



Differences in Lifestyles Including Physical Activity According to Sexual Orientation among Korean Adolescents

*Jin-Ho YOON¹, *Wi-Young SO²*

1. Institute of Sports Medicine and Science, Korea National Sport University, Seoul, Korea
2. Dept. of Human Movement Science, Seoul Women's University, Seoul, Korea

***Corresponding Author:** Email: wowso@swu.ac.kr

(Received 26 July 2013; accepted 12 Oct 2013)

Abstract

Background: The purpose of the present study was to examine differences in lifestyle factors such as physical activity among homosexual (gay or lesbian), bisexual, and heterosexual Korean adolescents.

Methods: The sample consisted of 74,186 adolescents from grades 7–12 (ages 12–18) who participated in the 8th annual Korea Youth Risk Behavior Web-based Survey in 2012. Of this sample, only 11,829 provided enough information regarding their romantic and sexual experiences to define them as gay, lesbian, bisexual, or heterosexual. From this information, males were divided into gay ($n = 323$), bisexual ($n = 243$), and heterosexual ($n = 6,501$) groups, and females were divided into lesbian ($n = 208$), bisexual ($n = 113$), and heterosexual ($n = 4,441$) groups. Differences in lifestyle factors according to sexual orientation were analyzed using one-way analysis of variance.

Results: Males showed significant differences by sexual orientation group in terms of frequency of smoking ($P = 0.029$), alcohol consumption ($P < 0.001$), muscular strength exercises ($P = 0.020$), and walking for at least 10 minutes per week ($P < 0.001$). Females showed significant differences by sexual orientation group in terms of frequency of smoking ($P < 0.001$), alcohol consumption ($P < 0.001$), vigorous physical exercise ($P < 0.001$), moderate physical exercise ($P < 0.001$), and muscular strength exercises ($P < 0.001$), as well as for self-reported mental stress ($P < 0.001$).

Conclusion: We concluded those gay and bisexual males and lesbian and bisexual females had significant lifestyle differences as compared with heterosexual adolescents. This effect was stronger for females than for males.

Key words: Adolescent, Bisexual, Gay, Heterosexual, Homosexual, Lesbian, South Korea

Introduction

The number of men and women worldwide who identify as lesbian, gay, or bisexual (LGB) has increased in recent years. According to a survey undertaken in 2011 by the Williams Institute at the UCLA School of Law, approximately 9 million people (3.5% of adults) in the United States identify as LGB and an additional 0.3% of adults identify as transgender (1). In 2003, a study on Australia reported that among adults aged 16–59, 1.6% and 0.9% of males identified as gay and bisexual, respectively, and 0.8% and 1.4% of fe-

males identified as lesbian and bisexual, respectively (2). In Denmark in 1992, 2.7% of adult men and women reported having had same-sex sexual experiences (3). In France in 1992, 4.1% of men and 2.6% of women reported at least one same-sex sexual experience during their lifetime (4). In Ireland in 2006, 2.7% of men and 1.2% of women identified as either homosexual or bisexual (5), while in a 2003 Norwegian survey, 12% of respondents reported having had a same-sex sexual experience (6), and 6.1% of people surveyed in the

United Kingdom in 1992 had had a same-sex sexual experience (7). In summary, the number of men and women worldwide who identify as lesbian, gay, or bisexual (LGB) has increased in recent years, with up to 12% of respondents reporting having engaged in same-sex sexual activity (1–7). Locally, even though statistics for the LGBT population cannot be determined for certain Korean cultures, of a sample of 1,748 adolescents in South Korea, 12.7% had problems with their gender identity (8).

A number of studies have shown higher rates of diseases such as HIV/AIDS among the LGB population (9–11), as well as a higher prevalence of asthma (12), obesity (13), and poor health behavior, indicating a relationship between this group's atypical sexual orientation and health-related lifestyle (14–15). For this and other reasons, the LGB population has attracted increasingly more interest worldwide. However, there is currently almost no research in South Korea on the prevalence of LGB identity and sexual behavior, meaning that the Korean government has no information regarding possible public health concerns among the LGB population. Therefore, the purpose of the present study was to determine whether lifestyle-related factors, including physical activity (PA), differ between lesbian, gay, bisexual, and heterosexual Korean adolescents.

