

## Cultural Adaptation, Reliability and Validity of The Pelvic Girdle Questionnaire in Pregnant

### Gebelerde Pelvik Kuşak Anketinin Kültürel Adaptasyonu, Güvenilirliği ve Geçerliği

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#### Abstract

**Objectives:** The aims of this study were to translate the Pelvic Girdle Questionnaire (PGQ) to Turkish and to assess its test-retest reliability and validity in pregnant women.

**Materials and Methods:** One hundred and thirty-five pregnant with pelvic girdle pain were recruited in the study. Visual analog scale was used to evaluate pain intensity, PGQ for condition-specific health related quality of life, Nottingham Health Profile for health-related quality of life, Oswestry Disability Index for disability level, The guidelines for cross-cultural adaptation in PGQ was used.

**Results:** A total of 135 pregnant with a mean age of the  $30 \pm 4.77$  years included in the study. Interclass correlation coefficient score for test-retest reliability was 0.972 (95% CI= 0.968-0.977) for PGQ activity subscale, 0.910 (95% CI=0.905-0.915) for PGQ symptom subscale and 0.979 (95% CI= 0.975-0.983) for PGQ total.

**Conclusion:** The study demonstrated that Turkish version of PGQ is a valid and reliable tool for measuring both disability and symptom and good psychometric properties in Turkish speaking pregnant with pelvic girdle pain.

**Keywords:** Pelvic girdle pain, Turkish version, reliability, validity, cultural adaptation, pregnancy

#### Öz

**Amaç:** Bu çalışmanın amacı gebe kadınlarda Pelvik Kuşak Anketi'ni (PKA) Türkçe'ye çevirmek ve test-tekrar test güvenilirliği ve geçerliğini değerlendirmektir.

**Materyal ve Metot:** Çalışmaya pelvik kuşak ağrısı olan 135 gebe alındı. Ağrı şiddetini değerlendirmek için görsel analog skalası, duruma özel sağlık ile ilgili yaşam kalitesine için PKA, sağlıkla ilgili yaşam kalitesi için Nottingham Sağlık Profili, özürülük düzeyi için Oswestry Özürülük İndeksi, PKA'da kültürlerarası uyum için kılavuzlar kullanılmıştır.

**Bulgular:** Çalışmaya yaş ortalaması  $30 \pm 4,77$  olan 135 gebe dahil edildi. Test-tekrar test güvenilirliği için sınıflar arası korelasyon katsayısı puanı, PKA aktivite alt boyutu için 0,972 (% 95 CI = 0,968-0,977), PKA semptom alt boyutu için 0,910 (% 95 CI = 0,905-0,915) ve PKA toplam için 0,979 (% 95 CI = 0,905-0,915) olarak bulundu.

**Sonuç:** Çalışma, pelvik kuşak ağrısı olan Türkçe konuşan gebelerde PKA'nin Türkçe versiyonunun hem sakatlığı hem de semptomu ölçmek için geçerli ve güvenilir bir araç olduğunu ve iyi psikometrik özelliklere sahip olduğunu göstermiştir.

**Anahtar Kelimeler:** Pelvik kuşak ağrısı, Türkçe versiyon, geçerlik, güvenilirlik, kültürel adaptasyon, gebelik

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## Introduction

Pelvic girdle pain (PGP) is a common condition referring to pain in one or both sacroiliac joints, the symphysis pubis, the gluteal region or all of the above-mentioned regions.<sup>1</sup> The pathophysiology of PGP may be related to a combination of both biomechanical and hormonal factors. Relaxin is a polypeptide hormone causing laxity of the connective tissue, resulting in the widening and separation of the symphysis pubis during pregnancy. In addition, there is increased laxity in the sacroiliac joint, which acts as a stabilizer during load transfer from the trunk to the legs, increased spinal curvature during the pregnancy and changed center of gravity anteriorly and superiorly.<sup>2,3,4</sup> The term, 'pregnancy related' is used in the literature because the symptoms begin during or after pregnancy. Approximately 45% of all pregnant women and 25% of all postpartum women experience PGP.<sup>5</sup> The pain symptoms improve a few weeks or months after delivery, but 18.5% of women report persistent pain and 3.0% report pelvic girdle syndrome.<sup>6</sup>

For the evaluation of PGP, adequate outcome measures are required. The Pelvic Girdle Questionnaire (PGQ), the first condition-specific outcome measure designed to assess the aspects of the quality of life in PGP patients, was originally developed for use both during pregnancy and postpartum and tested on Norwegian women. Traditionally, clinical measurements have generally been based on the perspective of the clinician. The PGQ enables information gathering about the patients' conditions from their perspective.<sup>7</sup>

