Using PRECEDE to Develop a Weight Management Program for Disadvantaged Young Adults

Jennifer R. Walsh, PhD, RD; Adrienne A. White, PhD, RD; Kendra K. Kattelmann, PhD, RDN

This supplemental article was supported by a National Research Initiative Grant from the US Department of Agriculture National Institute for Food and Agriculture.
Using PRECEDE to Develop a Weight Management Program for Disadvantaged Young Adults
Jennifer R. Walsh, PhD, RD1; Adrienne A. White, PhD, RD2; Kendra K. Kattelmann, PhD, RDN3

ABSTRACT
Objective: To conduct a needs assessment using the PRECEDE model for the development of a weight management program for low-income young adults.
Design: Four phases were implemented using qualitative (focus groups and interviews) and quantitative (survey) methodologies, with steering committee guidance.
Setting: Northeastern residential vocational center.
Participants: Convenience sample of low-income young adults, 18–24 years old (total n = 203), who were attending a job training vocational center.
Phenomenon of Interest: General themes of life satisfaction determinants and issues related to weight, self-reported weight and related behavior, existing environmental supports, and desired changes of behavioral and environmental influences of weight.
Analysis: Content analysis of qualitative data; descriptive analysis and Student t test.
Results: Self-image and discrimination were themes for weight issues. More than half of participants were overweight or obese (57%) and had low levels of physical activity (58%). Self-reported fruit and vegetable intake was inadequate (<2.5 cups/d). Identified environmental factors most needing improvement were accessibility for walking and biking and availability of healthful food. Participants reported exercising, getting adequate sleep, eating healthful snacks, and effectively managing stress as behavior they were willing to change.
Conclusions and Implications: The PRECEDE model was useful to identify concerns, priorities, and modifiable factors among a young adult community that can increase the relevancy of a weight management program.

INTRODUCTION
Over 30 million adults in the US are 18–24 years old, which represents almost 10% of the total population.1 Although young adults who do not attend post-secondary schools represent about half of all young adults, they remain an understudied group compared to young adults who attend college.1,2 As alternatives to 2- and 4-year colleges, young adults may choose job training programs. Almost 60,000 were enrolled in government job training programs in 2010.3 Many of these young adults are low income, minorities, and at great risk of health disparities.1,4 Young adults are at particularly high risk of excess weight gain, which may vary by age and sex.2,5 The prevalence of obesity greatly increases from adolescence into the early 30s, and for this specific audience, there are no programs to address this concern.2,5 Therefore, weight management programs are needed for young adults.9 Although programs designed in the context of young adults’ priorities and interests are ideal, weight management programs may be perceived as challenging with disadvantaged young adults, because their urgent needs are related to the basic needs of housing and financial security through employment. These priorities may be perceived as having more current relevance than health-related priorities.7 Since disadvantaged young adults may have to satisfy basic needs, they are not likely to focus on the future, which limits the effect of any attempts to create motivation for behavior change by emphasizing long-term health benefits.8

The community-based participatory research (CBPR) approach has been used to find solutions to health-related issues that are supported and implemented by the priority population.9,10 With this...
approach, young adults have the opportunity to provide input and be involved in the development of programs designed to address their needs. This approach is also useful in identifying ways to design programs to capitalize on a community’s priorities and interests. PRECEDE-PROCEED is a health program planning model with participatory research principles that has been used in a variety of communities to optimize health. PRECEDE consists of 4 planning phases, and PROCEED provides program implementation and evaluation. PRECEDE—the acronym for predisposing, reinforcing, enabling, constructs in education/ecological diagnosis and evaluation—is the preliminary assessment for identifying and categorizing factors affecting behavior change. In phase 1, the Social Diagnosis, an assessment of the indicator of quality of life and related health issues is conducted. In phase 2, Epidemiological Diagnosis, the health issues and their implications within the community are explored. In phase 3, Education and Environmental Diagnosis, factors affecting behavior related to health issues are identified and categorized. In phase 4, Policy and Administrative Diagnosis, resources, personnel, and policies are aligned to ensure success of the program within the community. This model is flexible and scalable in that it can be adapted to any community with a variety of assessment methods, both quantitative and qualitative. PRECEDE-PROCEED has been applied in a disadvantaged young adult community for smoking cessation, but it has not been used to develop weight management programs targeting prevention of obesity for low-income young adults.

