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Health-Related Quality of Life With Regard to Smoking, Consumption of Alcohol, and Sports Participation

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Abstract

Background: Health-related quality of life (HRQoL) is an important determinant in a person's life.
Objectives: In this study aimed at physical education students, alcohol consumption and smoking as risk factors and sports as a healthy factor could affect HRQoL.
Patients and Methods: This study was an analytical cross-sectional study. For our purpose, the subjects (n = 519) were asked to answer the SF-36 questionnaire (short form health survey for HRQOL). To analyze the data, two-way multivariate analysis of variance (MANOVA), one-way analysis of variance (ANOVA), the independent-samples t-test, and Pearson correlation coefficient were conducted. In this study, the $P < 0.05$ was considered a significant difference, and due to a Bonferroni correction, for ANOVAs tests, a $P < 0.0125$ was considered a significant difference.
Results: The results suggest that statistically significant differences for alcohol consumption were only obtained from the role-emotional (RE) scale, in which drinkers had lower mean scores than nondrinkers. For smoking, significant differences were obtained from the scales of RE, vitality (VT), emotional well-being (EW), social functioning (SF), and general health (GH), in which nonsmokers outdid smokers. The combination of alcohol drinking and smoking led to statistically significant lower scores on the RE scale and strongly destroyed the role-emotional part of HRQOL.
Conclusions: It can be concluded that smoking and alcohol consumption may be related to poor HRQOL in physical education and sports students despite the fact that they regularly engage in sports programs that could positively affect their HRQOL.

Keywords: Alcohol, Cigarette Smoking, Health-Related Quality of Life, Physical Education and Sport, University Student

1. Background

Measuring and incorporating quality of life (QoL) into scientific study is difficult, since it can be defined in many different ways. But when considered in the context of health and disease, quality of life is commonly referred to as health-related quality of life (HRQoL) to differentiate it from other factors such as culture, religion, environment, education, and finance. The concept of HRQoL, being the main concern of health care professionals, has evolved since the 1980s to encompass those aspects that apparently affect health, either physically or mentally (1), and it is becoming an important health outcome indicator (2). Since then, we have incorporated HRQoL measures into research on health outcomes to quantify, in a way that is valid and reproducible, the degree to which a medical condition or treatment can affect a patient's life. In addition to providing valuable new insights into the relationship between HRQoL and risk factors, measuring HRQoL along with traditional measures can help determine the burden of preventable diseases, injuries, and disabilities (3-5).

In the literature, cigarette smoking and alcohol consumption as risk factors for health have been documented to influence HRQoL measures. In a study conducted on university students, for instance, researchers found that students who never got drunk had a better HRQoL with respect to social functioning, mental health, and mental composite score compared to those getting drunk on a monthly or weekly basis (6). Heikkinen et al. (7) reported that daily smokers had both a lower HRQoL and overall QoL compared to those who never smoked. Previous studies in different groups also suggested a significant positive relationship between physical activity or sports (as a healthy factor) and HRQoL. Anokye et al. (8, 9) found that higher levels of physical activity are associated with a better HRQoL, and Snyder Valier et al. suggested that athletic involvement may be a benefit to the overall health status of adolescents.

The benefits of physical activity and sports on HRQoL are obvious, and it is perhaps a common perception that college athletes are automatically healthier and more attentive and have higher levels of HRQoL. However, an ac-

cumulating body of evidence is showing that athletes in college are more likely to engage in alcohol consumption and less likely in cigarette smoking (10). The co-occurrence of drinking and smoking is pretty common, with one often favored over the other (11, 12), although evidence suggests that their combination might dramatically increase the risk of diseases (13).

2. Objectives

While previous studies have thoroughly examined the relationships between smoking, alcohol consumption, and HRQoL in different groups of people, reports on physical education and sports students who regularly participate in sports activities seem to be missing. Therefore, in this study, we endeavored to compare HRQoL among physical education and sports students with regard to the consumption of alcohol and smoking.

