Research Paper

# Weight loss intention, dietary behaviors, and barriers to dietary change in veterans with lower extremity amputations

A.J. Littman, Ph.D.[a,b,*], L.V. McFarland, Ph.D.[a,c], M.L. Thompson, Ph.D.[a,d],
E.D. Bouldin, M.P.H.[a,b,e], D.E. Arterburn, M.D.[f], B.R. Majerczyk, M.P.H.[a], and
E.J. Boyko, M.D.[a]

[a]Seattle Epidemiologic Research and Information Center, Department of Veterans Affairs Puget Sound Healthcare System, 1660 South Columbian Way, Seattle, WA 98108, USA
[b]Department of Epidemiology, University of Washington, Seattle, WA, USA
[c]Department of Medicinal Chemistry, University of Washington, Seattle, WA, USA
[d]Department of Biostatistics, University of Washington, Seattle, WA, USA
[e]Denver-Seattle Center of Innovation for Veteran-Centered & Value Driven Care, Department of Veterans Affairs Puget Sound Healthcare System, 1660 South Columbian Way, Seattle, WA 98108, USA
[f]Group Health Research Institute, Seattle, WA, USA

## Abstract

**Background:** Obesity is thought to be highly prevalent in persons with lower extremity amputations (LEAs) and can impair physical and social functioning.

**Objective:** The aim of this study was to determine the prevalence of weight loss intention, weight loss strategies, dietary patterns, and barriers to making dietary changes, and their associations with body mass index (BMI, kg/m$^2$), amputation characteristics, health status, and socioeconomic factors.

**Methods:** We conducted a cross-sectional study ($n = 150$) using data from a self-administered questionnaire.

**Results:** 43% of participants were obese and 48% were trying to lose weight; 83% of those trying to lose weight reported trying to "eat differently", but only 7% were following a comprehensive weight loss program involving dietary changes, physical activity, and behavioral counseling. 21% of participants reported ≥6 barriers to changing their eating habits (e.g., habit, too little money, stress/depression). Obesity was associated with younger age, lower physical health scores, hypertension, arthritis, and diabetes. Compared to those not trying to lose weight, a greater proportion of those trying to lose weight had a BMI ≥35 kg/m$^2$, age <55 years, higher physical and mental health scores, and more frequent consumption of vegetables, beans, chicken, and fish.

**Conclusions:** Though over half of overweight and obese individuals with LEA were trying to lose weight, few reported following a comprehensive program to lose weight, which may indicate an unmet need for services for this group. To be effective, these programs will need to address the complex physical and mental health challenges that many of these individuals face.   Published by Elsevier Inc.

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Lower extremity amputations (LEAs) are frequently an unfortunate complication of type 2 diabetes and peripheral vascular disease. In 2006, over 1 million people in the U.S. had a LEA[1]; this number is predicted to double by 2050.[2] Studies of LEA and obesity have varied in methodology and time period. Some,[3–5] but not all[6] studies have found that obesity is more prevalent in persons with LEA than in the general population.[7] Obesity may adversely impact mobility, prosthesis fit and function,[8,9] and quality of life, and exacerbate secondary conditions that are common

among people with LEA, such as musculoskeletal pain, osteoarthritis, falls, and injuries.[10–12] In the general population, obesity can lead to reduced activity levels and a cascade of events such as increased wheelchair use, a more sedentary lifestyle, greater health care utilization and costs, reduced ability to live and function independently and increased burden on formal and informal caregivers.[13,14]

In the general population, evidence-based guidelines for obesity treatment recommend comprehensive weight management programs (e.g., dietary modification, physical activity and behavioral counseling). However, weight control may be especially challenging for people with LEA because of additional barriers to performing physical activity[15–19]; consequently, it is likely that diet modification and behavioral counseling take on even greater prominence.[20]

The overarching goals of this study were to better understand the current dietary patterns, barriers to healthy eating habits, and weight loss strategies in this population in order to design and implement effective weight loss interventions for people with LEA. To accomplish these goals, we conducted a cross-sectional study of a population-based sample of veterans to determine the prevalence of weight loss intention, weight loss strategies, dietary patterns, and barriers to making dietary changes, and their associations with body mass index (BMI, kg/m$^2$), amputation characteristics, health status, and socioeconomic factors.