Methods

The 8th Korea Youth Risk Behavior Web-based Survey (KYRBWS-VIII) is an annual epidemiological and cross-sectional study that assesses the public health of Korean adolescents. It uses a complex sample design of 43 clustering techniques, 129 stratification techniques, and multistage sampling to cover all of South Korea while limiting the sample size to a manageable size: 400 middle schools and 400 high schools. This sample includes students from grades 7–12 (aged 12–18 years). All of the details regarding the data collection procedure have been described by the Ministry of Education, Science, and Technology, the Ministry of Health and Welfare, and the Korea

Centers for Disease Control and Prevention (16). This survey has well-established validity and reliability for this population (17–18).

In the KYRBWS-VIII, students are assigned unique identification numbers by their classroom instructors, and then access the survey web page using these numbers. On the web page, they are asked if they are willing to participate; students who choose to participate complete the questionnaire at their schools anonymously. Because the KYRBWS-VIII does not collect any private information (e.g., students' names, social security numbers, school names, telephone numbers, or home addresses), ethical approval was not required.

The overall response rate for participation in the KYRBWS-VIII was 96.4% (74,186 out of 76,980 students; 38,221 males and 35,965 females). However, only 11,829 of these 74,186 participants provided enough information about their romantic and sexual behavior to be categorized as gay, lesbian, bisexual, or heterosexual. The subjects' demographic characteristics are shown in Table 1.

Defining groups: homosexual (gay or lesbian), bisexual, and heterosexual

Sexual identity was evaluated using the item "Select all of the following items that you have experienced." Possible responses were: [1] "none of these," [2] "kissing and fondling someone of the opposite sex," [3] "sexual intercourse with someone of the opposite sex," [4] "kissing and fondling someone of the same sex," [5] "sexual intercourse with someone of the same sex," [6] "experienced sexual violence from others," and [7] "committed sexual violence."

Respondents who responded "yes" to only [4] or [5] (i.e., respondents who reported sexual or romantic behavior with people of the same sex only) were categorized as homosexual (gay or lesbian), respondents who responded "yes" to both [4] or [5] and [2] or [3] (i.e., respondents who reported sexual or romantic behavior with people of both sexes) were categorized as bisexual, and respondents who responded "yes" to only [2] or [3] (i.e., respondents who reported sexual or romantic behavior with people of the opposite sex only) were categorized as heterosexual.

Table 1: The subjects' demographic characteristics

Variables		Males (n=7,067)	Females (n=4,762)	Total (n=11,829)
Age (years)		15.85 ± 1.54	15.89 ± 1.55	15.87 ± 1.54
Height (cm)		172.63 ± 6.77	160.61 ± 5.25	167.82 ± 8.56
Weight (kg)		62.61 ± 10.67	52.80 ± 7.29	58.68 ± 10.61
Body mass index (kg/m ²)		20.94 ± 2.93	20.44 ± 2.47	20.74 ± 2.77
12 years	Homosexual (gay or lesbian)	16 (7.8)	25 (16.5)	41 (11.5)
	Bisexual	10 (4.9)	6 (4.0)	16 (4.5)
	Heterosexual	179 (87.3)	120 (79.5)	299 (84.0)
13 years	Homosexual (gay or lesbian)	47 (10.7)	22 (7.0)	69 (9.2)
	Bisexual	22 (5.0)	6 (1.9)	28 (3.7)
	Heterosexual	372 (84.3)	285 (91.1)	657 (87.1)
14 years	Homosexual (gay or lesbian)	39 (5.8)	24 (5.7)	63 (5.8)
	Bisexual	34 (5.1)	8 (1.9)	42 (3.8)
	Heterosexual	595 (89.1)	392 (92.4)	987 (90.4)
15 years	Homosexual (gay or lesbian)	53 (4.3)	26 (3.7)	79 (4.1)
	Bisexual	44 (3.6)	8 (1.1)	52 (2.7)
	Heterosexual	1,132 (92.1)	665 (95.2)	1,797 (93.2)
16 years	Homosexual (gay or lesbian)	53 (3.3)	29 (2.7)	82 (3.0)
	Bisexual	42 (2.6)	17 (1.6)	59 (2.2)
	Heterosexual	1,517 (94.1)	1,045 (95.7)	2,562 (94.8)
17 years	Homosexual (gay or lesbian)	66 (3.4)	38 (2.6)	104 (3.1)
	Bisexual	45 (2.3)	30 (2.1)	75 (2.2)
	Heterosexual	1,829 (94.3)	1,383 (95.3)	3,212 (94.7)
18 years	Homosexual (gay or lesbian)	25 (2.9)	20 (3.6)	45 (3.2)
	Bisexual	28 (3.2)	10 (1.8)	38 (2.7)
	Heterosexual	821 (93.9)	522 (94.6)	1,343 (94.1)
Total ages	Homosexual (gay or lesbian)	323 (4.6)	208 (4.4)	531 (4.5)
	Bisexual	243 (3.4)	113 (2.4)	356 (3.0)
	Heterosexual	6,501 (92.0)	4,441 (93.2)	10,942 (92.5)

