

RESEARCH REPORT

CROSS-CULTURAL ADAPTATION, VALIDITY AND RELIABILITY OF CORNELL MUSCULOSKELETAL DISCOMFORT QUESTIONNAIRE (CMDQ) IN TURKISH LANGUAGE

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INTRODUCTION

Musculoskeletal (MS) problems form a serious threat for working people in modern world. Literature provides ample evidence about adverse effects of MS problems on health and productivity worldwide (Bureau of Labor Statistics, 2007; Buckle and Devereux, 2002; Morken et al., 2003; Punnet and Wegman, 2004; Sim et al., 2006). For example, in the USA, 2006 statistics showed that 30 % of injuries and illnesses with days away from work were due to MS disorders (Bureau of Labor Statistics, 2007). In Norway, MS disorders accounted for 45 % of total sickness absence among aluminum industry workers (Morken et al., 2003). Amounting evidence as such pointed to the fact that, reduction and prevention of MS problems has become a high priority issue in global scale (Buckle and Devereux, 2002).

Assessment of MS discomfort is a coral part of efforts to combat MS problems (Hedge, 2004; Li and Buckle, 1999; Punnet and Wegman, 2004). It is widespread to use questionnaires as data collection tools in MS discomfort assessment and using valid and reliable questionnaires is imperative to perform sound assessments (Hedge, 2004; Li and Buckle, 1999). Furthermore, if the assessment is to be performed with populations speaking languages other than the source language, cross-cultural adaptation and validation of the questionnaire in target language is required (Beaton et al., 2000).

Cornell MS Discomfort Questionnaire (CMDQ) is a well-designed data collection tool which was developed by Professor Alan Hedge and ergonomics graduate students at Cornell University (Cornell University Ergonomics Web, Hedge et al., 1999). CMDQ Addresses 7-day frequency, severity and working ability interference effects of MS discomfort across 20 body parts. It has been used in assessment of MS discomfort among different working populations such as nursing personnel (Menzel et al., 2004) and data entry employees in a large Canadian telecommunication company (Fagarasanu and Kumar, 2006). Soft copies of CMDQ for male/female standing and sedentary workers are available in Cornell University Ergonomics Web.

CMDQ was originally developed in English and in order to use it with Turkish speaking populations, cross-cultural adaptation and validation of the tool in Turkish language was necessary. This report presents cross-cultural adaptation, validity and reliability of CMDQ in Turkish language. It was considered that present research would contribute to literature via providing researchers who need to assess MS discomfort among Turkish speaking populations with the Turkish version of CMDQ.

ACKNOWLEDGEMENTS

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CROSS-CULTURAL ADAPTATION

Methodology

Cross-cultural adaptation of CMDQ in Turkish language was carried out in accordance with guidelines developed by Beaton et al., (2000). The guidelines include a six-stage methodology for adaptation of health related subjective data collection tools. Standing workers version of CMDQ was used in adaptation process in that this version included “foot” among body parts which was not included in sedentary workers version of the tool. In the following, stages of cross-cultural adaptation were elaborated.

Stage-1: Translation

Translation of CMDQ in Turkish was made by two native Turkish translators. Both translators had high command of English. One of the translators (i.e. third author) was a physiatrist who was familiar with MS problems and concept of the study. Other translator was an industrial engineer who was not familiar with concept of the study (i.e. naïve translator). Translations were made independently. Both translators produced a written translation report.

Stage-2: Synthesis

Translators and the first author synthesized Turkish translations of CMDQ in a meeting. Three issues were needed to be addressed.

