Original article

Happiness and health behaviors in South Korean adolescents: a cross-sectional study

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ABSTRACT

Objectives: We examined the associations between happiness and a wide range of health behaviors in South Korean adolescents.

Methods: Study data were derived from the ninth Korea Youth Risk Behavior Web-based Survey (KYRBS) administered from June to July 2013. In addition to happiness levels, the questionnaire includes items on sociodemographics and health-related lifestyle factors (smoking, drinking, having breakfast, fruit and vegetable intake, physical activity, sedentary behavior, and hours of sleep).

Results: The multivariate analysis revealed that higher levels of happiness were associated with smoking, drinking, having breakfast, eating fruits daily, vegetable intake, participating in at least 60 minutes of physical activity a day, sedentary behavior, and hours of sleep. Additionally, there were gender differences in relationships between happiness and eating fruit daily, participation in physical activity, and sedentary behavior.

Conclusions: These results encourage public health professionals to consider the psychological aspects of adolescent life in working to improve their health behaviors and outcomes.

Keywords: Adolescent, Happiness, Health behaviour

INTRODUCTION

The spotlight on positive psychology has grown in recent years, as empirical evidence confirming the influence of positive psychological variables such as happiness on well-being, continue to emerge [1]. Happiness has been broadly used to describe positive subjective experiences, and is said to often comprise two components: the cognitive appraisal of one's life and affective evaluations (both positive and negative), which are viewed as two separate dimensions [2].

Research on happiness has suggested that increasing happiness has multiple health benefits, such as a reduced risk of morbidity, disability, and mortality [3]. One possible explanation for health outcomes of happiness may be that positive well-being may be accompanied by health behaviors that reduce risk of disease and promote health status. Because approximately a half of cancer deaths can be prevented by improvement of health behaviors and environmental factors, the investigation of association between happiness and health behaviours may helpful in developing cancer prevention strategy [4].

Although there is a substantial evidence that health behaviors are associated with negative mood states, the relationship of healthy lifestyles with happiness is less well established [5, 6]. While associations between self-reported happiness and refraining from smoking, lower alcohol consumption, high levels of physical activity, and a healthy diet have been documented in several studies [7], underlying mechanisms of effect are still subject to debate as findings vary between countries, especially between developed and developing nations [8].

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Happiness is considered to be particularly important in adolescents, due to its contribution to their future success [9]. However, few studies have investigated adolescent health behaviors in relation to happiness from their perspective. Therefore, after adjusting for known socioeconomic factors, we examined the associations between happiness and a wide range of health-related lifestyle behaviors, such as smoking, drinking, having breakfast, eating fruits and vegetables, physical activity, sedentary behavior, and hours of sleep among South Korean adolescents. We predicted, on the basis of previous findings, that being a non-smoker or non-drinker, having breakfast, eating fruits daily, vegetable intake, participating in physical activity, less sedentary behavior, and sufficient sleep would be associated with a higher level of happiness.

METHODS

Participants and procedure

The data were derived from the ninth Korea Youth Risk Behavior Web-based Survey (KYRBS) [10], administered by the Korea Center for Disease Control and Prevention (KCDC) from June to July 2013. The KYRBS is a self-administered, anonymous, online survey comprising 126 questions across 16 categories covering, among others, health behaviors and perceived happiness [10]. In 2013, as many as 75,149 students enrolled in 400 middle schools and 400 high schools were randomly selected to participate in the ninth KYRBS. Each student was randomly assigned a unique identification number, which they used to log into the survey Web page in the computer room of their school. Before they began the questionnaire, an item asked potential

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respondents to electronically indicate whether they agreed to participate. Those who declined to participate did not proceed further, while 72,435 students (36,655 boys, 35,780 girls), whose complete demographic data were obtained through the survey, agreed to participate (response rate: 96.4%). Details of the sampling and scheduling procedures are described elsewhere [11].

This study was approved by the Institute of Review Board at the Korean National Cancer Center (IRB No. NCC2014-0028), and informed written consent was obtained from all study participants.

Instruments

Happiness was assessed using a single item: 'In general, how would you describe your happiness?' Predefined responses were 'very happy', 'a little happy', 'neutral', 'a little unhappy', and 'very unhappy'. Previous study revealed that this single item had a good concurrent, convergent, and divergent validity [12]. The happiness measure, used in this study, most probably, relates to 'overall happiness' rather than specific components such as 'affect' or 'contentment'. Single-item happiness measures have been widely used in the literature in several different cultures [13].