Note. Data are expressed as mean ± standard deviation or as n (%)

Subjects who reported that they had never engaged in sexual or romantic behavior (responding “yes” to [1]), or who reported only experiences of sexual violence (responding “yes” to [6] or [7]) were excluded, as these items provided no information on sexual identity.

Using these criteria, the 11,829 subjects who provided sufficient information were divided into groups. Males were divided into gay ($n = 323$),

bisexual ($n = 243$), and heterosexual ($n = 6,501$) groups, and females were divided into lesbian ($n = 208$), bisexual ($n = 113$), and heterosexual ($n = 4,441$; Table 1) groups.

Lifestyle factors including physical activity

The data were then analyzed according to the groups' sexual orientation for any significant relationships with certain key lifestyle behaviors:

smoking cigarettes, drinking alcohol, eating breakfast, mental stress, and exercise (vigorous, moderate, muscular strength exercises and walking at least 10 minutes per week) through the KYRBWS-VIII. Possible responses to these items are given as follows.

Frequency of vigorous PA, frequency of moderate PA, and frequency of muscular strength exercises per week were 1 = "never," 2 = "once," 3 = "twice," 4 = "three times," 5 = "four times", and 6 = "five times or more." Vigorous PA included activities such as digging, aerobics, heavy lifting, or fast cycling; moderate PA included activities such as cycling at a regular pace, carrying light loads, or playing doubles tennis; and muscular strength exercises included activities such as sit-ups, push-ups, and weight lifting or weight training. Frequency of smoking and frequency of drinking per month had possible responses of 1 = "never," 2 = "1–2 days," 3 = "3–5 days," 4 = "6–9 days," 5 = "10–19 days," 6 = "20–29 days," and 7 = "every day" for. For frequency of breakfast consumption and frequency of walking at least 10 minutes per week, response options included 1 = "never," 2 = "once," 3 = "twice," 4 = "three times," 5 = "4 times," 6 = "5 times," 7 = "6 times," and 8 = "every day." Finally, self-reported mental stress was assessed using responses of 1 = "very high," 2 = "high," 3 = "normal," 4 = "low," and 5 = "very low."

Statistical analysis

One-way analysis of variance (ANOVA) was used to identify differences in lifestyle factors, especially physical activity, among the three sexual identity groups (homosexual [gay or lesbian], bisexual, and heterosexual). Tukey's post-hoc testing was conducted to specify how the groups differed. The analyses were performed using SPSS version 18.0 (Chicago, IL, USA) and statistical significance was set at $P < 0.05$. All study results are given as the mean \pm standard deviation or number (%).

Results

The differences in lifestyle factors, especially physical activity, among the sexual identity groups are

shown in Table 2. Using one-way ANOVA, we found that males showed significant differences by sexual identity group for frequency of smoking ($P = 0.029$), alcohol consumption ($P < 0.001$), muscular strength exercises ($P = 0.020$), and walking for at least 10 minutes ($P < 0.001$). Tukey's post-hoc test indicated that gay males performed muscular strength exercises less frequently ($P < 0.05$) and walked for at least 10 minutes less frequently ($P < 0.001$) than heterosexual males. Bisexual males consumed alcohol more frequently ($P < 0.001$) and walked for at least 10 minutes less frequently ($P < 0.001$) than heterosexual males.

