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Health-related determinants of happiness in Korean adults

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Abstract
Objectives Happiness has been associated with a range of favorable health outcomes. The aim of this study was to examine the relationships between happiness and health behaviors, stress, and environmental aspects of exercise in a Korean national representative sample.
Methods This cross-sectional study was conducted using multiple-stratified random sampling on the Korea Census of 2005. In October 2009, investigators conducted 15-min face-to-face interviews with 1,530 South Korean volunteers aged between 30 and 69 years. The questionnaire included questions about sociodemographic factors, perceived stress, smoking, drinking, healthy diet, exercise, exercise environment, and happiness levels.
Results The multivariate analysis revealed that middle-aged participants were less likely to be happy than younger and older participants, and higher happiness was associated with being part of a couple, higher income, lower stress, healthy diet, exercise, and certain exercise environments (e.g., mountain trails).
Conclusions Besides individual-level sociodemographic conditions, such as income or psychological status, community-level conditions, such as environment, should be considered when national and community public welfare policy is established.

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Keywords Happiness · Health behaviors · Stress · Exercise environment

Introduction

Positive psychology has received much less attention in medicine than negative emotions and mental disorders. This is mainly because extreme or prolonged negative emotions have the potential to produce grave problems for individuals and society (Fredrickson 2004). In recent years, research on positive psychology has emerged, highlighting the role of positive psychological variables in making life more successful, improving human functioning, and increasing happiness (Seligman 2002). Within the literature, happiness has been used broadly to describe positive subjective experiences. Happiness often comprises two components: the cognitive appraisal of one's life (i.e., life satisfaction) and affective evaluation with positive and negative affect (i.e., emotions), which are viewed as two separate dimensions (Diener 2000). The combination of these components creates a holistic view of the overall perception of happiness.

Research has suggested that increasing happiness has multiple benefits. Happiness has been reported to be associated with health states and behaviors; longevity; social environmental factors, such as social capital and social participation; and environmental surroundings such as pollution, disaster, and congestion (Stubbe et al. 2007; Smyth et al. 2008; Grant et al. 2009; Holly and Schiffrin 2010; Piqueras et al. 2011; Yoon et al. 2013). For example, longitudinal observational studies of older adults have shown associations between positive affect and reduced risk of mortality, disability, and coronary heart disease, which are independent of risk factors and negative affect

(Blazer and Hybels 2004; Kubzansky and Thurston 2007). In a 20-year study of initially healthy men from the Finnish Twin Cohort, it is reported that life satisfaction was associated with decreased disease mortality after adjustment for marital status, social class, smoking, and physical activity (Koivumaa-Honkanen et al. 2000).

Based on the common conception that stress impedes happiness, it would seem that an important way to increase happiness would be to reduce stress levels. However, from research on the relationship between stress and happiness, whether stress management is essential in interventions designed to increase happiness remains unclear. The relationship between happiness and stress has been examined in terms of both the negative effects of stress on well-being and the role of positive emotions in buffering against stress. Some research has found that positive emotions played a key role in undoing the cardiovascular effects of negative emotions (Fredrickson et al. 2000) and other research has demonstrated the negative effects of stress on well-being (Suh et al. 1996).

Happiness may be accompanied by health behaviors that reduce long-term risk of disease development (Grant et al. 2009). Previous studies have found that there is a significant association between happiness and health behaviors, such as lower alcohol consumption, refraining from smoking, high levels of physical activity, and a healthy diet (Grant et al. 2009; Piqueras et al. 2011; Moor et al. 2014). However, the causal pathways linking behavior with happiness have not been well identified; bidirectional processes are probably involved. For example, longitudinal observational trials have shown that increasing physical activity has beneficial effects on positive psychological states (Wang et al. 2012). Stopping smoking leads to enhanced well-being, while smoking may, in part, be a consequence of negative affective sates (Kassel et al. 2003). In spite of these data, findings regarding the association between happiness and health behavior choices are mixed, and some results have been inconsistent (Kawada et al. 2009; Molnar et al. 2009). Furthermore, few have studied the relationship between happiness and health behaviors in the general Asian population.

