Prevalence of health behaviors among a university staff: an exploratory study

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Abstract

This study assessed the prevalence of health behaviors among non-academic staff at a Midwestern U.S. university. A sample of 627 women and 237 men completed a web survey for the study. Most of the health behaviors showed no sex difference. Health behaviors of drinking, smoking, and irregular breakfast eating were significantly associated with amount of education. Logistic regression analysis indicated that sleeping less than 5.5 hours (odds ratio: 8.44; 95% CI: 3.55, 20.05), coffee drinking (odds ratio: 1.63; 95% CI: 1.12, 2.37), currently smoking (odds ratio: 3.74; 95% CI: 2.25, 6.21), infrequent exercise (odds ratio: 2.01; 95% CI: 1.4, 2.90), and regular soda consumption (odds ratio: 2.13; 95% CI: 1.53, 2.95), were associated with irregular breakfast eating. Amount of education was associated with health-compromising behaviors and needs to be considered during health promotion programs.

Keywords: university staff, web survey, health behaviors, education, obesity

Introduction

In the USA, the leading causes of death among adults are associated with chronic diseases like heart disease, cancer, diabetes.[1] Developing countries are also heavily burdened by these chronic diseases.[2] Most of these diseases are influenced by health compromising behaviors like smoking, alcohol intake, and physical inactivity. Further, obesity and overweight are significantly associated with several major health problems like diabetes, high blood pressure, high cholesterol, asthma, arthritis, and poor health status.[3]

A healthy lifestyle is associated with a decrease in chronic diseases and an increase in lifespan.[4] Nutrition plays an important role in health. For example, eating breakfast regularly is an important contributor to a healthy lifestyle and health status. Regular breakfast eating improves the overall diet quality of adults.[5] Studies have shown that skipping breakfast is associated with obesity.[6, 7] Smith[8] indicated that irregular breakfast consumption may decrease intelligence in older adults.

Health-compromising behaviors have been associated with socio-economic factors like education and employment.[9] For example, prevalence of smoking was higher (37%) among populations who had earned a high school diploma or had less education but lower (14%) among people who had earned undergraduate degrees.[10] Berrigan and associates[11] documented that age, sex, race/ethnicity, education, and income were associated with health behavior patterns.

In the USA, over 75% of healthcare dollars is spent on chronic disease [12] while 45% of the working-age population (18-64 years old) has a chronic condition.[13] Workplace health promotion is a way to reduce this cost. In the USA, three million employees work for 2,600 four-year degree-granting institutions. Hence, universities are an easy location for worksite health promotion and a way to reduce healthcare cost for a sizeable number of the workforce.[14] Assessing the health behavior patterns of this population is critical in planning health promotion. The purpose of this exploratory work is to evaluate the prevalence of selected health behaviors among non-faculty staff for future intervention study. More specifically, this study also aims to explore the relationship of irregular breakfast eating with other health-compromising behaviors. Regular breakfast eating is an important factor for everyone's healthy life style and health status. Previous studies that explored the relationship between skipping breakfast and associated health behaviors mostly focused on children and adolescence. Very few focused on adults. Results of this study will add to the literature about the pattern of breakfast eating and its relationship to other life style related health behaviors.

Method

The study protocol and survey were approved by the university's Institutional Review Board for protection of human subjects. After obtaining written permission to administer the survey, email addresses were obtained from the Office of Human Resources at the university. In this study, 4,238 recruitment emails were sent to university staff workers at the Midwestern university. Of those emails, 32 were undeliverable and the maximum number of participants who had possibly received the email was 4,206. A total of 899 subjects (response rate 21.37 %) completed the questionnaire, and 26 individuals visited the information page of the study but did not complete the questionnaire. No incentive was offered and no reminder emails were sent as permission was given for one-time administration only. A similar response rate was obtained in sending a single email message by Kaplowitz, Hadlock, and Levine.[15] When potential participants clicked the hyperlink on the invitation email, they connected to a web page containing information about the study and a consent form. To proceed with the study, participants were required to click a button to indicate their consent to participate in the online study. If consent was granted, participants were automatically presented a 26-item online questionnaire.

