

Research Article

Adaptation of the Godin Leisure-Time Exercise Questionnaire into Turkish: The Validity and Reliability Study

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This study was conducted with the aim of determining whether the Turkish form of the “Leisure-Time Exercise Questionnaire” developed by Godin is a valid and reliable tool for diabetic patients in Turkey. The study was conducted as a methodological research on 300 diabetic patients in Turkey. The linguistic equivalence of the questionnaire was assessed through the back-translation method, while its content validity was assessed through obtaining expert opinions. Cronbach’s alpha value was found to assess the reliability of the questionnaire. The test-retest analysis and the correlation between independent observers were examined. The content validity index (CVI) was found to be .82 according to the expert assessments, and no statistical difference was found between them (Kendall’s $W = .17$, $p = .235$). Cronbach’s alpha was found to be $\alpha = .64$, the result of the test-retest analysis was $r = .97$, and the correlation between independent observers (ICC) was .98. This study found that the Turkish form of the Leisure-Time Exercise Questionnaire is a valid and reliable tool that can be used to define and assess the exercise behaviors of Turkish diabetic patients.

1. Introduction

Physical activity is an important factor for managing type 2 diabetes. Evidence suggests that regular exercises control the blood glucose of type 2 diabetic patients, decrease their diabetic complications, and have positive effects on the mortality, quality of life, and cardiovascular system of these patients [1–4]. The clinical practice guideline of Canadian Diabetes Association also suggests 150 min of exercise in a week for all diabetic patients, ranging from moderate to severe intensity, spread over 3 days in a week with no more than two consecutive days without exercise [3]. In this respect, assessing physical activity/exercise behaviors of diabetic patients is important for contributing to the patients’ success in self-management.

The number of people affected by diabetes is gradually increasing, and diabetes-related deaths have been ranked at the top. Diabetes is a lifelong disease, complications of which affect individuals and the society. It also decreases the quality of life of the patients and requires the participation of more than one discipline in the treatment and care and

a holistic assessment of the patients [5–8]. Regular exercise is an important component of treatment in diabetic patients and is also essential for the prevention of diabetes and the self-management of individuals diagnosed with diabetes [9–15]. The Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) was developed by Godin in Canada in 1985 to assess the leisure-time physical activities (LTPA) adults take part in. It is a short and practical questionnaire used to identify the leisure-time physical activities based on self-report. When the questionnaire was developed, its reliability was found to be .94 for the strenuous activity score and .74 for the total LTPA score, using the kappa index [16].

In the Leisure-Time Exercise Questionnaire, which is practical and easy to fill, the activities are classified into three subgroups: “strenuous,” “moderate,” and “light.” The scores corresponding to the energy expenditure (metabolic equivalent (MET)) are obtained by multiplying activities performed for more than 15 min in a week with their coefficients. The numbers represent the MET intensity values (strenuous/exhausting exercises: 9 METs, moderate exercises: 5 METs, and light exercises: 3 METs). MET is defined as the amount

of oxygen consumed while sitting at rest and is equal to 3.5 mL O₂ per kg body weight × min. The MET concept represents a simple, practical, and easily understood procedure for expressing the energy cost of physical activities as a multiple of the resting metabolic rate [10, 12–14].

The increasing scores are associated with the increasing number of exercise behaviors. The final score provides us with references about the contribution of physical activity to health. Godin [17] states that, while calculating the final score, the calculation of only the scores of moderate and strenuous activities will probably be better than the calculation of the total score of activities in the three categories. Godin (2011) regarded the activity score of 24 units and more as active (substantial benefits); the activity score of 14–23 units as moderately active (some benefits); and the activity score of 13 units and less as inactive (less substantial or low benefits) at first. Recently, the activity score of 24 units and more has been suggested to be active and the activity score of 14–23 units has been suggested to be inactive. Only moderate and strenuous activities were included in the scoring. It is stated that although two different classifications exist, both of them correspond to the physical activity level [18].

A large number of studies have been conducted on diabetes care and management. However, the number of studies that examine especially the extent to which Turkish diabetic patients incorporate physical activity/exercise in their lives and the tools used for assessing these activities are limited. The selection of appropriate activities is achieved by determining the physical activity/exercise levels of diabetic patients, and the activities they perform frequently using tools will be provided in the literature. Therefore, assessment tools are required especially for the physical activity/exercise behaviors of diabetic patients. The aim of this study was to determine the validity and reliability of the Turkish adaptation of the Godin Leisure-Time Exercise Questionnaire and to present a new tool in the literature that can be used to assess the physical activity behaviors of diabetic patients.