Subjective economic status was defined by respondents' self-reported family incomes. The participants chose one of five descriptors of family income levels: 'low', 'low-middle', 'middle', 'middle-high', and 'high' income. Current smoking and drinking were determined according to the follow-up question, 'During the past 30 days, on how many days did you smoke cigarettes/drink alcohol?' [14]. Those who responded

'more than one day' were classified as current smokers and drinkers. Eating patterns were assessed with three questions regarding how frequently they had breakfast, fruits, or vegetables over the past 7 days. Each item was reclassified as dichotomised variables (i.e., as desired diet variables: breakfast [$\geq$ 3/week] [15], fruits [$\geq$ 1/day] [16], vegetables [$\geq$ 3/day] [16].

Physical activity was evaluated by asking: 'During the past 7 days, on how many days do you any intensity activities that cause an increase in breathing or heart rate for a total of at least 60 minutes per day?' Responses were reclassified into two categories: < 3/week and $\geq$ 3/week [17]. Sedentary behavior was assessed by asking: 'On an average school day, how many hours do you watch TV or videos, or play computer or video games in your leisure time?' These responses were also categorised into two groups: < 2 h/day and $\geq$ 2 h/day [15]. Sleeping patterns were defined in terms of the number of hours respondents slept on weekdays and weekends during the past 7 days. Each item was reclassified as dichotomised variables: < 8 h/night and $\geq$ 8 h/night [18].

The KCDC assessed the reliability of the KYRBS [10], and found that self-reported health risk behaviors among Korean middle and high school students were reliable over time [19].

Data Analysis

Cell percentages (%) are weighted percentages using survey sample weights. The adjusted odds ratios (aORs) and 95% confidence intervals (CI) in this study were based on weighted analyses. Chi-square tests were conducted to examine the differences

between boys and girls in sociodemographic characteristics, health behaviors (e.g. smoking, drinking, eating habits, physical activity, and sleeping patterns), and happiness levels. Multivariate logistic regression analysis was performed to determine aORs for happiness levels related to smoking, drinking, eating habits, physical activity, and sleeping patterns by gender, after adjusting for age and subjective economic status. In this study, age was included for adjusting factor because an adolescence is age-sensitive period in cognitive, affective, and social sectors. Data were analysed using SPSS 15.0 software.

RESULTS

The sample consisted of 72,435 Korean adolescents aged between 12 and 18 years old, 47.7% of whom were female. Of the respondents, 58.2% perceived themselves as happy (very happy or a little happy). According to gender, happiness level of boys was significantly higher than that of girls. Approximately 9.7% of adolescents smoked currently and 16.3% were current drinkers. Three respondents out of four had breakfast more than 3 days per a week and only one person out of five ate fruits daily. The proportion of participants who had vegetable more than 3 days per a week was 16.6%. About 30% of adolescents participated in at least 60 minutes of physical activity more than 3 days per a week and 66.3% of them spent more than 2 hours a day in watching TV or videos, or playing computer or video games in their leisure time. Respondents who slept for more than 8 hours were 21.8% on weekdays and 66.3% on weekends. The health behaviors which showed the differences by gender were current smoking, current

drinking, eating fruit daily, vegetable intake, physical activity, sedentary behaviour, and hours of sleep (Table 1).

Table 2 provides aORs for associations between happiness and current smoking, current drinking, having breakfast, eating fruit, vegetable intake, physical activity, sedentary behavior, and hours of sleep by gender. Results revealed that both boys and girls who were happier were less likely to smoke or drink. Girls who were happy were more likely to eat fruit daily and less likely to have sedentary behaviour, while boys did not show extinct association between happiness and these behaviors. On the contrary to this, boys who were happy were more likely to participate in physical activity, though there was no notable relationship between happiness and physical activity among girls. In terms of having breakfast, vegetable intake, and sleeping patterns, adolescents who perceived themselves as happier were more likely to have better lifestyles regardless of gender.

DISCUSSION

This study was conducted to explore associations of happiness with health-related lifestyle factors in the South Korean adolescent population using a web-based questionnaire survey. The main hypotheses were largely confirmed. Multivariate analysis of survey data revealed that the presence of happiness was significantly associated with current smoking, current drinking, having breakfast, eating fruits daily, vegetable intake, participating in at least 60 minutes of physical activity a day, sedentary behavior, and hours of sleep. Additionally, there were gender differences in relationships

between happiness and eating fruit daily, participation in physical activity, and sedentary behavior.

