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Perceptions of Worksite Support and Employee Obesity, Activity and Diet

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Abstract

Objectives—To examine the associations of perceptions of organizational commitment to employee health and coworker physical activity and eating behaviors with body mass index (BMI), physical activity and eating behaviors in hospital employees.

Methods—Baseline data from 899 employees participating in a worksite weight gain prevention trial were analyzed.

Results—Greater perception of organizational commitment to employee health was associated with lower BMI. Greater perception of coworker healthy eating and physical activity behaviors were associated with fruit and vegetable and saturated fat consumption and physical activity, respectively.

Conclusions—Improving organizational commitment and facilitating supportive interpersonal environments could improve obesity control among working populations.

Keywords

body mass index; social environment; workplace

Introduction

Overweight/obesity has numerous health consequences^{1,2} and contributes to excess mortality.^{3,4} Approximately two thirds of American adults are overweight or obese.⁵ A growing number of population-based studies suggest that environmental factors influence obesity rates and associated physical activity and eating behaviors.^{6,7} The environment broadly includes all factors “external to the individual”⁸ and includes not only physical environment, but also cultural and social environments.⁹

Most American adults spend large parts of most days at work,¹⁰ and the worksite is a promising setting for targeting obesity control.¹¹ Research to date has focused primarily on objective aspects of the worksite environment, such as the physical and structural environment and worksite policies, in relation to obesity and associated health behaviors.¹²⁻¹⁴ Perceptions of worksite norms and values related to health, weight, physical activity and eating at both the organization and coworker levels have been studied less.^{15,16} To develop conceptually grounded intervention strategies, a greater understanding is required of how employee obesity and associated health behaviors are impacted by employees' perceptions of worksite environmental support.

Guided by an ecological framework,¹⁷ this study, within hospital worksites, examines: 1) perceptions of organizational commitment to employee health and coworker normative behaviors for physical activity and healthy eating at work; 2) the associations of employee demographic and job characteristics with these perceptions; and 3) the association of these perceptions with body mass index (BMI), physical activity and eating behaviors.

Methods

Study Design

This study used baseline data from a site-randomized trial of an ecological intervention targeting weight gain prevention among hospital employees. The study was conducted at 6 member hospitals of the largest health care system in central Massachusetts. Details of the intervention have been reported elsewhere.¹⁸ Baseline employee assessments occurred at 2 time points 6 months apart. Data were obtained from 3 sources: human resources data, anthropometric measurements, and a 30-minute self-administered survey.

Study Sample and Recruitment

Participants were sampled from human resources records of each hospital to represent the hospital employee population. Employees of each hospital were stratified by gender and minority status. A simple random sample was selected from each stratum, with over-sampling of male and minority employees, ensuring the ability to perform subgroup analysis by gender and race/ethnicity in a predominantly female and non-Hispanic White workforce. All eligible employees had a known non-zero probability of selection.

Recruitment occurred from March to December 2005. The initial study invitation was by letter to the work address, signed by the Principal Investigator and the hospital president. Letters in both Spanish and English were sent to employees listed as Hispanic in human resources records. The letter invited their participation in a study to test ways of preventing weight gain in hospital employees, described how they were selected and provided telephone and email contact information to set up an initial visit, ask questions or refuse participation. Employees who did not actively refuse were enrolled by announced drop-in sessions or individually scheduled appointments. IRB approval required that project staff would only attempt additional contact with uninvolved invitees by work telephone, pager or mail to the work address following a standardized protocol. To enroll housekeeping employees, who lacked work mailboxes and

work telephones, invitation letters were distributed at the time clock during shift change and study staff made an informational presentation to a staff meeting.

Cohort members were screened to meet these inclusion criteria: 1) age between 18 and 65, 2) able to understand and communicate in English or Spanish, 3) no plan to leave employment in the next 2 years, 4) worked at least 20 hours per week in one of the hospitals, 5) did not work in more than one participating hospital, and 6) had no impediment to being weighed and measured.

Measures

Body Mass Index

Body mass index (BMI) was calculated from measured weight and height. Weight measurement was taken on digital scales and rounded to the nearest 2/10th of a pound. Heights were measured to the nearest 1/8th inch using portable stadiometers. The average BMI across baseline 1 and baseline 2 assessments was used in this analysis.