2. Method

2.1. Design and Sample. The study was conducted with an aim of determining whether the Turkish form of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) is valid and reliable for Turkish diabetic patients. The sample of the study consisted of all diabetic patients who applied to the endocrinology polyclinic in the Department of Internal Diseases at a university hospital between April and August 2011. In the literature, it is recommended that, while determining the sample volume in the validity and reliability studies, the number of individuals to be contacted should be 10 times more than that of the items in the questionnaire [19]. Therefore, in the present study, the aim was to contact 290 individuals, which is 10 times more than the number of the items (29) included in the GSLTPAQ. The study sample consisted of 290 diabetic patients, the number of which is 10 times more than that of the questionnaire items, but the study was completed with 300 diabetic patients.

2.2. Measures. The Individual Interview Form that describes the diabetic patients and the Godin-Shephard Leisure-Time Physical Activity Questionnaire were used in the study.

2.3. Individual Interview Form. The Individual Interview Form consisted of questions about the sociodemographic characteristics of the patients (age, sex, marital status, who they are living with, educational status, social security, working, income level, and smoking), their medical history (type of diabetes, duration of diabetes, metabolic indicators, complications, hospitalization history, diabetes history in their families, treatment mode, and self-monitoring of blood glucose), and whether they are receiving education regarding diabetes.

2.4. Godin-Shephard Leisure-Time Physical Activity Questionnaire. The Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) was developed by Godin and Shephard in 1985 [16]. It was developed to classify physical activities/exercises performed by adults and to determine their activity levels. Activities were classified into three subgroups, including “strenuous,” “moderate,” and “light,” in the Leisure-Time Exercise Questionnaire, which was practical and easy to fill. The frequency and type of activities/exercises performed weekly by individuals were used as criteria while calculating individuals’ physical activity/exercise score in the questionnaire: total score = strenuous/exhausting (9 METs × times/week) + moderate (5 METs × times/week) + light (3 METs × times/week).

Activities selected from the physical activity/exercise groups were multiplied with the aforementioned coefficients and the score for each activity group was calculated. Their contribution to health at different levels was remarked. For the final score calculation, score of 24 units and more was regarded as active (substantial benefits); score of 14–23 units was regarded as moderately active (some benefits); and score of 13 units and less was regarded as inactive (less substantial or low benefits) [17]. When the questionnaire was developed, its reliability was found to be .94 for the strenuous activity score and .74 for the total LTPA score, using the kappa index [16]. In a recent study conducted to test the validity of the tool temporal stability, the *k* coefficient for the 15-day period was .65 [95% confidence interval (CI) = .34–.96] and it was .45 for the 30-day period (95% CI = .25–.64) [18].

In this study, the mild activities were included in the total final score, as mild activities were preferred by the Turkish society and have importance for individuals. According to Turkey Nutrition and Health Survey (2014), most females between the ages of 20 and 30 years have either sedentary or light activity level or active or moderately active lifestyle (44.4% and 44.8%, resp.). Most males between the ages of 31 and 50 years are at sedentary or light activity level (36.3%). Most males between the ages of 51 and 64 years are at sedentary or light activity level (52.4%). Most females and males between the ages of 65 and 74 years are at the sedentary or light activity level (53.8% and 66.5%, resp.) [20]. Therefore, the results were indicated in a way that the light activities were included in the final score. Recently, a similar study in which

the developer of the questionnaire was also involved has been observed in the literature.

2.5. Validity and Reliability

2.5.1. Linguistic Validity of Leisure-Time Exercise Questionnaire. The back-translation is the most used method to ensure the culture equivalence while translating a tool (questionnaire, scale, and inventory) from its original language to the target language [21, 22]. In the present study, the questionnaire was adapted into Turkish language and culture. As a valid method in the literature, the translation-back-translation was used to ensure the linguistic and conceptual equivalence while adapting the questionnaire into Turkish. During the adaptation of the original questionnaire [16] into Turkish language and culture, it was translated into Turkish in accordance with translation methodology. After the questionnaire was translated into Turkish by two different experts, the obtained Turkish form was translated into English by another expert using the back-translation method. The original English forms and the forms obtained through the back-translation method were compared and necessary adjustments were made through reviewing the Turkish expressions of inappropriate items. Afterward, sport/exercises specific to the American culture were made compatible with exercise sources and types that Turkish people can reach, by working with two experts in the field of exercise physiology. For example, activities such as field hockey (two teams play with each other with a ball and clubs having curved ends), football (American soccer), squash (a racket sport played by two players with a ball and racket), roller skating (sport shoes with two wheels of steel used to roll along on the ice or flat surface), baseball (defense and offense play), badminton (a sport played with rackets and a feathered shuttlecock), archery, and golf (a sport played with golf sticks and balls in a special area) were changed to aerobics, weightlifting, hoeing, walking on the beach, lifting with light weights, stair climbing, walking at a slow tempo, and table tennis, respectively, in the Turkish adaptation, and they were identified with Turkish expressions. In this process, we did not use first MET value. However, we benefited from the activities in the same group. We used studies for the determination of the same group [10, 20, 23].