The survey was taken from a previous study.[16] In this study, eating breakfast and associated health behaviors among adults and adolescents were assessed in Finland. Most of the health behaviors examined were also generally observed in adults in Western countries. For example, drinking sugared beverages, drinking coffee and alcohol, smoking, and using different fat content in milk are some behaviors common to both Finland and the USA. The questionnaire was examined for content validity. The 26-item survey was divided into two sections. One section had 7 items related to anthropometric and demographic data. The other contained 19 questions about eating habits and related behaviors. The health behavior variables were smoking, alcohol use, leisure-time exercise, breakfast intake, sleeping hours, frequency of eating snacks, and Body Mass Index (BMI). Socio-economic status was operationalized as the most education completed and

classified into three groups: high school diploma, associate/bachelor's degree, and master's/doctoral degree. BMI (weight in kilograms divided by the square of height in meters) was calculated from self-reported height and weight for each participant. Participants were classified within the range of underweight to obese in accord with the classification used by the Department of Health and Human Services' Centers for Disease Control and Prevention: A BMI less than 18.5 is underweight; healthy weight, 18.5 – 24.9; overweight, 25.0 – 29.9; and obese greater than 30.[17]

Education of subjects was categorized into three groups: those with a "high school diploma," a "bachelor degree or associate degree," and those with a "postgraduate degree." Marital status was categorized as "married," "divorced/widowed/separated," or "never married." Smoking behavior was categorized as "never smoked," "former smokers," and "current smokers." Based on their breakfast consumption, subjects were categorized into two groups: every day or 5-6 days/week as "regular breakfast eaters" and never, 1-2 days/week, or 3-4 days/week as "irregular breakfast eaters."

Percentages or frequencies were utilized to describe the distribution of demographic characteristics of the sample. Sex differences in self-reported health-related behaviors were tested using chi square. Differences between health-compromising behavior categories and demographic variables like sex, age, education, and marital status were tested using chi square tests, which were not applied to ethnicity because a majority of participants were White. Logistic regression was applied, controlling for age, sex, marital status, and education, to examine the relationships of smoking, drinking alcohol, frequency of coffee intake, frequency of snacking, number of hours sleep, exercise habits, BMI category, and the outcome variable-irregular breakfast eating. Of the original study sample of 899 subjects, 836 provided complete data on all variables. Analyses were performed using Statistical Package for the Social Sciences (SPSS) Version 15.0 for Windows, and an alpha level of .05 was chosen to judge statistical significance.

Results

The characteristics of the sample reported here are shown in Table 1. Roughly two-thirds of the sample (72.6%) was female, and approximately one-third of the sample (34.2%) was 50 years of age or over. Over 94% of the sample (n=814) reported they were White. More than half reported being married (60%) and most as having a college degree (70%). Women were more likely to have earned a high school diploma (19.9% vs. 7.6%) while men were more likely to have a postgraduate degree (46.4% vs. 30.8%). There was a statistically significant sex difference in education ($\chi^2_{(2)} = 28.20$, p<.001), and marital status ($\chi^2_{(2)} = 14.91$, p<.001) but not with age group.

Based on self-reported height and weight, 55.7% of the study sample was classified either overweight or obese. Two percent (n=17) were underweight. All underweight subjects were women except one. In this study, the mean BMI for men was 27.31 ± 4.93 and 27.5 ± 7.12 for women. The lowest mean BMI (25.35 ± 6.77) was observed in the 18-29 years old age group while the highest mean BMI (28.70 ± 6.72) was observed in the over 60 years old age group. Given 17 underweight subjects, they were excluded. The relationship between years of education and various demographic variables and health behaviors are presented in Table 2. As shown, there was a significant association between education and BMI categories (normal, overweight, and obese), suggesting that those with a higher education were less likely to be obese. Women were more likely to be normal weight (42.9%) than men (36.2%). At the same time, prevalence of obesity was higher among women (29%) than men (23.4%).

