the National Health Council Resolution No. 466/2012 (CAAE: 5066815.1.0000.5114) and all the individuals included signed the informed consent form.

The sample size was stipulated above 100 individuals as established by COSMIN for reliability studies with excellent methodological quality<sup>15</sup>.

### Raters

Two female raters, one of them being a physical therapist with a master's degree and four years of clinical experience, and the other was an undergraduate student in physical therapy with two years of experience in supervised rehabilitation. Both raters received a previous training that consisted of the application of ILP in interview with 10 individuals without dysfunction and in five patients with musculoskeletal pain. All collections were made independently, and the raters were aware that their assessments would be compared.

### Procedures

The intra- and inter-rater reliability and measurement error of the ILP questionnaire were tested according to

recommendations of COSMIN<sup>15</sup> and the Guidelines for Reporting Reliability and Agreement Studies (GRRAS)<sup>16</sup>.

Data were collected in two phases: In the first phase, Rater 1 collected the demographic and socioeconomic data and applied the ILP questionnaire through an interview. After the physical therapy session, which lasted an average of one hour, Rater 2 reapplied the ILP in the same circumstances of the previous collection.

In the second phase, performed in the next physical therapy session of the patient, with three to seven days from the first phase, Rater 1 reapplied the ILP questionnaire to patients who did not report lifestyle changes in order to obtain intra-rater reliability data.

## Instrument

The ILP questionnaire has 15 items and addresses five components, such as nutrition, physical activity, preventive health behavior, social relationships, and stress control<sup>14</sup>. The score ranges from zero to 45 and can be classified as an excellent (45 points), good (from 44 to 34), regular (from 33 to 27), below average (26 to 18) and poor (17 to zero) profile. The components can also be assessed separately and classified as negative profile if the average score is less than one, as regular profile if between one and 1.99, and as positive profile for average scores between two and three<sup>14</sup>.

## Statistical analysis

The internal consistency was analyzed by the Cronbach's Alpha obtained from the ILP scores of the first assessment, and the values were considered excellent (above 0.9), good (between 0.8 and 0.9), acceptable (between 0.7 and 0.8), poor (between 0.6 and 0.7) and unacceptable (below 0.6)<sup>17</sup>.

Intra- and inter-rater reliability was established for the ILP scores and its components by the Intraclass Correlation Coefficient (ICC) with a 95% confidence interval<sup>18</sup> and for the classifications of ILP scores and its components by the quadratic weighted Kappa Coefficient<sup>19</sup> associated with the percent agreement.

ICC values were categorized as poor (<0.40), moderate ( $0.40 \leq \text{ICC} \leq 0.75$ ) or excellent ( $>0.75$ )<sup>18</sup>. Kappa values were categorized as poor agreement ( $K < 0$ ), slight agreement (0.01-0.20), fair agreement (0.21-0.40), moderate agreement (0.41-0.60), substantial agreement (0.61-0.80), almost perfect agreement (0.81-0.99), perfect agreement ( $k=1$ )<sup>19</sup>.

The measurement error were determined for the ILP score by the Standard Error of Measurement (SEM) and Minimum Detectable Change (MDC) with 95% confidence interval<sup>18</sup>. SEM was calculated by the formula  $\text{SEM} = 1.96 * \text{SD} * \sqrt{1 - \text{ICC}}$ , where SD is the standard deviation of the ILP score in the first assessment and ICC is the intra-rater reliability. MDC values were calculated by the formula  $\text{MDC}_{95} = \text{SEM} * \sqrt{2}$ <sup>18</sup>.

ICC and Kappa data were obtained by the Statistical Package for the Social Science (SPSS) version 17.0 for Windows.

## RESULTS

The study recruited 121 individuals, 20 of whom did not attend the service in the period from three to seven days for intra-rater analysis, and sixteen people were not able to undertake the assessment by Rater 2 (Figure 1).