The proportion of adolescents in our study who reported that they were very happy or a little happy with their lives was 58.2%. This proportion was noticeably lower than those found for Western populations. In a Norwegian survey targeting adolescents participating in a World Health Organization project, the proportion of happy individuals was approximately 90% [9]. In another survey targeting Japanese adults, the proportion of participants reporting being happy was found to be only 48.4% [20]. On the contrary, a nationwide survey of US adults reported a sizable portion of happy individuals: 94.8%, to be exact [13]. Further, a previous study found that the probability of being in a depressed mood was greater in collectivistic than in individualistic cultures [21]. Thus, these findings seem to suggest lower levels of happiness among individuals in collectivistic societies such as Japan and Korea relative to individualistic Western societies.

Our results indicated a negative relationship between happiness and smoking or drinking habits both boys and girls. These results are in line with previous evidence showing an inverse relationship between these [22]. Adolescents who are not satisfied with their lives smoke and get drunk more often than those who do not experience these feelings. Our findings also suggest that the associations were stronger in girls than in boys, perhaps because girls are more sensitive to emotional events or problems [23].

Consistent with previous reports, this study suggests a positive correlation between happiness and healthy diet [7, 24, 25]. Kawada et al. previously found that having

breakfast was negatively related to depressive state, supporting our present findings [24]. Our study also revealed that female adolescents who were very happy ate fruits daily, and both boys and girls who were very happy had vegetables more than three times per day. Psychological comfort may lead a person to pay more attention to his or her health and the health value of certain foods. Broaden-and-build Theory suggests that positive emotions might trigger an upward spiral that could reinforce positive behavioral patterns such as healthy eating [26]. Gender differences shown in associations between happiness and eating fruit daily may be due to the relative lack of concern for health and consumption of fruits among boys compared to girls [27].

With respect to the relationship between happiness and physical activity, we found that boys who were very happy were more likely to participate in at least 60 minutes of physical activity, while distinct associations were not shown in girls. One possible explanation may be that many girls do not engage in sports; rather, they may have social interactions outside the sphere of sports. While several studies have found relationships between reduced sport participation and emotional difficulties in boys, few have tested for an interaction between gender and sport participation [22]. Contrary to the result of physical activity, perception of happiness of boys was not related to sedentary behavior, though girls who felt happier were less likely to report sedentary behavior. This may be explained by the fact that boys are less inactive and tend to enjoy computer games much more than girls regardless of emotional status.

Our study provided evidence implying that happiness may be significantly associated with sufficient sleep, consistent with previous findings [28, 29]. Prior research on stress and sleep has focused on the negative consequences of poorer mental health status on

sleep disturbance. Zhou et al. demonstrated the longitudinal relationship of stress disorder with sleep problems in adolescents [29]. Although the causal relationship between cognitive and emotional mood and duration of sleep needs further clarifying, this cross-sectional study suggests that happiness may lead to sufficient sleep in adolescents.

The causal pathways linking happiness with health behaviors are still not clear. Bidirectionality is probably involved in the prospective relationship between happiness and health behaviors. Several longitudinal studies have suggested that serious and persistent negative emotions were prospective predictors of increased smoking, and, similarly, heavy smoking predicted the subsequent development of depressive symptoms [23]. Previous results of lagged analysis also revealed that fruits and vegetables predicted improvements in positive affect the next day, while, on days when young adults experienced greater positive affect, they reported eating more servings of fruit and vegetables [25]. A similar pattern was shown in the area of physical activity. Analysis of the Prospective National Population Health Survey revealed that a change in leisure-time physical activity from active to inactive was associated with increased odds of becoming unhappy 2 years later [30]. Regarding sleep duration, several longitudinal studies have shown a predictive relationship between disordered sleep and subsequent depression across various populations [31]. Future research needs to include randomized controlled trials evaluating the influence of happiness on health behaviors in adolescents.

This study had several strengths, including its use of a national representative sample and consideration of a wide range of lifestyle factors. It was also novel in its survey of

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adolescents living in South Korea, where some of the highest suicide rates in the world have consistently been reported. There were several limitations as well. This study was cross-sectional, so cause–effect relationships could not be confirmed. Our findings were based on self-reports of happiness with single item; therefore, some of the responses may not have been entirely reliable. Thus, study on development and evaluation of the happiness scale for adolescent could be the next step for future study. There may be third factors underlying associations between happiness and health behaviors such as personality, social environment, or genetic factors. Thus, several additional unmeasured variables could contribute to the observed relationships between happiness and health behaviors. Nevertheless, most importantly, this study demonstrated a meaningful link between two distinct adolescent health research literatures: that on happiness levels and that on health-related lifestyle factors. Research bridging the two areas is limited; however, this study identified significant relationships between self-reported happiness and health behaviors.