In this adaptation process, differences in health, language, culture, and lifestyle of the society were taken into consideration. It is also stated in the literature that the necessity to modify the items of the tool through changing them sometimes in the adapted culture is possible and important, at the same time protecting the linguistic and cultural equivalence in these items [24, 25].

2.5.2. Content Validity of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ). The Turkish form of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) was presented to a committee consisting of 10 experts in the field of exercise physiology, public health, endocrinology, and internal diseases for their opinion to assess the content validity of it. This committee

consisted of two lecturers working in Community Health Nursing, one lecturer from the Department of Psychiatric Nursing, three lecturers from the Department of Internal Diseases in the Faculty of Medicine, and four lecturers from the School of Health and Physical Education. Their options were asked, and necessary adjustments were made in accordance with their recommendations.

Each item was presented for the experts to assign a score between 1 and 4 (1: not appropriate, 2: slightly appropriate (items should be made suitable), 3: quite appropriate (it is appropriate but a small change is needed), and 4: entirely appropriate). The experts gave 3 and more points for each question separately ranging from 80 to 100%. The content validity index (CVI) was found to be .82 according to the assessment of the experts. The scores of 10 experts were assessed with Kendall's W analysis. No statistical difference was found between them (Kendall's $W = .17$, $p = .235$). They were found to be coherent. The result showed that it has high internal validity to determine the exercise behaviors of diabetic patients. GSLTPAQ validity was determined. The questionnaire that was put into its final form after the content validity was administered to 20 diabetic patients who were not involved in the study. Since the items were found understandable, no change was made in the questionnaire and the Turkish version of the questionnaire was found to be applicable.

2.5.3. Reliability Results of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ). Reliability refers to the consistency of questions in a test or questionnaire and the extent to which the assessment tool reflects the problem [26]. Several methods are found to assess the reliability of an assessment tool. In this study, Cronbach's alpha values were found, the test-retest analysis was conducted, and the correlation between independent observers (intraclass correlation coefficient (ICC)) was evaluated for the reliability of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ).

2.6. Data Collection. The study data were collected through structured individual interviews with diabetic patients who applied to the polyclinic and complied with the study criteria. It took approximately 5–10 minutes to have an interview with each diabetic patient. After the content validity, the tool was administered to 20 diabetic patients who were not involved in the study, and no problem was found. Structured individual interviews were held with the diabetic patients in a private interview room located in the endocrinology polyclinic of the hospital. The interviews were carried on with 300 patients over a period of 5 months. The test-retest analysis was applied to 30 diabetic patients with an interval of 3 weeks.

2.7. Analytic Strategy. The statistical analysis for the questionnaire's validity and reliability was conducted using the SPSS package program. Number, frequency, mean, and standard deviation were used to assess the descriptive data of the study, and the significance level was accepted as $p < .05$. The options of the experts were assessed with the CVI for

the content validity of the questionnaire. Also, Kendall's *W* analysis was used. For the reliability, the test-retest analysis was conducted and the correlation between independent observers was assessed.

2.8. *Ethics.* Written permission was obtained through e-mail from Godin who developed the tool. Written permission was also obtained from the ethics committee of the university to conduct the validity and reliability study of the Turkish form of the Godin Leisure-Time Exercise Questionnaire. Prior to the study, the aim of the study was explained to the diabetic patients involved in the sample and their verbal consents were obtained. Patients who were 20 years and older, literate, and not pregnant, did not have communication difficulty, and agreed to participate in the study were included.

3. Results

The validity and reliability of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) for the Turkish diabetic patients were examined in the study. The Turkish form of the questionnaire was found as a valid and reliable tool. The most fundamental features necessary for a good assessment tool are validity and reliability [27].

