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Eating Patterns and Leisure-Time Exercise among Active Duty Military Personnel: Comparison to the Healthy People Objectives

Tracey J. Smith, PhD, RD; Laura E. Dotson, MS, MPH; Andrew J. Young, PhD; Alan White, PhD; Louise Hadden; COL(Ret.) Gaston P. Bathalon, PhD, RD; COL LesLee Funderburk, PhD, RD; Bernadette P. Marriott, PhD

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ABSTRACT

Objective To assess whether active duty military personnel meet Healthy People 2010 objectives for physical activity and fruit, vegetable, and whole-grain intake; the relationship of select demographic characteristics, lifestyle factors (eg, smoking), and eating patterns (eg, frequency and location of meals) on achieving diet and exercise-related Healthy People 2010 objectives; and the relationship of eating patterns to self-reported weight gain.

Methods Secondary data from 15,747 participants in the 2005 Department of Defense Health Related Behaviors Survey was analyzed.

Results More than 57% of respondents met the Healthy People 2010 guidelines for moderate or vigorous leisure exercise but only 3% reported eating fruit (once), vegetables (3 times), and whole grains (3 times) daily. Individuals who reported gaining weight during the previous year were more likely to skip breakfast and eat at, or from, a restaurant ≥2 times per week compared with those who did not gain weight ($P<0.001$). Regression analysis indicated that women were more likely to eat fruits (odds ratio [OR] 1.25) and vegetables (OR 1.20) and less likely than men to eat whole grains (OR 0.76) or engage in moderate or vigorous exercise (OR 0.71). Military personnel who skipped breakfast ≥2 times per week (OR 0.45) or ate at a restaurant/takeout food (OR 0.54) ≥2 times per week were significantly less likely to meet Healthy People 2010 guidelines for food intake (defined as achieving a daily intake of one or more fruits, three or more vegetables, and three or more servings of whole grains) and exercise (OR 0.88 and 0.82, respectively).

Conclusions Although the majority of military personnel met guidelines for physical activity, their intake of fruits, vegetables, and whole grains was suboptimal. Skipping breakfast and eating at, or from, restaurants were risk factors for poor nutrient intake and associated with weight gain. These data suggest that skipping breakfast and eating out deter achieving Healthy People 2010 objectives and provide targets for military programs to promote achieving these objectives.

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THE DIETARY GUIDELINES FOR AMERICANS (DGA), reviewed and released every 5 years, are "evidence-based nutritional guidance to promote health, reduce the risk of chronic diseases, and reduce the prevalence of overweight and obesity through improved nutrition and physical activity."[1] Key recommendations from the most recently released guidelines (2010 DGA) are based on two overarching themes: maintain calorie balance over time to achieve and sustain a healthy weight, and consume nutrient-dense foods and beverages.[2] The guidelines provide suggestions for reducing specific foods and food components (eg, refined grains); increasing certain foods and thus the nutrients they contain (eg, fruits, vegetables, and whole grains); and building healthy eating patterns. In addition, the US Department of Health and Human Services releases Healthy People objectives for the nation every 10 years that are based on the DGA. These measurable objectives are designed to guide the US population toward making informed health decisions and to assess the influence of prevention activities.

The Department of Defense (DoD) Survey of Health Related Behaviors Among Military Personnel (HRBS) is a large, worldwide (ie, nondeployed military personnel stateside and overseas), representative survey of active duty Army, Navy, Marine

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Corps, and Air Force personnel that has been administered approximately every 2 years since 1980. To help guide military-sponsored health promotion programs, the HRBS was expanded in 1995 to include questions related to diet and physical activity that were relevant to the DGA and Healthy People objectives.[3] For example, data from the 1998 and 2002 HRBS indicated that 67.7% and 70.2% of military personnel, respectively, engaged in strenuous physical activity for 20 minutes or more at least three times per week, thus meeting the 2010 Healthy People objectives.[4,5] In the 2005 HRBS, specific questions based on the 2010 Healthy People objectives and the 2005 DGA related to body weight, dietary intake, frequency/intensity of leisure-time exercise, blood pressure, cholesterol, and eating behavior patterns were included.[6]