Fruit and vegetable and fat consumption—Fruit and vegetable and saturated fat consumption were measured by the Block Rapid Food Screener,¹⁹ a brief food-frequency type measure that assessed commonly eaten foods. The fruit and vegetable screener consists of ten items and is summarized as servings of fruits and vegetables per day. The fat screener consists of 17 items and assesses both fat and saturated fat. Summarization as percentage of total calories from saturated fat was used in this study. Using the 100 Block Food Frequency Questionnaire as a gold standard, Spearman rank-order correlation coefficients were .71 ($P < .0001$) for fruit and vegetable and .72 ($P < .0001$) for saturated fat.

Physical activity—Physical activity was assessed by the self-administered long-form of the International Physical Activity Questionnaire (IPAQ). The IPAQ, developed by the World Health Organization, has demonstrated reasonable psychometric properties for assessing population levels of self-reported physical activity.²⁰ Vigorous, moderate and walking activity in 4 domains, work, household, free time and transportation, were assessed.

Perceived organizational commitment to employee health—Employee perception of organizational commitment to employee health was measured by the 4-item sub-scale of the Worksite Health Climate survey (WHC), which demonstrated strong internal reliability ($\alpha = .88$).¹⁵ Respondents rated each item on a 5-point scale ranging from strongly disagree to strongly agree. The scale was computed as an average of the items.

Perceived coworker normative behaviors—Modified versions of the WHC sub-scales for health norms measured employee perceptions of eating and physical activity behaviors of coworkers.¹⁵ Individual items were selected and adapted to focus on at-work behaviors. Four items asked about coworkers' physical activity behaviors at work and 5 asked about coworkers' eating habits at work. Seven response categories (almost none to almost all) estimated the proportion of coworkers who practice specific behaviors. Negative items were reverse coded, with higher scores corresponding to healthier behaviors. Psychometric testing of each scale indicated very good internal consistency ($\alpha = .78$, healthy eating; $\alpha = .74$, physical activity). Factor analysis indicated that items were approximately evenly loaded on the scales. Each scale was therefore computed as an average of items and had a possible range of zero to 4.

Job Characteristics

Human resources files provided employee job titles, which were used to create a variable categorizing occupation as administrative/clerical, manager, faculty member (including

physicians), nurses and physician assistants, other clinical workers, technicians and laborers. Employees provided information on shift(s) usually worked, whether they were paid salary or hourly rate, whether they were a union member, average number of hours worked per week, and number of years employed at the hospital.

Demographic Characteristics

Information on gender, age group (18-40, 41-50, >50), and race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, other) was available from human resources records. Education level (\leq high school, some post-high school/college, college graduate or more) was collected via the survey.

Statistical Analysis

Data were analyzed using Stata SE 9.1 software (Stata Corp, College Station, TX). Analyses were weighted by the inverse of the stratum-specific sampling probability to account for sampling design. Frequency distributions were computed to describe the study sample. The percentages of employees who agreed or strongly agreed with each of the individual items comprising the 3 worksite perception scales were calculated. Multivariable linear regression models for survey data^{21,22} were used to assess associations of demographic and job characteristics with the 3 worksite perceptions scales, and relationships of the 3 worksite perceptions scales with BMI, fruit and vegetable consumption, saturated fat consumption and physical activity, controlling for demographic and job characteristics. Because physical activity (met-hrs per week) was heavily skewed, the logarithmic transformation of physical activity was used in the regression analysis. Number of years as a hospital employee was not included in the models due to collinearity with age, nor were indicators of being a union member or wage type due to collinearity with education and occupation. No significant interaction terms were found.

