Stress Management

Stress Level, Health Behaviors, and Quality of Life in Employees Joining a Wellness Center

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Abstract

Purpose. Examine the relationship between stress level and quality of life at a worksite wellness center.

Design. A survey completed when joining the wellness center.

Setting. Employee wellness center.

Subjects. Survey that inquired about stress, health behaviors, and quality of life of more than 13,000 employees joining a wellness center.

Measures. A series of questions about current health status and health behaviors.

Analysis. Two-sample t-tests assuming unequal variances.

Results. A total of 2147 of these employees reported having high stress levels. Employees with high stress levels had statistically significant lower quality of life, more fatigue, and poorer health compared with employees with low stress levels. In terms of their ability and motivation to participate in wellness programs, the high-stress employees were also less active and had less healthy nutritional habits, less support, and less confidence in their ability to be active. They also reported having more health problems, including high blood pressure, high blood sugar, high cholesterol, and overweight.

Conclusions. It appears that employees with high stress levels—those who might most benefit from participation in wellness programs—may experience the greatest difficulty participating actively in wellness programs because of their lack of support, low confidence, and numerous health problems. Perhaps offering tailored stress reduction programs for these employees would be beneficial. (Am J Health Promot 2011;26[1]:21–25.)

Key Words: Psychologic Stress, Health Behavior, Quality of Life, Prevention Research. Manuscript format: quantitative research; Research purpose: intervention testing/program evaluation; Study design: nonexperimental; Outcome measure: behavioral; Setting: workplace; Health focus: stress management; Strategy: assessment of relationships; Target population age: adults; Target population circumstances: Midwest employed, mostly white, sample

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INTRODUCTION

Many companies in the United States and across the globe are designing programs or building centers to improve the health and wellness of their employees. Participation in wellness programs can lower health care costs[1] and improve work productivity.[2] Unfortunately, many employees either will not enroll into wellness programs or will drop out early. Although it may enhance adherence to offer personalized wellness programs to all employees, it is far more costly to offer individualized assistance compared with group-based, education-focused, or Web-based interventions. Therefore, identification of employees at high risk for health problems and psychologic difficulties would allow the employer to more effectively target personalized wellness interventions to these high-risk employees with significant health problems and poor quality of life.

It has been well documented that mental health problems are associated with increased health care costs, disability, and a lack of presenteeism at the workplace. However, a practical, convenient, and effective measure of mental health status has yet to be identified. Stress is a prevalent mental health problem in the workplace,[3] and having a high level of perceived stress is associated with poor work performance,[4] higher health care costs,[5] and poor quality of life.[6] It has been estimated that two-thirds of the general population has experienced stress within the past 2 weeks, with almost 50% rating it as moderate or high stress.[7] In a survey of 6000 employees at a major medical university, 37% were

not managing stress effectively.[8] Thus, stress is a common challenge faced by many employees. If these high-stress employees could be identified, perhaps tailored wellness programs would improve their health behaviors and work productivity and thereby reduce health care costs.

METHODS

The purpose of this project was to examine whether a brief question regarding an employee's current stress level would be associated with significant health risks. These health risks included poor quality of life, negative health behaviors (inadequate exercise, substandard nutrition, and smoking cigarettes), and poor health (overweight, high blood pressure, high cholesterol, or high blood sugar).

Measures

At the time of enrollment into a wellness center, employees were asked a series of questions about their current health status and health behaviors. Similar items have been used with patients with cancer,[9] geriatric patients with cancer,[10] and long-term lung cancer survivors.[11] These single-item questions have been shown to be valid and clinically appropriate.[12] Clinical interpretation of these 0 to 10 items is that a score of 0, 1, 2, or 3 is indicative of significant difficulties. In contrast, a score of 7 or greater is reflective of positive functioning.[13] For example, most individuals who rate their overall quality of life as 7, 8, 9, or 10, when asked would respond that they have a good quality of life, that they enjoy life, and that life is meaningful to them. The items on the questionnaire were each oriented in the direction of higher scores, indicating the "healthier" response. The questionnaire was part of a quality assurance and program outcome assessment project. The study was approved by Institutional Review Board of the Mayo Clinic.

Stress Level. The stress item was: During the past week, including today, how would you rate your current stress level from 0 (as bad as it can be) to 10 (as good as it can be)? A rating of 0, 1, 2, or 3 is therefore indicative of high stress.[12]

Current Health Status Items. (1) If you walked up two flights of stairs, how would you rate your overall level of fatigue and shortness of breath from 0 (could not do it) to 10 (could do it easily)? (2) After a typical night's sleep, rate how tired or fatigued you feel from 0 (always) to 10 (never). (3) How would you rate your overall health from 0 (poor) to 10 (excellent)? (4) During the past week, including today, how would you rate your overall quality of life from 0 (as bad as it can be) to 10 (as good as it can be)? Participants were also asked (yes or no) to indicate whether they used tobacco, were overweight, or had high blood pressure, high cholesterol, or high blood sugar.