3. Patients and Methods

3.1. Population and Sample

This study was an analytical cross-sectional study with a randomly chosen sample group of undergraduate physical education and sports students attending four different educational programs (physical education and sports teaching, sports administration, coaching, and recreation) at Gazi University in Ankara, Turkey, during the 2013 - 2014 academic years. Using these inclusion criteria, 519 (221 female and 298 male) individuals were chosen. The students were aged from 17 to 31, with an average age of 22.06 years. Exclusion criteria were any disabilities or specific diseases (such as diabetes) and influenza that could affect HRQoL.

3.2. Data Collection Tools

At the HRQoL check, participants were requested to self-complete a personal information form and a Turkish version of the short form survey instrument (SF-36).

Participants provided information about their sex, age, and program of study as the demographic characteristics, and their smoking habits (yes or no, the number of years they smoked, and the number of cigarettes per day) and alcohol consumption (yes or no and the frequency of consumption) as the lifestyle risk factors. In the process, the authors followed the ethical principles in the declaration of Helsinki.

The SF-36 measures eight multi-item parameters of health status, including physical functioning (PF), role-physical (role limitations due to physical health problems; RP), pain (P), and general health (GH) as well as vitality (VT), social functioning (SF), role-emotional (role limitations due to emotional problems; RE), and emotional well-being (EW). The first four domains deal with physical aspects, and the second reflect mental features. For each parameter, scores are coded, summed, and transformed to a scale from 0 (the worst possible condition) to 100 (the best possible condition). In reliability studies of the Turkish version of SF-36, Cronbach's alpha coefficients were calculated for each scale, and values between 0.7324 and 0.7612 were obtained. Item-total score correlation coefficients were also individually calculated for each scale of the relevant items. For PF, this was between 0.4712 and 0.7348; for RF, between 0.6883 and 0.9034; for P, between 0.7887 and 0.8872; for GH, between 0.5690 and 0.7812; for VT, between 0.6167 and 0.7943; for SF, between 0.8353 and 0.8445; for RE, between 0.6539 and 0.8257; and for EW, between 0.6893 and 0.7815EW (14).

3.3. Data Analysis

The evaluation of the data was performed in SPSS 22 using two-way multivariate analysis of variance (MANOVA), one-way analysis of variance (ANOVA), the independent-samples t-test, and the Pearson correlation coefficient. In this study, a $P < 0.05$ was considered a significant difference.

4. Results

Descriptive data revealed that 31.98% of physical education and sports students smoked, and 48.17% of them consumed alcohol. Smokers reported that they started smoking recently (12.3%), 1 - 3 years ago (31.9%), 4 - 6 years ago (38.7%), 7 - 9 years ago (12.3%), or 10 or more years ago (4.9%). Data pertaining to the number of cigarettes a day smoked by respondents indicated that 60.8% of them smoked 1 - 10 cigarettes, 30.4% smoked 11 - 20, 8.2% smoked 21 - 30, and 0.6% smoked more than 30 cigarettes daily. Descriptive data about alcohol consumption revealed that 3.6% of individuals drank daily, 17.1% on some days during the week, 8.1% once a week, 22.2% once a month, 38.3% occasionally, and 10.1% otherwise.

Table 1 presents the results of descriptive statistics for all (mental and physical health) scales of SF-36, considering smoking and alcohol.

In order to simplify the analysis process, two MANOVAs were conducted separately for mental health scales and physical health scales.

4.1. Mental Health Scales

Prior to conducting the MANOVA for the mental health scales, the assumption that the dependent variables would