Results

Response Rates

One thousand nine hundred eighty seven (1987) employees were invited to participate and 1593 were eligible. Of the 394 deemed ineligible, the most common reasons included no longer being an employee (37%), working fewer than 20 hours per week (17%) or at more than one hospital (13%), and working off-site (12%). Of the eligible employees, 899 (56%) consented to participate. Men (51%) were less likely to participate than women (60%). Physicians/faculty (33%) were less likely to participate than all other occupations ($p < .0001$). Reasons for not participating included not being interested (54%) and insufficient time (18%). Of the 899 who completed baseline 1 measurements, 849 (94%) also completed baseline 2 measurements. Reasons for non-completion of baseline 2 measurements included no longer working at the hospital system ($n=25$), non-response ($n=12$), no longer interested in participating ($n=8$) and being pregnant or on other leave ($n=5$). Among those still at the worksite ($n=869$), 98% completed both assessments.

Employee Characteristics

The unweighted analyses reflect successful over-sampling of under-represented demographic groups in the hospital workforce: 68% were female (compared to 79% of workforce), with 69.9% non-Hispanic White (compared to 87% of workforce), 12.3% non-Hispanic Black (compared to 5% of workforce), 13.7% Hispanic (compared to 6% of workforce) and 4% Asian or other race/ethnicity (compared to 2% of workforce). Demographic and job characteristics of the employee cohort, weighted to reflect the larger hospital workforce, are described in Table

1. Categorical assessments of BMI indicated that 30% of employees had a BMI within the normal range (<25.0), 35% were overweight (25.0-29.9) and 35% were obese (≥ 30.0).

Perceptions of worksite support—The average ratings of the 3 perception scales were as follows: 2.96 (SD=.84) for organizational commitment to employee health (range 1 to 5), 3.19 (SD=.88) for coworker normative eating behaviors (range: 0 to 6), and 1.70 (SD=.99) for coworker normative physical activity behaviors (range 0 to 6). Ratings of individual items are presented in Table 2. Item ratings for the organizational commitment scale were modest, ranging from 23.2% agreeing that top hospital management is committed to improving employee health, to 39.0% agreeing that the hospital is concerned about employee health and well-being. There was considerable variability among the 9 items related to coworker behaviors. The percentage reporting that most or almost all coworkers engaged in each behavior ranged from 41.7% for including salads, vegetables and fruits in meals, to 3.5% for walking during lunch or breaks.

Associations of demographic and job characteristics with perceptions of worksite support—Table 3 presents the associations of demographic and job characteristics with perceptions of organizational commitment and coworker behaviors scales. Compared to women, men had lower perceived normative coworker healthy eating behaviors. Compared to non-Hispanic Whites, Non-Hispanic Blacks had higher perceived organizational commitment to employee health and Hispanics and Asians/Others had higher perceived coworker normative activity. Higher educational level was associated with lower perceived organizational commitment to employee health.

Compared to administrative workers, physicians and nurses and physicians' assistants had lower perceptions of organizational commitment to employee health, while laborers had higher perceptions. Although not statistically significant, compared to administrative workers, there was a trend toward physicians and technicians having higher perceptions of coworker normative eating behaviors; and nurses and physician assistants having lower perceptions of coworker normative physical activity behaviors. Working third shift, compared to first or second, was associated with lower perceptions of coworker normative physical activity behaviors, while having a second job was associated with higher perceptions.

Associations of perceptions of worksite support with BMI, and diet and activity measures—Table 4 presents the multivariable adjusted association of worksite environment perceptions with each outcome measure. Perception of stronger organizational commitment to employee health was associated with lower BMI. Higher perception of coworker normative healthy eating behaviors was associated with greater fruit and vegetable consumption and less fat consumption. Higher perception of coworker normative physical activity behaviors was associated with greater total physical activity.

Discussion

Little is known about how the worksite social environment, including health-related norms and values, impacts obesity and associated activity and eating behaviors.^{6,9} Observational studies have found worksite built environment and policy factors to be related to obesity.^{12-14,23} Perceptions of supportive worksites have been associated with work-related outcomes in previous studies.²⁴⁻²⁶ For example, Lowe and colleagues²⁴ observed that higher ratings of social support were associated with higher perceptions of a healthy work environment, and that higher perceptions of a healthy work environment were associated with higher job satisfaction, commitment and morale and lower absenteeism in a population-based survey. The current study expands existing literature by examining how perceptions of hospital worksite support for health are associated with employee BMI and health behaviors.

