

# Turkish validity and reliability of the lifestyle questionnaire related to cancer

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## SUMMARY

**OBJECTIVE:** The aim of this study was to adapt the lifestyle questionnaire related to cancer in Turkish and investigate its validity and reliability.

**METHODS:** This methodological study was conducted on 1,196 participants. Cronbach's  $\alpha$  was used to assess validity and reliability. The internal consistency was evaluated using item-total correlation.

**RESULTS:** The normed chi-square in this study was 5.87. The root mean square error of approximation was calculated as 0.051. The comparative fit index and the Tucker-Lewis Index were 0.83 and 0.81, respectively. The split-half method was used to test the reliability of the scale (Part 1 Cronbach's  $\alpha$ : 0.826, Part 2 Cronbach's  $\alpha$ : 0.812, and Adjusted Cronbach's  $\alpha$ : 0.881).

**CONCLUSION:** The Turkish version of lifestyle questionnaire related to cancer (8 subscales, 41 items) is a reliable and valid measure to evaluate lifestyle behaviors related to cancer in adults.

**KEYWORDS:** Adult. Behavior. Health. Life style. Primary health care.

## INTRODUCTION

Cancer is the second most common cause of death worldwide. It is claimed that cancer will be a huge obstacle to increasing life expectancy. There are many factors implicated in the emergence of cancer; extrinsic factors account for 70–90% of cancer development which can be reduced through lifestyle factors<sup>1,2</sup>. In developed countries, it is observed that the most common types of cancer differ from infection/poverty-related cancers<sup>3</sup> and are mostly associated with Westernization of lifestyle<sup>4,5</sup>.

In epidemiological studies, it has been shown that various lifestyle factors such as non-smoking, normal body weight, regular exercise, and a healthy diet could reduce the risk of cancer<sup>6-8</sup>. Healthy lifestyle behaviors, as a means of providing optimal metabolic health and reducing the overall burden of cancer, should be lifelong<sup>9</sup>. Momayyezi et al.<sup>10</sup> constructed a questionnaire named “lifestyle questionnaire related to cancer” (LQ-RC) to examine various aspects of lifestyle related to cancer. The aim of this study was to evaluate the validity and reliability of the LQ-RC in the Turkish population.

## METHODS

### Study group and procedures

This is a methodological study aiming to evaluate the reliability and validity of the LQ-RC. The sample size is recommended at least 5–10 times the total number of items in the scale when adapting a scale to another culture<sup>11</sup>. Considering that there may be deficiencies or errors in the data, it was planned to use a sample size that was 20 times the total number of items in the original scale. Therefore, the study sample was composed of 1,200 volunteers aged 18–64 years who consulted at primary healthcare centers between February and June 2018. Current dieters, foreigners, and participants who did not completely reply to all questions were excluded from the study. Four participants were removed because of missing data and wrong anthropometric measurements. The study was completed with 1,196 participants. Questionnaires were completed at primary healthcare centers via the face-to-face method.

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## Language adaptation protocol

The language adaptation of the scale was achieved with the back-translation method<sup>12</sup>. The original version of the LQ-RC was translated into target language by the professional translator. Each translated text was administered to 10 participants. Thereafter, another translation from target language back to source language was carried out to compare with the original text. The back-translation comparison process was repeated until the translation and original versions were the same. A pilot study was performed on a small group of 50 participants who had not been included in the main study.

## Study instruments

Sociodemographic information and anthropometric measurements of the participants included in the study were recorded on the sociodemographic characteristic form. The original LQ-RC, which was a 4-point Likert-type scale, has 60 items divided into 8 subscales: “physical health, physical activity and exercise, balanced consumption of food, weight control and nutrition, mental health, reproductive health, drug and alcohol avoidance, and environmental pollutants and harmful substances.” Cronbach’s  $\alpha$  of the original scale was 0.87. Items 21, 31, 43, 44, 45, 47, 51, 59, and 60 were reverse scored. High score indicates that individual has healthier lifestyle behaviors that can reduce the risk of cancer.

## Ethics statement

This study was performed in accordance with the Helsinki Declaration and has been approved by the Erciyes University Ethics Committee (2017/92). All participants’ written consents were obtained. Permission was obtained from the scale developer.