Table 1. Results of Descriptive Statistics for all Scales of SF-36

Value	Mental Health Scale						
Independent Variables	Alcohol	Smoking	N	RE, Mean ± SD	VT, Mean ± SD	EW, Mean ± SD	SF, Mean ± SD
	Yes	Yes	120	48.06 ± 39.02	59.95 ± 18.17	65.33 ± 17.25	71.12 ± 20.08
	Yes	No	130	70.26 ± 37.87	67.00 ± 17.96	70.25 ± 16.65	73.61 ± 19.31
	Yes	Total	250	59.60 ± 39.93	63.61 ± 18.37	67.89 ± 17.08	72.42 ± 19.68
	No	Yes	46	68.84 ± 39.38	63.91 ± 18.47	67.30±18.94	66.79 ± 18.44
	No	No	223	71.30 ± 37.88	67.18 ± 17.85	71.96 ± 16.11	71.88 ± 21.26
	No	Total	269	70.88 ± 38.08	66.62 ± 17.96	71.17 ± 16.68	71.01 ± 20.86
	Total	Yes	166	53.82 ± 40.11	61.05 ± 18.29	65.88 ± 17.70	69.92 ± 19.68
	Total	No	353	70.92 ± 37.83	67.11 ± 17.87	71.33±16.31	72.52 ± 20.55
	Total	Total	519	65.45 ± 39.35	65.17 ± 18.21	69.59 ± 16.94	71.69 ± 20.29
Value	**Physical Health Scales**						
Independent Variables	**Alcohol**	**Smoking**	**N**	**PF, Mean ± SD**	**RP, Mean ± SD**	**P, Mean ± SD**	**GH, Mean ± SD**
	Yes	Yes	120	89.12 ± 13.91	75.83 ± 31.41	71.12 ± 20.08	67.47 ± 16.72
	Yes	No	130	88.72 ± 21.40	85.77 ± 25.66	73.61 ± 19.31	71.89 ± 15.12
	Yes	Total	250	88.91 ± 18.16	81.00 ± 28.94	72.42 ± 19.68	69.77 ± 16.03
	No	Yes	46	90.00 ± 17.03	81.52 ± 27.61	66.79 ± 18.44	65.31 ± 14.59
	No	No	223	91.10 ± 15.31	82.09 ± 32.83	71.88 ± 21.26	69.80 ± 16.45
	No	Total	269	90.91 ±15.59	82.00 ± 31.94	71.01 ± 20.86	69.03 ± 16.21
	Total	Yes	166	89.37 ± 14.79	77.41 ± 30.43	69.92 ± 19.68	66.87 ± 16.15
	Total	No	353	90.22 ± 17.81	83.45 ± 30.39	72.52 ± 20.55	70.57 ± 15.97
	Total	Total	519	89.95 ± 16.89	81.52 ± 30.51	71.69 ± 20.29	69.39 ± 16.11

be correlated with each other in the moderate range had to be tested; therefore, a series of Pearson correlations were performed between all of the dependent variables (15). After the correlation test was conducted, the results showed that a meaningful pattern of correlations was observed amongst all of the dependent variables (all correlations were positive and in the moderate range; $p < 0.01$), suggesting the appropriateness of MANOVA. In addition, the Box's M value of 28.65 had a nonsignificant association with a P value of .566. Therefore, for the purposes of MANOVA, the covariance matrices between the groups were assumed to be equal.

Then the MANOVA was conducted to test three hypotheses for mental health scales. For the first hypothesis that one or more mean differences would exist between two levels (yes, no) of the independent variable (alcohol consumption) with regard to the dependent variables (mental health scales of SF-36) the statistically significant MANOVA effect was obtained, Pillais' Trace = .028, $F(4, 512) = 3.65$, $P < 0.05$, partial eta squared = 0.028. Power to detect the effect was 0.879. Thus, hypothesis 1 was accepted.

For the second hypothesis one or more mean differences would exist between two levels (yes, no) of the independent variable (smoking) with regard to the dependent variables (mental health scales of SF-36) the statistically significant MANOVA effect was obtained, Pillais' Trace = 0.029, $F(4, 512) = 3.81$, $P < 0.05$, partial eta squared = 0.029. Power to detect the effect was .893. Thus, hypothesis number two was also accepted.

The statistically significant MANOVA effect for the third hypothesis one or more mean differences exist in cases of interaction between the two independent variables (alcohol consumption × smoking consumption) was revealed, Pillais' Trace = 0.019, $F(4, 512) = 2.43$, $P < 0.05$, partial eta squared = 0.019. Power to detect the effect was .698. Hence, hypothesis 3 was accepted.