Most functional questionnaires are developed in the English language; however, measures should be specifically designed for non-English speaking countries. Therefore, large, multicentre, multinational trials are needed. In contrast, a questionnaire previously developed in another language can be used providing that cultural adaptations are made.<sup>8</sup> Consequently, internationally accepted tools for functional assessment have been adapted and used, particularly in clinical research.<sup>9,10</sup>

To the best of our knowledge, there is no questionnaire for assessing pelvic girdle pain in Turkey. The aims of this study were to translate the Pelvic Girdle Questionnaire into Turkish and to evaluate its test-retest reliability and construct validity.

## Materials and Methods

### Participants

The study was performed at Turgut Özal University School of Physiotherapy and Rehabilitation. Women with back pain were referred by the obstetrician to the physiotherapy and rehabilitation unit and clinically examined by the same physical therapist using the recommended inclusion criteria<sup>2</sup> as outlined in Table 1. The exclusion criteria were as follows: being illiterate, having locomotor system disease and a history of fracture or spinal, pelvic or lower extremity surgery. The study was approved by the University's Human Investigation Committee (2012-04), and all participants read and signed the informed consent form prior to enrolment in the study.

### Instruments

Pain intensity was measured on a visual analogue scale (VAS; 0–100 mm).<sup>11</sup>

The original Pelvic Girdle Questionnaire (PGQ) was published in 2011 and consisted of 25 items including activity and symptom subscales. Each item was scored on a four-point response scale that ranged from no problem at all (score 0) to a large extent (score 3). The scores were summarized and recalculated to percentage scores from 0 (no problem at all) to 100 (to a large extent), where 100 was the worst possible score. For the total PGQ the scores are summarized, then divided by 75 and multiplied with 100 to get the percentage. For the subscale activity the scores are summarized and divided by 60 and for the subscale symptom the scores are summarized and divided by 15, and multiplied with 100.<sup>7</sup>

The original Oswestry Disability Index (ODI) was developed in a specialist referral clinic for patients with chronic low back pain.<sup>12</sup> The ODI included 10 items (pain intensity, personal hygiene, lifting, walking, sitting, standing, sleeping, sexual activity, social activity and travelling) and was scored on a 6-point Likert Scale. The scores were summarized and recalculated to percentage scores from 0 to 100, where 100 was the worst possible disability. We used the items in the Turkish version developed by Yakut et al. and found good comprehensibility, internal consistency and validity for the assessment of disability in patients with low back pain.<sup>13</sup>

General health was assessed using the Nottingham Health Profile (NHP) originally developed in the Department of Public Health at the University of Nottingham.<sup>14</sup> Cultural adaptation of the Turkish version and psychometric properties were developed by Kucukdeveci et al. The NHP includes 38 items and 6 subscales: energy level, pain, physical activity, sleep, emotional reaction and social isolation. The total score of each subscale ranges from 0 to 100. The adaptation of the NHP into Turkish was found to be successful.<sup>15</sup>

### **Translation of the PGQ**

We used the guidelines for cross-cultural adaptation of the translation process.<sup>16</sup> Britt Stuge from the Department of Orthopaedics in Oslo University Hospital, Norway was contacted via mail to determine whether there were any attempts in progress to develop the Turkish version of the questionnaire. We established a translation team, which consisted of 2 bilingual physiotherapists, 2 native Turkish-speaking physiotherapists and 1 bilingual native English-speaking teacher whose qualifications included a university degree in English. The original PGQ was translated from English to Turkish independently and separately by native Turkish-speaking physiotherapists and a draft Turkish version was produced. The draft translation was then given to the native English speaker to translate back to English. The native speaker was blind to the original version of the questionnaire and to the purpose of the study. The content of the original and the back-translated English versions were compared, and differences were noted. The team reviewed and compared the original version and reverse-translated the English version to detect errors of interpretation and nuances that might have been missed. The original English, Turkish and reverse-translated English versions and a synthesis of translation differences were discussed by the translation team. The translation team reached a consensus on the PGQ regarding linguistic imprecision and cultural differences. Another stage of the translation process is a test of the pre-final version. A total of 30 volunteer patients with PGP were included in the pilot study to determine any misunderstandings and deviations in the translation. The comprehensibility and acceptability of the translation were tested item by item. All of

the participants responded that the scale was easy to understand. The final version of the PGQ was produced by consensus and is described in appendix 1.