Ratings of individual items of the 3 employee perception scales were low in this population of hospital workers, suggesting considerable room for improvement in leadership visibility and activities geared toward employees. Items generically pertaining to the organization as a whole were rated more positively than items related to direct management. This may in part be explained by employee dissatisfaction with other job-related issues. With respect to ratings of coworker normative behaviors, perceptions of healthy eating behaviors were modest, while perceptions of physical activity behaviors were substantially lower. This may be expected, as eating is a routine work day activity, while physical activity is generally not.

Greater perception of organizational commitment to employee health was associated with lower BMI in this study, suggesting that having more positive perceptions may positively influence weight. Findings suggest that interventions that promote support and visibility of support of leadership and management in promoting health of employees can potentially promote weight control. Due to the cross-sectional design of this study, however, it is unclear if perceived organizational support for employee health results in lower BMI, or if persons with lower BMI are more likely to have knowledge or take advantage of opportunities for healthy lifestyle at work, resulting in higher perceptions of support. Also, it may be that obese persons are more likely to place blame on their organization.

Perceptions of coworker normative behaviors were associated with a participant's own physical activity and eating behaviors. This is consistent with previous findings,¹⁵ and suggests that employee behavior is influenced by coworker health-related norms and values. This also is consistent with a recent study of a large social network which concluded that obesity spreads⁷ through social ties. While it may be that in this cross-sectional analysis, persons are more likely to take note of or associate with other employees with behavioral patterns similar to their own, the influence of coworkers on employee behaviors and health warrants further study. Findings support intervention strategies that promote norms for healthy eating and physical activity among coworker networks.

Perceptions of organizational support for employee health vary significantly according to several demographic and job characteristics. This may reflect a range of exposure to top "leadership" or "management" and/or differential frames of reference or expectations among employee sub-groups. African Americans had highest ratings. Possible explanations may include greater pride and positive feelings among African Americans about working at a hospital, a well-known and respected institution in its community. Studies of health care delivery have observed that African Americans are more likely to believe that self-presentation is important.²⁷ This may extend to the worksite, with African Americans wishing to support leadership. Alternatively, African Americans may be more likely to report in socially desirable ways due to greater mistrust of research,^{28,29} and concerns about the confidentiality of their responses. Persons age 41 to 50 had lowest ratings. Struggles particular to this age group, such as family and financial responsibilities and expectations during mid-career, may impact this. Persons with advanced degrees and faculty members and nurses had lowest ratings of organizational support. This may reflect higher expectations by educated professionals, and particularly for nurses, may show the tension in the profession regarding salary, control over work life, decision autonomy and stress.^{30,31}

There was less variation in perceptions of coworker behaviors by demographic and job characteristics, reflecting more homogeneity about perceived norms. Males had lower perceptions of healthy coworker eating than women. Group eating, with opportunities to observe and be influenced by peers' eating habits, may be more common among women than men. Ratings of coworker physical activity behaviors were highest among Hispanics and Asians. Reasons for this remains unclear, and future research should explore racial and ethnic differences in normative perceptions. Persons who worked third shift had lowest ratings of

coworker physical activity behaviors. Previous studies have found higher levels of obesity and associated health conditions among shift workers.³²⁻³⁴ Norms of physical inactivity among coworkers at night may be fostered by lower levels of general activity, potentially greater likelihood of fatigue, less flexibility in work schedule and few options for at-work physical activity.

Several limitations to this study must be acknowledged. The cross-sectional design limits inferences about causality. Self-report may underestimate dietary intake and overestimate physical activity.^{19,35,36} Non-responders may differ significantly from study participants in ways that could not be measured. Overweight or obese persons may be less willing to agree to anthropometric measurement. Alternatively, people with a desire to lose weight might have consented at a higher rate. Independent of BMI, non-participants might have less interest in health promotion. However even considering selection and social desirability biases, the sample was diverse with respect to demographics and job characteristics.