Of the diabetic patients participating in the validity and reliability study, 64.3% were between the ages of 40 and 59, 61% were females, 96.3% have type 2 diabetes, and 37.7% have diabetes for 1–5 years (Table 1). The mean of diabetic patients' body mass index (BMI) was found to be 27.86 ± 3.82 (min: 19, max: 44). When the diabetic patients' characteristics about the disease were examined, their preprandial blood glucose means were found to be 170.09 ± 37.54 (min: 80, max: 348), postprandial blood glucose means were 254.96 ± 60.59 (min: 100, max: 348), and HbA1c means were 7.42 ± 0.72 (min: 6, max: 12).

First, the questionnaire was adapted into the Turkish language and culture. During the process of adaptation into Turkish, minor changes were made to some expressions in the light of expert opinions. For its content validity, the questionnaire was presented to a committee consisting of 10 experts in the field of exercise physiology, public health, endocrinology, and internal diseases for their opinion. The CVI was found to be .82 according to the assessments of the experts. The scores of 10 experts were assessed with Kendall's *W* analysis. No statistical difference was found between them (Kendall's $W = .17$, $p = .235$). The preliminary application of the Turkish version of GSLTPAQ was conducted with 20 diabetic patients to test its applicability and practicability. It was found to be easy, practical, and applicable in a short time.

The test-retest reliability refers to an assessment tool's ability to generate consistent results from one application to another and its competency to show the feature of time invariance. The correlation between the scores obtained from two applications is calculated to determine the test-retest reliability. The correlation generates the retest reliability coefficient of the test. Since the questionnaire scores have the feature of continuous variable, "The Pearson Product-Moment Correlation Equation" was used to find the reliability. The value of the correlation coefficient (r) can range

TABLE 1: Distribution of diabetic patients' descriptive characteristics ($n = 300$).

Descriptive characteristics	Number	(%)
Patient's age		
20–39	83	27.7
40–59	193	64.3
60 and older	24	8
Sex		
Male	117	39
Female	183	61
Marital status		
Married	258	86
Single	34	11.3
Divorced/widow	8	2.7
Educational status		
Elementary school	192	64
High school	68	22.7
University and further	40	13.3
Type of diabetes		
Type 1	11	3.7
Type 2	289	96.3
Duration of diabetes		
Less than 1 year	23	7.7
1–5 years	113	37.7
6–9 years	99	33
10–14 years	50	16.6
15 years and more	15	5

between "0" and "1." As the value of correlation increases, the effectiveness level of the expression increases. As the value of correlation decreases, the effectiveness level of the expression decreases. A correlation coefficient high enough shows the consistency of measurements obtained from the test and whether there is a considerable change that is measured within the period between two applications [27]. When the mean scores obtained in the reliability analysis conducted to assess the time invariance of the Turkish form of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) on 30 individuals with an interval of 3 weeks were compared through dependent samples *t*-test, no significant difference was found between them.

When the correlation between the scores obtained from the first and second applications conducted as the reliability analysis of the tool was examined with the Pearson correlation analysis, the reliability coefficient between the scores obtained from the two measurements performed with an interval of 3 weeks was found to be $r = .97$, which is a statistically highly significant and very strong positive correlation. Cronbach's alpha value used for assessing the reliability was found to be $\alpha = .64$. Cronbach's alpha internal consistency coefficient lower than .40 indicates that the test is not reliable, while values of .40–.59, .60–.79, and .80–1.00 demonstrate low, moderate, and high degrees of reliability, respectively [22]. In this study, Cronbach's alpha coefficient of the Turkish form of the Godin-Shephard Leisure-Time Physical Activity

TABLE 2: Comparison of test-retest mean scores of the Turkish form of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) and their correlations ($n = 30$).

Questionnaire	First practice Mean \pm SD	Second practice Mean \pm SD	<i>t</i>	<i>p</i>	<i>r</i>	<i>p</i>
GSLTPAQ Turkish	23.73 \pm 7.73	23.33 \pm 6.86	1.185	.000	.97	<.001*

* $p < .05$; $\alpha = 0.64$; ICC = 0.98.

Questionnaire (GSLTPAQ) was .64 (moderate reliability). The correlation between independent observers was found to be ICC = .98 (Table 2).

4. Discussion

This study was conducted with an aim of testing the validity and reliability of the Turkish form of the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) for diabetic patients. In this respect, several changes were made in the language, content, and cultural equivalence studies to adapt some activities into the Turkish culture by obtaining the opinions of experts in the field of exercise. In this adaptation process, differences in health, language, culture, and lifestyle of the society were taken into consideration. This is because it is stated in the literature that the necessity to modify the items of a tool through changing them sometimes in the adapted culture is possible and important, at the same time protecting their linguistic and cultural equivalence [24, 25].