### Statistical analysis

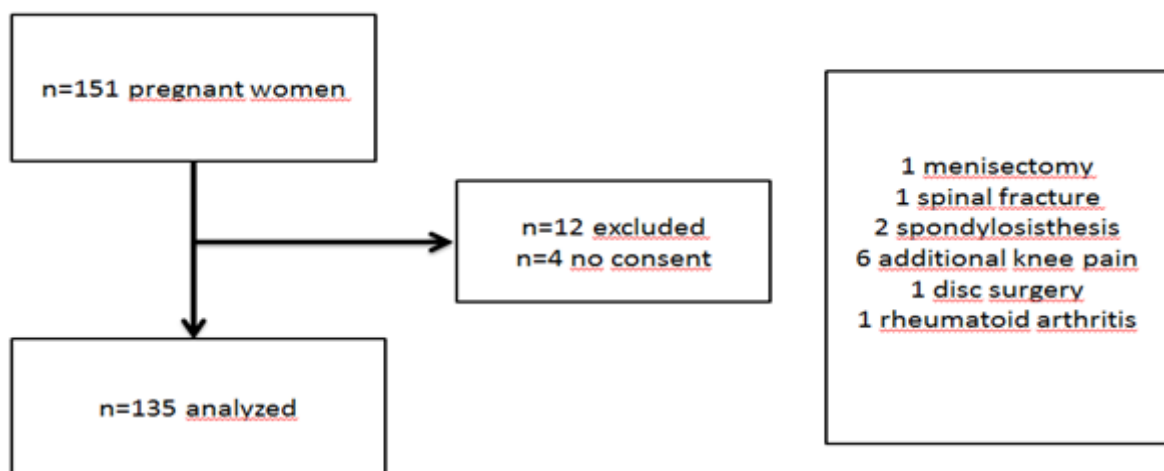
All data analyses were performed using SPSS (Statistical Package for the Social Sciences) 15.0 for Windows. For investigating normality of the distribution of continuous variables, the Kolmogorov–Smirnov test was used. The descriptive statistics were expressed as the mean  $\pm$  SD for continuous variables and as the number of patients and percentage (%) for categorical variables.

Construct validity of the Turkish version of the instrument was measured by comparing the VAS, ODI and NHP<sup>7</sup>. This relation was measured using Pearson’s correlation analysis with the probability error of  $p < 0.05$ . The construct validity coefficients were accepted as follows:  $r \geq 0.81-1.0$  as excellent,  $0.61-0.80$  very good,  $0.41-0.60$  good,  $0.21-0.40$  fair and  $0-0.20$  poor.<sup>17</sup>

For reliability, internal consistency and test-retest reliability were calculated. Test-retest reliability is a measure of stability when the same test is applied to the same subjects at two points in time. The appropriate interval length depends on the stability of the variables. In this study, 7 days was used as a time interval. Test-retest reliability was determined using the intraclass correlation coefficient (ICC). The internal consistency of a scale is a measure of scale homogeneity. The coefficient of internal consistency is calculated with Cronbach’s alpha. ICC can vary from 0.00 to 1.00, in which values of  $0.60-0.80$  are regarded as evidence of good consistency with those  $>0.80$  indicating excellent consistency. Portney and Watkins claim that for most clinical measurements, reliability should be  $>0.90$  to ensure reasonable validity.<sup>18</sup>

### Results

A total of 151 pregnant women ranging from 20 to 40 years of age attended and a total of 135 pregnant women with a mean age of  $30 \pm 4.77$  years were included in the study. The non-response rate was 11% and the flowchart of the study is shown in Figure 1. Table 1 shows the patients’ demographic and clinical characteristics.



**Figure 1.** Enrollment of the study

**Table 1.** Inclusion criteria of the study

<p>Pain located distal, lateral or both in relation to the L5-S1 area</p> <p>Pain in buttocks, symphysis or both</p> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Posterior Pelvic Pain Provocation Test,</li> <li>• Active Straight Leg Raising Test,</li> <li>• pain provocation of the long dorsal sacroiliac ligament,</li> <li>• pain provocation of the symphysis by palpation and</li> <li>• pain provocation by a modified Trendelenburg test</li> </ul> <p>The results of the Posterior Pelvic Pain Provocation Test or the Active Straight Leg Raising Test had to be positive on the right side, left side, or both, and the results of at least 1 of the other 3 tests had to be positive</p>
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The range of the 'if item-deleted  $\alpha$  values' was 0.869–0.882 for the PGQ activity subscale and 0.600–0.714 for the PGQ symptom subscale in the analysis of internal consistency reliability (Table 2).

