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Worksite Wellness

A Cholesterol Awareness Program

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RESEARCH ABSTRACT

A 7-month intervention was undertaken to determine the impact of education and coaching on lifestyle choices and lipid values among employees with hyperlipidemia. Four classes over 2 months at the worksite during work time and two telephone interventions were provided with pre, mid, and post data collection. Total cholesterol and low-density lipoprotein values improved during the intervention. Positive lifestyle changes were made involving exercise and diet. Appropriate physician visits and continuous health care increased. Lipid-based interventions at the worksite can elicit positive changes in lifestyle, appropriate health care use, and improved lipid values.

Employee health benefit costs have been rising dramatically. Cardiovascular disease remains the leading cause of death in the United States and the leading cause of death in all industrialized nations (Anderson & Smith, 2005; Hay & Sterling, 2005). Hypertension, diabetes, and myocardial infarction are some of the most costly conditions (Goetzel, Hawkins, Ozminkowski, & Wang, 2003; Ozminkowski et al., 2004). Lipid-lowering medications, including statins and fibric acid medications, have been shown to decrease this risk, although adherence to these medications is frequently low. In addition, as more is learned about lipids and their impact on heart disease, therapeutic goals are becoming increasingly more stringent and additional components of the full lipid panel are being incorporated into those goals (National Cholesterol Education Program, 2002; National Heart, Lung and Blood Institute, 2008). Achieving improved control and meeting these new goals demonstrates the importance of the entire health care team in assisting individuals to adhere to lifestyle changes and medications when prescribed. This is a complex issue needing multifaceted solutions.

Two thirds of deaths in North Carolina are related to tobacco use, malnutrition, and physical inactivity. The North Carolina Prevention Partners (2008) state that obesity, malnutrition, physical inactivity, and tobacco-related illnesses cost the state $25.82 billion per year and employers an average of $5,711 per employee per year. Employers and employees must take responsibility for reducing health risks by increasing prescription and behavior modification adherence and reducing overall health care costs. Investment in health promotion and disease control programs by employers can control costs and improve employee health.

The incidence of dyslipidemia increases with age (American Heart Association, 2007). The average age of Piedmont Health Coalition employees is older than that of the national work force. Physical inactivity is more likely in this older and less affluent worker population (American Heart Association).

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Applying Research to Practice

Cholesterol education at the worksite can improve lipid profiles and heart-healthy behaviors. Access to a health care provider is a key component of improving lipid management for individuals with elevated lipids and cardiovascular risk. Occupational health nurses are the most accessible health care providers to employees. Partnering with other local health care resources can increase the outreach of occupational health nurses and further improve employees' health.

The benefits of providing worksite programs targeting employee health have been documented (Bloch et al., 2006; Hartman, Himes, McCarthy, & Kushe, 1995; Perovich & Sandoval, 1995; Pescatello et al., 2001); however, many companies do not sponsor these programs. Some noted advantages of worksite programs include convenience for employees (Anderson & Dusenbury, 1999), added motivation in the group environment (Baer, 1993; Karlenhagen & Ohlson, 2003), and less time away from the job, meaning lower costs compared to health center programs with employer support (Baer; Glanz, Sorensen, & Farmer, 1996). Although more worksite programs are offered throughout the country and employees are more aware of their risk for disease, relatively few employees enroll in worksite programs (Emmons, Linnan, Shadel, Marcus, & Abrams, 1999). In addition, self-selected participation does not always result in the highest-risk workers becoming involved.

To determine the impact of education and coaching on lipid values and lifestyle practices, this 7-month intervention was undertaken. The program was scheduled at the workplace during work time. The goal was to recruit the highest-risk workers by using a variety of recruitment methods. The objectives of the program were to lower blood cholesterol among workers who had been diagnosed with elevated cholesterol, increase appropriate use of health care, and increase medication compliance.

METHODS

Study Population and Data Collection

From January to August 2005, CAP (Cholesterol Awareness Program—Hats Off to a Healthier You!) was implemented in seven companies ranging in size from 100 to 1,500 employees. All companies were members of the Piedmont Health Coalition (PHC), an independent health insurer in Alamance County, North Carolina. PHC manages employee health by providing programs that promote wellness and a healthy lifestyle (www.piedmonthealthcoalition.org). Seven local companies, including the local medical center and various textile companies and mills, joined together to maximize their buying power and minimize overhead costs.

Admission to the program was capped at 139 participants due to budget constraints. Participants were recruited through annual health fair cholesterol results, self-referral (based on recent primary care laboratory work), or referrals from occupational health nurses at the participating companies. All participants signed consent forms approved through the institutional review board. The program was implemented by staff from Alamance Regional Medical Center who had successfully implemented a diabetes program just 6 months earlier. The diabetes program had been so successful that the seven companies that implemented the program wanted to be involved in the worksite cholesterol program as well. Certified diabetes educators (both registered nurses and registered dietitians) implemented both of these programs. A collaborative partnership was also established between these educators and occupational health nurses at some of the plants. The occupational health nurses were supportive and assisted with program promotion and communication. However, many of these nurses were at these companies for only limited hours per week and had many other employer-driven projects, making it impossible for them to participate fully on this cholesterol program.