The reason why the point-scoring system of the original tool was not used to determine the activity levels is because light activities have an important place in the Turkish society. In a society where most of the individuals live a sedentary life, moderate and strenuous activities are performed less or are not performed at all [20]. Recently, a study in which the similar scoring system (the light activity score was included in the final score) was used has been observed in the literature. In that study, the fact that walking as a physical activity has an important role in the Brazilian society was regarded as its reason [28].

The frequency of performing a physical activity/exercise shows the difference from one culture to another. Previous studies have stated that rapid urbanization, economic growth, and technological changes have an effect on exercise behaviors [23, 29]. For example, the frequency of performing physical activity/exercises in developed countries is low; there is a positive correlation between high socioeconomic situation and physical activity/exercises behaviors; and as the socioeconomic level increases, the accessibility to several activities increases [29].

A majority of the study sample consisted of individuals with type II diabetes who were diagnosed with diabetes less than five years ago, had moderate or low education level, and are aged 40 or older. During the administration of the survey, the researcher answered participants' questions and explained the items they did not understand. The Turkish translation of Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ) indicated that 61% of the

diabetic individuals ($n: 183$) were inactive and 39% were ($n: 117$) active at different levels (moderately active and active) in terms of physical activity/exercise. In the international literature, the studies that were conducted with diabetic individuals and took their self-reporting determined that the frequency of performing physical exercise in diabetic individuals ranged between 26 and 45% [6, 10, 12, 15]. In the sample of this study, the frequency of doing physical activity/exercise among adult diabetics was close to the values given above. Physical activity/exercise behaviors might have been affected by the characteristics of the sample and the other characteristics. An analysis of the differences between males and females showed that females mainly preferred physical activities and/or exercises with low and moderate difficulty, while males preferred doing moderate and strenuous difficulty physical activities/exercises. This finding is consistent with the findings of many studies demonstrating the difference between males and females in their preferences of physical activities/exercises. Karaca (2008) stated that females chose moderate activities, and males chose high-difficulty activities [30]. Wilson (2003) said that these differences were caused by the physical requirements of certain activities, with males and females having different socializing experiences and females mainly staying at home [31]. In this study, walking with slow or fast pace and climbing stairs were the activities that were performed by all diabetic individuals most frequently. Brunet et al. (2005) conducted a study with Aboriginal people and determined that the individuals with type II diabetes mostly preferred walking (68.9%) and doing the house chores [32]. Arslan et al. (2003) conducted a study with nondiabetic adults and found that walking, gardening, and physical-fitness exercises-aerobic-step were the activities that were performed most frequently [33]. Accordingly, physical activity/exercise habits of diabetic individuals are mainly shaped by cultural structure, social characteristics, and habits. This study did not explain the finding which indicated that the diabetic individuals aged 40 years or older did more physical activities/exercises than the other age groups. The diabetic individuals that were single, widow/widower, or divorced did more physical activities and/or exercises than the married ones, which is consistent with a study conducted in Canada [14]. As in the study by Cerin and Leslie (2008), this study found that the diabetic individuals who had low education levels performed less physical activities/exercises [29]. In this study, the physical activity/exercise behaviors may have been influenced by factors the results of which were not examined.

The study was conducted on 300 diabetic patients. A limitation to the study was small sample size and this study

used improbable sampling method. Thus, the study results cannot be generalized to all diabetic individuals. Since the physical activities assessed in the study are based on the self-report of diabetic patients, some limitations are found regarding its validity. It is recommended to test the tool in different and larger populations using various methods.

5. Conclusion

GSLTPAQ was adapted into the Turkish language and culture. Its language and content validity was ensured. Some terms in the questionnaire were made compatible with the exercise sources and types that Turkish people can reach, for the cultural equivalence according to expert opinions. However, since activities and sport habits performed frequently are different in each society, several changes were made according to the expert opinions. It was pointed out that the Turkish version of GSLTPAQ can be used to define and assess the exercise behaviors of Turkish diabetic patients. The questionnaire is a valid, reliable, easy-to-apply, and practical tool. It can be stated that it is valid and reliable for Turkey. It is recommended that the tool should be tested on a larger sample and should be used by researchers to determine the physical activity levels of different populations in a society.

Competing Interests

The authors declare that they have no competing interests.

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