## Statistical analysis

Data were analyzed using the IBM SPSS Statistics (Statistical Package for the Social Sciences, SPSS Inc., Chicago, IL, USA) 22.0 statistical package program and TURCOSA statistical software (Turcosa Analytics Ltd. Co., Turkey). Descriptive statistics were presented as sample size, percentage, mean, and standard deviation. The data were tested with the Kolmogorov-Smirnov test for normal distribution. Cronbach’s  $\alpha$  was used to test the reliability. Sampling adequacy was tested at Kaiser-Meyer-Olkin (KMO). Bartlett’s test was used for factorability. The determination of factor structure was evaluated by principal component analyses. The factor analysis was conducted using the Varimax rotation. Confirmatory factor analysis (CFA) was performed to assess construct validity. Model fit and degrees of freedom were evaluated with goodness-of-fit indices such as the root mean square error (RMSEA),

comparative fit index (CFI), and Tucker-Lewis Index (TLI). Cronbach’s  $\alpha$  criterion was determined as 0.70<sup>13</sup>. The internal consistency was evaluated using item-total correlation. Statistical significance was set at  $p < 0.05$ .

## RESULTS

The mean age was  $31.17 \pm 12.08$  years. In total, 71.6% of the participants were female; 43.9% of the participants were high school graduates; 94.5% of the participants were living in urban areas; and nearly half of the participants were single. The mean LQ-RC score of the participants was  $65.63 \pm 15.74$ . The sociodemographic characteristics of the study population are shown in Table 1.

## Construct validity

To determine the measurement power of each item, all correlation coefficients were examined. A total of 19 items (i.e., 4, 9, 21, 24, 26, 27, 28, 29, 31, 32, 33, 38, 43, 44,

**Table 1.** Sociodemographic characteristics of the participants.

Characteristics	Values
Age ( $\bar{X} \pm SS$ )	31.17±12.08 years
Gender, n (%)	
Male	340 (28.4)
Female	856 (71.6)
Education, n (%)	
Illiterate	28 (2.3)
Primary education	219 (18.3)
High school	525 (43.9)
Graduate	363 (30.4)
Postgraduate	61 (5.1)
Employment status, n (%)	
Employed	361 (30.2)
Unemployed	834 (69.7)
Accommodation, n (%)	
Urban	1,130 (94.5)
Rural	66 (5.5)
Marital status, n (%)	
Married	546 (45.6)
Single	612 (51.2)
Divorced	15 (1.3)
Widow	23 (1.9)
LQ-RC score ( $\bar{X} \pm SS$ )	65.63±15.74

45, 47, 49, 50, and 51) that did not meet this requirement were excluded from the scale. The split-half method was used to test the reliability of the scale consisting of 41 questions and the LQ-RC (Part 1 Cronbach's  $\alpha$ : 0.826, Part 2 Cronbach's  $\alpha$ : 0.812, and adjusted Cronbach's  $\alpha$ : 0.881). The model was found to be compatible (Hotelling  $T^2$  8940.38,  $p < 0.001$ ).

### Confirmatory factor analysis

An eight-factorial structure was tested based on the original version for the confirmatory construct validity of the LQ-RC. The desired model fit was analyzed with the TURCOsa statistical software. The normed chi-square (NC) was 5.87 ( $\chi^2/df=3909.482/666$ ). RMSEA was calculated as 0.051. The CFI and TLI were 0.83 and 0.81, respectively.

### Internal consistency reliability

The internal consistency of the LQ-RC and its subscales was evaluated by Cronbach's  $\alpha$  coefficient. The "stress management" factor yielded 0.834, the "avoiding risky nutrition behaviors" factor yielded 0.716, the "use of preventive health services" factor yielded 0.734, the "physical health" factor yielded 0.712, the "physical activity and exercise" factor yielded 0.684, the "adequate and balanced nutrition" factor yielded 0.608, the "avoidance of hazardous substances" factor yielded 0.584, and the "risk mitigation applications" factor yielded 0.534. As a whole, the LQ-RC had 0.881 (Table 2). Bartlett's test of sphericity was  $\chi^2/df=12951.9/703$ ,  $p < 0.001$ , while the KMO index was 0.881. The best resolution of the 41 items of the LQ-RC was represented by eight factors corresponding to eight subscales.