Conclusions

In summary, this study found cross-sectional evidence of associations between perceptions of supportive worksite environments and obesity and associated health behaviors. It demonstrated variability in perceptions according to selected demographic and job characteristics. It also confirmed that obesity is indeed common among hospital workers, who may be viewed, by patients and society in general, as role models for prevention and health. Prospective studies are warranted. Of particular interest are interventions that effectively target perceptions of social norms regarding obesity, eating and physical activity. Implications for interventions include the need for leadership to visibly advocate for and model a healthy lifestyle and to foster policies and practices that promote optimal normative perceptions of healthy eating and activity. Initiatives should whenever possible encourage coworkers to form teams for support and motivation. Newsletters, posters and other small media can showcase positive employee behaviors and “success stories.” Additionally interventions can target sub-groups which may need tailored messages to increase motivation and highlight role models among leadership and coworkers.

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Table 1
Participant Demographic and Job Characteristics(n=899)^a

Characteristic	% of population	Characteristic	% of population
Gender		Years employed	
Male	21.0%	0-3 years	28.0%
Female	79.0%	3-6 years	17.1%
Age Group		6-15 years	24.7%
<=40	36.5%	> 15 years	30.2%
41-50	33.0%	Average hours worked/ week	
> 50	30.5%	20-35	34.2%
Race/Ethnicity		36-40	42.6%
Asian/Other	2.0%	41-50	16.9%
Hispanic	6.0%	51+	6.3%
Non-Hispanic Black	5.0%	Shift	
Non-Hispanic White	87.0%	First (days)	68.9%
Educational status		Second (evenings)	12.5%
High school degree or less	13.1%	Third (nights)	8.7%
1-3 years of college/post high school	46.8%	Split	2.3%
College graduate	26.9%	Mixed	7.6%
Master's or Doctoral degree	13.2%	Have a second job	
Occupation		Yes	15.8%
Physicians/Faculty	4.1%	No	84.2%
Managers	7.9%	Member of a union	
Nurses/physician assistants	30.3%	Yes	64.6%
Other clinical workers	19.4%	No	35.4%
Administrative/clerical	20.7%	Payment	
Technicians	10.0%	Salary	18.0%
Laborers	7.6%	Hourly	82.0%

^aWeighted by the inverse of the stratum-specific (site, gender, race/ethnicity) sampling probability to account for sampling design.

Table 2

Ratings of Individual Items in Perceived Organizational Commitment to Employee Health and Coworker Normative Behaviors Scales^a

Perceived organizational commitment to employee health	% reporting agree or strongly agree
Hospital values workers with healthy lifestyles	35.8%
Hospital is concerned about health/well-being of employees	39.0%
Top management at this hospital is committed to improving employee health	23.2%
My immediate supervisor/management is committed to improving employee health	27.9%
<hr/>	
Perceived coworker normative behaviors	% reporting most or all.
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Coworkers eat healthy snacks	20.5%
Coworkers use the stairs instead of the elevator	17.5%
Coworkers are concerned about the fat in the foods they eat	27.2%
Coworkers walk instead of drive short distances for meetings or errands	9.2%
Coworkers include salads, vegetables and fruits in their meals.	41.7%
Coworkers park their car further from the building so they have to walk more	9.0%
Coworkers regularly choose high fat foods for meals	12.3%
Coworkers walk on their lunch hour or break	3.5%
Coworkers regularly eat potato chips or candy bars for snacks	14.3%

^aWeighted by the inverse of the stratum-specific (site, gender, race/ethnicity) sampling probability to account for sampling design.

Table 3
 Multivariable Adjusted Association of Demographic and Job Characteristics with the Perceptions Scales^a