The homogeneity of variance assumption was tested for all four mental health scales of SF-36 prior to conducting a series of follow-up ANOVAs. Based on a series of Lev-

ene's F tests, the homogeneity of variance assumption for all scales of RE (F = 0.630, P = 0.596), E (F = 0.052, P = 0.984), EW (F = 0.775, P = 0.508), and SF (F = 1.573, P = 0.195) was considered satisfied. As follow-up tests to the MANOVA, a series of ANOVAs on each of the four dependent variables was conducted. Additionally, a Bonferroni correction (0.05/4 = 0.0125) for multiple comparisons was applied in order to prevent alpha inflation; therefore, for the ANOVA tests, a P < 0.0125 was considered a significant difference.

The statistically significant univariate main effect for alcohol was only obtained for the scale of RE (F (1, 512) = 7.698, P < 0.0125, partial eta square =.0125, power = .791). For smoking, significant effects were obtained for all scales of RE (F (1, 512) = 9.825, P < 0.0125, partial eta square = 0.019, power = 0.879), VT (F (1, 512) = 7.768, P < 0.0125, partial eta square = 0.015, power = .794), EW (F (1, 512) = 7.708, P < 0.0125, partial eta square = 0.015, power = 0.791), and SF (F (1, 512) = 7.213, P < 0.0125, partial eta square = 0.014, power = 0.764). The ANOVA for the interaction of alcohol and smoking was significant for only one scale of RE (F (1, 512) = 6.296, P < 0.0125, partial eta square = 0.012, power = 0.707).

The individual t-tests about the mean difference were conducted for the independent variables in order to investigate the specific mean difference (Table 2).

As seen in Table 2, on all the scales, the group that answered "Yes" to consumption (Yes-group) had lower means than the group with a "No" answer (No-group). Therefore, the No-group had better HRQoL on all scales. Moreover, for alcohol on the scale of RE, the mean of the Yes-group was low in comparison to the No-group, and thus, the HRQoL of the No-group was high.

To investigate the interaction of two independent variables on the RE scale, the individuals were separated into four groups of "A-y&S-y," "A-y&S-n" , "A-n&S-y" and "A-n&S-n" (A = alcohol; S = smoking; y = answer to consumption was "Yes"; n = answer to consumption was "No"). To make further comparisons, one-way ANOVA was performed, and the results revealed statistically significant differences among the four groups (F = 10.8, P < 0.001). In the next step, in order to examine individual mean difference comparisons, a series of post-hoc analyses (Fisher's LSD) were performed (Table 3).

As seen in Table 3, on the RE scale, the A-y&S-y group had statistically significant low mean scores compared with the groups, A-y&S-n, A-n&S-y, and A-n&S-n (mean scores of groups are shown in Table 1.

4.2. Physical Health Scales

In a separate section, a MANOVA was conducted to test the three hypotheses for the physical health scales. Prior to conducting the MANOVA, the assumption that the dependent variables would be correlated with each other in the moderate range had to be tested; therefore, a series of Pearson correlations were performed between all of the dependent variables (15). After conducting the correlation test, a meaningful pattern of correlations was observed amongst all of the dependent variables (all correlations were positive and in the moderate range; P < 0.01), suggesting that the MANOVA was appropriate. Moreover, the Box's M value of 52.47 was found associated with a P value of 0.01. Based on Huberty and Petoskey's guideline, this was considered nonsignificant (i.e., P < 0.005) (16). Therefore, for the purposes of the MANOVA, the covariance matrices between the groups were assumed to be equal.

The MANOVA was conducted to test the three hypotheses for the physical health scales. For the first hypothesis one or more mean differences would exist between two levels (yes, no) of the independent variable (alcohol consumption) with regard to the dependent variables (physical health scales of SF-36) the statistically significant MANOVA effect was not obtained, Pillais' Trace = 0.012, F (4, 512) = 1.532, P > 0.05, partial eta squared = 0.012. Power to detect the effect was 0.475. Thus, hypothesis number one was rejected.

For the second hypothesis that there would be one or more mean differences between two levels (yes, no) of the independent variable (smoking) with regard to the dependent variables (physical health scales of SF-36) the statistically significant MANOVA effect was obtained, Pillais' Trace = .019, F (4, 512) = 2.424, P < 0.05, partial eta squared = 0.019. Power to detect the effect was .696. Thus, hypothesis 2 was accepted.