**Table 2.** Demographic and Clinical Characteristics of the Pregnant Women (n=135)

Characteristic	Value
Age, years, m $\pm$ sd	30.00 $\pm$ 4.77
Gestational week, m $\pm$ sd	22.60 $\pm$ 8.89
BMI, kg/m <sup>2</sup> , m $\pm$ sd	25.03 $\pm$ 3.52
Weight gaining with pregnancy, kg, m $\pm$ sd	7.20 $\pm$ 4.81
Number of pregnancies, n (%)	
1	79 (58.52)
2	31 (22.96)
3 or more	25 (18.52)
Pain localization, n (%)	
Pain located at symphysis pubis	23 (17.04)
Pain located at posterior	74 (54.81)
Pain located at both of them	38 (28.15)
Pain duration, month, m $\pm$ sd	1.75 $\pm$ 0.45
Current smoker, n (%)	27 (20)
Educational status, n (%)	
Primary-secondary school	16 (11.85)
High school	40 (29.63)
University	79 (58.52)
Doing exercise, n (%)	
Yes	47 (34.82)
No	88 (65.18)

Abbreviations: BMI, body mass index; m, mean; SD, Standard deviation.

Cronbach's  $\alpha$  coefficients were 0.882 for the PGQ activity subscale, 0.714 for the PGQ symptom subscale and 0.894 for the total PGQ in the analysis of scale reliability.

For reliability, all of the participant were re-evaluated in terms of inclusion criteria after 1 week later and seen that all participants had pelvic girdle pain. Thus we applied the PGQ to the same subjects. The ICC score for test-retest reliability was 0.972 (95% CI = 0.968–0.977) for the PGQ activity subscale, 0.910 (95% CI = 0.905–0.915) for the PGQ symptom subscale and 0.979 (95% CI = 0.975–0.983) for the total PGQ (Table 3).

**Table 3.** Interclass correlation analysis of PGQ

Scale/Item	Item-total correlation	$\alpha$ (If Item Deleted)	$\alpha$ (Overall)
Pelvic Girdle Questionnaire activity subscale score (0–3)			0.882
1. Dress yourself	0.436	0.879	
2. Stand for less than 10 min	0.436	0.879	
3. Stand for more than 60 min	0.493	0.877	
4. Bend down	0.400	0.880	
5. Sit for less than 10 min	0.458	0.878	
6. Sit for more than 60 min	0.653	0.871	
7. Walk for less than 10 min	0.316	0.882	
8. Walk for more than 60 min	0.644	0.874	
9. Climb stairs	0.700	0.870	
10. Do housework	0.494	0.877	
11. Carry light objects	0.473	0.878	
12. Carry heavy objects	0.312	0.882	
13. Get up/sit down	0.722	0.869	
14. Push a shopping cart	0.571	0.874	
15. Run	0.327	0.882	
16. Carry out sporting activities	0.237	0.882	
17. Lie down	0.633	0.872	
18. Roll over in bed	0.551	0.875	
19. Have a normal sex life	0.499	0.877	
20. Push something with 1 foot	0.527	0.876	
Pelvic Girdle Questionnaire symptom subscale score (0–3)			0.714
1. Pain in the morning	0.400	0.714	
2. Pain in the evening	0.430	0.682	
3. Has your leg/have your legs given way?	0.530	0.641	
4. Do you do things more slowly?	0.628	0.600	
5. Is your sleep interrupted?	0.474	0.665	

According to Pearson's correlation analysis, the  $r$  value was 0.975 ( $p < 0.001$ ) for the PGQ activity subscale, 0.912 ( $p < 0.001$ ) for the PGQ symptom subscale and 0.981 for the total PGQ (Table 4).