Current Health Behavior Items. (1) How would you rate your current level of physical activity from 0 (not active at all) to 10 (extremely active)? (2) How confident are you that you can have a physically active lifestyle (30 minutes of physical activity on most days of the week) from 0 (not at all confident) to 10 (extremely confident)? (3) How would you rate your nutritional habits from 0 (terrible) to 10 (very healthy)? (4) How would you rate your support for maintaining healthy living from 0 (as bad as it can be) to 10 (as good as it can be)?

Wellness Center
Our on-site facility for wellness, research, and education provides an enjoyable, affordable, accessible environment for individuals and groups to learn and practice healthy living through quality facilities and effective programs and services. The scope of programming includes aerobic fitness, healthy nutrition, weight management, musculoskeletal conditioning, and stress management. All interventions are delivered by a team of certified health and wellness and clinical professionals and are focused on sustainable behavior change. The cost of the center is supported by the institution—member cost is minimal, only $25 every 2 weeks. Additionally, if employees use the center on a regular basis, the fee is reduced. To date, approximately 60% of employees have joined the wellness center.

Statistical Methods
Sample characteristics were summarized using frequencies and percent-

ages for categorical variables (gender, prior membership at a fitness facility, questionnaire item responses) and means and SDs for continuous variables (body mass index and age). The questionnaire item measuring stress level from 0 ("as bad as it can be") to 10 ("as good as it can be") was dichotomized into those who had "low stress" (response ≥ 4) vs. those who had "high stress" (response <4). Average responses to each of the remaining 11-point scale items were compared between the stress groups using two-sample t-tests assuming unequal variances, and the 95% confidence intervals for the difference in means for each item were calculated. The percentages of those reporting issues with tobacco use, overweight, high blood pressure, high cholesterol, or high blood sugar were compared between the high- and low-stress groups with χ^2 test, and the 95% confidence intervals for the difference in percentages for each of these items were calculated. Given the large sample size, confidence intervals are presented rather than p values because most p values for differences were highly significant ($p < .01$). All analyses were performed using SAS version 9 software (SAS Institute, Cary, North Carolina).

RESULTS

Respondents were on average 38.5 years (SD, 12.9) and mostly female (63.1%). This is similar to the demographics of all of the employees. The average body mass index was 26.9 (SD, 5.8). Most had been a member of another fitness/wellness facility before (63.3%). High stress levels (<4) were reported by 2147 (16.3%) respondents (Table 1).

Significant differences were found on nearly all items relating to current perceived health compared with stress levels. The mean overall health was rated as being higher for those with low stress compared with those who reported a high level (7.45 vs. 6.87), as was the mean quality of life (7.87 vs. 6.91), lack of fatigue from walking up two flights of stairs (7.67 vs. 6.85), and lack of fatigue after a typical night's sleep (6.25 vs. 5.26; Table 2). Those

Table 1
Participant Demographics

Characteristics (N = 13,882)	
Mean age at enrollment, y (SD)	38.5 (12.9)
Mean body mass index (SD)	26.9 (5.8)
Gender, No. (%)	
Female	7247 (63.1)
Male	4236 (36.9)
Have you ever been a member of any other fitness/wellness facility?, No. (%)	
No	4651 (36.7)
Yes	8023 (63.3)
Stress level (0 = as bad as it can be; 10 = as good as it can be), No. (%)	
Low stress (≥4)	11,051 (83.7)
High stress (0–3)	2147 (16.3)

with high stress more frequently reported issues with being overweight (49.1% vs. 40.0%), high blood pressure (12.2% vs. 10.6%), high cholesterol (16.1% vs. 13.4%), and high blood sugar (5.3% vs. 4.0%) compared with those with low stress. Reported use of tobacco was not significantly different between stress categories (4.4% vs. 3.7%, respectively; Table 3).

Significant differences were found on all items relating to current health behaviors compared between stress classifications. The mean level of physical activity was higher for those with low stress compared with those

who reported high stress (5.34 vs. 4.63), as was the mean confidence in having a physically active lifestyle (7.80 vs. 7.19), current nutritional habits (6.43 vs. 5.74), and support for maintaining healthy living (6.68 vs. 7.07; Table 2).