Understanding the determinants of happiness is important not only to identify the factors contributing to individual happiness but also to evaluate the welfare implications of public policies. Welfare policies based on broader measures of well-being are more likely to move the society toward environmental sustainability (Gowdy 2005). There are a few studies examining the relationship between environmental surroundings and happiness. Some studies have found a positive correlation between climatic variables and subjective well-being (Brereton et al. 2008) and a negative correlation between air and noise pollution and subjective well-being (Di Tella and MacCulloch 2008). In addition to climatic conditions, Brereton et al. (2008) examined the relationship between subjective well-being and environmental surroundings proxied by indicators such as proximity to a major road, airport, landfill site, or hazardous waste facility. However, less is known about associations between happiness and environments related to health behaviors. Therefore, the aim of this study was to explore health-related determinants of happiness, including exercise environments, while excluding the effects of sociodemographic factors in Korean adults.

Methods

Design and sample

The participants in this cross-sectional study were chosen from a population-based database using multiple stratified random sampling on the Korea Census of 2005 which is the 17th population census in Korea. The enumeration districts were selected based upon administrative districts and their size. Three to eight households were chosen randomly in an enumeration district and one eligible person per household was selected as a respondent. A total of 1,530 participants, aged between 30 and 69 years with no history of cancer, were engaged in face-to-face interviews in October 2009. We requested their written consent after informing them that completion of the survey was voluntary, anonymous, and confidential. The study protocol was approved by the Institute Review Board at the National Cancer Center.

Measures

Happiness was assessed by participants' responses to the question "In general, how would you describe your happiness?" Predefined responses were "very happy," "mostly happy," "a little bit happy," and "not happy at all." We combined "very happy" with "mostly happy" responses to form an overall "happy" category and combined the remaining responses to form an "unhappy" category. This single item is part of the General Health Questionnaire, which has been validated by many studies (Goldberg et al. 1997). Our chosen method of categorizing participants as happy or unhappy is consistent with the measurement of subjective happiness, which is defined by asking respondents to state how happy they are (Diener 2009). 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 (Subramanian et al. 2005; Wang et al. 2012; Yoon et al. 2013).

The psychosocial wellbeing index-short form (PWI-SF) was used to assess participants' levels of psychosocial stress (Jang 2000). The original PWI, based on the General Health Questionnaire-60 (Goldberg and Hillier 1979), was revised and adapted by Jang (1994) to incorporate items relevant to the Korean population. The PWI-SF consists of 18 items, each scored on a four-point Likert scale ranging from "strongly disagree" (0) to "strongly agree" (3). It contains items on social performance and self-confidence (e.g. I can enjoy daily life), depression (e.g. I feel unhappy and depressed), general well-being and vitality (e.g. I feel comfortable and healthy), and sleeping disturbance and anxiety (e.g. I can't sleep well because I am concerned). The total possible score ranges from 0 to 54. Respondents with scores below 9, from 9 to 27, and above 27 were classified as low, moderate, and high stress groups, respectively. The Cronbach's alpha coefficient was 0.87.

Participants who admitted to smoking during their face-to-face interviews were classified as smokers. Those who had never smoked or had ceased smoking were classified as non-smokers. To determine drinking habits, participants were asked to respond with a "yes" or "no" to the following question: "Do you abstain from drinking or drink fewer than two glasses of alcohol per day?" To assess dietary behavior, participants were asked to indicate whether they consumed a diverse, well-balanced diet that included sufficient quantities of fruits and vegetables. Participants who exercised more than 5 times a week for 30 min a day were considered regular exercisers. To determine the influence of environmental factors on exercise, participants were asked if they had access to exercise facilities near their homes, that is, fitness clubs, parks, or mountain trails.

Other variables included in this analysis were age, education, marital status, and income. We classified education level into three categories: lower than middle school graduate, high school graduate, and higher than college graduate. Marital status was defined as being part of a couple or not part of a couple. Income was classified into three categories according to annual household income: $<$24,000, 24,000–59,999, and $\geq$60,000. The cut-off point for the top 30 % of annual household income in Korea is about \$60,000, while \$24,000 is the lowest quintile of annual household income.