The statistically significant MANOVA effect for the third hypothesis that there would be one or more mean differences when there was an interaction of the two independent variables (alcohol consumption × smoking consumption) was not revealed, Pillais' Trace = 0.008, F (4, 512) = 1.052, P > 0.05, partial eta squared = 0.008. Power to detect the effect was .333. Hence, hypothesis 3 was accepted.

The homogeneity of variance assumption was tested for all four physical health scales of SF-36 prior to conducting a series of follow-up ANOVAs. Based on a series of Levene's F tests, the homogeneity of variance assumption for the scales of P (F = 1.587, P = 0.191) and GH (F = .527, P = 0.664) was considered satisfied. However, the Levene's F tests suggested that the variances associated with the scales of PF (F = 2.908, P = 0.034) and RP (F = 3.250, P = 0.022) were not homogenous. An examination of the standard deviations (see Table 1) showed that none of the largest standard deviations was more than four times the amount of the corresponding smallest, and this suggested that the ANOVA would be robust in this case (17). A series of ANOVAs on each of the four dependent variables considering the independent variable of smoking were conducted as follow-

Table 2. Results of the Individual t-Tests Regarding the Mean Difference on Mental Health Scales of SF-36[a]

Value	Yes-Group			No-Group			Mean Difference
	IV	Scales	Mean ± SD	Mean ± SD	t	Sig.	
	Alcohol	RE	59.60 ± 39.93	70.94 ± 38.16	-3.320	0.001	-11.34
	Smoking	RE	53.82 ± 40.10	70.92 ± 37.83	-4.711	0	-17.10
		VT	61.05 ± 18.29	67.11 ± 17.87	-3.580	0	-6.07
		M	65.88 ± 17.70	71.33 ± 16.31	-3.456	0.001	-5.45
		SF	67.62 ± 23.36	72.97 ± 22.04	-2.532	0.012	-5.35

[a] Significance level is .0125; Yes-group, answer to consumption is "Yes"; No-group, answer to consumption is "No"; IV, independent variable.

Table 3. Results of Post-Hoc Analyses for Mean Differences of Groups on Scale of RE

Comparisons	Mean Difference	Sig.
A-y&S-y vs. A-y&S-n	-22.20	0[a]
A-y&S-y vs. A-n&S-y	-20.79	0.002[a]
A-y&S-y vs. A-n&S-n	-23.24	0[a]
A-y&S-n vs. A-n&S-n	-1.044	0.805
A-n&S-y vs. A-y&S-n	-1.416	0.829
A-n&S-y vs. A-n&S-n	-2.46	0.692

[a] Significance level is 0.0125.

up tests to the MANOVA. Additionally, a Bonferroni correction (0.05 / 4 = 0.0125) for multiple comparisons was applied in order to prevent alpha inflation; therefore, for the ANOVA tests, a $P < 0.0125$ was considered a significant difference. Results showed that a statistically significant univariate main effect for smoking was only obtained for the GH scale ($F(1, 512) = 7.321$, $P < 0.0125$, partial eta square =.014, power = 0.771).

The individual t-tests about the mean difference were conducted in order to investigate the specific mean difference for the dependent variable of GH, considering smoking as an independent variable. The result of the individual t-tests showed that the group that answered "Yes" to consumption of smoking had lower means in contrast to the group that answered "No" (t = -2.455, mean differences = -3.71). Thus, the No-group had higher HRQoL than the Yes-group on the GH scale.

5. Discussion

A sample group of 519 undergraduate physical education and sports students (including 221 female and 298 male) from four different educational programs Physical education and sports teaching as well as sports administration, coaching, and recreation in Ankara, Turkey, during the 2012 - 2013 academic years, were asked to fill out a personal information form and a Turkish version of SF-36. The data was analyzed in SPSS 22 using two-way multivariate analysis of variance (MANOVA), one-way analysis of variance (ANOVA), the independent-samples t-test, and Pearson correlation coefficient, and the corresponding tables were drawn.