DISCUSSION

We found, by using a single question about current stress level, that the more than 2000 employees who rated their stress level "as bad as it can be" had more fatigue from walking up two flights of stairs, had more general fatigue, perceived themselves as having poorer health, and had lower quality of life compared with more than 11,000 employees who rated their stress level as low. These findings are similar to a literature review by Siegrist and Rödel,[14] who also found associations between work stress and health risk behavior. In terms of health behaviors, the high-stress employees also were more sedentary, were less confident in their ability to be physically active,

Table 2
Participants' Ratings of Their Current Health and Health Behaviors*

Question (Target Phrases)	Low Stress		High Stress		Difference†	95% CI‡
	No. of Participants	Mean	No. of Participants	Mean		
Fatigue from two flights of stairs (0 = could not do it; 10 = could do it easily)	10,991	7.67	2134	6.85	0.82	0.71–0.94
Fatigue after typical night's sleep (0 = always; 10 = never)	10,866	6.25	2104	5.26	0.99	0.88–1.10
Overall health (0 = poor; 10 = excellent)	10,981	7.45	2121	6.87	0.58	0.50–0.66
Current quality of life (0 = as bad as it can be; 10 = as good as it can be)	11,018	7.87	2136	6.91	0.96	0.89–1.03
Current level of physical activity (0 = not at all active; 10 = extremely active)	10,965	5.34	2134	4.63	0.70	0.60–0.81
Confidence in having physically active lifestyle (0 = not at all confident; 10 = extremely confident)	10,988	7.80	2136	7.19	0.60	0.49–0.72
Current nutritional habits (0 = terrible; 10 = very healthy)	11,033	6.43	2139	5.74	0.69	0.60–0.38
Support for maintaining healthy living (0 = as bad as it can be; 10 = as good as it can be)	10,954	7.68	2122	7.07	0.61	0.53–0.70

* CI indicates confidence intervals.
† Difference calculated as "low stress" minus "high stress."
‡ 95% CI for the difference in the means; all differences were statistically significant ($p < 0.05$).

Table 3
Participants' Health Status and Stress Classification*

	Low Stress, %	High Stress, %	p	Difference†, %	95% CI‡, %
High blood pressure	10.6	12.2	<0.05	1.6	0.1–3.1
High blood sugar	4	5.3	<0.01	1.4	0.3–2.4
High cholesterol	13.4	16.1	<0.001	2.7	1.0–4.4
Tobacco use	3.7	4.4	=0.15	0.7	−0.3–1.6
Overweight	40	49.1	<0.001	9.0	6.7–11.3

* CI indicates confidence intervals.
† Difference calculated as "low stress" minus "managing stress."
‡ 95% CI for the difference in percentages; intervals that exclude zero indicate statistically significant differences ($p < 0.05$).

perceived themselves as having less support for healthy living, and had less healthy nutritional habits. The high-stress employees were also more likely to have high blood pressure, high blood sugar, and high cholesterol and to be overweight. Thus, the high-stress employees reported having the most health problems and endorsed having little confidence or support for change. Unfortunately, it is very likely that this high-risk group (those with significant health concerns) will be the most likely to demonstrate poor participation rates and nonadherence to wellness programs because of their high stress levels.

Other investigators have found a relationship between stress and health behaviors. In a sample of more than 800 adults enrolling into a 3-month lifestyle change program administered by health insurance companies, effective stress management was associated with improvements in metabolic function, weight loss, and hostile attitudes.[15] Not surprisingly, stress is also associated with mental health problems. In a survey of employees at four European companies, cumulative stress over a 1-year period was associated with depression, anxiety, and somatization.[16] Fortunately, participation in worksite stress management programs can reduce distress and improve job performance.[17]

This study has several limitations. Foremost is that the assessment of medical diagnosis was based on self-report. Some participants therefore may have not accurately reported their blood pressure, blood sugar, cholesterol, or weight classification. Similarly, tobacco use was not biochemically confirmed, and assessment of activity

level did not involve standardized measures such as pedometers or activity logs. The participants did not report socioeconomic status or ethnicity, but the work force in this sample is predominantly middle class and white; therefore, these findings may not apply to low-income groups or populations with greater diversity. Finally, we did not assess the employees' motivation for joining the wellness center. Our assumption was that they were focused primarily on our wellness center's exercise programs, but perhaps those with high stress were interested primarily in our yoga, meditation, massage, or stress programs. Future investigations should assess motivation for joining a wellness center.