Intervention Program

At enrollment, 4 months, and 7 months, lipid panel, weight, blood pressure, and pulse were measured. The questionnaire completed by all participants included the following: physician contact; hospital use; emergency department use; employment absenteeism; smoking; exercise frequency, perceived intensity, and time; diet; family and personal health history; and medication use.

Diet and exercise were evaluated using a Likert scale ranging from 1 to 5 (1 = none, 2 = 1 to 2 times per week, 3 = 3 to 4 times per week, 4 = 5 to 6 times per week, and 5 = 7 or more times per week). The questionnaire was completed by employees. Spanish-speaking interpreters or educators were provided when needed.

Four classes were taught during months 2 and 3. Each class was 30 minutes long. Classes were provided 2 weeks apart, at all worksites, and on all shifts. During class 1, instructors offered information on how to manage cholesterol and participants were provided cholesterol goal numbers based on National Cholesterol Education Program II (NCEP) guidelines. During class 2, the management of cholesterol through diet and exercise was discussed. Participants learned about types of fats, the need for increased dietary fiber, exercise recommendations, and recommended fat intake guidelines from the American Dietetic Association. During class 3, instructors focused on the risk factors associated with elevated cholesterol, medications, and the importance of continuous health care. During class 4, instructors focused on setting long-term goals, diet, exercise, physician care, the potential need for medications, and potential barriers to long-term success. Classes were provided on work time with no penalty to employees for participating. Company management encouraged participants to join the program and continue attending.

During month 4, all participants were re-screened, receiving both laboratory screenings and the questionnaire. All participants were called during months 5 and 6, and final questionnaires and laboratory tests were collected at month 7. At all three screening points, employees were referred to their primary care providers if their laboratory results warranted intervention based on NCEP III guidelines.

Confidentiality

All participants signed informed consent documents that had been approved by the internal review board of the local medical center. All documentation was locked in boxes at the worksites and file drawers at the medical center. All laboratory results were sent directly to the educators' office. All participants agreed to contact their physician or initiate contact with a new physician as needed. All results were tabulated by the educators and principal investigator. Occupational health nurses at worksite locations knew of employees' enrollment in this program, but not specific data (i.e., laboratory results, medications, or dietary changes). Employers did receive aggregate reports such as total number of employees enrolled and percent of enrollees with hypertension, hyperlipidemia, and medication use. Again, no specific or personal data were shared. All of the measures listed above were clearly described in the initial documents given to each participant.

Statistical Analysis

Analysis of variance was used to compare pre, mid, and post assessment changes. Paired *t* tests were used to compare pre and post changes in lifestyle factors. Analysis of variance was used to compare pre, mid, and post values for continuous variables. For comparison of Likert scale data with continuous variables, Spearman's rank correlation was used. All statistics were analyzed with GB STAT, version 10. A *p* value of less than .05 was considered statistically significant.

RESULTS

One hundred thirty-nine employees were enrolled in CAP. Of these, 105 completed the program. Of the 34 who did not, 6 were no longer employed by the participating companies; 2 died unrelated to the study; 9 attended the entire program but did not complete either the final laboratory tests or the questionnaire; 9 signed the initial consent form and completed the initial questionnaire and laboratory tests but never attended any of the 7-month program; and 8 did not complete the program for an undocumented reason.

Those who did and did not complete the trial are compared in Table 1. Overall, these two groups were similar. Pre-program non-completers had higher triglyceride levels and weighed an average of 12 pounds more.

Table 1

Pre-Program Comparison of Completers and Non-Completers

	Completers (n = 105)	*Non-Completers (n = 34)*
Age (yr)		
Mean	49.5	48.58
Range	19 to 71	23 to 69
Gender (female)	69	20
Ethnicity		
White	69%	62%
Black	21%	26%
Latino	9%	9%
Other	1%	3%
Mean weight (lb)	185.3	197.67
Mean body mass index	30.31	32.20
Mean blood pressure (mmHg)	124/76	122/75
Mean total cholesterol	223	222.9
Mean low-density lipoprotein	138	136.9
Mean high-density lipoprotein	52.8	50.2
Mean triglycerides	165	210.9
Smoker	23%	20.6%
No physician	7.7%	8.8%

Exercise

Exercise was measured via frequency, intensity, and time spent through self-report (Table 2). All three parameters increased during the course of the intervention. The greatest positive changes were seen at the midpoint compared to baseline. Final reports demonstrated continued improvements. The parameters were not significantly different prior to the intervention between completer and non-completer groups.

