

Factors Associated with Perceived Stress: Focused on Daily Walking and Access to Exercise Facilities

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ABSTRACT

The perceived stress incurs negative effect on health and closely related with quality life. This study aimed to explore relationship between regular daily walking, accessibility to exercise facility and perceived stress level in Korean adults analyzing nationally representative data. Total participants of 147,739 were analyzed in the data of Korea Community Health Survey 2018. To identify association between perceived stress and daily walking and access to exercise facilities, we conducted multivariable binomial logistic regression model. This study found that regular daily walking (aOR=0.902, p -value<0.001), and closer access to exercise facilities were significantly associated with lower perceived stress level (difficult: aOR=1.172; p -value<0.001, very difficult: aOR=1.300; p -value<0.001). This finding supports the importance of physical activity and supplying the exercise facilities close to the community residency could help relieve stress. This study provides basic evidence to underlying the importance of regular daily walking and distance to exercise facilities for reducing perceived stress level.

Keywords: Access to exercise facilities, Daily walking Korea Community Health Survey, Perceived stress, Psychological health,

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INTRODUCTION

The perceived stress may incur negative psychological symptoms and plays a major role in deterioration of the quality of life. Meanwhile, moderate-intensity cardiovascular exercise, such as walking for more than 150 minutes or more per week, is associated with reducing risk of morbidity compared to being inactive. (Mcphee J *Set al.*, 2016)Several studies suggested that regular body movement like walking and physical activities could impact positive effect on not only physical but also psychological health. (Lu Z., 2010; MatzerF *et al.*, 2018) The American College of Sports Medicine encouraged to complete moderate intensity activity for at least 30 minutes and five days per week for well-being. (OjaPet *al.*, 2011) World Health Organization (WHO) guidelines on maintenance of healthy lifestyle reported that required moderate physical activity at least 150 minutes per week for adults. (Souza FilhoB A B *Det al.*, 2020)

Compared with other moderate intensity physical activities, walking had less economic burdens and walking have less barrier making it easier to maintain daily.(Lu Z., 2010; MatzerF *et al.*, 2018) WHO reported that failure of increasing physical activity level will negative effect to heath system and community well-being. And they promote to update physical activity guidance like “create an active environment (space, place)”. (Organization W H., 2018)Moreover, well-equipped physical environment in daily life such as accessibility to facility and number of facilities is associated with increased amounts of physical activities. (Lee S A *et al.*, 2016; Eriksson U *et al.*, 2012) It was indicated that accessibility to exercise facilities and insufficient enjoyment were known as physical activities barriers. (Ashton L*Met al.*, 2017)However the evidence for association daily walking, access to exercise facility and perceived stress are still inconclusive in total population. Since there are few numbers of prior studies that have been carried out on current topic. (Lee S A *et al.*, 2016)Thus, this study aimed to clarify regular daily walking and easier access to exercise facilities were significantly related to perceived stress level in general adult populations.

MATERIALS & METHODS

Study Population and Data

This study was analyzed using the data of Korea Community Health Survey (KCHS) 2018. The KCHS is national representative cross-sectional surveys and openly accessible at website (<http://chs.cdc.go.kr>). This survey was conducted to Korean adults aged 19 years and older during 2018.08.16~2018.10.31 under the supervision of the Korea Centers for Disease Control and Prevention. The KCHS was investigated by 17 metropolitan local government and 245 community health centers in Korea. The survey was designed to ensure national representativeness. First, sampling unit was Tong, Ban, Lee, which are the smallest administrative district units in Korea. Second, systematic sampling was conducted by Tong, Ban, Lee households. Survey contents had 21 domains and 201 questions. And trained interviewers conducted data by one-on-one interviews. Among 228,340 respondents, 147,739 participants were included in the analysis, excluding those have missing data in study variables.