A significant sex difference was observed in alcohol consumption ($\chi^2_{2 (4)} = 36.29$, p<.001, n=841) and coffee intake ($\chi^2_{2 (3)} = 18.36$, p<.001, n=859). Women were less likely to drink alcohol than men (15.8% vs. 11.6%). At the same time, men were more likely to drink alcohol every day than women (19.4% vs. 11.8%). Women were less likely to drink coffee than men (45.2% vs. 34.9%). There were no significant sex differences for frequency of exercise, sleeping hours, smoking status, and consumption of regular soda. More than three-quarters of the sample (76.7%) reported they never smoked while 11.7% reported currently smoking. Of 105 current smokers, 36.4% reported smoking 9 or fewer cigarettes per day, 22.7% reported smoking 10 cigarettes per day, and 37.3% reported 12-20 cigarettes per day. The overall mean number of cigarettes smoked per day was 11.2.

Even though there was no sex difference in eating breakfast, 19.5% of the sample (n=169) reported usually never eating breakfast while more than half (51.7%, n=457) reported eating breakfast every day; 82.4% reported eating breakfast on the day the survey

was administered. The most reported reasons for not eating breakfast were not enough time or not being hungry. Over eighty-six percent (86.3%) reported eating regular meals. Approximately three-fourths of the sample (73.8%) reported exercising once or more times per week during leisure time while 7.3% reported not exercising at all (men at 6.8% vs. women at 8%). Among those who reported exercising, 26.4% reported exercising less than 30 minutes, 55.9% reported 30 to ≤60 minutes and 17.7% reported 60 or more minutes per week.

Education was also significantly associated with alcohol consumption, marital status, BMI category, smoking, eating breakfast, and sleeping hours. Those with a high school diploma were less likely to consume alcohol every day than others who had a college or postgraduate degree. Participants with a postgraduate degree were less likely to be current smokers and more likely to have never smoked than those with a high school or college degree. Further, participants with a high school diploma were more likely to sleep 5.5 hours or less and tended to be obese and likely to never eat breakfast.

Results of the multiple logistic regression analysis for breakfast eating were shown in Table 3. The analysis identified several health-compromising risk factors for irregular breakfast eating: hours sleeping, coffee intake, smoking, exercise, and regular soda consumption. For example, the odds ratio for sleeping 5.5 hours or less was 8.44 with a 95% confidence interval of 3.55, 20.05. This suggests that those who were "eating breakfast irregularly" were almost 8 times more likely to sleep fewer hours than those who were "eating breakfast regularly." Further, those who were "eating breakfast irregularly" were over two times more likely to smoke than those who were "eating breakfast regularly."

Discussion

Health-compromising behaviors like smoking, physical inactivity, poor eating habit and weight gain have been recognized as major threats to individual and population health.[18] In the present study, mean BMI increased with an increase in age. A similar pattern was observed in other studies.[19] In other words, prevalence of obesity was greater among older age groups compared to younger age groups. Women were more likely to be obese than men. The inverse association between the prevalence of obesity and education was consistent with the results of other studies.[20, 21] This influence of educational differences

with obesity indicates how weight status is affected by social and economic factors.

In the present study, non-health-promotion behaviors, such as sleeping fewer hours, smoking, infrequent exercise, regular soda intake, drinking coffee, and obesity, were associated with irregular breakfast eating after controlling confounding variables of age, marital status, gender, and education level. For example, irregular breakfast eaters were more likely to sleep 5.5 hours or less, which may make them feel tired the next morning and suppress their appetite or may interfere with the time allotted for breakfast. Promoting healthy behaviors might improve the meal intake pattern. Also, other studies have shown an association of irregular breakfast eating with non-health promotion behaviors.[16]

In this study, education was significantly associated with health-behavior variables such as alcohol consumption, smoking, hours of sleeping, and eating breakfast. The prevalence of current smoking was three fold higher among participants with a high school diploma than those with a postgraduate degree (16.8% vs. 5.6%) while the percentage of never smokers among subjects with a high school diploma was 72.7%, and among those with postgraduate degrees it was 87.8%. A similar finding was observed in a study conducted by Wetter et al.[10] Further, there was no significant difference in smoking behavior among participants with a high school diploma or an associate or bachelor's degree. In addition, participants with a higher educational degree were less likely to skip breakfast. This finding was similar to other studies.[22] Education provides economic freedom while boosting self-efficacy and can indirectly influence health outcomes.[23] Level of education is difficult to change, so implementing a theory-based intervention may be more practical for changing behaviors. A study by Streacher et al.[24] indicated that a tailored intervention may be a better approach for addressing multiple risk behaviors than an untailored one.