The first issue was definitions of “upper arm”, “forearm”, “thigh” and “lower leg” parts. In spoken Turkish language, upper and lower parts of arms and legs are not expressed with different terms such as forearm or thigh. Instead, upper-lower regions of arms and legs are expressed via indicating the associated body part with gestures. Also, Turkish synonyms of “forearm” and “thigh” are used in medical literature, but not in spoken Turkish. Hence, it was decided to use Turkish synonyms of “upper arm”, “lower arm”, “upper leg” and “lower leg” with side-definitions indicating the associated body region. For example; the term “upper arm” was accompanied by the phrase “between shoulder and elbow”. That one of the translators was a physiatrist significantly contributed to producing this solution. The second issue was the phrase, “During the last work week how often did you experience ache, pain, discomfort in...” in frequency scale, which was clearly comprehended to be continued with listed body parts. This sentence structure was not found applicable in Turkish language. Instead, it was decided to use the Turkish synonym of the sentence; “During the last work week how often did you experience ache, pain, discomfort?” which was followed by the synonym of the phrase “Answer for every body part”. The third issue was use of body diagrams in original version of CMDQ. In Turkish culture, particularly among Turkish people with low education level, it would likely be deemed inappropriate to communicate using naked body diagrams as in original versions of CMDQ, which could also introduce a drawback for participation in future studies. Hence, naked body diagrams in the original version of CMDQ were modified into clothed diagrams by a professional graphical designer. This modification was supported and found suitable by both translators. Consequently, an agreed upon Turkish translation of CMDQ and a written report were produced.

Stage-3: Back translation

Synthesized Turkish version of CMDQ was delivered to two back-translators. One of them was from a bi-lingual family; her mother was American and father was Turkish, which contributed to her command of both Turkish and American languages and cultures. Other back-translator was American and she had been working in Turkey for two years. They were language professionals working in a publishing company. Back translations were made independently. Back-translators were totally blind to the original version of CMDQ and they were not informed about concept of the study. Both of them produced a written back translation report.

Stage-4: Expert committee review

Expert committee comprised of translators, back translators, first author (i.e. methodologist), second author (i.e. occupational health specialist) and a company doctor. Both of the latter two committee members had knowledge and experience about concept of research. The committee reviewed original and translated versions of the tool. Insertion of side-definitions in aforementioned body parts, addition of the phrase “Answer for every body part” to frequency scale and clothing modifications on the body diagrams were found suitable by the committee. Based upon their experience about Turkish culture, back-translators particularly supported clothing modifications on body diagrams. In the end of the review, Turkish prefinal version of CMDQ was produced and the committee reached consensus about equivalence (i.e. semantic, idiomatic, experiential and conceptual equivalence), understandability and applicability of Turkish prefinal version of the tool. Subsequently, five subjects from various backgrounds reviewed Turkish prefinal version of CMDQ and found face validity of the tool satisfactory, which concluded expert committee review stage.

Stage-5: Pretest of prefinal version

Turkish prefinal version of CMDQ was pretested by 20 subjects (15 males, 5 females) with various educational and occupational profiles. Proportions of elementary school, high school and university graduates among subjects were 45 %, 50 % and 5 % respectively. The subject group included manufacturing workers, office employees and cleaning service employees with proportions of 60 %, 15 % and 25 % respectively.

Each subject was given a brief introduction and requested to complete Turkish prefinal version of CMDQ independently, in a self-administered manner. Subsequently, each subject was interviewed about clarity and understandability of the tool. Although subjects did not state problems about text and layout of the tool, proportion of missing/incorrect responses on item basis (i.e. each body part being an item and total number items for 20 participants amounting to 400) was found to be 39 % (i.e. 155 items). It was observed that substantial portion of missing/incorrect items either was at body parts with left-right distinction or in severity and interference scales.

High proportion of missing/incorrect data was discussed by the committee except back-translators. It was considered that Turkish population could need more visual orientation on the layout of the tool. Thus, it was targeted to orient subjects more effectively toward all body parts (i.e. vertically) and toward severity and interference scales (i.e. horizontally) via incremental modifications. For vertical orientation; body parts were separated with blank lines, anchors for right-left section of the body parts were separated with a line where necessary (e.g. shoulder, forearm), terms “right” and “left” and the phrase “Answer for every body part” in the frequency scale were written in boldface. For horizontal orientation; backgrounds of severity and interference scales were colored in different tones of gray and the phrase “If you experienced ache, pain, discomfort...” in these scales were written in boldface. Revised Turkish prefinal version of the CMDQ was approved by the committee and reviewed by the same subject group. It was concluded that orientation on the revised version was satisfactory and cross-cultural adaptation process was completed. Cross-culturally adapted Turkish versions of CMDQ (T-CMDQ) were presented in Appendix.