Analysis

Chi-square tests were conducted to examine relationships between sociodemographic characteristics, stress, smoking, drinking, healthy diet, exercise, exercise environment (fitness clubs, parks, and mountain trails), and happiness levels. Multivariate logistic regression analysis was subsequently performed to determine adjusted odds ratios (aORs) for smoking, drinking, healthy diet, exercise, and exercise environment related to happiness, after adjusting for effects of sociodemographic factors and stress. Variables that achieved a marginal significance ($p < 0.10$) in the univariate analysis were included in the multivariate analysis. Data were analyzed using SPSS 15.0 software.

Results

The sample consisted of 1,530 Korean adults, 50.1 % of whom were female. Of the respondents, 59.5 % perceived themselves as happy. The differences in happiness ratings according to gender, age, education, marital status, income, residential area, perceived stress, health behaviors, and exercise environment are shown in Table 1. There were significant differences between happiness levels according to age group, education level, marital status, annual family income, perceived stress, smoking, healthy diet, exercise, and exercise environment (fitness clubs, parks, and mountain trails). No other significant differences were found. Participants who were younger, part of a couple, in higher education, earning a higher income, living near exercise-friendly environments (e.g., fitness clubs, parks, and mountain trails), less stressed, nonsmokers, consuming a healthy diet, or exercising regularly reported that they were happy.

Table 2 provides aORs for associations between happiness and sociodemographic factors, stress, smoking, healthy diet, exercise, and exercise environment. Results revealed that respondents aged between 50 and 59 were less likely to be happy than those aged between 30 and 39 (aOR 0.62, 95 % CI 0.42, 0.90). The odds of happiness were estimated to be 1.58 times greater for participants who were part of a couple than for those who were not (aOR 1.58, 95 % CI 1.08, 2.31). Participants who earned more than 60,000 dollars annually were more likely to be happy than those who earned less than 24,000 dollars (aOR 2.13, 95 % CI 1.24, 3.65). Stress was the most significant predictor of happiness, indicating that stress levels were negatively associated with happiness (aOR 0.05, 95 % CI 0.01, 0.16; aOR 0.01, 95 % CI 0.00, 0.01). The odds of happiness were 1.53 times greater for participants who consumed a healthy diet (aOR 1.53, 95 % CI 1.19, 1.97) and 1.40 times greater for those who exercised regularly (aOR 1.40, 95 % CI 1.09, 1.79). Respondents who lived close to mountain trails that could be used for exercise were more likely to be happy than those who did not (aOR 1.31, 95 % CI 1.01, 1.70).