CONCLUSION

In conclusion, among a large sample of employees joining a wellness center, we found that using a single item to inquire about current stress level identified a group of employees with poorer perceived health, poor quality of life, negative health behaviors, and health problems. These results demonstrate the importance of assessing the stress levels of employees joining a wellness center. One simple direct question about current stress level can perhaps quickly identify a population at high risk for health problems and poor health habits. Future researchers should seek to replicate the validity of using this single-item stress level question in more diverse populations and compare the specificity and reliability of using a single item with existing validated stress questionnaires that consist of several items. However, if

proven to be reliable, valid, and accurate, this simple, easy-to-score, single item assessing current stress level could be used to target high-risk employees for personalized wellness programs.

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Many individuals who join a gym, fitness, or wellness center will drop out within 3 months. Little is known about how to effectively reduce attrition. Clearly, these individuals were seeking to implement positive lifestyle changes but were unsuccessful.

What does this article add?

In a large sample of employees joining a wellness center, high stress was associated with low quality of life, poor health, and negative lifestyle factors. The offering of both fitness and effective stress reduction programs to these individuals would probably be beneficial.

What are the implications for health promotion practice or research?

Many wellness centers focus on fitness level during the orientation process. Perhaps by including assessment of the individual's stress level, wellness programs could then be tailored to meet both the mind and body needs of the individual. Assessment of the individual's fitness and stress level may reduce dropout rates and enhance the effectiveness of wellness programs.

References

1. Patel DN, Lambert EV, da Silva R, et al. The association between medical costs and

participation in the vitality health promotion program among 948,974 members of a South African health insurance company. *Am J Health Promot.* 2010;24:199–204.

2. Mills PR, Kessler RC, Cooper J, Sullivan S. Impact of a health promotion program on employee health risks and work productivity. *Am J Health Promot.* 2007;22:45–53.

3. Billings DW, Cook RF, Hendrickson A, Dove DC. A Web-based approach to managing stress and mood disorders in the workforce. *J Occup Environ Med.* 2008;50:960–968.

4. Lerner D, Adler DA, Rogers WH, et al. Work performance of employees with depression: the impact of work stressors. *Am J Health Promot.* 2010;24:205–213.

5. Goetzel RZ, Ozminkowski RJ. The health and cost benefits of work site health-promotion programs. *Annu Rev Public Health.* 2008;29:303–323.

6. Nyklicek I, Kuijpers KF. Effects of mindfulness-based stress reduction intervention on psychological well-being and quality of life: is increased mindfulness indeed the mechanism? *Ann Behav Med.* 2008;35:331–340.

7. Williams KA, Kolar MM, Reger BE, Pearson JC. Evaluation of a wellness-based mindfulness stress reduction intervention: a controlled trial. *Am J Health Promot.* 2001;15:422–432.

8. Prochaska JO, Butterworth S, Redding CA, et al. Initial efficacy of MI, TTM tailoring and HRI's with multiple behaviors for employee health promotion. *Prev Med.* 2008;46:226–231.

9. Rummans TA, Clark MM, Sloan JA, et al. Impacting quality of life for patients with advanced cancer with a structured multidisciplinary intervention: a randomized controlled trial. *J Clin Oncol.* 2006;24:635–642.

10. Lapid MI, Rummans TA, Brown PD, et al. Improving the quality of life of geriatric cancer patients with a structured multidisciplinary intervention: a randomized controlled trial. *Palliat Support Care.* 2007;5:107–114.

11. Clark MM, Novotny PJ, Patten CA, et al. Motivational readiness for physical activity and quality of life in long-term lung cancer survivors. *Lung Cancer.* 2008;61:117–122.

12. Locke DE, Decker PA, Sloan JA, et al. Validation of single-item linear analog scale assessment of quality of life in neuro-oncology patients. *J Pain Symptom Manage.* 2007;34:628–638.

13. Huschka MM, Mandrekar SJ, Schaefer PL, et al. A pooled analysis of quality of life measures and adverse events data in North Central Cancer Treatment Group lung cancer clinical trials. *Cancer.* 2007;109: 787–795.

14. Siegrist J, Rödel A. Work stress and health risk behavior. *Scand J Work Environ Health.* 2006;32:473–481.

15. Daubenmier JJ, Weidner G, Sumner MD, et al. The contribution of changes in diet, exercise, and stress management to changes in coronary risk in women and men in the multisite cardiac lifestyle intervention program. *Ann Behav Med.* 2007;33:57–68.

16. Godin I, Kittel F, Coppieters Y, Siegrist J. A prospective study of cumulative job stress in relation to mental health. *BMC Public Health.* 2005;5:67.

17. Umanodan R, Kobayashi Y, Nakamura M, et al. Effects of a worksite stress management training program with six short-hour sessions: a controlled trial among Japanese employees. *J Occup Health.* 2009;51:294–302.