The last subscale of the original version is "reproductive health" for women. Due to the fact that approximately half of the participants in this study were single and it is not suitable to question whether single women use birth control because of cultural issues, we excluded this subscale in consultation with the scale developers. Data analysis was carried out with eight factors explaining 51.89% of the variance among the scale items (Table 2). It is suggested that the total explanatory variance of the scale is above 50.0%<sup>14</sup>.

## DISCUSSION

Cancer awareness and cancer prevention strategies have become popular topics<sup>15</sup>. The aim of this study was to adapt the LQ-RC in Turkish and evaluate its reliability and validity among this population. To the best of our knowledge, the LQ-RC is the first scale to provide information via lifestyle factors related to

cancer in adults. This study showed that the Turkish version of the LQ-RC is a reliable and valid measurement tool.

The correlation coefficient of the item analysis is used in the reliability analysis<sup>16</sup>. When a high correlation coefficient is obtained for each item, it is determined that the item is sufficient to measure the targeted item. The recommended item coefficient should be  $>0.20$  or  $>0.25$ <sup>16</sup>. According to the correlation coefficient of the split-half method test scores, the LQ-RC scale and its subscales showed internal consistency. No previous culture adaptation study of the LQ-RC has been performed. Therefore, it is not currently possible to compare Cronbach's  $\alpha$  values in other cultural adaptations.

The adequacy of the defined subscales to explain the original structure of the scale is determined by CFA. Sampling adequacy was evaluated with KMO sampling adequacy measurement and Bartlett's test. If the sample is sufficient to perform factor analysis, the  $KMO > 0.5$ <sup>17</sup>. In this study, the KMO value was calculated as 0.881. Regarding the RMSEA values used to determine the model fit, it has been suggested that value  $<0.05$  is good,  $0.05-0.08$  is acceptable,  $0.08-0.10$  is marginal, and  $>0.10$  is poor<sup>18</sup>. Finding the RMSEA value at 0.051 indicates that there is an acceptable fit in this study. CFI should be  $\geq 0.80$ <sup>19</sup> and  $TLI \geq 0.85$ <sup>20</sup>. The confirmatory analysis of this study revealed that the CFI value is 0.83 and the TLI value is 0.81, so in this study, RMSEA, CFI, and TLI values indicated an adequate fit. Although item 24 in the Turkish version of the LQ-RC was statistically appropriate, it was excluded from the expert's opinion as it was not appropriate to be under the same subscale as the other items. Internal consistency is satisfactory, reflecting the intercorrelation of the items on the scale and the measured construct around it.

## CONCLUSION

Although much is known about cancer by the day, there is still no well-established treatment for the many types of cancer. There are more clinical studies about cancer, but lifestyle behaviors are also important. Besides, it is much easier to make lifestyle changes. These results suggest that the Turkish version of the LQ-RC is reliable and valid. With a practical scale, the lifestyle behaviors of individuals could be quickly evaluated, and individuals could be encouraged to have healthier lifestyle behaviors. There are some limitations to this study. The original version of the LQ-RC included reproductive health-related items only for women. Half of the participants in this study were single and probably did not use birth control methods. Future studies may address both genders.