There were several limitations to this study. First, BMI was calculated based on self-reported height and weight, and rate of overweight and obesity may be inaccurate. These rates likely to be underestimated as reported by Rowland.[25] Second, the low response rate may be a result of not being granted permission to send reminders after the first contact. This low response rate may limit the generalizability of the findings as this group may be different from the entire university staff. However, Klesges et al.[26] found that, by using aggressive sampling techniques, unbiased estimates of health risk behaviors were

possible. In other words, there were small differences in the characteristics of respondents and non-respondents. Further, Kaplowitz et al.[15] indicated that a web survey response can be increased to as much as a mail survey by sending a surface mail notification before delivering the web survey.

Conclusion

More than half of the sample was either overweight or obese. Non-health promotion behaviors and obesity were more common among participants with less education. Further, health-compromising behaviors were more prevalent among irregular breakfast eaters who may care less about adhering to healthful behaviors than the regular breakfast eaters. For example, irregular breakfast eaters were more likely to never exercise compared to regular breakfast eaters. Eating breakfast may enhance energy intake and provide an energy boost to engage in regular physical activity.[27] Irregular breakfast skippers are more likely to have an increased consumption of soda or other sugared beverages. They may be compensating for calories with these non-nutritive beverages. Also, smoking may reduce their appetite and lead to skipping breakfast. Based on the results of this study, it is recommended that rather than promoting a nutritional intervention approach to this complex issue, applying a holistic program such as discouraging smoking while encouraging exercise and regular nutritious meals may be beneficial.

This study is a cross-sectional survey (quantitative study) and useful in exploring the lifestyle behaviors of participants. Lack of adequate information on barriers to a healthy life-style in a specific population creates major obstacles to the effective prevention of risk factors for chronic diseases. Quantitative studies, such as surveys, are easy to access for the study population but could not explore the needs and barriers of the participants. Further investigation is needed in the form of a qualitative study to understand the needs and barriers of the participants in the workplace. This will be critical in developing a holistic workplace health program.

References

1. Minio AM, Heron MP, Smith BL. Deaths: Preliminary Data for 2004, United States. National statistics reports 45 (3), Hyattsville, Maryland: National Center for Health Statistics; 2006.

2. WHO, Preventing chronic diseases: a vital investment, World Health Organization, Geneva (2005).

3. Mokdad AH, Ford ES, Bowman BA et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. JAMA. 2003; 289:76-79.

4. Hensrud D. (2000). Clinical preventive medicine in primary care: Background and practice: rationale and current preventive practices. Mayo Clin Proceedings. 2000; 75:165–172.

5. Morgan KJ, Zabik ME, Stampley GL. The role of breakfast in diet adequacy of the U.S. adult population. J Am Coll Nutr. 1986; 5: 551-563.

6. Ma Y, Bertone ER, Stanek EJ, et al. Association between eating patterns and obesity in a free-living US adult population. Am J Epidemiol 2003; 158:85-92.

7. Schlundt DG, Hill JO, Sbrocco T, Pope-Cordle J, Sharp T. The role of breakfast in the treatment of obesity: a randomized clinical trial. Am J Clin Nutr 1992; 55:645-51.

8. Smith A. Breakfast consumption and intelligence in elderly persons'. Psychol Rep. 1998; 82: 424-426.

9. Schuit AJ, van Loon AJM, Tijhuis M, et al. Clustering of lifestyle risk factors in a general adult population. Prev Med. 2002; 35: 219-224.

10. Wetter DW, Cofta-Gunn L, Fouladi RT, et al. Understanding the associations among education, employment characteristics, and smoking. Addict Behav. 2005; 30: 905-914.