Table 1 Participant characteristics by happiness level in Korea in 2009

	Total *N* (%)	Happy *N* (%)	Unhappy *N* (%)	$p^{\dagger}$
Total	1,530 (100.0)	911 (59.5)	619 (40.5)	
Gender				
Male	764 (49.9)	444 (58.1)	320 (41.9)	0.256
Female	766 (50.1)	467 (61.0)	299 (39.0)	
Age in years				
30–39	469 (30.7)	300 (64.0)	169 (36.0)	0.039
40–49	481 (31.4)	290 (60.3)	191 (39.7)	
50–59	339 (22.1)	185 (54.6)	154 (45.4)	
60–69	241 (15.8)	136 (56.4)	105 (43.6)	
Education level				
Lower than middle school graduate	311 (20.4)	157 (50.5)	154 (49.5)	<0.001
High school graduate	740 (48.7)	437 (59.1)	303 (40.9)	
Higher than college graduate	471 (30.9)	313 (66.5)	158 (33.5)	
Marital status				
Part of couple	1.327 (86.7)	814 (61.3)	513 (38.7)	<0.001
Not part of couple	203 (13.3)	97 (47.8)	106 (52.2)	
Annual family income in US dollars				
<24,000	318 (21.0)	151 (47.5)	167 (52.5)	<0.001
24,000–59,999	1,048 (69.4)	642 (61.3)	406 (38.7)	
≥60,000	145 (9.6)	107 (73.8)	38 (26.2)	
Residential area				
Metropolitan	705 (46.0)	430 (61.0)	275 (39.0)	0.430
Small-medium city	688 (45.0)	405 (58.9)	283 (41.1)	
Rural	137 (9.0)	76 (55.5)	61 (44.5)	
Stress				
Low	123 (8.0)	120 (97.6)	3 (2.4)	<0.001
Moderate	1,154 (75.5)	757 (65.6)	397 (34.4)	
High	253 (16.5)	34 (13.4)	219 (86.6)	
Current smoking				
Yes	373 (24.4)	199 (53.4)	174 (46.6)	0.005
No	1,157 (75.6)	712 (61.5)	445 (38.5)	
Drinking				
Yes	527 (34.4)	309 (58.6)	218 (41.4)	0.600
No	1,003 (65.6)	602 (60.0)	401 (40.0)	
Healthy diet				
Yes	966 (63.1)	637 (65.9)	329 (34.1)	<0.001
No	564 (36.9)	274 (48.6)	290 (51.4)	
Regular exercise				
Yes	677 (44.2)	439 (64.8)	238 (35.2)	<0.001
No	853 (55.8)	472 (55.3)	381 (44.7)	
Exercise environment: fitness clubs				
Yes	1,107 (72.4)	688 (62.1)	419 (37.9)	0.001
No	423 (27.6)	223 (52.7)	200 (47.3)	
Exercise environment: parks				
Yes	1,210 (79.1)	744 (61.5)	466 (38.5)	0.003
No	320 (20.9)	167 (52.2)	153 (47.8)	
Exercise environment: mountain trails				
Yes	1,068 (69.8)	669 (62.6)	399 (37.4)	<0.001
No	462 (30.2)	242 (52.4)	220 (47.6)	

† p values were determined using Chi-square tests

Table 2 Multivariate logistic regression analysis, with happiness level as the dependent variable in Korea in 2009

	OR	95 % CI
Age in years		
30–39	1.00	
40–49	0.75	0.54–1.03
50–59	0.62	0.42–0.90
60–69	0.95	0.60–1.50
Education level (missing $n = 8$)		
Lower than middle school graduate	1.00	
High school graduate	1.10	0.75–1.62
Higher than college graduate	1.40	0.90–2.31
Marital status		
Not part of a couple	1.00	
Part of a couple	1.58	1.08–2.31
Annual family income in US dollars (missing $n = 19$)		
<24,000	1.00	
24,000–59,999	1.19	0.85–1.66
≥60,000	2.13	1.24–3.65
Stress		
Low	1.00	
Moderate	0.05	0.01–0.16
High	0.01	0.00–0.01
Current smoking		
No	1.00	
Yes	0.79	0.60–1.05
Healthy diet		
No	1.00	
Yes	1.53	1.19–1.97
Regular exercise		
No	1.00	
Yes	1.40	1.09–1.79
Exercise environment: fitness clubs		
No	1.00	
Yes	1.08	0.81–1.43
Exercise environment: parks		
No	1.00	
Yes	1.15	0.84–1.57
Exercise environment: mountain trails		
No	1.00	
Yes	1.31	1.01–1.70

Data were adjusted for age, marital status, income, education, stress, smoking, healthy diet, exercise, exercise environment: fitness clubs, exercise environment: parks, and exercise environment: mountain trails

OR odds ratio, *CI* confidence interval

Discussion

The associations between four lifestyle factors, stress, exercise environment, and happiness in daily life were evaluated in a Korean population, using a questionnaire survey. According to the results of the multivariate analysis, the presence of happiness was significantly associated with age, marital status, income, perceived stress, healthy diet, exercise, and exercise environments such as mountain trails.