Lipids

A statistically significant reduction was found in total cholesterol and low-density lipoprotein (LDL) levels (223 to 211 mg/dL, $p \leqslant .0374$; 138 to 126 mg/dL, $p \leqslant .0165$, respectively) from the beginning to the end of the program. High-density lipoprotein (HDL) and triglyceride levels did not change significantly (Table 3). The average HDL level was above the Adult Treatment Panel (ATP) III-recommended 40 mg/dL, but 19 of the 105 participants had an HDL level below this threshold.

During the 7 months, 51% of completers and 15% of non-completers were referred to primary care physicians. Because they did not participate in the entire study, those non-completers were referred based on their initial laboratory data. During the study, 75 completers were referred to a physician at some point. At the end of the

Table 2

Completers' Exercise Changes During Three Periods and Compared to Non-Completers

	Completers (N = 104)			
Exercise	***Pre***	***Mid***	***Post***	***Non-Completers[c] (N = 34)***
Mean frequency (Likert[a])	2.11 (*n* = 104)	2.84 (*n* = 100)	2.80 (*n* = 102)	2.03 (*n* = 30)
Mean intensity (Likert[b])	1.58 (*n* = 77)	1.96 (*n* = 94)	1.73 (*n* = 99)	1.65 (*n* = 26)
Mean time (minutes)	89.5 (*n* = 70)	104 (*n* = 89)	97.8 (*n* = 97)	96.4 (*n* = 22)

[a]1 = never; 2 = ⩽ 1 day per week; 3 = 2 to 3 days per week; 4 = 4 to 5 days per week; and 5 = 6 to 7 days per week.
[b]1 = light; 2 = moderate; and 3 = vigorous.
[c]Pre-program.

Table 3

Comparison of Completers' Pre, Mid, and Post Values

	Pre	***Mid***	***Post***	**p**
Mean total cholesterol	223	214	211	.0374[b]
Mean low-density lipoprotein	138	129	126	.0165[b]
Mean high-density lipoprotein	52.8	52	52	.6272
Mean triglycerides	165	175	169	.9304
% change in total cholesterol			Average 5.2%	
Mean weight (lb)	185.3	183	183.6	
Mean body mass index	30.31	[a]	30.11	.627
Mean blood pressure (mmHg)	124/76	126/76	127/78	
Tobacco use	23%	[a]	24%	

[a]Either not measured at midpoint or several participants did not answer at midpoint.
[b]Statistically significant.

program, 49 of the 105 participants were receiving evidence-based care; 27 needed attention, and appointments were scheduled; 26 were not at goal and untreated despite referrals and physician care; and 3 needed treatment, had no physician, or were given a list of physicians currently taking patients but by the end of the study still had not seen a provider.

In Table 4, those who reached their lipid goals were compared to those who did not. Those who did not reach their goal were younger, weighed more, had a higher blood pressure, were more likely to smoke, and had worse dyslipidemia. They also demonstrated a worsening in most areas during the 7 months of intervention.

Blood Pressure

Overall, average blood pressure did not change significantly during the study (124/76 mmHg pre vs. 127/78 mmHg post). However, individuals at their blood pressure goal increased from 56% to 59%.

Occupation

Participants were divided into two groups based on occupation. The first group included those with managerial responsibilities and those with professional clinical positions (referred to as "managers" from this point forward). The other group included those with non-professional or blue-collar positions (referred to as "line workers" from this point forward). Table 5 demonstrates differences between the two groups for various factors pre and post study. Total cholesterol and LDL levels were reduced among both managers and line workers. HDL levels increased slightly among managers and decreased among line workers. Both groups increased exercise frequency and intensity, but the greater improvement was among line workers. Also, total minutes of exercise per week increased among line workers but decreased among managers; however, managers still exercised more minutes per week overall. Both groups lost a small amount of weight, and blood pressure did not change significantly.

Table 4

Comparison of Completers Who Met Their Goal With Those Who Did Not

	Met Goal (n = 49)	*Did Not Meet Goal (n = 56)*
Mean age (yr)	50.37	48.7
Gender (female)	67.3%	64.3%
Mean weight (lb)	182.6 pre; 178.5 post	187.6 pre; 188.1 post
Mean body mass index	30.0 pre; 29.5 post	30.6 pre; 30.6 post
Mean blood pressure (mmHg)	123/74 pre; 123/76 post	125/78 pre; 130/79 post
Mean total cholesterol	215 pre; 194 post	230 pre; 225 post
Mean low-density lipoprotein	128 pre; 109 post	147 pre; 141 post
Mean high-density lipoprotein	58.9 pre; 59 post	47.5 pre; 46.5 post
Mean triglycerides	138 pre; 134 post	189 pre; 198 post
Smoker	16% to 20%	29% to 25%
Exercise		
Mean frequency[a]	2.1 pre; 3.0 post	2.13 pre; 2.62 post
Mean intensity[b]	1.66 pre; 1.79 post	1.51 pre; 1.67 post
Mean time (minutes)	110 pre; 100 post	71 pre; 86 post
Family history of heart disease	86%	77%
Without a physician	5 pre; 4 post—only the one finding a physician was referred	4 pre; 3 post—all were referred to a physician

[a]Likert scale (1 = never; 2 = ⩽ 1 day per week; 3 = 2 to 3 days per week; 4 = 4 to 5 days per week; and 5 = 6 to 7 days per week).
[b]Likert scale (1 = light; 2 = moderate; and 3 = vigorous).