11. Berrigan D, Dodd K, Troiano RP, et al. Patterns of health behavior in U.S. adults. Prev Med. 2003; 36: 615-623.

12. Centers for Disease Control and Prevention, 2009. Power of prevention Available at: http://www.cdc.gov/chronicdisease/pdf/2009-Power-of-Prevention.pdf. Accessed November 1, 2010.

13. Paez KA, Zhao L, Hwang W. Rising Out-Of-Pocket Spending For Chronic Conditions: A Ten-Year Trend. Health Affairs. 2009; 28:1-15.

14. McRobbie MA, Kolbe LJ. The Academy's Pivotal Role in supporting Public-Private Partnerships to Prevent Chronic Diseases. Prev Chronic Dis. 2009; 6(2): A73. Published online 2009 March 15.

15. Kaplowitz MD, Hadlock TD, Levine R. A comparison of web and mail survey response rates. Public Opin Q. 2004; 68: 94-101.

16. Keski-Rahkonen A, Kaprio J, Rissanen A, et al. Breakfast skipping and health-compromising behaviors in adolescents and adults. Eur J Clin Nutr. 2003; 57: 842-853.

17. Centers for Disease Control and Prevention, 2007. Overweight and Obesity: Defining Overweight and Obesity. Available at: http://www.cdc.gov/nccdphp/dnpa/obesity/defining.htm. Accessed March 10, 2010.

18. Fraiser GE, Sumbureu D, Pribis P, et al. Association among health habits, risk factors, and all cause mortality in a black California population. Epidemiology. 1997; 8:168-174.

19. Allman-Farinelli MA, Chey T, Bauman AE, et al. Age, period and birth cohort effects on prevalence of overweight and obesity in Australian adults from 1990 to 2000. Eur J Clin Nutr. 2007; 62: 898-907.

20. Kaplan M.S, Huguet N, Newsom JT, et al. Prevalence and correlates of overweight and obesity among older adults: Findings from the Canadian National Population Health Survey. J Gerontol A Biol Sci Med Sci. 2003; 58: M1018-M1030.

21. Sulander TT, Uutela AK. Obesity and education: Recent trends and disparities among 65- to 84-old men and women in Finland. Prev Med. 2007; 45: 153-156.

22. Siega-Riz AM, Popkin BM, Carson T. Differences in food patterns at breakfast by sociodemographic characteristics among a nationally representative sample of adults in the United States. Prev Med. 2000; 30: 415-424.

23. Ross CE, Wu C. The links between education and health. Am Sociol Rev. 1995; 60:719-745.

24. Strecher V, Wang C, Derry H, Widenhaus K, Johnson C. Tailored interventions for multiple risk behaviors. Health Educ Res. 2002; 17:619-626.

25. Rowland, ML. Self-reported weight and height. Am J Clin Nutr. 1990; 52: 1125-1133.

26. Klesges R.C, Williamson JE, Somes GW, et al. A population comparison of participants and nonparticipants in a health survey. Am J Public Health. 1999; 89: 1228-1231.

27. Wyatt HR, Grunwald GK, Mosca CL, et al. Long-term weight loss and breakfast in subjects in the National Weight Control Registry. Obes Res. 2002; 10: 78-82.

Table 1 Percentages distribution of participant's demographic characteristics

	Percentage of population		
	Total (n=899)	Male (n=237)	Female (n=627)
Age	%	%	%
18 - 29yr.	17.8	18.1	18.2
30 - 39yr.	21.6	24.1	21.9
40 - 49yr.	23.1	24.9	23.6
50 - 59yr.	26.5	24.1	28.7
60 - 69yr.	7.1	8.0	7.2
70 - 79yr.	0.6	0.8	0.5
No response	3.3		
Education			
Some high school	0.1	0	0.2
High school grad	15.8	7 .6	19.8
Associate degree	9.5	8.4	10.4
Bachelor's degree	37.3	37.6	38.9
Master's degree	26.9	35.0	25.0
Doctoral degree	7.1	11.4	5.7
No response	3.3		
Marital status			
Married	60.8	65.7	62.9
Divorced	12.9	8.1	15.6
Widowed	1.9	0.4	2.6
Separated	1.0	0.8	1.1
Never married	19.2	25.0	17.8
No response	4.1		
Ethnicity			
Asian or Asian American	2.2	2.5	2.2
Black	0.9	0.8	1.0
Hispanic or Latino	0.9	2.1	0.5
White	90.5	92.8	94.7
Other	1.6	4.0	1.6
No response	3.9		
Body Mass Index			
Underweight	1.9	0.4	2.6
Normal	38.7	36.0	41.8
Overweight	29.9	40.3	27.4
Obese	25.8	23.3	28.3
No response	3.7		