The goal of this study was to conduct a needs assessment using the PRECEDE model to inform the development of a weight management intervention for low-income young adults attending a residential job training center. This study was the preliminary assessment for the development of the Young Adults Eating and Active for Health—Vocational (YEAH-VOC) program. The 4 objectives, specific to each phase of PRECEDE, were to:

- diagnose the social conditions at the job training center using focus groups and key informant interviews;
- diagnose the epidemiological conditions by assessing the behavior of the participants using a survey and the environment through an audit of the job training center;
- identify the willingness of the participants to change factors that predispose, enable, and/or reinforce behavior related to weight management using an educational and ecological assessment, and identify how important making these changes is to the participants; and
- diagnose the policy and administrative conditions of the job training center that would be facilitators or barriers to a weight management intervention through informal meetings.

METHODS

From summer 2007 through fall 2009, the PRECEDE model was applied in 4 sequential phases using qualitative and quantitative methods to determine demographic, epidemiological, behavioral, organizational, and administrative diagnoses. The investigators held meetings to define goals and objectives for the committee and to share information and supporting agendas. This time also was an opportunity for researchers and external community educators to learn more about the priority population. For phase 1, focus groups and interviews occurred during fall 2007, and an online survey was conducted in spring 2008 to start phase 2. Upon development of tools, a 3-step audit of the built and food environment was conducted in fall 2008. Finally, phase 3 was an online survey completed in spring 2009, and phase 4, a qualitative assessment, ended in December 2009. Surveys were hosted using online resources for ease of data collection. Participants provided consent online prior to completion of the surveys. All methods were approved by the University of Maine Institutional Review Board. This project was supported by a National Research Initiative Grant from the USDA National Institute for Food and Agriculture.

Participants and Recruitment

Participants were low income, 18–24 years old, and attending a residential job training program with an estimated enrollment of over 300. Most participants were from the northeastern US, and all had incomes at or below 100% of the federal poverty level. Based on a Test of Adult Basic Education score, the average English literacy level among young adults at the job training program was fifth grade. Convenient samples were recruited through word of mouth and flyers for each phase of the study. Small cash incentives of $5 or $10 were given to participants and staff members.

Structure and Function of the Steering Committee

A steering committee of researchers and community stakeholders—including job training participants and program staff from the recreation, wellness, and counseling departments—met typically once a month to guide each step of the PRECEDE process. The researcher identified the priority population and developed a partnership with the academy director for the job training program, who identified staff members for the steering committee and was a champion for the program. The equitable partnership worked to identify best approaches and implement assessments, address logistics, analyze data, and form next steps. For example, through discussion, it was determined that groups of supervised young adults would be best to carry out an assessment of the food environment. Steering committee members were provided small incentives of fruit or gift cards for local grocery stores.

Protocols and Instruments by Phase

Phase 1: Social assessment. To identify the social conditions related to their satisfaction with life and how health and weight affected life satisfaction, 4 focus groups were conducted with job training program participants (n = 19; 7 men). The focus groups were homogenous by sex, lasted approximately 90 minutes, and held in the job training program wellness center. Key informant interviews were conducted with participants (n = 2; 1 man, 1 woman) selected by the steering committee and staff members (n = 5) in private areas of the center at convenient times for the committee.
The Pittsburgh Sleep Quality Index included the following items:

- their own computers. The survey as they responded to questions at computer access and the researcher participants met in a classroom with items that needed further discussion. The focus groups were audio-taped, which was explained to participants in a hard-copy consent form that was read aloud. The discussion guide was pilot-tested in 2 focus groups, 1 each with men and women. Example questions included, “What will improve your satisfaction with your life?” and “How do different social situations affect how you eat?”