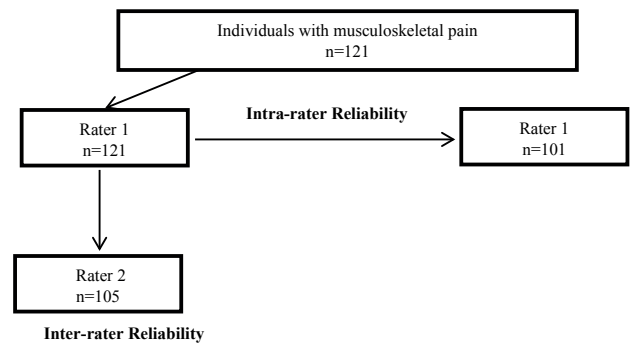


Figure 1. Flowchart of patients with musculoskeletal pain

The individuals had a mean age of 58 years (standard deviation=14.1 years), mostly women with primary education, showing a balanced proportion between economically active and retired individuals or homemakers. Musculoskeletal diseases were predominantly chronic, with a more frequent diagnosis of “other soft tissue disorders (30.6%)” and “dorsopathies (28.9%).” The lifestyle profile was regular and most of the components were also classified as regular (Table 1).

The internal consistency of ILP was 0.61, and the components of nutrition and social relationships were the ones with the best consistency. The intra- and inter-rater reliability of ILP and most of the components was excellent, being moderate only for preventive health behavior (0.74) and stress control (0.68) in the inter-rater analysis and for physical activity in the intra-rater analysis, according to Table 2. The SEM of ILP was 4.1 points, and the MDC was 5.7 points.

Table 1. Demographic and socioeconomic data of patients with musculoskeletal pain (n=121)

Variables	Values	
<b>Age</b> , mean (standard deviation)	58 (14.1)	
<b>Sex</b> , N (%)	20 (17)/101 (84)	
Male / Female		
<b>Schooling</b> , N (%)	1 (1)	
Semi-illiterate		
Some elementary school / Elementary school	46 (38)/23 (19)	
Some high school / High school	12 (10)/29 (24)	
Some college / College degree	6 (5)/4 (3)	
<b>Profession</b> , N (%)	62 (51)/59 (49)	
Active / Retired or homemaker		
<b>Time of injury</b> , N (%)	9 (7)/112 (93)	
1 to 6 months / >6 months		
<b>Comorbidities</b> , N (%)	68 (56)	
No comorbidity		
Diabetes / High blood pressure	1 (1)/9 (7)	
Respiratory diseases	19 (16)	
Two or more of these comorbidities	24 (20)	
<b>Diagnostics (ICD)</b> , N (%)	26 (21.5)	
Arthroses (M15-M19)		
Internal derangement of the knee (M23)	1 (0.8)	
Other specified deforming dorsopathies (M43, M40-M54)	35 (28.9)	
Spondylosis (M47)	7 (5.8)	
Synovitis and tenosynovitis (M65)	1 (0.8)	
Other and unspecified soft tissue disorders (M70-M79)	37 (30.6)	
Osteopathies and chondropathies (M80-M94)	3 (2.5)	
Birth injury to peripheral nervous system (P14)	1 (0.8)	
Fracture of rib(s), sternum and thoracic spine (S22)	1 (0.8)	
Superficial injury of hip and thigh (S70) and fracture of lower limb (T12)	4 (3.3)	
Mononeuropathy of upper limb (G56)	5 (4.1)	
<b>ILP</b> (0-45 points)	Mean (SD)	Profile
	29.7 (6.2)	regular
Nutrition (0-3 points)	1.5 (0.8)	regular
Physical activity (0-3 points)	1.5 (0.7)	regular
Preventive health behavior (0-3 points)	2.7 (0.4)	positive
Social relationships (0-3 points)	2.2 (0.7)	positive
Stress control (0-3 points)	1.9 (0.7)	regular

SD: Standard deviation; ILP: Individual Lifestyle Profile; ICD: International Statistical Classification of Diseases and Related Health Problems

The agreement of ILP scores and its components between the raters was substantial ( $k=0.63$  to  $0.77$ ) and associated with a proportion of agreement from 65% to 98% (Table 3). For the same rater, the agreement of

the assessments was almost perfect, except for physical activity ( $k=0.59$ ) and social relations ( $k=0.79$ ), which was substantial. The percent agreement ranged from 61% to 98% (Table 3).