Variable

The independent variable was daily walking and access to exercise facilities. Daily walking was categorized into 0 = not regular walking; 1 = regular walking (more than 30 minute and five days per week). (Lu Z., 2010) Access to exercise facilities was ascertained by the question “Was it easy to find a place to exercise near your residences?”, with possible responses of “very easy”, “easy”, “difficult”, or “very difficult.”

The dependent variable was perceived stress. Perceived stress was assessed by 4-point likert scale (“very high”, “high”, “low”, or “very low”) and categorized as binary scale (“high” or “low”). (Kim H J *et al.*, 2019)

Sociodemographic characteristics were age, sex, education level, household income, marital status, occupational status, and multi-generational household. And health related variable was body mass index (BMI). Age was categorized as “19-29”, “30-39”, “40-49”, “50-59”, and “60 or older”. Education level was categorized into “high-school or lower” and “college or higher”. Household income was defined as first quintile (poor), second quintile, third quintile, fourth quintile, and fifth quintile (rich). (Statistics Korea) Marital status was categorized as “single”, “married”, and “others (separated/divorced/widowed)”. Occupational status was classified as “yes” and “no”. Multi-generational household was categorized into “one-generation”, “two-generation”, and “three-generation and above”. BMI was defined as “normal ($18.5 \leq \text{BMI} < 23$)”, “underweight ($\text{BMI} < 18.5$)”, “overweight ($23.0 \leq \text{BMI} < 25$)”, and “obese ($\text{BMI} \geq 25$)”. (Lim J U *et al.*, 2017)

Statistical Analysis

Descriptive analysis was done for indicating sociodemographic, health related characteristics of this population. The frequency and percent of this population were reported. Multivariable binary logistic regression was performed to access the factors associated with perceived stress. Adjusted odds ratios (aOR) and 95% confidence interval (CI) were reported. Hosmer-Lemeshow was conducted to test goodness-of fit. (Hosmer D W., *et al*, 1997) Statistical procedure was conducted using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, N.Y., USA). The significance level was set at 0.05.

RESULTS AND DISCUSSION

Results

Table 1 is general characteristics of the participants. Among 147,739 participants, about 22.8% (33,689) reported that perceived high level of stress, 56.5% (83,468) was female, and mean of age was 55.6±17.7 years. 44.9% (66,275) participants practice regularly daily walking. Most participants' accessibility to exercise facilities were "easy" (49.3%). And most people showed "high-school and lower" (66.7%) educational level. Among participants 27.7% participant's household income were "1st quintile" (27.7%). Most participants BMI were "normal" (36.4%). And 65.8% marital status were "married" (65.8%), 58.8% participant's occupational status were "yes" (58.8%). 49.5% participant's multi-generational household answered "one-generation" (49.5%). (Table 1)

Table 1: Participants' general characteristics

Variable	Category	N	%
Sex	Male	64,271	43.5
	Female	83,468	56.5
Age	19-29	14,788	10.0
	30-39	16,797	11.4
	40-49	22,239	15.1
	50-59	27,583	18.7

	>=60	66,322	44.9
Education level	<= High school	98,512	66.7
	>=College	49,227	33.3
Household income	1 st Quintile (poor)	40,945	27.7
	2nd Quintile	32,770	22.2
	3 rd Quintile	33,733	22.8
	4th Quintile	20,416	13.8
	5 th Quintile (rich)	19,875	13.4
BMI	Normal	53,825	36.4
	Underweight	6,098	4.1
	Overweigh	35,792	24.2
	Obese	52,024	35.2
Marital status	Single	21,305	14.4
	Married	97,152	65.8
	Others	29,282	19.8
Occupational status	No	60,829	41.2
	Yes	86,910	58.8
Multi-generational household	One-generation	73,174	49.5
	Two-generation	64,533	43.7
	Three-generation or more	10,032	6.8
Daily walking	Notregular	81,464	55.1
	Regular	66,275	44.9
Access to exercise facilities	Very easy	42,447	28.7
	Easy	72,881	49.3
	Difficult	22,992	15.6