Stage-6: Submission of documentation to the developers

This report documents cross-cultural adaptation process, assessment of validity and reliability of T-CMDQ.

VALIDITY AND RELIABILITY OF T - CMDQ

Participants

Validity and reliability of T-CMDQ was measured via application of the tool in a metal manufacturing company. Fifty two employees formed initial sample. All participants were Turkish and participation was voluntary. Questionnaires returned by four participants were invalid and final participant group was formed by 48 employees. Demographics of participants were presented in Table 1.

Table 1. Demographics of participants

Demographics of participants		
Gender	Males	81.3 % (n=39)
	Females	18.7 % (n= 9)
Age	Range	23-56
	Mean (std. dev)	36.21 (7.874)
Education	Primary school or lower	22.9 % (n=11)
	Secondary school	16.7 % (n= 8)
	High School	35.4 % (n=17)
	University or higher	25.0 % (n=12)

Materials and Methods

Validity

In order to measure validity of T-CMDQ, participants also completed Visual Analog Scale (VAS) of 100 mm. (i.e. No ache, pain, discomfort at all; '0', Very severe ache, pain, discomfort; '100') which was widely used in validation of health related questionnaires (Björkstén et al., 1999; Mannion et al., 2006). VAS Responses were compared with responses given in T-CMDQ frequency and severity scales. It was hypothesized that participants who report discomfort in VAS should also report discomfort in T-CMDQ frequency scale at any level. By the same token, those who did not report any discomfort in VAS were also expected to respond "Never" in T-CMDQ frequency scale. Also, VAS scores were expected to correlate positively with T-CMDQ severity scores. Thus, agreement between responses given in VAS and T-CMDQ frequency scale was measured by Kappa coefficient and correlation between VAS scores and T-CMDQ severity scale scores was assessed using Spearman correlation coefficient.

Reliability

Test-retest reliability and internal consistency of T-CMDQ were measured. Participants completed T-CMDQ two times in order to measure test-retest reliability. Time interval between two tests ranged between 7-10 days as recommended in literature (Marx et al., 2003). Test-retest reliability of T-CMDQ was assessed using Kappa coefficient for frequency, severity and interference scales separately. Internal consistency of each scale was assessed by Cronbach's alpha statistic.

Results

Analysis showed that, total proportion of missing/incorrect responses in two tests was 8.9 % including four invalid questionnaires. Assessments were performed using valid responses for each body part. Results of validity and test-retest reliability assessments were presented in Table-2.

Table 2. Validity and test-retest reliability assessment results

Body parts	Validity			Test-retest reliability		
		Agreement between VAS & Frequency scale	Correlation between VAS & Severity scale	Frequency Scale	Severity Scale	Interference scale
	n	Kappa	Spearman	Kappa	Kappa	Kappa
Neck	48	0.792	0.819*	0.738	0.778	0.750
Right shoulder	46	0.740	0.670*	0.700	0.737	0.675
Left shoulder	47	0.617	0.464*	0.743	0.776	0.744
Back	45	0.733	0.773*	0.640	0.559	0.644
Right upper arm	46	0.697	0.516*	0.781	0.767	0.737
Left upper arm	46	0.741	0.589*	0.837	0.826	0.767
Low back	43	0.631	0.702*	0.564	0.569	0.598
Right forearm	48	0.672	0.488*	0.750	0.689	0.689
Left forearm	46	0.697	0.463*	0.767	0.739	0.707
Right wrist	48	0.708	0.479*	0.693	0.687	0.656
Left wrist	46	0.740	0.485*	0.753	0.738	0.738
Hips	48	0.917	0.834*	0.948	0.972	0.944
Right upper leg	47	0.830	0.757*	0.814	0.830	0.826
Left upper leg	44	0.818	0.494*	0.879	0.879	0.864
Right knee	47	0.703	0.604*	0.624	0.658	0.628
Left knee	47	0.787	0.672*	0.681	0.689	0.744
Right lower leg	48	0.794	0.768*	0.740	0.779	0.750
Left lower leg	48	0.751	0.659*	0.739	0.778	0.834
Right foot	48	0.709	0.670*	0.712	0.722	0.694
Left foot	48	0.792	0.676*	0.765	0.806	0.751

* $p < 0.005$

Validity

Kappa coefficients ranged between 0.617 - 0.917 across body parts which indicated substantial to almost perfect agreement (Sim and Wright, 2005) between VAS responses and T-CMDQ frequency scale responses. Spearman correlation coefficients ranged between 0.463-0.834 across body parts (i.e $p < 0.005$) which indicated that VAS scores and T-CMDQ severity scale scores were positively correlated.