**Phase 2: Epidemiological, behavioral, and environmental assessment.** Participants (n = 81; 52 men) completed a 35-minute online survey about their eating, physical activity, and sleep behavior. Prior to the survey, they completed a screener to ensure eligibility based on age of 18–24 years old. In a series of groups, participants met in a classroom with computer access and the researcher read the survey to assist participants as they responded to questions at their own computers. The survey included the following items:

- The Pittsburgh Sleep Quality Index measures quality and quantity of sleep. The survey has 19 self-reported questions related to sleep over the past month. The items generate 7 component scores (sleep quality, sleep latency, duration, efficiency, disturbances, use of sleep medication, and daytime dysfunction), which are summed for a global Pittsburgh Sleep Quality Index score.

- The ecSatter Inventory measures eating competence. The ecSatter Inventory consists of 16 items that measure eating attitudes, food acceptance, internal regulation, and contextual skills such as meal planning. The internal reliability was tested and the Cronbach α coefficients for the subscales ranged from .65 to .84. Scores range from 0 to 48; a higher score indicates greater eating competence.

- The NCI Fruit and Vegetable Questionnaire is a 10-item questionnaire that includes assessing portion sizes of fruits and vegetables consumed.

- The International Physical Activity Questionnaire (short version) is a 7-item instrument used to measure physical activity.

- The Three Factor Eating Questionnaire is an 18-item instrument that measures (1) cognitive restraint and unrestrained eating behavior (restriction of food intake); (2) emotional eating and disinhibition (inability to resist emotional cues); and (3) subjective feelings of hunger (tendency to eat more than usual because of a loss of control over intake accompanied by subjective feelings of hunger).

- Demographics were assessed with 20 questions that were previously used with this young adult population.

Concurrently with the behavioral survey, the investigators conducted an environmental audit of the food and built environment within a 1-mile radius of the job training program. Access to healthful food, opportunities for physical activity, and health-related messaging were assessed. Detailed methods and analysis have been published elsewhere. Data from this phase and preceding phases were used by the steering committee to identify the intervention’s behavioral focus and theoretical framework. Delivery methods for the intervention also were explored, and components were determined.

**Phase 3: Educational and ecological assessment.** A key part of this phase was to identify categories of causal factors related to weight management with a focus on predisposing factors that facilitate or hinder motivation for change (eg, beliefs) and the enabling factors that facilitate performing the behavior (eg, accessibility and affordability of resources). Key to implementing this phase was identifying and prioritizing the most important and changeable factors to change behavior and the environment from the perspective of young adults. The Behavior, Environment, and Changeability Survey was developed specifically for this work because there were no instruments available to assess how important and how changeable young adults ranked key behavioral and environmental weight-related factors. Participants (n = 101; 52 men) ranked 4 categories of factors from 5 = highest rank to 1 = lowest rank for each of the following areas: (1) environmental factors perceived to be most important to support the ability to reduce or prevent unhealthy weight gain (eg, biking-friendly environment); (2) behavior most important for health (eg, eating healthy snacks); (3) behavior they were most willing to change (eg, managing stress); and (4) a topic about which they had a desire to learn more (eg, getting 7–9 hours of sleep per night). Factors within each category were selected based on results from prior phases and previous work with the young adult population.

Data Analysis

Content analysis of qualitative data was based on grounded theory and conducted independently by 2 trained researchers using NVivo (version 7.0, QSR International, Cambridge, MA, 2006); a third researcher assisted with coding inconsistencies to create consensus. High intercoder reliability (>0.80) was found among the 3 trained data analyzers. Quantitative data were analyzed using SPSS Statistics (version 18.0, SPSS, Inc, Chicago, IL, 2009). Data were tested for normality, and non-normal data were transformed for analysis. Descriptive statistics and Student t tests were conducted to identify differences by age groups and sex.
for sleep behavior, eating behavior, fruit and vegetable intake, and physical activity. An a priori \( P < .05 \) significance level was selected.