	Very difficult	9,419	6.4
Perceived stress	Low	114,050	77.2
	High	33,689	22.8

Table 2. Factors associated with perceived stress: effect of daily walking and accessibility exercise facilities(N=147,739; reference group = low perceived stress)

Variable	Category	aOR	p-value	95% CI	
				LL	UL
Daily walking	Notregular	ref			
	Regular	0.902	<0.001	0.880	0.925
Access to exercise facilities	Very easy	ref			
	Easy	0.980	0.166	0.951	1.009
	Difficult	1.172	<0.001	1.128	1.217
	Very difficult	1.300	<0.001	1.233	1.370
Age	19-29	ref			
	30-39	1.150	<0.001	1.085	1.219
	40-49	0.920	0.008	0.866	0.978
	50-59	0.727	<0.001	0.681	0.775
	>=60	0.497	<0.001	0.464	0.532
Sex	Male	ref			
	Female	1.179	<0.001	1.148	1.211
Education level	<= High school	ref			
	>=College	0.973	0.108	0.942	1.006
Household	1 st Quintile (poor)	ref			

income	2nd Quintile	0.817	<0.001	0.785	0.849
	3 rd Quintile	0.704	<0.001	0.674	0.736
	4th Quintile	0.692	<0.001	0.658	0.728
	5 th Quintile (rich)	0.715	<0.001	0.679	0.753
BMI	Normal Underweight Overweight Obese	ref			
	Underweight	1.201	<0.001	1.130	1.278
	Overweight	1.025	0.145	0.992	1.059
	Obese	1.145	<0.001	1.112	1.179
Marital status	Single	ref			
	Married	1.022	0.478	0.963	1.084
	Others	1.056	0.031	1.005	1.109
Occupational status	No	ref			
	Yes	1.205	<0.001	1.172	1.240
Multi-generational household	One-generation	ref			
	Two-generation	1.160	<0.001	1.124	1.198
	Three-generation	1.171	<0.001	1.113	1.239
Hosmer&Lemeshow	χ^2	13.224 ($p=0.104$)			
	Degree of freedom	8			

Table 2 is summarized results of the multivariable binomial logistic regression that investigated factors associated with perceived stress. Compared with reference groups, most independent groups have significant association. Regular daily walking group who walked more than five days per week and 30 minutes showed decreased odds of being perceived high level of stress compared with not regular daily walking group (aOR=0.902, 95% CI=0.880 to 0.925). In terms of access to exercise facilities, those who responded as “difficult” (aOR=1.172, 95% CI= 1.128

to 1.217) or “very difficult” (aOR=1.300, 95% CI=1.233 to 1.370) showed increased odds of being perceived high level of stress compared with those who responded as “very easy”. In age, “30 to 39” years showed increased odds of being perceived high level of stress compared with 19 to 29 years. (aOR=1.150, 95% CI= 1.085 to 1.219). Others (“40-49”, “50-59”, “≥60”) had decreased odds of being perceived high level of stress compared with 19 to 29 years. (40-49 years aOR=0.920, 95% CI= 0.866 to 0.978; 50-59 years aOR=0.727, 95% CI= 0.681 to 0.775; ≥ 60 years aOR=0.497, 95% CI= 0.464 to 0.532). Female showed increased odds (aOR=1.179, 95% CI=1.148 to 1.211). In educational level, those who were university and higher showed decreased odds of being perceived high level of stress (aOR=0.973, 95% CI=0.942 to 1.006). Among household income, the higher household, “2nd quintile”, “3rd quintile”, “4th quintile”, “5th quintile” income groups showed decreased odds of being perceived high level of stress compared with “1st quintile” (“2th quintile” aOR=0.817, 95% CI=0.785 to 0.849; “3rd quintile” aOR=0.704, 95% CI=0.692 to 0.728; “4th quintile” aOR=0.692, 95% CI=0.658 to 0.728; “5th quintile” aOR=0.715, 95% CI=0.679 to 0.753). In terms of BMI, “underweight” and “obese” groups showed increased odds of being perceived high level of stress compared with “normal” (“underweight” aOR=1.201, 95% CI= 1.130 to 1.278; “obese” aOR=1.145, 95% CI= 1.112 to 1.179). In marital status, others who were “separated”, “divorced”, “widowed” showed increased odds of being perceived high level of stress however “single” (aOR=1.056, 95% CI=1.005 to 1.109). In occupational status, “yes” showed increased odds of being perceived high level of stress than “no” (aOR=1.205, 95% CI=1.172 to 1.240). Among multi-generational household, reference was “one-generation”. The higher multigenerational household (“two-generation”, “three-generation”) showed increased odds of being perceived high level of stress compared with “one-generation” (“two-generation” aOR=1.160, 95% CI= 1.124 to 1.198; “three-generation” aOR=1.174, 95% CI= 1.113 to 1.239).(Table 2)