**Table 4.** Reliability of the Pelvic Girdle Questionnaire

<b>Internal consistency: Cronbach's <math>\alpha</math> (N=135)</b>	<b>Value</b>
PGQ Activity Subscale	0.714
PGQ Symptom Subscale	0.882
PGQ Total Scale	0.894
<b>Test-retest reliability: ICC</b>	
PGQ Activity Subscale	0.972 (95% CI= 0.968-0.977)
PGQ Symptom Subscale	0.910 (95% CI= 0.905-0.915)
PGQ Total Scale	0.979 (95% CI= 0.975-0.983)
<b>Test-retest reliability: correlation, <math>r</math></b>	
PGQ Activity Subscale	<b>0.975**</b>
PGQ Symptom Subscale	<b>0.912**</b>
PGQ Total Scale	<b>0.981**</b>

Abbreviations: ICC, Intraclass correlation coefficient. \*\*,  $p < 0.001$

When the correlation between the PGQ and the ODI was investigated, the  $r$  value was 0.693 (a good correlation,  $p < 0.001$ ) for the PGQ activity subscale, 0.772 (a very good correlation,  $p < 0.001$ ) for the PGQ symptom subscale and 0.800 (and excellent correlation,  $p < 0.001$ ) for the total PGQ. When the relation between the total PGQ and total NHP was investigated, the  $r$  value was 0.406 (a moderate correlation,  $p = 0.002$ ) for the PGQ activity subscale and 0.603 (a good correlation,  $p < 0.001$ ) and 0.507 (a good correlation,  $p < 0.001$ ) for the total PGQ. The correlation coefficient between PGQ and pain severity was 0.522 (a moderate correlation,  $p < 0.001$ ) for the PGQ activity subscale, 0.585 (a moderate correlation,  $p < 0.001$ ) for the PGQ symptom subscale and 0.645 (a good correlation,  $p < 0.001$ ) for the total PGQ. These results demonstrated construct validity of the Turkish version of the PGQ. The results of the tests for validity are shown in Table 5. Also, mean and standard deviation values of the questionnaire scores are shown in Table 6.

## Discussion

Our study demonstrated that the Turkish version of the PGQ is a valid and reliable instrument for measuring both disability and symptoms in Turkish speaking pregnant women with PGP. The questionnaire is simple, takes just 3 min to complete and can be easily incorporated into epidemiological studies and clinical research. The questionnaire also has good psychometric properties.

Adequate translation procedures are needed to achieve cross-cultural equivalence when translating participant-reported outcome measures. The results of reliability and validity testing are consistent with previous studies, which show that our translation procedure was adequate.

**Table 5.** Validity of the Pelvic Girdle Questionnaire

		PGQ Activity Subscale	PGQ Symptom Subscale	PGQ Total Scale
NHP pain	r	<b>0.543**</b>	<b>0.546**</b>	<b>0.610**</b>
	p	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
NHP sleep	r	0.138	<b>0.472**</b>	0.231
	p	0.31	<b>&lt;0.001</b>	0.076
NHP energy	r	<b>0.341*</b>	<b>0.396*</b>	<b>0.414*</b>
	p	<b>0.01</b>	<b>0.002</b>	<b>0.001</b>
NHP social isolation	r	0.068	<b>0.269*</b>	0.132
	p	0.619	<b>0.038</b>	0.315
NHP emotional status	r	<b>0.298*</b>	<b>0.339*</b>	<b>0.296*</b>
	p	<b>0.026</b>	<b>0.008</b>	<b>0.022</b>
NHP Physical mobility	r	<b>0.370*</b>	<b>0.606**</b>	<b>0.499**</b>
	p	<b>0.005</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
NHP total	r	<b>0.406*</b>	<b>0.603**</b>	<b>0.507**</b>
	p	<b>0.002</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Oswestry Disability Index score	r	<b>0.693**</b>	<b>0.772**</b>	<b>0.800**</b>
	p	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Pain Severity-VAS (0-10)	r	<b>0.522**</b>	<b>0.585**</b>	<b>0.645**</b>
	p	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

Abbreviations: r: Pearson's correlation coefficients; NHP: Nottingham Health Profile; VAS: Visual Analog Scale; \*\* p<0.001; \* p<0.05

**Table 6.** Results of Pelvic Girdle Questionnaire, Nottingham Health Profile, Oswestry Disability Index and Visual Analog Scale Scores

	Minimum-Maximum	X±SD
PGQ Activity Subscale	11.11-78.33	44.46±17.81
PGQ Symptom Subscale	0-93.33	41.89±19.95
PGQ Total Scale	11-80	43.72±17.23
NHP pain	0-100	42.04±26.88
NHP sleep	0-77.63	19.94± 22.70
NHP energy	0-100	50.86±35.99
NHP social isolation	0-100	12.56± 25.30
NHP emotional status	0-100	24.19± 25.12
NHP Physical mobility	0-87.31	38.54±13.67
NHP total	17.71-432.1	185.36±105.81
Oswestry Disability Index score	2-70	29.77±13.85
Pain Severity-VAS (0-10)	2-10	5.45±1.58