Both groups increased their consumption of low-fat cheese and fruit. Line workers consumed more reduced-fat margarine, whereas managers consumed less. Both groups ate away from home less frequently and consumed less fried foods, full-fat cheese, bacon or sausage, biscuits, chips or crackers, cookies, butter, and fatback.

Lifestyle

Weight decreased from an average of 185.3 to 183.6 pounds, and body mass index decreased from 30.31 to 30.11. Smokers increased from 23% to 24% of the participants.

Of the many dietary factors that were measured, margarine use increased, butter use decreased, and the frequency of eating out decreased. The consumption of fried foods, full-fat cheese, bacon or sausage, biscuits, chips or crackers, cookies, and fruit did not change. Use of full-fat cheese declined at the midpoint but returned to baseline in the post analysis. Overall, participants denied consumption of fatback during the study.

Exercise frequency, intensity, and total time per week were measured. The median frequency increased from 1 day or less to 2 to 3 days per week. Total minutes of exercise per week increased from an average of 90 before the study to 104 at the midpoint and 93 at the end. Intensity increased from a median of light to moderate.

Physician Contact

The number of workers with no physician visits in the past 6 months dropped from 31 to 25. At the beginning of the study, eight of the completers and three of the non-completers did not have a primary care physician. All were given names of local providers accepting new patients. Four of the eight completers without a physician were specifically referred due to their cardiovascular risk factors. At the end of the study, one had successfully arranged and completed a visit with a new primary care provider. The others either had not made an appointment or the appointment was for a future date. No difference was seen in hospital and emergency department use. Self-reported sick days did not change significantly.

Medications

Although one of the study objectives was to correlate medication use with lipid outcomes, the researchers experienced barriers to meeting this objective. Participant-reported data were inconsistent. Participant self-reported medication records were to be used to track medication changes over time. The intent was to identify the addition of anti-hyperlipidemia agents, dose changes, and lipid-related medication changes. During data collection interviews, it was noted that participants were often not aware of the names of their medications. The data given frequently involved color, shape, and size descriptions and were not always identifiable. It was not practical for par-

Table 5

Comparison by Occupational Group

	Managers (n = 33)		*Line Workers (n = 72)*	
	Pre	***Post***	***Pre***	***Post***
Mean total cholesterol	217.88	212.70	225.96	209.66
Mean low-density lipoprotein	134.73	125.39	139.91	125.91
Mean high-density lipoprotein	50.82	51.33	53.69	53.03
Mean triglycerides	160.15	190.06	167.03	158.68
Exercise				
Mean frequency[a]	2.33	2.75	2.01	2.82
Mean intensity[b]	1.77	1.88	1.48	2.03
Mean time (minutes)	139.6	101.7	60.47	88.49
Mean weight (lb)	192.06	191.87	182.00	179.61
Mean body mass index	31.05	31.00	29.95	29.68
Average blood pressure (mmHg)	124/78	126/80	123/75	127/77

[a]Likert scale (1 = never; 2 = ⩽ 1 day per week; 3 = 2 to 3 days per week; 4 = 4 to 5 days per week; and 5 = 6 to 7 days per week).
[b]Likert scale (1 = light; 2 = moderate; and 3 = vigorous).

ticipants to bring their medications to their workplace for identification, as they did not have safe storage available for the medications and temperatures were not conducive to safely store medications in automobiles. Most participants did not carry a list of their medications. Although all participants were PHC employees, not all had PHC insurance, so insurance records could not be consistently used to verify medications prescribed.

DISCUSSION

This 7-month workplace cholesterol awareness program demonstrated the ability of the intervention to decrease heart disease risks and improve health behaviors. The participants in this study were stratified to target the highest-risk employees, but workers ultimately self-selected. In addition, those who both self-selected and completed the study had fewer risks than those who self-selected but then did not complete the program. Other authors have documented the limitations of self-selection. Such participants are typically more motivated in the beginning and are more likely to be more open to making better lifestyle choices (Aldana, Greenlaw, Diehl, Englert, & Jackson, 2002; Hyman, Paradis, & Flora, 1992; Poole, Kumpfer, & Pett, 2001). It is possible that employees who never agreed to participate could have even higher risks than those who consented to participate but did not complete.