The proportion of respondents in our study population who reported that they were very happy or mostly happy with their lives was 59.5 %. This proportion is notably lower than those found in Western populations; however, it is similar to those found in other Asian populations. A nationwide survey in Japan reported that the proportion of happy individuals was 48.4 % (Oshio and Kobayashi 2010) and Yiengprugsawan et al. (2012) showed that 57.6 % of respondents reported that they were happy all or most of the time in a Thai population. In contrast, Western populations have been found to exhibit higher levels of happiness relative to Asian populations. Subramanian et al. (2005) found that the proportion of respondents reporting happiness was 94.8 % among USA adults and approximately 98 % of participants reported being happy and interested in life or somewhat happy in the National Population Health Survey of Canada (Wang et al. 2012). There is evidence of lower subjective well-being and elevated levels of depressive symptoms in Pacific Asian populations relative to Western populations (Grant et al. 2009). Differences in factors such as individualism-collectivism and culture norms are thought to contribute (Steptoe et al. 2007). A previous study found that depressed mood was greater in collectivistic cultures than in individualistic cultures (Steptoe et al. 2007). Thus, there seem to be lower happiness levels among collectivistic countries such as Japan, Thailand, and Korea relative to individualistic countries such as USA and Canada.

Referring to the relationship between age and happiness, we found that happiness was lower in the middle-aged group, especially in participants in their 50 s; however, this relationship has been found to be inconsistent in other studies. Dear et al. (2002), Stubbe et al. (2007), and Oshio and Kobayashi (2010) found that happiness was higher in young adults than in middle-aged or elderly adults. In contrast, some studies have found an opposite effect of age, highlighting aging as a preventative factor with respect to feelings of unhappiness (Kawada et al. 2009), or have not shown any age effect (Subramanian et al. 2005; Yiengprugsawan et al. 2012). Some studies have proved that there are nonlinear effects, but happiness is approximately U-shaped throughout the life course and mental distress tends to reach maximum levels in middle age. In general, these studies found lower levels of happiness in participants between 35 and 62 years of age—middle age—across gender and countries (Blanchflower and Oswald 2008). This finding is consistent with our data.

Participants who were part of a couple reported being happier than people who were not part of a couple. This is consistent with findings from previous studies (Subramanian et al. 2005; Oshio and Kobayashi 2010; Yiengprugsawan et al. 2012). Subramanian et al. (2005) found that married people reported being happier and healthier than people who were single, widowed, separated, or divorced, and both unmarried and separated/divorced groups reported higher odds ratios for being unhappy (relative to married groups) than for being unhealthy. This is supported by findings from a previous study in which participants who were separated, divorced, or widowed were the least happy (Yiengprugsawan et al. 2012).

Our findings revealed a significant positive association between income levels and happiness. Researchers have found consistent positive correlations between income and happiness (Subramanian et al. 2005; Oshio and Kobayashi 2010; Yiengprugsawan et al. 2012; Yoon et al. 2013). For example, comparing participants in the worst-off income category (households making less than $20,000) to those in the highest-income group (households earning more than $100,000 per year), the worst-off participants were about 3.85 times more likely to report being unhappy (Subramanian et al. 2005). In addition, another study targeting Korean elders revealed that happiness levels escalated as income increased (Yoon et al. 2013).

We found that stress was the strongest predictor of happiness. Respondents who perceived higher levels of stress reported being less happy than those with lower levels of stress. These results are in line with previous evidence showing an inverse relationship between happiness and perceived stress by means of self-reported measures (Holly and Schiffrin 2010; Mikolajczak et al. 2010; Piqueras et al. 2011). Piqueras et al. (2011) reported that participants who reported feeling stressed in normal circumstances and during test situations exhibited a lower likelihood of being considered "very happy." Holly and Schiffrin (2010) found that all three scales measuring happiness demonstrated a negative linear correlation between happiness and stress. In addition to these results, Mikolajczak et al. (2010) also found a relationship between subjective happiness and cortisol awakening response flexibility, a biological marker of psychological and physical health status. This study suggests that interventions designed to increase happiness may benefit from the inclusion of activities to manage and cope with stress and this sort of intervention should also utilize measures of state happiness that are sensitive to increases that may occur as a result of the intervention.