X. Mean; SD. Standard Deviation; PGQ. Pelvic Girdle Questionnaire; NHP. Nottingham Health Profile; VAS. Visual Analog Scale



In our study, reliability determined by internal consistency was measured by Cronbach's  $\alpha$  values. ICC can vary from 0.00 to 1.00, in which the values of 0.60–0.80 are regarded as evidence of good reliability with those  $>0.80$  indicating excellent reliability. Portney and Watkins claim that for most clinical measurements, reliability should be  $>0.90$  to ensure reasonable validity.<sup>18</sup> Stuge, who developed the questionnaire, reported Cronbach  $\alpha$  coefficients of 0.93 for the PGQ activity subscale and 0.91 for the PGQ symptom subscale.<sup>7</sup> In our study, ICCs were  $>0.90$  and reliability was  $>0.90$ . We found an ICC of 0.97 for the activity subscale, 0.91 for the symptom subscale and 0.98 for the total. The results showed that PGQ is a reliable tool for Turkish speaking patients with PGP.

Grotle, who examined the internal consistency, test-retest reliability and construct validity of instruments, conducted the study concerning psychometric properties of the PGQ, ODI, Disability Rating Index, Fear-Avoidance Beliefs Questionnaire activity subscale, Pain Catastrophizing Scale and 36-Item Short-Form Health Survey questionnaire to evaluate validity.<sup>11</sup> In our study, we used the VAS, ODI and NHP to assess construct validity of the PGQ. We found a good correlation between the PGQ and VAS ( $r = 0.645$ ), an excellent correlation between the PGQ and ODI ( $r = 0.800$ ) and a moderate correlation between the PGQ and NHP ( $r = 0.406$ ).

At the end of the translation process, there was no need to change any words or sentences in the Turkish version. Therefore, we concluded that this questionnaire was easily understandable to the Turkish population.

The limitation of this study was that only pregnant women were included the study. Future studies should be performed with postpartum women, because PGP occurs in both pregnant and postpartum women.

This study led to use the condition-specific, reliable, valid, easily understandable questionnaire to assess Turkish speaking pregnant women with PGP and in clinical research in a Turkish population.

The authors contributed to the study as following

GD Yilmaz Yelvar: Project development, Data Collection, Manuscript writing

Y Cirak: Project development, Data analysis

Y Parlak Demir: Project development

ES Turkyilmaz: Data Collection

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## Appendix

### PELVİK KUŞAK ANKETİ

Pelvik kuşak ağrısı nedeniyle aşağıda listelenen aktiviteleri gerçekleştirmeyi ne ölçüde sorunlu bulursunuz? Her bir aktivite için bugün nasıl olduğunuzu tanımlayan en iyi kutuyu işaretleyin

Pelvik kuşak ağrınız nedeniyle sizin için ne kadar sorunlu	Hiç(0)	Küçük bir oranda (1)	Bir dereceye kadar (2)	Büyük ölçüde (3)
1.Kendi başınıza giyinmek				
2.10 dk.dan daha az ayakta durmak				
3.60 dk.dan daha fazla ayakta durmak				
4.Yere eğilmek				
5.10 dk.dan daha az oturmak				
6.60 dk.dan daha fazla oturmak				
7.10 dk.dan daha az yürümek				
8.60 dk.dan daha fazla yürümek				
9.Merdiven çıkmak				
10.Evişi yapmak				
11.Hafif objeler taşımak				
12.Ağır objeler taşımak				
13.Kalkmak/oturmak				
14.Alişveriş arabasını itmek				
15.Koşmak				
16.Spor aktiviteleri yapmak*				
17.Yatmak				
18.Yatakta dönmek				
19.Normal bir cinsel hayata sahip olmak*				
20.Tek ayakla bir şeyleri itmek				

\*Uygun değilse sağdaki kutuyu işaretleyin

Ne kadar ağrı hissediyorsunuz	Hiç (0)	Biraz (1)	Orta (2)	Oldukça (3)
21.Sabah				
22.Akşam				
Pelvik kuşak ağrısı yüzünden ne ölçüde,	Hiç(0)	Küçük bir oranda (1)	Bir dereceye kadar (2)	Büyük ölçüde (3)
23.Bacak/bacaklarınızda boşalma hissi oluyor				
24.Bir şeyleri çok yavaş yapıyorsunuz				
25.Uykunuz bölünüyor				

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