Total cholesterol and LDL levels were significantly reduced with this intervention. Even a 1% reduction in total cholesterol level can decrease coronary risk by 2% to 3% (Aldana et al., 2002; Manson et al., 1992). A 10% reduction in total cholesterol has been linked to a 13% reduction in coronary heart disease mortality and a 10% reduction in all-cause mortality (Gould, Rossouw, Santanello, Heyse, & Furberg, 1995). This 7-month intervention resulted in an average 5.2% reduction in total cholesterol for those who completed the intervention. The younger the age when cholesterol is lowered, the greater the reduction in risk (Law, Wald, & Thompson, 1994). Several of the participants in this study were young. For future interventions, this young, otherwise assumed healthy group should be encouraged to participate, especially if they have a strong family history of heart disease.

Participants who achieved their LDL goal at the end of the study were thinner, were less likely to smoke, had lower blood pressure, had lower triglyceride levels, and were older than those who were not at goal. In both groups (at LDL goal and not at goal), eight individuals did not have a primary care physician at the start of the study. In both groups, one of those eight had a primary care physician by the end of the study. In the at-goal group, only one of the five was referred to a physician based on laboratory data during the study; this was the one individual who did find a physician by the end of the study. All three in the not-at-goal group were referred to a physician based on laboratory data, but none had successfully scheduled and attended a physician visit by the end of the study. Others have experienced similar difficulty encouraging workers without physicians to seek health care (Greene & Strychar, 1992; Pearson & Peters, 1997).

It was interesting to explore differences between managers and line workers in local businesses. Not many conclusions can be drawn, but managers overall weighed more and had higher triglyceride levels. Also, managers exercised longer, but had less improvement in their exercise habits than did line workers. This analysis was not part of the original proposal for this study; however, trends noted during data collection warranted mention.

HDL levels did not change significantly during this 7-month intervention. The average HDL level of the study

population was higher than anticipated, probably reflecting the self-selected participants. Individual instances of participants with very low HDL levels, at young ages in some cases, and a strong family history of heart disease were found. All were referred to their primary care physician for further intervention. Low HDL level is strongly linked to cardiovascular disease (Barter, 2002; Despres, Lemieux, Dagenais, Cantin, & Lamarche, 2000; Robins, 2001; Robins et al., 2003; Wierzbicki & Mikhailidis, 2002). Low HDL level is an even better indicator of diabetes and obesity than high LDL level (Robins, 2001). Small increases in HDL level can significantly decrease the risk of coronary heart disease (Barter).

Blood pressure did not change significantly during the assessment period in this study. Although interventions targeted lipid-associated dietary changes, salt was not a focus. Also, exercise and weight did not change significantly, so the total lifestyle changes seen in this study may not have been enough to lower blood pressure in this time frame. However, the percent of workers at their blood pressure goal did increase. This indicated that blood pressures were highly variable during the study, but more employees reached their goal over time. The measurements were taken in the workplace during work hours, potentially contributing to the variability of the readings.

Several lifestyle changes were targeted in this intervention and measured. Weight did not change as much as desired during this 7-month study. Body mass index has been demonstrated to be closely linked to increased risk of diabetes, metabolic syndrome, and cardiovascular disease (Wang, McDonald, Champagne, & Edington, 2004). Diet is a key factor in healthy living and heart disease prevention. However, it is difficult to measure dietary patterns and changes. The researchers did not find statistically significant changes with the questionnaire. Two other possible tools have been described; both the Quebec Heart Health Demonstration Project (Huot, Paradis, & Ledoux, 2004) and the Coronary Health Improvement Project (Aldana et al., 2002) have had success in improving cardiovascular risk. Validated dietary scales improve the ability to compare trials and the impact of interventions on real behavior change.

Participant self-reported medication use was not effective in this study. As other investigators have found, workers often do not know the names, doses, or uses of their medications. Health literacy data have demonstrated a direct correlation between health literacy and medication adherence (Keller, Wright, & Pace, 2008; Roth & Ivey, 2005). Although no adherence measure was used in this study, attempts to obtain verbal medication lists from employees indicated significant adherence and literacy concerns. All individuals should be encouraged to carry written documentation of medications. Eventually, electronic health profiles accessible by all providers will enhance health care, assuring all providers complete and updated information for each employee (Blobel, 2007; Interoperability Initiative for a European eHealth Area: www.i2-health.org/ehealth-iop/what-is-eHealth).

By the end of the study, 25 participants who were referred to their primary care physicians still had not been seen, although several had appointments. Another nine were seen but had not been prescribed a lipid-lowering medication or not had a previously ineffective regimen changed (Greene & Strychar, 1992; Pearson & Peters, 1997; Wing, 1993). Use of lipid-lowering medications is an effective means of lipid change (Wierzbicki & Mikhailidis, 2002).