Demographic characteristics (eg, sex and age), lifestyle habits (eg, smoking and alcohol consumption), and diet patterns (eg, eating occasions per day and location of meals) have been associated with poor dietary intake and physical inactivity in nonmilitary groups.[7-13] Data from the 2005 HRBS indicated that the prevalence of obesity in military personnel was significantly associated with increased age, being black or Hispanic/Latino, and being married.[14] However, how demographic characteristics (eg, sex and age), lifestyle habits (eg, smoking and alcohol consumption), and diet patterns (eg, eating occasions per day and location of meals) relate to poor dietary intake and physical inactivity has not been examined in a military population and findings may be dissimilar between military and nonmilitary populations. For example, among a sample of the nonmilitary US population, men engaged in more leisure-time physical activity per day compared with women.[8] However, because military personnel must meet physical fitness standards, these differences by sex in physical activity may not exist.[15] In addition, the identification of demographic characteristics, lifestyle habits, and diet patterns that are associated with meeting the Healthy People 2010 objectives or that may contribute to unwanted weight gain, can be helpful in improving existing military-sponsored health promotion programs.

The purpose of this secondary analysis of the HRBS public use data was threefold: to determine whether active duty military personnel in the Army, Navy, Marine Corps, and Air Force meet diet and physical activity-related Healthy People 2010 objectives; to assess the relationship of select demographic characteristics (eg, sex, age, education, and marital status), lifestyle factors (smoking and alcohol consumption), and eating patterns (eg, frequency and location of meals) on achieving diet and exercise-related Healthy People 2010 objectives; and to identify the relationship of select eating patterns with self-reported weight gain during the previous year.

METHODS AND PROCEDURES

The 2005 HRBS was conducted by Research Triangle Institute International under a collaborative agreement with Tricare Management Activity.[6] For our secondary analysis, we obtained a deidentified data file from Tricare Management Activity through a data use agreement.

Data Collection

The target population in the original survey included all nondeployed active duty personnel in the Army, Navy, Marine Corps, and Air Force with the exception of recruits, service academy students, persons absent without official leave, incarcerated individuals, and persons whose station had been changed permanently. The eligible target population totaled 1,011,852 individuals.

A random sample of 60 major military installations were selected as the first sampling stage representing all active duty personnel using a stratified, probability proportional size methodology. The installations were stratified by service arm (ie, Army, Navy, Marine Corps, and Air Force) and world region (ie, continental United States, afloat status for Navy). At each installation, military personnel were randomly selected by military pay grade (enlisted: E1-E3, E4-E6, E7-E9; officer: W1-W5, O1-O3, and O4-O10) and sex. In this study, officers and women were oversampled to make inferences due to their relatively low numbers in this subpopulation. Services were sampled equally to infer service-specific analysis; however, to permit detailed service analysis, Marine Corps participants were oversampled due to their smaller numbers.

The survey was administered onsite by Research Triangle Institute project staff at participating installations in group sessions from April to August 2005. Respondents anonymously and voluntarily answered the survey (average completion time was approximately 55 minutes). The study was approved by the Surgeon General of the US Army Human Subjects in Research Protection Office (Fort Detrick), and the Research Triangle Institute's Institutional Review Board. This secondary data analysis was approved by the Institutional Review Board at Abt Associates Inc.

Variables

The purpose of the 2005 HRBS was to "measure progress of the military in meeting selected Healthy People 2010 objectives and to continue the survey of substance abuse and health behaviors among military personnel."[6] A pilot study was conducted at one military installation for each service branch to "examine the adequacy of questionnaire item wording, formatting, and response alternatives. Based on analyses of item distributions and feedback from informal debriefings of selected participants, some items were refined and some item formatting or working was modified to enhance clarity."[6]

The survey included questions on self-reported body weight and height, weight history, diet, and leisure-time physical activity.[6] Self-reported height and weight was used to calculate body mass index (BMI). Standard definitions of BMI were used to classify weight status of respondents as underweight ($<$18.5), healthy weight (18.5 to 24.9), overweight ($\geq$25 to 29.9), or obese ($\geq$30).[16-18] Respondents were also asked whether they had gained weight during the previous year.

Specific diet-related questions were based on categories of foods that are targeted in the 2005 DGA[1] and Healthy People 2010 objectives.[6,19] The dietary intake questions examined how often, during an average week, the participants ate fruit, vegetables, whole grains (eg, foods with at least 51% of the total weight as whole-grain ingredients contain a substantial amount of whole grains, including rye, whole wheat, or heavily seeded bread, popcorn, brown or wild rice, whole-wheat pasta or crackers, oatmeal, or corn tacos[6]), other grains, low-fat dairy (eg, reduced-fat milk or nonfat), yogurt, cottage cheese, low-fat cheese, frozen low-fat yogurt, or soy milk), regular dairy (eg, regular or whole milk, cheese, and ice cream), lean protein (eg, baked or broiled chicken breasts [no