Reliability

Kappa coefficients ranged between 0.564-0.948, 0.589-0.972 and 0.598-0.944 for frequency, severity and interference scales respectively. These results indicated that, agreement between test-retest

responses in all three scales were in moderate to almost perfect level (Sim and Wright, 2005). Among 60 Kappa coefficients examined across three scales, proportion of moderate, substantial and almost perfect agreement level coefficients were 6.7 %, 71.6 % and 21.7 % respectively. While test-retest responses in three scales of low back and severity scale of back were in moderate agreement, test-retest responses in remaining body parts across three scales were in substantial or almost perfect agreement. Cronbach's alpha statistic for frequency, severity and interference scales were 0.876, 0.895 and 0.875 respectively which indicated that internal consistency of the T-CMDQ was high (Bland and Altman, 1997).

DISCUSSION AND CONCLUSIONS

Present research aimed to cross-culturally adapt CMDQ in Turkish language and to examine validity and reliability of adapted Turkish version of the tool.

In cross-cultural adaptation, it was sought to produce a clear and understandable Turkish version of the tool. Guidelines developed by Beaton et al. (2000) were followed in cross-cultural adaptation process. A multi-disciplinary group of researchers, language and health professionals participated in translation, synthesis, back-translation, expert committee review and pretest steps. Minor modifications were needed to be made on text of the original version. Turkish synonyms of upper arm, forearm, thigh and lower leg were added indicative expressions (e.g. "between shoulder and elbow" for upper arm). Question statement in frequency scale was added Turkish synonym of "Answer for every body part" in order to build a meaningful Turkish statement. Body diagrams were modified into clothed diagrams in order to suit Turkish culture. Based upon excessive missing/incorrect responses in pretest, layout of the tool was modified such that participants could be oriented across body parts and scales more effectively; body parts and left-right sections were separated with lines, question statements in severity and interference scales were written in boldface, backgrounds of severity and interference scales were colored in gray. Given that T-CMDQ was planned to be used mainly in studies with work force, participant group in validation of the tool was formed by employees in a metal manufacturing company. Proportion of missing/incorrect responses, which was 39 % in pretest, decreased to 8.9 % in validation part, which was deemed acceptable for a self-administered questionnaire. This result was considered to substantiate that abovementioned layout modifications were useful. Outcome of cross-cultural adaptation process; T-CMDQ was considered applicable with Turkish population.

Examination of psychometric properties of T-CMDQ yielded satisfactory results. T-CMDQ demonstrated good validity as agreement between discomfort reportings on VAS and T-CMDQ frequency scale was substantially high and VAS scores significantly and positively correlated with T-CMDQ severity scores across all body parts. Test-retest reliability and internal consistency of T-CMDQ were also found to be at good levels. Kappa coefficients showed substantial and almost perfect agreement between test-retest responses in all scales except low back and severity scale of back which were in moderate agreement. These results indicated that test-retest reliability of frequency, severity and interference scales were satisfactory. As high values of Cronbach's alpha statistic suggested, internal consistency across three scales was also high. Based on the abovementioned results, it was concluded that T-CMDQ was a valid and reliable data collection tool.

Use of applicable, valid and reliable data collection tools in ergonomics research is of utmost importance in order to perform sound assessments (Annett, 2002). It was considered that present research produced an applicable Turkish version of CMDQ with good psychometric properties. In future MS discomfort assessments with Turkish speaking populations, T-CMDQ could be used effectively as a valuable data collection tool.