Longer-term intervention is needed to optimally improve outcomes. One study showed that the full effect of risk reduction may not be seen for 5 years (Law et al., 1994). Employers and others seeking long-term solutions should remember that consistent intervention over time is more effective than single interventions (Huot et al., 2004; Perri, Sears, & Clark, 1993; Wing, 1993).

IMPLICATIONS FOR OCCUPATIONAL HEALTH NURSES

Occupational health nurses are uniquely qualified to assess, plan, coordinate, and implement health promotion and chronic disease management programs. Such opportunities are facilitated by having a captive audience (employees), support from the employer, and access to physical resources (meeting rooms, computers, and projectors). Limitations may include lack of time to introduce new programs, budget, and specialized skills such as establishing a research project or tracking and analyzing data.

It has been the authors' experience that occupational health nurses often live close to their worksite and thus are familiar with local resources. Although this article discussed the partnership between occupational health nurses and diabetes educators from a local hospital, many other partnerships are possible. For example, students from a nursing program could assist with blood pressure and glucose screenings, or could organize a health fair for employees. Students from a physical therapy program could help design an exercise program. Pharmacy students could help assess medication needs and compliance. Although such students provide free labor, are usually eager to help, and receive oversight from their instructors, a contractual agreement may be required between the employer and the school. Partnerships may involve professionals from the local hospital, university, or health department. Partnering with another occupational health nurse may also be possible. Instructors and professors at universities possess data tracking, statistical analysis, and publication skills. Finally, health insurance companies can be powerful partners. They have access to significant data, know where the most money is being spent, and can direct occupational health nurses toward the greatest savings.

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REFERENCES

Aldana, S. G., Greenlaw, R., Diehl, H. A., Englert, H., & Jackson, R. (2002). Impact of the Coronary Health Improvement Project (CHIP) on several employee populations. *Journal of Occupational and Environmental Medicine, 44*(9), 831-839.

American Heart Association. (2007). *Heart disease and stroke statistics*. Retrieved May 30, 2008, from www.americanheart.org/