	Organizational commitment to employee health		Coworker normative eating behaviors		Coworker normative physical activity behaviors	
	β (95% CI)	P-value	β (95% CI)	P-value	β (95% CI)	P-value
Gender						
Male	-0.07 (-.24, .10)	.42	-.33 (-.51, -.15)	<.001	-.11 (-.29, .07)	.22
Female	Referent		Referent		Referent	
Age Group						
<=40	Referent		Referent		Referent	
41-50	-1.6 (-.31, -.01)	.04	.05 (-.13, .23)	.57	-.03 (-.24, .18)	.80
> 50	.09 (-.08, .26)	.31	-.05 (-.25, .14)	.61	-.02 (-.22, .18)	.82
Race/Ethnicity						
Asian/Other	.27 (-.07, .61)	.11	-.22 (-.53, .08)	.15	.43 (0.2, .85)	.04
Hispanic	.14 (-.06, .35)	.16	-.003 (-.25, .25)	.98	.42 (.15, .69)	.002
Non-Hispanic Black	.19 (.01, .37)	.04	.13 (-.10, .37)	.27	.02 (-.24, .28)	.88
Non-Hispanic White	Referent		Referent		Referent	
Educational status						
High school degree or less	Referent		Referent		Referent	
1-3 years of college/post high school	-.13 (-.37, .12)	.32	.01 (-.25, .27)	.75	-.18 (-.46, .10)	.21
College graduate	-.22 (-.50, .07)	.14	.05 (-.25, .34)	.75	-.21 (-.53, .12)	.21
Master's or Doctoral degree	-.38 (-.74, -.01)	.04	-.03 (-.35, .29)	.86	-.12 (-.52, .27)	.54
Occupation						
Administrative	Referent		Referent		Referent	
Managers	.24 (-.05, .53)	.10	.19 (-.14, .52)	.26	.07 (-.21, .35)	.70
Physicians/Faculty	-.50 (-1.01, .02)	.06	.42 (-.44, .89)	.08	.01 (-.49, .51)	.97
Nurses/physician assistants	-.26 (-.51, -.01)	.04	.13 (-.12, .37)	.31	-.24 (-.51, .03)	.08
Other clinical workers	-.05 (-.31, .14)	.72	.19 (-.09, .46)	.18	.07 (-.21, .35)	.62
Technicians	-.09 (-.31, .14)	.47	.22 (-.03, .47)	.09	-.17 (-.46, .12)	.26
Laborers	.32 (-.09, .64)	.05	.15 (-.28, .58)	.49	-.25 (-.65, .16)	.24
Average hours worked per week						
20-35	Referent		Referent		Referent	
36-40	-.001 (-.17, .17)	.99	-.08 (-.26, .10)	.38	-.02 (-.24, .20)	.87
41-50	.03 (-.21, .26)	.81	-.11 (-.34, .13)	.38	-.05 (-.32, .21)	.69
51+	-.07 (-.45, .31)	.71	-.06 (-.48, .37)	.17	.08 (-.39, .54)	.74
Shift						
First/Second	Referent		Referent		Referent	
Third	-.04 (-.23, .15)	.67	-.16 (-.37, .06)	.15	-.48 (-.72, -.24)	<.001
Split	-.09 (-.53, .34)	.69	-.12 (-.47, .24)	.52	.50 (-.14, 1.15)	.13
Have a second job						
Yes	-.04 (-.20, .12)	.62	.15 (-.07, .37)	.17	.23 (.03, .44)	.02
No	Referent		Referent		Referent	

^aWeighted by the inverse of the stratum-specific (site, gender, race/ethnicity) sampling probability.

Table 4
Multivariable Models (adjusted) of the Association of Worksite Health Perceptions, Demographic and Job Characteristics with BMI, Physical Activity and Eating Behaviors^a

	BMI ^b		Fruit and vegetable servings ^b		% of total calories from fat ^b		Log physical activity (MET minutes/week) ^{b,c}	
	β (95% CI)	P-value	β (95% CI)	P-value	β (95% CI)	P-value	Relative Difference+ (95% CI)	P-value
Organizational commitment to employee health	-.73 (-1.38, -.07)	.03	.02 (-.17, .20)	.87	.17 (-.40, .73)	.56	-3.3% (-16.1%, 11.5%)	.64
Coworker normative eating behaviors	-.08 (-.58, .43)	.76	.33 (.16, .49)	<.001	-.84 (-1.35, -.34)	.05	-	
Coworker normative physical activity behaviors	.15 (-.45, .74)	.63	-	-	-	-	18.2% (6.0%, 31.9%)	.003

^a Weighted by the inverse of the stratum-specific (site, gender, race/ethnicity) sampling probability.

^b Each model adjusts for gender, age, race/ethnicity, education, occupation, average number of hours worked per week, shift and have a second job.

^c Expressed as % relative difference for ease of interpretation.