**Table 2.** Explanatory factor analysis of the lifestyle questionnaire related to cancer.

Items	F1	F2	F3	F4	F5	F6	F7	F8
1	0.185	0.164	0.300	<b>0.581</b>	0.121	-0.025	-0.015	0.090
2	0.089	0.074	<b>0.726</b>	0.108	0.148	0.087	-0.057	-0.009
3	0.047	0.075	<b>0.742</b>	0.089	0.027	0.143	0.101	-0.082
5	0.063	0.117	<b>0.758</b>	0.021	0.092	0.082	0.110	0.080
6	0.003	0.255	<b>0.360</b>	-0.024	-0.013	0.269	0.022	0.206
7	0.085	0.259	<b>0.536</b>	0.051	0.109	0.134	-0.126	0.361
8	0.193	0.158	0.255	<b>0.683</b>	0.062	0.024	0.067	-0.027
10	0.374	0.008	0.002	0.254	<b>0.379</b>	-0.135	0.155	0.104
11	0.056	0.113	0.110	0.086	<b>0.756</b>	0.107	-0.064	0.099
12	0.061	0.029	0.132	0.095	<b>0.728</b>	0.063	0.155	0.166
13	0.059	0.121	0.085	0.036	<b>0.733</b>	0.174	-0.102	-0.005
14	<b>0.403</b>	-0.090	-0.011	0.335	0.264	0.093	0.048	-0.254
15	0.387	-0.048	-0.054	<b>0.484</b>	0.172	0.063	0.222	-0.141
16	<b>0.699</b>	-0.078	0.140	0.157	-0.027	-0.050	0.115	0.283
17	<b>0.708</b>	0.013	0.004	0.241	0.005	0.067	0.023	0.001
18	<b>0.722</b>	0.136	0.051	-0.015	0.092	0.079	0.029	0.031
19	<b>0.726</b>	0.170	0.008	0.063	0.092	0.081	-0.167	-0.094
20	<b>0.673</b>	-0.023	0.017	0.081	0.039	0.078	0.125	-0.103
22	<b>0.676</b>	0.126	0.054	0.008	0.025	0.096	0.042	-0.066
24	0.363	-0.083	0.088	-0.017	0.021	-0.005	<b>0.499</b>	0.056
25	<b>0.655</b>	-0.087	0.132	0.093	-0.044	-0.059	0.174	0.321
30	0.172	<b>0.464</b>	-0.024	-0.043	0.012	0.169	0.151	-0.245
34	0.004	<b>0.613</b>	0.157	0.129	0.040	-0.013	0.021	0.263
35	0.017	<b>0.698</b>	0.153	0.046	0.096	0.085	0.086	0.117
36	0.033	<b>0.703</b>	0.108	0.092	0.102	0.114	0.141	0.028
37	0.031	<b>0.604</b>	0.094	0.232	0.048	0.023	0.144	0.109
39	0.058	0.375	0.136	0.090	0.168	0.295	0.089	<b>0.451</b>
40	0.036	0.338	0.036	0.126	-0.082	0.190	<b>0.588</b>	-0.025
41	0.040	0.197	0.018	0.098	0.029	0.072	<b>0.684</b>	-0.030
42	0.033	0.300	-0.014	0.036	0.025	0.115	<b>0.513</b>	0.255
46	0.065	0.030	-0.032	0.198	0.295	0.023	0.064	<b>0.519</b>
48	-0.036	0.309	0.122	-0.107	0.070	0.204	0.057	<b>0.569</b>
52	0.038	0.142	-0.097	<b>0.645</b>	0.039	0.219	0.059	0.191
53	0.127	0.206	0.017	<b>0.551</b>	0.102	0.478	0.046	0.029
54	-0.087	0.229	0.054	0.087	0.330	<b>0.483</b>	-0.236	0.117
55	0.136	0.072	0.114	0.106	0.099	<b>0.642</b>	0.206	-0.016
56	0.035	0.164	0.150	0.036	0.116	<b>0.635</b>	-0.007	0.173
57	0.140	-0.050	0.197	0.111	-0.004	<b>0.574</b>	0.244	0.012
Explained variance (%)	10.98	7.63	6.60	6.00	5.96	5.60	4.80	4.31
Total explained variance (%)	10.98	18.62	25.214	31.22	37.17	42.77	47.58	51.89
Cronbach's $\alpha$	0.834	0.716	0.734	0.712	0.684	0.608	0.584	0.534

Bold indicates the items of the subscales.

## AUTHORS' CONTRIBUTIONS

**NÖ:** Conceptualization, Data analysis, Methodology, Visualization, Writing – original draft, Writing – reviewing

& editing. **AB:** Data analysis, Writing – reviewing & editing. **MYAS:** Data analysis, Methodology. **TT:** Conceptualization, Data collection, Methodology, Writing – original draft.

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