According to the results, smoking and alcohol consumption could relate to a poor quality of some HRQoL dimensions for physical education and sports students. The students who were not consuming alcohol were better with respect to the dimensions of RE than those who were; therefore, alcohol could relate to a damaged HRQoL for the RE dimension among physical education and sports students. Contrary to smokers, nonsmoking students had a better HRQoL for the RE, VT, EW, SF, and GH dimensions, indicating a better HRQoL, especially with respect to the mental aspects, among nonsmokers. Plus, interaction between smoking and alcohol was only found in the RE dimension, with results showing that the group made up of both smokers and alcohol drinkers had dramatically damaged HRQoL in contrast both to those who were neither smokers nor alcohol drinkers and to those groups who were either smokers or alcohol drinkers but not both. Therefore, when physical education and sports students are both drinkers and smokers, they can suffer from serious problems with respect to the RE dimension of HRQoL.

In relation to these findings, in the literature, no study was found handling smoking and alcohol consumption or their interactions with respect to physical education and sports students. However, in general, the findings about alcohol consumption are in parallel with the studies that were performed on adolescents and university students. Chen and Storr (18) suggested that adolescents with recent alcohol use tended to experience a poorer level of HRQoL; however, the estimated associations were not constant over the eight examined domains of general health, with the strongest inverse relationship appearing in the

domain of role limitation due to emotional problems (RE). Kisic-Tepavcevic et al. (6), in a study on university students, found that those who never got drunk had a better HRQoL with respect to social functioning and mental health as well as mental composite score compared to students who got drunk on a monthly and weekly basis. However, the findings of the present study contrast with the studies of Kaplan et al. and also of Dissing et al. (19, 20), performed on adults; the results of both studies suggested that moderate drinkers had higher initial levels of HRQoL than nonusers.

The findings of the present study about smoking are in parallel with the majority of the studies performed in Turkey and the rest of the world, which have suggested that smoking is associated with a poor HRQoL (7, 21-24). For instance, Vogl et al. (22) found that in the general English population, smoking was negatively associated with HRQoL, and the number of cigarettes smoked determined the magnitude of this association. In another study, Laaksonen et al. (23) found that on the physical subscales (on general health and physical functioning), male nonsmokers reported better health than current male smokers. Meanwhile, on the mental subscales, nonsmokers had consistently better health than current smokers.

Studies suggested that alcohol consumption and smoking can be co-used, and one can increase the use of the other (11, 12, 25); studies on their interactions, when there is a condition of both alcohol consumption and smoking, have also suggested that HRQoL can be seriously harmed. Strine et al. (26), in a study entitled, "HRQOL and health risk behaviors among smokers" , suggested that those who had never smoked had significantly better HRQoL than current smokers, and they were less likely to drink heavily, to binge drink, and to report anxiety and depressive symptoms. Topolski et al. (27) examined the association between health risk behaviors (use of tobacco, alcohol and illicit drugs, and high risk sexual behavior) and self-perceived quality of life among adolescents. Results revealed that, in general, adolescent abstainers (who never engaged) reported a higher quality of life than engagers (adolescents who often engaged) and experimenters (who occasionally engaged) on Youth Quality of Life Instrument items. Adolescents who engaged in only one health risk behavior scored higher than those who engaged in multiple risk behaviors.

These studies examined risky health behavior, including smoking and alcohol consumption, among others; however, in the literature, there was no study that directly examined the interaction of smoking and alcohol consumption on the HRQoL of physical education and sports students, individuals supposedly regularly engaged in physical activities. In our study, we targeted this portion of the society, and based on the results found, it can be concluded that smoking and alcohol consumption may be related to poor HRQoL in physical education and sport students despite the fact that they regularly engage in sports programs that could positively affect their HRQoL (8, 9, 28). As a suggestion, physical education and sports students who are drinking or smoking might be a possible target group to intervene and avert HRQoL problems, especially with respect to mental aspects. This goal can be reached by educational and preventive means.

5.1. Limitations

Regarding limitations, the current study was performed among the physical education and sports students, and students of other programs or non-students were not included; moreover, the results of study were limited to people aged from 17 to 31.

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Footnotes

Authors' Contribution: All authors were involved in designing the study, data collection and analysis, results interpretation, and manuscript preparation.

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