RESULTS
Diagnosis of Social Conditions Leading to Satisfaction With Life and Weight-related Issues

Themes from focus groups and interviews for determinants of life satisfaction are listed in Table 1. A total of 19 participants (n = 7 men) with a mean age of 20 ± 2 years participated in 4 focus groups (3–7 participants each). Regarding how weight-related issues affected life satisfaction, identified themes included many factors that could lead to dissatisfaction with life: extreme body size, self-image and confidence issues, depression, discrimination, cultural and media messages that imply specific body types or characteristics are most desirable, emotional eating, disordered eating (restrictive, compulsive), large portion sizes, and sedentary behavior. Increased risk of chronic disease was another weight-related issue mentioned, as participants had family members with chronic disease, and a few men had personally experienced metabolic risk factors, such as hypertension.

When asked specifically about how health affected their satisfaction with life, focus group participants spoke of the impact physical and psychological health had on their well-being. They spoke of being faced with challenges of the job training environment that affect their life satisfaction, such as rules and the day-to-day structure of their schedule. The fact that basic needs such as housing were not met in childhood was also a theme. Weight concerns included self-image and discrimination, especially when considering employment.

Epidemiological Diagnosis Determined by Behavioral and Environmental Assessments

For the phase 2 diagnosis of behavior, most of the participants (n = 81; 52 men; 64%) were identified as non-Hispanic white (n = 48; 59%), Hispanic/Latino (n = 14; 17%), or non-Hispanic black (n = 10, 12%). The sample represented an even distribution of age; 50% (n = 40) were 18 or 19 years old and the others were 20–24 years old. Based on self-reported height and weight data, more than half (n = 46, 57%) had a body mass index (kg/m²) of overweight or obese. Although no sex differences were determined for fruit and vegetable intake, eating competence scores were lower for women than for men \((P < .05); Table 2\). Emotional eating and uncontrolled eating were significantly higher for women than for men \((P < .05). For sleep habits, women had lower sleep quality \((1.1 ± 0.6 vs 1.4 ± 0.7; P = .03), more sleep disturbances \((1.7 ± 0.5 vs 1.1 ± 0.5; P = .001), and greater daytime dysfunction \((1.2 ± 0.9 vs 1.7 ± 1.1; P = .05) than men (data not shown). Participants who were 18 or 19 years old reported lower fruit and vegetable intake \((1.7 ± 0.9 vs 2.3 ± 1.0; P = .03) and less sleep \((0.9 ± 0.9 vs 1.4 ± 1.0; P = .03) than students aged 20–24 years (data not shown).

Based on the phase 2 diagnosis of the environment, several environmental supports and areas needing improvement were identified. Although quite outdated, an assortment of recreational equipment, exercise areas, and programs were available at the training center with amenities like lockers, showers, and music. Students were well informed about the availability of facilities and services. A major issue was that access to these resources was limited to about 5 hours per day in the afternoon and evening. The center and local area were supportive for walking, but no options for biking were available. Two major walking paths were of concern because lighting was limited after dark.

Some policies and signage were in place to reinforce health at the job training program. Sexual responsibility policies and policies prohibiting smoking existed, and alcohol and drugs were strictly prohibited. No policies were in place to promote physical activity, offer healthful food at center functions, or provide healthful food or labeling at the cafeteria. Only about one third of all posted signs had messages promoting health, such as eating guidance in dining areas and prompts for physical activity opportunities.

The food environment on campus consisted of a cafeteria, small store with snack offerings, and separate vending area. The cafeteria offered a salad bar at lunch and dinner and had signs posted to encourage healthful eating. Fresh fruit, 100% fruit juice, non-fried vegetable sides, and diet soda were available. Young adults were allowed multiple servings of food, and no nutrition information was available. Other inadequacies were the lack of labeled special diet (ie, vegan) options, baked chips rather than regular, 100% whole-grain bread, low-fat/skim milk, milk alternatives, and high-fiber/low-sugar bread, low-fat/skim milk, milk alternatives, and high-fiber/low-sugar