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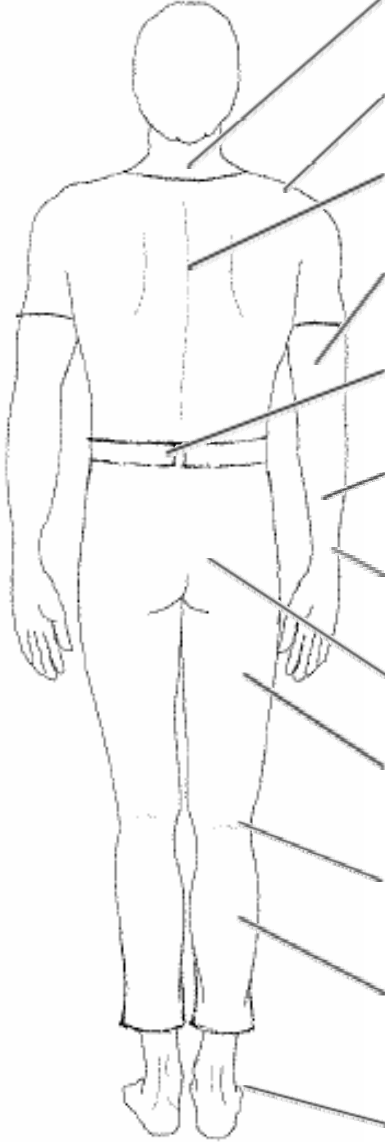
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APPENDIX**TURKISH VERSIONS OF
CORNELL MUSCULOSKELETAL DISCOMFORT QUESTIONNAIRE**

- **Standing workers, male version**
- **Standing workers, female version**
- **Sedentary workers, male version**
- **Sedentary workers, female version**

Aşağıdaki resim, ankette sorulan vücut bölümlerini yaklaşık olarak göstermektedir.
Lütfen uygun kutucuğu işaretleyerek cevaplayınız.

		Geçtiğimiz hafta çalıştığınız süre boyunca, vücudunuzda ne sıklıkta ağrı, sızı, rahatsızlık hissettiniz? (Her vücut bölümü için cevaplayınız)					Eğer ağrı,sızı,rahatsızlık hissettiyseniz, ne kadar şiddetliydi?			Eğer ağrı,sızı,rahatsızlık hissettiyseniz, bu işinizi yapmanıza engel oldu mu?		
		Hiç hissetmedim	Hafta boyunca 1-2 kez hissettim	Hafta boyunca 3-4 kez hissettim	Her gün bir kez hissettim	Her gün bir çok kez hissettim	Hafif şiddetliydi	Orta şiddetliydi	Çok şiddetliydi	Hiç engel olmadı	Biraz engel oldu	Çok engel oldu
Boyun		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sırt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Üst Kol (omuz - dirsek arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bel		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ön Kol (dirsek - bilek arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
El Bileği	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kalça		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Üst Bacak (kalça - diz arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diz	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alt Bacak (diz - ayak arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ayak	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Aşağıdaki resim, ankette sorulan vücut bölümlerini yaklaşık olarak göstermektedir.
Lütfen uygun kutucuğu işaretleyerek cevaplayınız.

		Geçtiğimiz hafta çalıştığınız süre boyunca, vücudunuzda ne sıklıkta ağrı, sızı, rahatsızlık hissettiniz? (Her vücut bölümü için cevaplayınız)					Eğer ağrı,sızı,rahatsızlık hissettiyseniz, ne kadar şiddetliydi?			Eğer ağrı,sızı,rahatsızlık hissettiyseniz, bu işinizi yapmanıza engel oldu mu?		
		Hiç hissetmedim	Hafta boyunca 1-2 kez hissettim	Hafta boyunca 3-4 kez hissettim	Her gün bir kez hissettim	Her gün bir çok kez hissettim	Hafif şiddetliydi	Orta şiddetliydi	Çok şiddetliydi	Hiç engel olmadı	Biraz engel oldu	Çok engel oldu
Boyun		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Omuz	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sırt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Üst Kol (omuz - dirsek arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bel		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ön Kol (dirsek - bilek arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
El Bileği	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kalça		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Üst Bacak (kalça - diz arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diz	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alt Bacak (diz - ayak arası)	(Sağ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Sol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