CONCLUSIONS

This study suggests that happiness is related to a variety of health behaviors among Korean adolescents: current smoking, current drinking, having breakfast, eating fruits daily, vegetable intake, participating in at least 60 minutes of physical activity a day, sedentary behavior, and hours of sleep. These results encourage public health professionals to take into account the psychological aspects of adolescent life in working to improve their health behaviors and outcomes. Public health strategies

promoting health-related lifestyle behaviors among adolescents may easily be utilized by emphasizing how to improve their ability to appraise their own lives in a positive manner.

Key Message: 본 연구는 청소년건강행태온라인조사결과를 활용하여 청소년들의 주관적 행복수준이 여러가지 건강행동과 관련이 있는지를 살펴보았다. 자신이 행복하다고 느끼는 청소년들은 흡연, 음주, 좌식생활을, 그렇지 않다고 느끼는 청소년들보다 더 적게 하고 있었고, 이와 반대로 아침식사, 채소과일섭취, 신체활동, 충분한 수면은 더 많이 하고 있었다. 성별로 보았을 때는, 주관적 행복인지수준과 과일섭취, 신체활동, 좌식생활에 각각 남녀 차이가 있었다. 이러한 결과를 통해 청소년들의 건강행동 증진을 위해서는 이들의 행복인지능력을 강화하는 노력을 할 필요가 있음을 알 수 있었다.

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Table 1 Participant characteristics by gender[a]

Variables	Boys N (%)	Girls N (%)	Total N (%)	χ^2 p-value[b]
Total	36 655 (52.3)	35 780 (47.7)	72 435 (100.0)	
Age, yr				
12-14	16 128 (41.6)	14 992 (41.8)	31 120 (41.7)	0.006
15-18	20 286 (58.4)	20 641 (58.2)	40 927 (58.3)	NS
Subjective economic status				
High	3 452 (9.7)	1 770 (5.1)	5 222 (7.5)	86.11
Middle-high	9 312 (25.9)	8 213 (23.7)	17 525 (24.9)	<0.001
Middle	16 377 (44.7)	18 117 (50.4)	34 494 (47.4)	
Low-middle	5 708 (15.1)	6 098 (16.5)	11 806 (15.8)	
Low	1 806 (4.7)	1 582 (4.2)	3 388 (4.5)	
Current smoking				
Yes	5 349 (14.4)	1 745 (4.6)	7 094 (9.7)	831.20
No	31 306 (85.6)	34 035 (95.4)	65 341 (90.3)	<0.001
Current drinking				
Yes	7 139 (19.4)	4 827 (12.8)	11 966 (16.3)	189.83
No	29 516 (80.6)	30 953 (87.2)	60 469 (83.7)	<0.001
Having breakfast				
< 3/week	9 847 (26.7)	9 470 (26.2)	19 317 (26.4)	1.2
≥ 3/week	26 808 (73.3)	26 310 (73.8)	53 118 (73.6)	NS
Eating fruit daily				
Yes	6 650 (18.8)	7 100 (20.8)	13 750 (19.7)	24.09
No	30 005 (81.2)	28 680 (79.2)	58 685 (80.3)	<0.001
Vegetable intake				
< 3/day	30 030 (82.3)	30 218 (84.6)	60 248 (83.4)	50.86
≥ 3/day	6 625 (17.7)	5 562 (15.4)	12 187 (16.6)	<0.001
Participation in 60 min of physical activity				
< 3/week	21 424 (58.8)	27 715 (77.8)	49 139 (67.9)	1321.97
≥ 3/week	15 231 (41.2)	8 065 (22.2)	23 296 (32.1)	<0.001
Sedentary behavior				
< 2h/day	12 705 (36.1)	10 512 (30.9)	23 217 (33.7)	106.19
≥ 2h/day	22 313 (63.9)	23 737 (69.1)	46 050 (66.3)	<0.001
Hours of sleep (weekdays)				
< 8h/night	22 604 (73.5)	26 054 (83.2)	48 658 (78.2)	90.27
≥ 8h/night	9 012 (26.5)	5 637 (16.8)	14 649 (21.8)	<0.001
Hours of sleep (weekends)				
< 8h/night	10 788 (34.9)	9 895 (32.4)	20 683 (33.7)	8.55
≥ 8h/night	21 032 (65.1)	21 420 (67.6)	42 452 (66.3)	0.004
Happiness level				
Very unhappy	644 (1.7)	626 (1.7)	1 270 (1.7)	169.96
A little unhappy	3 028 (8.4)	4 067 (11.4)	7 095 (9.8)	<0.001
Neutral	10 091 (27.7)	11 852 (33.0)	21 943 (30.2)	
A little happy	13 563 (37.2)	13 154 (37.1)	26 717 (37.1)	

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Very happy	9 329 (25.0)	6 081 (16.9)	15 410 (21.1)

NS: not significant.