<table>
<thead>
<tr>
<th>Table 1. Determinants of Life Satisfaction Themes From Focus Group and Key Informant Interviews of Young Adults (n = 21) and Staff (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic needs (ie, adequate shelter)</strong></td>
</tr>
<tr>
<td>Weather</td>
</tr>
<tr>
<td>Circumstantial</td>
</tr>
<tr>
<td>Education attainment</td>
</tr>
<tr>
<td>Personal goals and plans</td>
</tr>
<tr>
<td>Freedom/leisure time</td>
</tr>
<tr>
<td>Employment</td>
</tr>
<tr>
<td>Psychological health</td>
</tr>
<tr>
<td>Emotional health</td>
</tr>
<tr>
<td>Mental health</td>
</tr>
<tr>
<td>Past traumatic experiences</td>
</tr>
<tr>
<td>Discrimination</td>
</tr>
<tr>
<td>Peer pressure</td>
</tr>
</tbody>
</table>
Table 2. Body Mass Index and Weight-related Behavior of Young Adults (n = 81)

<table>
<thead>
<tr>
<th></th>
<th>Men (n = 52)</th>
<th>Women (n = 29)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body mass index (kg/m²)</td>
<td>27.0 ± 6.6</td>
<td>29.4 ± 8.7</td>
<td>NS</td>
</tr>
<tr>
<td>Total physical activity† (MET-min/wk)</td>
<td>5792.1 ± 5138.7</td>
<td>3254.2 ± 4508.2</td>
<td>.04</td>
</tr>
<tr>
<td>Fruit and vegetable intake† (cups/d)</td>
<td>1.8 ± 0.89</td>
<td>2.2 ± 1.1</td>
<td>NS</td>
</tr>
<tr>
<td>Eating competence‡</td>
<td>31.2 ± 6.8</td>
<td>24.0 ± 9.6</td>
<td>.001</td>
</tr>
<tr>
<td>Cognitive restraint†</td>
<td>36.8 ± 21.8</td>
<td>46.2 ± 20.2</td>
<td>NS</td>
</tr>
<tr>
<td>Uncontrolled eating‡</td>
<td>32.0 ± 20.7</td>
<td>42.5 ± 20.6</td>
<td>.04</td>
</tr>
<tr>
<td>Emotional eating‡</td>
<td>19.0 ± 24.3</td>
<td>33.7 ± 24.6</td>
<td>.01</td>
</tr>
</tbody>
</table>

NS indicates not significant.
*Significant at P < .05; †Based on the International Physical Activity Questionnaire; MET = ratio of metabolic rate during a specific physical activity to a reference of metabolic rate at rest, that is, activity taking into account energy expenditure. According to the 2008 Physical Activity Guidelines for Americans, health benefits of physical activity occur at a range of 500–1000 MET/week (Physical Activity Guidelines for Americans, 2008); ‡Based on the National Cancer Institute Screener; ‡Range of 0–48; score > 32 indicates eating competence; ‡Based on the Three Factor Eating Questionnaire R-18; 0 = low, 100 = high behavior.

Note: Student’s t tests were used.

cereals. Vending machines had a limited number of healthful or low-calorie beverages, and there were no high-fiber or baked snacks available.

Ecological and Educational Diagnosis

Results of phase 3, to identify the importance of changing behavior and willingness of young adults to change behavior related to weight management, are presented in Table 3. The top 5 priorities in each category ranked by participants are shown. Based on these data, in addition to the results of the previous phases, it was determined that an intervention addressing multiple behaviors would best meet the needs of young adults attending residential job training programs, particularly fruit and vegetable intake, exercise, and stress management, including sleep habits and time management. An individualized approach, such as regular messaging that aligns with participants’ needs and interests, would also be ideal. Based on the experience of collecting data during the study assessments, a classroom setting was selected for the intervention, as it would provide an opportunity for face-to-face contact with the researcher in addition to peer support for participants. In addition, the steering committee and researchers agreed that the intervention should include online educational modules and goal setting as an opportunity for providing learning applications as well as the benefit of long-term intervention sustainability. The modules also would be a way to provide participants with education to adopt healthful behaviors and to develop strategies to manage the food and built environment, with a specific focus on accessing healthful food and identifying opportunities for physical activities like walking. Following the developed intervention, participants may benefit from individualized messaging for reinforcement of the intervention.