Discussion

This study examined association between perceived stress and daily walking, access to exercise facilities using nationally representative data. As a result, this study showed that regular daily walking and easier access to exercise facilities were significantly associated with lower perceived stress level. This finding was consistent with previous study that physical activity has positive influence on mental health. (Lee S A *et al.*, 2016) And previous study suggested that accessibility to environmental factors such as green spaces are related with psychological health. (Kim J *et al.*, 2017) Prior studies have found that moderate intensity physical activity like walking is beneficial to reduce stress and anxiety, improve emotional well-being. (Lu Z., 2010) This study showed that difficult access to exercise facilities had higher perceived stress,

which is consistent with previous studies. (Lu Z., 2010) The physical activities have positive effect on physical and psychological health, and having short distance between physical environment and residence increase amount of physical activities. Like WHO new global action plan, creating active space and places will promote physical activities. (Organization W H., 2018; Lee S A *et al.*, 2016)[6-7]

Compared with male, female showed high perceived stress. Previous study has shown that female have lower threshold of responding stress than male. In educational level, university and higher noted low perceived stress than high school and lower. And high household income showed low perceived stress. The possible explanation of these finding was that socioeconomic factors have considerable association with psychological status. Areas where high household income people live tend to be well equipped with social overhead capital (SoC) such as green space and sports facilities. Lower education level made low accessibility to health information. Likewise, income inequalities was related with their social environment. (Feizi A *et al.*, 2012; Mulder B C *et al.*, 2011; CereijoTejedor L *et al.*, 2019) Normal weight had low perceived stress than “underweight” and “obese”. In previous study, body mass index described U-shaped relationship with unhealthy psychological status. People with unhealthy BMI have more negative psychological status than people with normal BMI. (Martinez E V *et al.*, 2014) Those who marital status is “single” showed low perceived stress. Compared to not married people, married people had responsibility to their family. (Feizi A *et al.*, 2012) Occupational status “yes” group showed high perceived stress than “no” group. These results can be explained that they who had occupation likely to concern many things such as business and family, household at the same time. These can be inducing stress. (Mulder B C *et al.*, 2011; Jeong I *et al.*, 2018) The higher multigenerational household showed high perceived stress. The prior study was revealed that increased family may enhancing stress especially in female. Most female have been main caregiver in household and increased family means more people who need care. (Jeong I *et al.*, 2018)

There were several limitations on this study. First, this study based on a cross sectional design, which was single time measurement of “perceived stress” and “daily walking”, “access to exercise facilities”. Second, this study didn’t adjust health behavior variables such as smoking, alcohol drinking which could affect stress and psychological health. And this study did not consider exercise facilities scale and specific accessibility of exercise facilities such as times. Despite several limitations, this study was conducted using nationwide representative data. And there are a few previous studies providing association between “perceived stress” and “daily walking”, “access to exercise facilities”. Therefore, this study suggests basic evidence for these

relationships.

CONCLUSION

This study showed that regular daily walking, easier access to exercise facilities had association with low perceived stress. Moreover, this finding supports the importance of regular daily walking and supplying the exercise facilities close to the community residency for community psychological health.

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