Table 2. Internal consistency and intra- and inter-rater reliability of the ILP score and its components

	Cronbach's Alpha (n=121)	ICC <sub>2,1</sub> (95%CI) Inter-rater (n=105)	ICC <sub>2,1</sub> (95%CI) Intra-rater (n=101)
Total ILP	0.61	0.83 (0.72; 0.89)	0.90 (0.86; 0.93)
Nutrition	0.46	0.84 (0.77; 0.89)	0.90 (0.85; 0.93)
Physical Activity	0.22	0.78 (0.69; 0.84)	0.68 (0.56; 0.78)
Preventive Health Behavior	0.24	0.74 (0.63; 0.82)	0.83 (0.75; 0.88)
Social Relationships	0.53	0.79 (0.64; 0.87)	0.86 (0.80; 0.91)
Stress Control	0.27	0.68 (0.54; 0.78)	0.83 (0.75; 0.88)

ICC: Intraclass Correlation coefficient; 95%CI: 95% confidence interval; SEM: Standard Error of Measurement; MDC95: Minimal Detectable Change associated with 95% confidence interval; NA: Not applicable.

Table 3. Proportion of agreement and Cohen's kappa coefficient for intra- and inter-rater assessments of the ILP score and its components

	Inter-rater (n=105)		Intra-rater (n=101)	
	Proportion of Agreement	Kappa (95%CI)	Proportion of Agreement	Kappa (95%CI)
Total ILP	66%	0.71 (0.51; 0.91)	74%	0.83 (0.73; 0.93)
Nutrition	72%	0.77 (0.69; 0.86)	78%	0.83 (0.75; 0.90)
Physical Activity	71%	0.67 (0.54; 0.80)	61%	0.59 (0.44; 0.73)
Preventive Health Behavior	98%	NC	98%	0.83 (0.54; 1)
Social Relationships	81%	0.73 (0.59; 0.87)	82%	0.79 (0.69; 0.89)
Stress Control	65%	0.63 (0.50; 0.76)	80%	0.83 (0.74; 0.90)

95%CI: 95% confidence interval; NC: Cohen's kappa coefficient not calculated due to multiple cells filled with the number zero.

## DISCUSSION

This study showed that the ILP questionnaire is reliable for assessments made by the same rater or between raters in individuals with musculoskeletal pain, but the internal consistency among items is questionable. This study offers a strong clinical contribution for assessing all reliability properties according to the recommendations of COSMIN<sup>15</sup> and GRRAS<sup>16</sup> and is the first study on the reliability of ILP in unhealthy individuals, in this case, in individuals with some chronic musculoskeletal dysfunction.

The internal consistency of ILP was poor ( $\alpha=0.61$ ) according to the Hill classification<sup>17</sup> and similar to the Brazilian version of the Fantastic Lifestyle checklist, which presented an alpha of 0.69<sup>20</sup> in the assessment of healthy young adults. However, in our study the consistency of ILP was lower than that observed by Hernandez et al.<sup>12</sup> and Both et al.<sup>2</sup>, in which the ILP presented an alpha of 0.71<sup>12</sup> and 0.78<sup>2</sup>, respectively. Although the internal consistency of ILP presented in the literature<sup>2,12</sup> is acceptable, the authors agree that the internal consistency is low probably due to the small number of items and components of the ILP and to the diversity of the items regarding the same construct. In addition to a possible problem in the questionnaire structure, the lowest values obtained in our study can be attributed to the sample profile that was characterized by individuals with predominant

primary education (57%) who were treated in a public service, while the study by Hernandez et al.<sup>12</sup> applied ILP to 168 people recruited from middle-class squares and neighborhood associations, and Both et al.<sup>2</sup> studied 1,606 teachers of Physical Education.