We did not find any relationship between happiness and smoking or drinking habits. Results of previous studies have been inconsistent. Some studies have found a relationship between happiness and nonsmoking or lower cigarette use (Grant et al. 2009; Piqueras et al. 2011), whereas others have not (Kawada et al. 2009; Yoon et al. 2013). Interestingly, Kostka and Jachimowicz (2010) found that older respondents who smoked may have had a more advantageous psychological profile, and smoking may have given them the impression that they were more in control of their lives. Heavy alcohol consumption has previously been linked to low life satisfaction (Grant et al. 2009; Molnar et al. 2009), but this effect has not been present in some studies (Grant et al. 2009; Kawada et al. 2009; Piqueras et al. 2011; Yoon et al. 2013). Additionally, the association between drinking and mood state could be curvilinear (Dear et al. 2002; O'Donnell et al. 2006). In analysis conducted by O'Donnell et al. (2006), high levels of depressed mood were more prevalent in nondrinkers and heavy drinkers than in moderate drinkers. Life satisfaction was also greater in moderate users compared with abstainers and heavy users in a nationally representative sample of Australian adults (Dear et al. 2002).

Findings from previous research associating dietary habits with happiness have been inconsistent. With respect to dietary frequency, there were no associations between happiness and the frequency of consumption of daily breakfast, snacks, or regular meals (Kawada et al. 2009; Piqueras et al. 2011; Yoon et al. 2013); however, regarding dietary quality, there was a positive relationship between happiness and fruit and vegetable intake (Grant et al. 2009; Piqueras et al. 2011). Our findings provide support for the relationship between happiness and fruit and vegetable intake. Participants who consumed a diverse, well-balanced diet that included sufficient quantities of fruits and vegetables were happier than those who did not.

With respect to the relationship between exercise and happiness, we found that happiness was positively associated with exercise participation, which is consistent with findings from previous studies (Schnohr et al. 2005; Stubbe et al. 2007; Grant et al. 2009; Kawada et al. 2009; Piqueras et al. 2011; Wang et al. 2012; Yoon et al. 2013). Stubbe et al. (2007) reported that exercisers are, on average, more satisfied with their lives and happier than non-exercisers, indicating that this association appears to be mediated by genetic factors that influence both exercise behavior and well-being. Schnohr et al. (2005) showed that both men and women who are physically active in their leisure time are less prone to stress and life dissatisfaction than sedentary individuals. They also recommended that the increase in mental well-being associated with increased physical activity in leisure time should be a key argument in future campaigns for physical activity in the general population.

We found that respondents who reported having access to desirable exercise environments, such as mountain trails, were happier than those who did not. It is reported that individuals living near mountain trails were more likely to

exercise regularly (Kye and Park 2012). Previous studies have indicated that a facility-rich environment could potentially encourage physical activity (Grasser et al. 2013). Exercise facilities serve as visual stimuli that may act as cues for exercise behavior. Facilities located in close proximity to the home also reduce some of the physical and psychological barriers associated with physical activity, which may in turn lead to happiness. Smyth et al. (2008) revealed that Chinese citizens with greater access to parkland reported significantly higher levels of well-being.

This study has a number of strengths, including the use of a national representative sample, consideration of environmental factors, and the novelty of including people living in Korea, where some of the highest suicide rates have consistently been reported, not only among OECD (2013) countries but the world, indicating that there could be serious social problems at present. There are also several limitations. This study was cross-sectional, so causal relationships could not be confirmed. The measures in this study were simple self-report items; more refined assessments with objective verification would have been desirable. Nevertheless, these results add to the literature in documenting associations between happiness and a range of behaviors, emotional responses, and environmental factors relevant to health in a different cultural group.

Conclusions

The findings of this study are consistent with the notion that health behaviors, perceived stress, and exercise environments account, in part, for the relationship between positive psychological states and good health. This underscores the importance of taking these variables into account in the design of strategies to promote health campaigns. Besides individual-level sociodemographic conditions, such as income or psychological status, community-level conditions, such as environment, should be considered when national and community public welfare policy is established.

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Conflict of interest No potential conflicts of interest were disclosed.

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