downloadable/heart/1166712318459HS_StatsInsideText.pdf
Anderson, J., & Dusenbury, L. (1999). An intervention project in Colorado. *AAOHN Journal, 47*(3), 99-106.
Anderson, R. N., & Smith, B. L. (2005). *Deaths: Leading causes for 2002.* Retrieved May 30, 2008, from www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_17.pdf
Baer, J. T. (1993). Improved plasma cholesterol levels in men after a nutrition education program at the worksite. *Journal of the American Dietetic Association, 93*(6), 658-663.
Barter, P. (2002). Treatment of dyslipidemia in high-risk patients: Too little, too late. *International Journal of Clinical Practice, 130*(Suppl.), 15-19.
Blobel, B. (2007). Comparing approaches for advanced e-health security infrastructures. *International Journal of Health Informatics, 76*, 454-459.
Bloch, M. J., Armstrong, D. S., Dettling, L., Hardy, A., Caterino, K., & Barrie, S. (2006). Partners in lowering cholesterol: Comparison of a multidisciplinary educational program, monetary incentives, or usual care in the treatment of dyslipidemia identified among employees. *Journal of Occupational and Environmental Medicine, 48*, 675-681.
Despres, J. P., Lemieux, I., Dagenais, G. R., Cantin, B., & Lamarche, B. (2000). HDL-cholesterol as a marker of coronary heart disease risk: The Quebec cardiovascular study. *Arthrosclerosis, 153*(2), 263-272.
Emmons, K. M., Linnan, L. A., Shadel, W. G., Marcus, B., & Abrams, D. B. (1999). The working health project: A worksite health-promotion trial targeting physical activity, diet and smoking. *Journal of Occupational and Environmental Medicine, 41*, 545-550.
Glanz, K., Sorensen, G., & Farmer, A. (1996). The health impact of worksite nutrition and cholesterol intervention programs. *American Journal of Health Promotion, 10*(6), 453-470.
Goetzel, R. Z., Hawkins, K., Ozminkowski, R. J., & Wang, S. (2003). The health and productivity cost burden of the "top 10" physical and mental health conditions affecting six large U.S. employers in 1999. *Journal of Occupational and Environmental Medicine, 45*(1), 5-14.
Gould, A. L., Rossouw, J. E., Santanello, N. C., Heyse, J. F., & Furberg, C. D. (1995). Cholesterol reduction yields clinical benefit: A new look at old data. *Circulation, 91*(8), 2274-2282.
Greene, G. W., & Strychar, I. (1992). Participation in a worksite cholesterol education program in a university setting. *Journal of the American Dietetic Association, 92*, 1376-1381.
Hartman, T. J., Himes, J. H., McCarthy, P. R., & Kushe, L. H. (1995). Effects of a low-fat, worksite intervention on blood lipids and lipoproteins. *Journal of Occupational and Environmental Medicine, 37*(6), 690-696.
Hay, J. W., & Sterling, K. L. (2005). Cost effectiveness of treating low HDL-cholesterol in the primary prevention of coronary heart disease. *Pharmacoeconomics, 23*(2), 133-141.
Huot, I., Paradis, G., Ledoux, M., & Quebec Heart Health Demonstration Project Research Group. (2004). Effects of the Quebec heart health demonstration project on adult dietary behaviours. *Preventive Medicine, 38*, 137-148.
Hyman, D. J., Paradis, G., & Flora, J. A. (1992). *A comparison of participants and nonparticipants in a worksite cholesterol screening.* Retrieved December 1, 2008, from www.i2-health.org/ehealth-iop/what-is-eHealth
Karlenhagen, S., & Ohlson, C. G. (2003). Primary prevention of cardiovascular disease by an occupational health service. *Preventive Medicine, 37*, 219-225.
Keller, D. L., Wright, J., & Pace, H. A. (2008). Impact of health literacy on health outcomes in ambulatory care patients: A systematic review. *Annals of Pharmacotherapy, 42*, 1271-1281.
Law, M. R., Wald, N. J., & Thompson, S. G. (1994). By how much and how quickly does reduction in serum cholesterol concentration lower risk of ischemic heart disease. *BMJ, 308*(6925), 367-372.
Manson, J. E., Tosteson, H., Ridker, P. M., Satterfield, S., Hebert, P., O'Connor, G. T., et al. (1992). The primary prevention of myocardial infarction. *New England Journal of Medicine, 326*(21), 1406-1416.
National Cholesterol Education Program. (2002). Third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol (Adult Treatment Panel III) final report. *Circulation, 106*(25), 3143-3421.
National Heart, Lung and Blood Institute. (2008). *Third report of the Expert Panel on Detection, Evaluation and Treatment of High Cholesterol in Adults (ATP III final report).* Retrieved May 30, 2008, from www.nhlbi.nih.gov/guidelines/cholesterol/atp3rpt.htm
North Carolina Prevention Partners. (2008). *Report card 2008.* Retrieved May 30, 2008, from www.ncpreventionpartners.org/content/document/2008ReportCard.pdf
Ozminkowski, R. J., Goetzel, R. Z., Santoro, J., Saenz, B. J., Eley, C., & Gorsky, B. (2004). Estimating risk reduction required to break even in a health promotion program. *American Journal of Health Promotion, 18*(4), 316-325.
Pearson, T. A., & Peters, T. D. (1997). The treatment gap in coronary artery disease and heart failure: Community standards and the post-discharge patient. *American Journal of Cardiology, 80*(8B), 45H-52H.
Perovich, N. J., & Sandoval, W. M. (1995). Outcomes of a worksite cholesterol education program over a 5-year period. *Journal of the American Dietetic Association, 95*(5), 589-590.
Perri, M. G., Sears, S. F. Jr., & Clark, J. E. (1993). Strategies for improving weight loss: Toward a continuous model of obesity management. *Diabetes Care, 16*, 200-209.
Pescatello, L. S., Murphy, D., Vollono, J., Lynch, E., Bernene, J., & Costanzo, D. (2001). The cardiovascular health impact of an incentive worksite health promotion program. *American Journal of Health Promotion, 16*(1), 16-20.
Poole, K., Kumpfer, K., & Pett, M. (2001). The impact of an incentive based worksite health promotion program on modifiable health risk factors. *American Journal of Health Promotion, 16*(1), 21-26.
Robins, S. J. (2001). Targeting low-high density lipoprotein cholesterol for therapy: Lessons from the Veterans Affairs high-density lipoprotein intervention trial. *American Journal of Cardiology, 88*(12A), 19N-23N.
Robins, S. J., Rubins, H. B., Faas, F. H., Schaefer, E. J., Elam, M. B., Anderson, J. W., et al. (2003). Insulin resistance and cholesterol events with low HDL cholesterol. *Diabetes Care, 26*, 1513-1517.
Roth, M. T., & Ivey, J. L. (2005). Self-reported medication use in community-residing older adults: A pilot study. *American Journal of Geriatric Pharmacotherapy, 3*(3), 196-204.
Wang, F., McDonald, T., Champagne, L. J., & Edington, D. W. (2004). Relationship of body mass index and physical activity to health care costs among employees. *Journal of Occupational and Environmental Medicine, 46*(5), 428-436.
Wierzbicki, A. S., & Mikhailidis, D. P. (2002). Beyond LDL-C: The importance of raising HDL-C. *Current Medical Research and Opinion, 18*(1), 36-44.
Wing, R. R. (1993). Behavioral treatment of obesity: Its application to type II diabetes. *Diabetes Care, 16*, 193-199.