The ILP components presented unacceptable internal consistency<sup>17</sup> ( $\alpha=0.22-0.53$ ) in patients with musculoskeletal pain. Our results were similar to those presented by Hernandez et al.<sup>12</sup> and Both et al.<sup>2</sup>, who observed  $\alpha$  values ranging from 0.28 to 0.71 and from 0.48 to 0.67, respectively. Although the components have low internal consistency due to their structure, a positive aspect is that some ILP items, such as physical activity and nutrition, were elaborated according to WHO recommendations<sup>21,22</sup>.

The intra- (ICC=0.90) and inter-rater reliability (ICC=0.83) of ILP was excellent and similar to the Brazilian version of the Fantastic Lifestyle checklist, whose ICC value was 0.92<sup>20</sup>. Most components of ILP also presented excellent intra- and inter-rater reliability, ranging from 0.83 to 0.90 and from 0.78 to 0.84, respectively. The reliability values were slightly lower in the inter-rater assessment, showing moderate reliability for preventive health behavior and stress control (ICC=0.74 and ICC=0.68), which suggests that the application of the questionnaire by the same examiner is more reliable.



The moderate reliability for preventive health behavior and physical activity, in some analyses, can be explained by the structure of the items that generally assess more than one aspect and can make the participant and the rater have different interpretations. In our study, the rater's interference in the interpretation of the response was minimized by previous training in which the information provided to some items of these components was standardized.

Regarding the stress control component, we observed the patients found a great difficulty in understanding the construct. Instead of a problem in the structure of the items, for example, many patients report having no leisure activity. Thus, these items may also be more influenced by the rater. In addition, these components showed the lowest values of internal consistency (*alpha* ranging from 0.22 to 0.27), which may also have compromised the reliability.

ILP showed a error of measurement of 4.1 points and a minimum detectable change of 5.7 points, which indicates to the healthcare professional that the lifestyle change should only be considered if it exceeds 6 points. The study by Nahas et al.<sup>14</sup> observed SEM values from 0.29 to 0.44 points, but it did not identify the population. Our error values were higher, but it is important to consider that this study complies with the recommendations of GRAAS<sup>16</sup> and COSMIN<sup>15</sup>, with excellent quality, and that these values refer to individuals with chronic musculoskeletal pain, so it is not possible to compare them with studies conducted with healthy individuals.

The classification of ILP scores and its components obtained an substantial to almost perfect intra-and inter-rater agreement ( $k=0.63$  to  $0.83$ ), associated with the percent agreement from 61% to 98%. No agreement report on the ILP questionnaire and on the Fantastic Lifestyle checklist exists, only the study by Nahas et al.<sup>14</sup> mentions percent agreement values from 74% to 93%, which agrees with our results.

The limitation of this study is the extrapolation of the results to other populations such as healthy individuals and people with other health dysfunctions, since the reliability and the error measures are specific and dependent on the population<sup>16</sup>. The original structure of ILP seems to compromise the internal consistency, since each component has few items and a broad approach, suggesting that future studies may alter this structure in order to improve this measurement property.

The strengths of this study are the unprecedented results of ILP reliability, obtained within the clinical

routine of a health service and in accordance with the recommendations of the reliability guidelines<sup>16</sup> and studies on measurement properties<sup>15</sup>. ILP is able to generate good reliability and agreement values, but we should proceed with caution in the inter-rater application of components physical activity and preventive health behavior, due to the items that assess more than one aspect, and the stress control component, due to the difficulty in understanding the construct. Thus, the prior training of raters is recommended by standardizing the information provided in these components.

## CONCLUSION

This study confirms the clinical use of ILP as a reliable instrument for assessing the lifestyle of individuals with musculoskeletal pain.

## ACKNOWLEDGMENTS

We thank the *Programa Institucional de Bolsas de Iniciação Científica* (PIBIC) (Project: 800585/2016-0, Scholarship Process: 144707 / 2016-0) for financial support.

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