Table 2 Healthy behaviors based on the level of education

	High school diploma	Degree[a]	Postgraduate	χ^2	P
Drinking (n=866)[b]					
Everyday	7.0	12.9	18.4		
1-2 times/week	16.1	31.0	29.9		
1-few times/month	14.7	17.2	19.1	42.06	.001
Few times/year	41.3	24.1	20.7		
Don't drink	21.0	14.8	11.8		
Smoking (n=865)[b]					
Never smoked	72.7	74.7	87.8		
Former smoker	10.5	11.0	6.6	23.74	.001
Current smoker	16.8	14.3	5.6		
Hours of Sleep (n=863)[b]					
5.5 hours or less	11.9	3.1	4.3		
6-7.5 hours	76.2	78.2	76.9	20.15	.001
8 or more hours	11.9	18.7	18.8		
Exercise (n=866)[b]					
Not at all	11.2	8.1	5.3		
Few times/month	30.1	20.0	11.6	31.44	.001
1 or more times/week	58.7	71.9	83.2		
BMI (n=848)[b]					
Normal	28.1	41.2	46.8		
Overweight	32.4	31.5	31.4	19.21	.001
Obese	39.6	27.3	21.7		
Eating breakfast (n=868)[b]					
Never	28.7	20.7	13.4		
1-2 days/week	11.9	7.6	8.2	26.45	.001
3-4 days/week	6.3	8.6	11.1		
5-6 days/week	14.7	9.3	12.5		
everyday	38.5	53.8	54.8		
Eating snacks (n=866)[b]					
Never	5.6	5.3	8.2		
1 time/day	33.6	44.4	44.8	12.91	.045
2 times/day	49.0	36.0	36.3		
3 or more times/day	11.9	14.4	10.8		
Age (n=869)[b]					
18-39 years	23.8	47.4	39.5		
40-59 years	64.3	48.3	49.3	42.22	.001
60 or over	11.9	4.3	11.1		
Marital status (n=862)[b]					
Married	65.7	61.1	65.7		
Divorced/widowed/separated	25.2	17.1	11.6	22.21	.001
Never married	9.1	21.9	22.8		

[a]Includes associate & bachelor's degree
[b]N= <899 due to missing values

Table 3 Logistic regression model[a] for irregular breakfast eating category

Main effects	Total population[b] (n = 836) OR (95% CI)
Smoking	
Currently non-smoker	1
Current smoker	3.74 (2.25, 6.21)**
Sleeping hours	
8 or more hours	1
6-7.5 hours	1.65 (1.07, 2.55)*
5.5 hours or less	8.44 (3.55, 20.05)**
Regular soda/sugared beverages	
Never	1
Few times/week	2.13 (1.53, 2.95)**
Coffee intake	
None	1
1-2 cups/day	1.62 (1.01, 2.60)*
3 or more cups/day	1.63 (1.12, 2.37)*
Alcohol consumption	
Never	1
Few times/year	0.60 (.31, 1.15)
1-few times/month	0.65 (.38, 1.12)
1-2 times/week	0.713 (.40, 1.26)
Every day	1.05 (.63, 1.74)
Exercise	
1 or more times/week	1
None-few times/month	2.01 (1.4, 2.90)**
Frequency of snacking	
Never	1
1 time/day	0.61 (.27, 1.34)
2 times/day	0.82 (.41, 1.63)
3 or more times/day	1.07 (.54, 2.12)

[a]sex, ethnicity, age, education, and marital status were
controlled in this model.
[b]Of the original study sample of 899 subjects, 836 subjects had
 completed data on all variables.
[c]Currently nonsmokers indicate those who reported never smoking or given up temporarily/permanently
** $p < .001$, * $p < .05$