Worksite Wellness: A Cholesterol Awareness Program

This issue of the AAOHN JOURNAL contains a Continuing Nursing Education Module on "Worksite Wellness: A Cholesterol Awareness Program." 1.0 contact hour of continuing nursing education credit will be awarded by AAOHN upon successful completion of the posttest and evaluation.

A certificate will be awarded and the scored test will be returned when the following requirements are met by the participant: (1) The completed answer sheet is received at AAOHN on or before January 31, 2010; (2) A score of 70% (7 correct answers) is achieved by the participant; (3) The answer sheet is accompanied by a check or money order for $15.00 ($20.00 non-members), or purchase online for $10.00 ($15.00 non-members) at www.aaohn.org. Expect up to 4 weeks for delivery of the certificate.

Upon completion of this lesson, the occupational health nurse will be able to:

1. Discuss how lipid management is a cornerstone of cardiovascular risk reduction.

2. Describe the methodology of the Cholesterol Awareness Program (CAP) study.

3. Discuss the results of the CAP study and their implications for practice.

4. Describe how occupational health nurses can partner with other health care providers to improve employee health at the worksite.

AAOHN is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

AAOHN is additionally approved as a provider by the California Board of Registered Nursing (#CEP9283) and the Louisiana State Board of Nursing (#LSBN3).

Contact hour credits received for successful completion of the posttest and evaluation may be used for relicensure, certification, or re-certification.

Directions: Circle the letter of the best answer on the answer sheet provided. (Note: You may submit a photocopy for processing.)

1. According to the North Carolina Prevention Partners (2008), obesity, malnutrition, physical inactivity, and tobacco-related illnesses cost the state _____ billion per year.
A. $11.78.
B. $18.43.
C. $25.82.
D. $32.76.

2. What was the final sample size of employees in this study?
A. 87.
B. 105.
C. 139.
D. 142.

3. During which class of the intervention program did the instructors focus on risk factors associated with elevated cholesterol and heart disease, medications, and the importance of health care?
A. 1.
B. 2.
C. 3.
D. 4.

4. The greatest positive changes in exercise occurred:
A. At baseline.
B. At midpoint.
C. After the program.

5. Which of the following was a statistically significant change in lipid levels from the beginning to end of the program?
A. Decrease in total cholesterol.
B. Increase in low-density lipoprotein level.
C. Increase in high-density lipoprotein level.
D. Decrease in triglyceride level.

6. At the end of the program, how many participants were receiving evidence-based care?
A. 27.
B. 34.
C. 49.
D. 75.

7. On comparison of managers to line workers, a study result was:
A. Managers had a greater improvement in exercise.
B. Line workers lost a large amount of weight.
C. Line workers consumed less reduced-fat margarine.
D. High-density lipoprotein levels increased slightly among managers.

8. The number of workers with no physician visits in the past 6 months dropped from 31 to:
A. 23.
B. 25.
C. 27.
D. 29.

9. A 10% reduction in total cholesterol has been linked to a ___% reduction in coronary heart disease mortality:
A. 9.
B. 11.
C. 13.
D. 15.

10. According to the study by Law, Wald, and Thompson (1994), the full effect of risk reduction may not be seen for __ years.
A. 2.
B. 3.
C. 4.
D. 5.

Worksite Wellness: A Cholesterol Awareness Program
February 2009

(Goal: To gain ideas and strategies to enhance personal and professional growth in occupational health nursing.)

Mark one answer only!
(You may submit a photocopy of the answer sheet for processing.)

1.	A	B	C	D	**6.**	A	B	C	D
2.	A	B	C	D	**7.**	A	B	C	D
3.	A	B	C	D	**8.**	A	B	C	D
4.	A	B	C		**9.**	A	B	C	D
5.	A	B	C	D	**10.**	A	B	C	D

EVALUATION (must be completed to obtain credit)

Please use the scale below to evaluate this continuing education module.

	4 - To a great extent	3 - To some extent	2 - To little extent	1 - To no extent
1. As a result of completing this module, I am able to:				
A. Discuss how lipid management is a cornerstone of cardiovascular risk reduction.	4	3	2	1
B. Describe the methodology of the Cholesterol Awareness Program (CAP) study.	4	3	2	1
C. Discuss the results of the CAP study and their implications for practice.	4	3	2	1
D. Describe how occupational health nurses can partner with other health care providers to improve employee health at the worksite.	4	3	2	1
2. The objectives were relevant to the overall goal of this independent study module.	4	3	2	1
3. The teaching/learning resources were effective for the content.	4	3	2	1
4. How much time (in minutes) was required to read this module and take the test?	60	70	80	90

Please print or type: (this information will be used to prepare your certificate of completion for the module).
DEADLINE: JANUARY 31, 2010. Allow up to 4 weeks for processing.

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