We also found, again using one-way ANOVA, significant differences among females according to sexual identity group for frequency of smoking ($P < 0.001$), alcohol consumption ($P < 0.001$), vigorous PA ($P < 0.001$), moderate PA ($P < 0.001$), and muscular strength exercises ($P < 0.001$). There were also significant inter-group differences for self-reported mental stress ($P < 0.001$). Tukey's post-hoc test showed that lesbian females reported more frequent vigorous PA ($P < 0.001$), moderate PA ($P < 0.001$), and muscular strength exercises ($P < 0.001$) than heterosexual females. Bisexual females engaged more frequently in smoking ($P < 0.001$), alcohol consumption ($P < 0.001$), vigorous PA ($P < 0.001$), moderate PA ($P < 0.001$), and muscular strength exercises ($P < 0.001$) than did heterosexual females, in addition to higher self-reported mental stress ($P < 0.001$).

Discussion

This study examined whether there were differences in lifestyle factors by sexual orientation in Korean adolescents. The most notable finding in the current study was that 887 adolescents (7.5% of the sample) had some same-sex romantic or sexual experience, such as kissing, fondling, or sex. This statistic indicates that the LGB adolescent population in Korea is larger than that of many other countries that were surveyed (9). This comparably large LGB population may pose a public health risk in terms of sexually transmitted diseases.

es. For this reason, we recommend that the Korean government put into place school- and com-

munity-based programs for preventing social and health problems in the LGB community.

Table 2: The differences in lifestyle factors among the sexual identity groups

	Heterosexual	Homosexual	Bisexual	Overall F	Overall P
Males	(n=323)	(n=243)	(n=6,501)		
Frequency of smoking	3.21 ± 2.69	2.87 ± 2.49 N/S	3.45 ± 2.74 N/S	3.559	0.029*
Frequency of alcohol consumption	2.10 ± 1.37	2.22 ± 1.59 N/S	2.69 ± 2.00 ###	21.213	<0.001***
Frequency of breakfast consumption	5.34 ± 2.65	5.05 ± 2.70 N/S	5.25 ± 2.81 N/S	1.946	0.143 N/S
Self-reported mental stress	2.66 ± 0.97	2.64 ± 1.09 N/S	2.54 ± 1.14 N/S	1.895	0.150 N/S
Frequency of vigorous PA	3.61 ± 1.69	3.61 ± 1.71 N/S	3.69 ± 1.71 N/S	0.227	0.797 N/S
Frequency of moderate PA	3.42 ± 1.69	3.26 ± 1.65 N/S	3.33 ± 1.64 N/S	1.638	0.194 N/S
Frequency of muscular strength exercises	3.06 ± 1.83	2.77 ± 1.69 #	3.00 ± 1.86 N/S	3.901	0.020*
Frequency of walking at least 10 minutes	6.77 ± 2.01	6.18 ± 2.36 ###	6.11 ± 2.44 ###	24.391	<0.001***
Females	(n=208)	(n=113)	(n=4,441)		
Frequency of smoking	1.94 ± 2.00	2.17 ± 2.03 N/S	3.83 ± 2.79 ###	48.723	<0.001***
Frequency of alcohol consumption	1.79 ± 1.16	1.85 ± 1.49 N/S	3.35 ± 2.39 ###	90.375	<0.001***
Frequency of breakfast consumption	5.15 ± 2.56	5.21 ± 2.62 N/S	4.93 ± 2.71 N/S	0.479	0.619 N/S
Self-reported mental stress	2.24 ± 0.89	2.35 ± 1.14 N/S	2.62 ± 1.33 ###	10.793	<0.001***
Frequency of vigorous PA	2.27 ± 1.50	2.88 ± 1.72 ###	3.18 ± 1.83 ###	33.681	<0.001***
Frequency of moderate PA	2.41 ± 1.49	2.84 ± 1.67 ###	3.08 ± 1.78 ###	18.393	<0.001***
Frequency of muscular strength exercises	1.72 ± 1.29	2.16 ± 1.55 ###	2.54 ± 1.78 ###	31.049	<0.001***
Frequency of walking at least 10 minutes	6.22 ± 2.25	6.04 ± 2.39 N/S	6.12 ± 2.48 N/S	0.686	0.504 N/S