Administrative and Policy Diagnosis, and Intervention Alignment

The primary areas addressed to facilitate a smooth implementation of the intervention were financial resources, scheduling, facilities, personnel support, and intervention delivery. In addition to grant funds for the intervention, steering committee members sought further funds through the job training program to host a program-wide event to pique interest among potential intervention participants. To provide the intervention in a face-to-face and online format, the steering committee worked with job training program administrators to make arrangements for classroom space, technological support, and staff liaisons for student contact throughout the training day. Based on the initial assessment phases, integrating the intervention during the daytime, when young adults were most engaged in the job training program, was necessary for optimal attendance in the intervention. Classrooms with computers and availability before participant lunchtimes were provided for the intervention. The job training program information technology support staff member was designated to assist with any computer or Internet issues. Staff members who met with the majority of students on a daily basis formed a communication system to provide messaging with reminders related to the intervention. Additionally, 4 options were proposed for implementing stage-based behavioral messages identified in phase 3: (1) electronic messages as email; (2) text messages; (3) print messages as postal mail; or (4) print messages delivered in participant bedrooms by resident assistants. The fourth option was most desirable and realistic for young adults to receive messages on a regular basis throughout the intervention.

DISCUSSION

A community-based steering committee consistently guided the sequential application of the PRECEDE phases. Data collected in the 4 phases provided the diagnosis of social, epidemiological, environmental, educational, ecological, administrative, and policy influences of weight management. By comprehensively following the model, the community was prepared for development and alignment of the intervention within the job training program. The continuous input and involvement of the steering committee and participants guaranteed the influence of community priorities in the subsequently developed intervention.

Life satisfaction themes from participants, such as basic needs, are consistent with those from other young adults with similar
Concerns of weight as prevalence among young adults implications, and the high smoking satisfaction, with favorable social negatively or positively in has been noted by others to apparent in this study. Substance use fi

psychological health as being greater anfl

improvements in life satisfaction than that of physical health on life satisfaction.40 Physical activity was higher the walking-only campus than those in the larger study.43 Physical activity was higher than other reports using the same instrument.39,41 This discrepancy may be a result of the walking-only campus of the job training program and the policy that vehicles were not allowed on campus. Other considerations are social desirability bias or an inability to accurately assess activity.

The results were most helpful in revealing behavioral foci and environmental priorities for the intervention. The administrative and organizational diagnosis reinforced the necessity of a steering committee and administrative investment for the success of the intervention. Several logistical barriers, such as facilities and personnel support, would have been impossible to resolve solely by the researchers.

Limitations and Lessons Learned

Limitations of this study included the small, convenient sample recruited for each phase and the inconsistent representation of young adults within the steering committee. Generalizability to other audiences is limited because of the specific focus on disadvantaged young adults. Additionally, the interviewer was also a data coder, which may have introduced bias into the qualitative data analysis. The investigators faced challenges to keep momentum with the steering committee and to access and connect with the priority audience. Although several steering committee members lacked commitment throughout the study duration, the overall dynamic and cohesive steering committee was necessary for grounding the project. Consistent with CBPR work,43 merging the agendas of all members forced researchers to be flexible so that everyone benefited from being involved.

As identified in other research,32 challenges arose during attempts to access and involve young adults on a regular basis because of other priorities that often included leisure time with friends. Ultimately, as with other CBPR studies,10,43 compensation proved necessary despite attempts to identify other ways to encourage commitment and participation. Finally, it was necessary for the researchers to experience the culture and day-to-day life of the center in order to connect with and relate to the priority audience.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The long process of multiple years when using the PRECEDE model must be contemplated,11 and strong community relationships with trust and a common interest are necessary. This study was the outcome of applying the PRECEDE model with the guidance of a community-based steering committee. Nutrition professionals can use the results as a way to initially understand disadvantaged young adult audiences and the need for salient healthy weight management programs. Findings were used to inform the development of a weight management intervention, the first to be developed for disadvantaged young adults using PRECEDE.

ACKNOWLEDGMENTS

This project was supported by National Research Initiative Grant 2009-55215-05460 from the US Department of Agriculture National Institute for Food and Agriculture.
REFERENCES