## Methods

### Study sample

The sampling frame included veterans who had a LEA at least 6 months prior to completing the questionnaire and at least one primary care visit in the previous 18 months (to increase the likelihood of a correct current address) at a Veteran Health Administration (VHA) facility in the Veterans Integrated Service Network (VISN) 20, which includes facilities in Washington, Oregon, Idaho, and Alaska. Potentially eligible individuals were identified using the VISN 20 Data Warehouse based on: 1) ICD-9 procedure codes (84.10–84.17), 2) prescription for a lower limb prosthesis or repair (L5000–L5341, L5999, L7500–7600, L8400–8410, L8417–8430, L8440–8460, L8470–8480, L8499), and/or 3) diagnosis of lower limb amputation (ICD-9 895.1, 896.0–896.3, 897.0–897.7 and V49.71–V49.76). The VA Puget Sound Institutional Review Board approved all study procedures. We randomly selected 400 individuals of the 2436 identified, with the aim of obtaining at least 150 completed questionnaires between June and November 2011. Individuals were mailed a pre-notification letter informing them about the study and allowing them to opt-out. Those who did not opt-out were mailed the survey. For non-responders, we mailed a reminder postcard, another copy of the survey and/or followed up by telephone.

The 28-page survey included questions on their amputation, physical activity, diet, weight and weight management, general health, and demographic characteristics.

### General health

We assessed physical and mental health using the global health question items from the Patient Reported Outcomes Measurement Information System (PROMIS), with items scored on a 5-point scale (5 = excellent to 1 = poor)[21,22] The 4-item physical health score assessed overall physical health, physical function, pain and fatigue. The 4-item mental health score assessed quality of life, mental health, satisfaction with social activities, and emotional problems. Raw scores were converted to T-scores, standardized to the U.S. population (mean of 50, standard deviation of 10) based on the methods described elsewhere.[23]

### Lower extremity amputation (LEA) characteristics

We inquired about respondents' level of amputation on each leg, the reason for the amputation and the time since their initial amputation. The type of LEA was classified hierarchically into four categories based on the most proximal level of amputation: toe, partial foot/feet, transtibial, and transfemoral. Reason for amputation was dichotomized into trauma vs. not (all other causes).

### Body mass index

Participants were asked to report their weight to the nearest pound and their height in feet and inches. We calculated a limb loss-adjusted body mass index (LLA-BMI, kg/m$^2$) as a proxy for body fat employing previously published methods that attempt to account for the weight difference due to the limb loss.[9,24,25] Briefly, this method assumes that limb weight is proportional to total body weight, and assigns a standard percentage of body weight loss for a given amputation level (e.g., 5% for a unilateral transtibial amputation). This weight is then added to the self-reported weight. For participants who reported their body weight including their prosthesis, we first subtracted the average weight (based on prosthetists' expert opinion) of a transtibial (6 pounds) or transfemoral (12 pounds) prosthesis as appropriate, from their reported body weight.[9,24,25] We then used standard BMI cut-points to define normal weight (18.5–24.9 kg/m$^2$), overweight (25.0–29.9 kg/m$^2$), obese class I (30.0–34.9 kg/m$^2$) and class II+ (≥35.0 kg/m$^2$). Since a major focus of this study is evaluating dietary behaviors in relation to weight management, we excluded participants who were underweight based on an LLA-BMI <18.5 kg/m$^2$ ($n = 5$).

### Indicators of dietary behaviors

Data on dietary behaviors were collected using an 8-item measure, ''Starting The Conversation'', which