Note. *P<0.05; ***P<0.001; one-way analysis of variance

N/S, not significant, #p<0.05 ###p<0.001 compared with heterosexual group; Tukey's post-hoc testing PA, physical activity

Prior studies have shown that gay and bisexual men have poorer general and mental health (9), higher rates of smoking (19) and higher rates of alcohol use (20) than do heterosexual men. Studies have also indicated that lesbians and bisexual women have poorer overall and mental health (13), higher rates of smoking (21–22), and higher rates of alcohol use (23–24). The results of the present study support these previous findings, in that gays, lesbians, and bisexual adolescents of both genders had higher rates of smoking and alcohol consumption than heterosexual adolescents did.

However, although gay and bisexual males reported lower rates of muscular strength exercises and walking than their heterosexual counterparts, which might be indicative of poorer physical health, lesbians and bisexual females reported higher rates of vigorous PA, moderate PA, and muscular strength exercises than did their heterosexual counterparts, which might be indicative of better physical health. Although the KYRBWS-VIII did not gather any information that might help us to better understand the reason for this difference, we hypothesize that this might be be-

cause lesbians may tend to assume male roles or lifestyles, leading lesbians and bisexual females to engage in more physical activities than heterosexual females. However, additional studies would be required to confirm this hypothesis.

This study is limited in that the KYRBWS-VIII was a cross-sectional, retrospective **cohort study; as a result**, we cannot make any statements regarding causality. Furthermore, although sexuality in adolescence may remain consistent throughout the lifespan, it is well known that sexual orientation in childhood and adolescence is not likely to persist into adulthood. Therefore, findings from this study cannot be generalized to the adult population in Korea. Moreover, since only participants who met the criteria for inclusion took part in the survey, findings from this study cannot be generalized to the entire youth population in South Korea. However, as the first national study on the lifestyle behaviors of the adolescent LGB population in South Korea, we believe that this study will both encourage additional inquiry in this area and provide valuable information to promote the public health of this population. An additional limitation could be the fact that, at such a young age and with so little sexual experience, the sexual experiences reported by participants may not reflect their true, respective sexual orientations.

Conclusion

We concluded that gay, lesbian, and bisexual males and females fare poorly with regard to healthy lifestyle behaviors, as compared to their heterosexual peers. This difference was stronger among females than among males. According to these results, we suggest that efforts be undertaken by schools and communities to modify and prevent unsuitable lifestyle behaviors among LGB adolescents, using social and health education programs that specifically target this group.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission,

redundancy, etc) have been completely observed by the authors.

Acknowledgements

This work was supported by a special research grant from Seoul Women's University (2013). The authors declare that there is no conflict of interest.

References

1. Gates GJ, Williams Distinguished Scholar (2011). *How many people are lesbian, gay, bisexual, and transgender?* Williams institute at UCLA School of Law.
2. Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO (2003). Sex in Australia: the rationale and methods of the Australian Study of Health and Relationships. *Aust N Z J Public Health*, 27 (2): 106-117.
3. Melbye M, Biggar RJ (1992). Interactions between persons at risk for AIDS and the general population in Denmark. *Am J Epidemiol*, 135 (6): 593-602.
4. No authors listed (1992). AIDS and sexual behaviour in France. ACSF investigators. *Nature*, 360 (6403): 407-409.
5. Layte DR, McGee H, Quail A, Rundle K, Cousins G, Donnelly C, Mulcahy F, Conroy R (2006). *The Irish study of sexual health and relationships*. The Crisis Pregnancy Agency and the Department of Health and Children.
6. Sundet JM, Kvale IL, Magnus P, Bakketeig LS (1988). *Prevalence of risk-prone sexual behaviour in the general population of Norway*. In *The Global Impact of AIDS*, New York: Alan R. Liss. 53-60.
7. Johnson AM, Wadsworth J, Wellings K, Bradshaw S, Field J (1992). Sexual lifestyles and HIV risk. *Nature*, 360 (6403): 410-412.
8. Lee YS, Jeon CM, Kim SY, Ko BJ (2005). Self-esteem and sexual liberality of adolescent with gender identity problem or homosexual tendency. *Korean Journal of Child & Adolescent Psychiatry*, 16 (2): 231-238.
9. Cochran SD, Mays VM (2007). Physical health complaints among lesbians, gay men, and bisexual and homosexually experienced heterosexual individuals: results from the California