[a] % = weighted percentage using survey sample weights.
[b] p-values are χ^2 test.

Table 2 Association between happiness and health behaviors [a]

Health behavior/Happiness level	Boys OR (95% CI)	Girls OR (95% CI)
Current smoking: Yes		
Very unhappy	1	1
A little unhappy	0.62 (0.51-0.76)	0.62 (0.47-0.82)
Neutral	0.57 (0.48-0.69)	0.36 (0.28-0.48)
A little happy	0.41 (0.34-0.49)	0.21 (0.16-0.27)
Very happy	0.36 (0.30-0.44)	0.16 (0.11-0.21)
Current drinking: Yes		
Very unhappy	1	1
A little unhappy	0.81 (0.67-0.99)	0.60 (0.49-0.74)
Neutral	0.70 (0.58-0.84)	0.41 (0.34-0.50)
A little happy	0.57 (0.47-0.69)	0.32 (0.26-0.39)
Very happy	0.52 (0.43-0.63)	0.24 (0.19-0.30)
Having breakfast: ≥ 3/week		
Very unhappy	1	1
A little unhappy	1.27 (1.05-1.54)	1.39 (1.15-1.68)
Neutral	1.29 (1.08-1.54)	1.59 (1.32-1.92)
A little happy	1.57 (1.31-1.87)	2.20 (1.83-2.63)
Very happy	1.52 (1.27-1.81)	2.26 (1.87-2.73)
Eating fruit daily: Yes		
Very unhappy	1	1
A little unhappy	0.84 (0.68-1.04)	0.82 (0.65-1.03)
Neutral	0.73 (0.60-0.86)	0.85 (0.68-1.07)
A little happy	0.80 (0.66-0.99)	0.98 (0.78-1.23)
Very happy	1.10 (0.90-1.34)	1.39 (1.11-1.75)
Vegetable intake: ≥ 3/day		
Very unhappy	1	1
A little unhappy	0.86 (0.67-1.09)	0.85 (0.65-1.10)
Neutral	0.82 (0.65-1.03)	0.91 (0.71-1.17)
A little happy	0.94 (0.75-1.18)	1.05 (0.82-1.35)
Very happy	1.53 (1.22-1.92)	1.49 (1.16-1.93)
Participation in 60 min of physical activity: ≥ 3/week		
Very unhappy	1	1
A little unhappy	0.87 (0.74-1.03)	0.80 (0.66-0.98)
Neutral	0.84 (0.72-0.99)	0.75 (0.62-0.92)
A little happy	1.05 (0.89-1.24)	0.83 (0.68-1.02)
Very happy	1.17 (1.00-1.37)	1.06 (0.87-1.30)
Sedentary behavior: ≥ 2h/day		
Very unhappy	1	1
A little unhappy	1.24 (1.01-1.52)	0.90 (0.73-1.12)
Neutral	1.09 (0.91-1.31)	0.79 (0.65-0.97)
A little happy	1.12 (0.93-1.35)	0.78 (0.63-0.96)
Very happy	0.97 (0.80-1.16)	0.72 (0.58-0.89)
Hours of sleep (weekdays): ≥ 8h/night		
Very unhappy	1	1
A little unhappy	1.45 (1.10-1.90)	1.25 (0.91-1.72)
Neutral	1.98 (1.53-2.56)	1.30 (0.95-1.78)

A little happy	2.29 (1.76-2.96)	1.66 (1.21-2.29)
Very happy	3.00 (2.30-3.91)	2.32 (1.69-3.19)
Hours of sleep (weekends): $\geq$ 8h/night		
Very unhappy	1	1
A little unhappy	1.27 (1.04-1.54)	1.15 (0.93-1.43)
Neutral	1.47 (1.23-1.77)	1.37 (1.11-1.69)
A little happy	1.56 (1.30-1.87)	1.54 (1.26-1.90)
Very happy	1.63 (1.35-1.96)	1.72 (1.40-2.12)

[a] Adjusted for age and subjective economic status