- Quality of Life Survey. *Am J Public Health*, 97 (11): 2048-2055.
10. Dilley JA, Simmons KW, Boysun MJ, Pizacani BA, Stark MJ (2009). Demonstrating the importance and feasibility of including sexual orientation in public health surveys: health disparities in the Pacific Northwest. *Am J Public Health*, 100 (3): 460-467.
 11. Coates TJ, Faigle M, Stall RD (1995). *Does HIV prevention work for men who have sex with men? Report for the Office of Technology Assessment*. UCSF, Center for AIDS Prevention Studies.
 12. Valanis BG, Bowen DJ, Bassford T, Whitlock E, Charney P, Carter RA (2000). Sexual orientation and health: comparisons in the women's health initiative sample. *Arch Fam Med*, 9 (9): 843-853.
 13. Case P, Austin SB, Hunter DJ, Manson JE, Malspeis S, Willett WC, Spiegelman D (2004). Sexual orientation, health risk factors, and physical functioning in the Nurses' Health Study II. *J Womens Health (Larchmt)*, 13 (9): 1033-1047.
 14. Sandfort TG, Bakker F, Schellevis FG, Vanwesenbeeck I (2006). Sexual orientation and mental and physical health status: findings from a Dutch population survey. *Am J Public Health*, 96 (6): 1119-1125.
 15. Dilley JA, Maher JE, Boysun MJ, Pizacani BA, Mosbaek CH, Rohde K, Stark MJ, Simmons KW, Pickle KE (2005). Response letter to: Tang H, Greenwood GL, Cowling DW, Lloyd JC, Roeseler AG, Bal DG. Cigarette smoking among lesbians, gays, and bisexuals: how serious a problem? *Cancer Causes Control*, 16 (9): 1133-1134.
 16. Ministry of Education, Science and Technology, Ministry of Health and Welfare, Korea Centers for Disease Control and Prevention (2012). *The Eighth Korea Youth Risk Behavior Web-based Survey*. Ministry of Education, Science and Technology, Ministry of Health and Welfare, Korea Centers for Disease Control and Prevention.
 17. Bae J, Joung H, Kim JY, Kwon KN, Kim Y, Park SW (2010). Validity of self-reported height, weight, and body mass index of the Korea Youth Risk Behavior Web-based Survey questionnaire. *J Prev Med Public Health*, 43 (5): 396-402.
 18. Bae J, Joung H, Kim JY, Kwon KN, Kim YT, Park SW (2010). Test-retest reliability of a questionnaire for the Korea Youth Risk Behavior Web-based Survey. *J Prev Med Public Health*, 43 (5): 403-410.
 19. Gruskin EP, Greenwood GL, Matevia M, Pollack LM, Bye LL (2007). Disparities in smoking between the lesbian, gay, and bisexual population and the general population in California. *Am J Public Health*, 97 (8): 1496-1502.
 20. Gruskin EP, Gordon N (2006). Gay/Lesbian sexual orientation increases risk for cigarette smoking and heavy drinking among members of a large Northern California health plan. *BMC Public Health*, 6: 241.
 21. Ryan H, Wortley PM, Easton A, Pederson L, Greenwood G (2001). Smoking among lesbians, gays, and bisexuals: a review of the literature. *Am J Prev Med*, 21 (2): 142-149.
 22. Gruskin EP, Hart S, Gordon N, Ackerson L (2001). Patterns of cigarette smoking and alcohol use among lesbians and bisexual women enrolled in a large health maintenance organization. *Am J Public Health*, 91 (6): 976-979.
 23. Ridner SL, Frost K, Lajoie AS (2006). Health information and risk behaviors among lesbian, gay, and bisexual college students. *J Am Acad Nurse Pract*, 18 (8): 374-378.
 24. Diamant AL, Wold C, Spritzer K, Gelberg L (2000). Health behaviors, health status, and access to and use of health care: a population-based study of lesbian, bisexual, and heterosexual women. *Arch Fam Med*, 9 (10): 1043-1051.