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Eating patterns may mediate the association between marital status, body mass index, and blood cholesterol levels in apparently healthy men and women from the ATTICA study

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Abstract

Marital status has been recognized as a significant health-influencing factor, including cardiovascular disease (CVD) risk. The aim of the present paper was to evaluate whether eating habits mediate the relationship between marital status and levels of CVD risk factors among apparently healthy men and women from the ATTICA Study. During 2001–2002, we randomly enrolled 1514 men (18–87 years old) and 1528 women (18–89 years old) from the Attica area, Greece; the sampling was stratified by the age-gender distribution of the region. Participants underwent clinical, anthropometric and psychological assessment. Food consumption was assessed through a semi-quantitative food frequency questionnaire. Participants were classified as never married, married, divorced and widowed. Discriminant analysis revealed that vegetable consumption, followed by red meat, potatoes, poultry, and soft drinks were the factors with the higher discriminating ability among the food groups studied. In particular, dietary patterns of never married participants were characterized by the consumption of potatoes and red meat, those of married participants by nuts, legumes and fish, those of divorced participants by fruits, cereals and soft drinks, whereas those of widowed participants by dairy, vegetables, sweets and poultry. In addition, never married and divorced participants reported eating fast-foods more frequently and drink less alcohol compared to married or widowed participants. After controlling for potential confounders (i.e., age, gender, physical activity, anxiety score and smoking habits), the reported marital status of the participants was associated only with body mass index and total serum cholesterol levels. When the analysis was repeated after taking into account the information on dietary habits by creating four ''new'' dietary-adjusted marital status groups, no significant association was revealed between marital status and body mass index and blood cholesterol levels. This finding implies that, in our population, eating patterns may explain the observed differences between marital status and selected CVD risk factors.

Keywords: Marital status; Cardiovascular disease risk; Eating patterns; Diet; Food groups' consumption; Greece; BMI

Introduction

Social factors influence a number of health behaviors and health-related characteristics. Education level,

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occupation and income have been well studied for their relationship to cardiovascular disease (CVD) risk factors, as well as various lifestyle habits (Cooper, 2001; Irala-Estevez et al., 2000; Kant & Graubard, 2007; Lantz et al., 2001; Pitsavos, Panagiotakos, Lentzas, & Stefanadis, 2005; Schnohr et al., 2004). For example, in the middle 1950s Lowe and Gibson (Lowe & Gibson, 1955) recognized marital status as a significant social, health-influencing parameter, with married women being heavier compared to single ones and proposed that factors other than childbearing might be involved. Thereafter, a lot of research has supported the hypothesis that marital status affects not only body weight (Hajian-Tilaki & Heidari, 2007; Schoenborn, 2004), but also other health indices and behaviors. In particular, non-married people, compared to married, present higher CVD or all-cause mortality rates (Eaker, Sullivan, Kelly-Hayes, D'Agostino, & Benjamin, 2007; Ikeda et al., 2007; Ingelsson, Lind, Arnlov, & Sundstrom, 2006; Jaffe, Manor, Eisenbach, & Neumark, 2007; Johnson, Backlund, Sorlie, & Loveless, 2000; Kaplan & Kronick, 2006; Lund et al., 2002; Malyutina et al., 2004; Sibai, Yount, & Fletcher, 2007), as well as more unfavorable CVD risk profile (Gliksman, Lazarus, Wilson, & Leeder, 1995).

In contrast, marital termination, in terms of divorce or widowhood, has been associated with a decrease in body mass index (Jeffery & Rick, 2002; Meltzer & Everhart, 1995; Shahar, Schultz, Shahar, & Wing, 2001; Sobal, Rauschenbach, & Frongillo, 2003) and an increase in CVD risk factors. In specific, divorced/separated or widowed people were found to have unfavorable lipid profile and blood pressure levels (Kushnir & Kristal-Boneh, 1995), higher inflammation markers (Engstrom, Hedblad, Rosvall, Janzon, & Lindgarde, 2006) and higher prevalence of hypertension (Yodfat, Frank, Fidel, Cohen, & Eliakim, 1979). Divorced persons were also identified as exhibiting higher incidence of metabolic syndrome (Troxel, Matthews, Gallo, & Kuller, 2005) and CVD events (Engstrom et al., 2006).

Although cohabitation was stronger predictor of mortality than marital status per se (Lund et al., 2002), a number of factors have been postulated to mediate the effect of marital status on health, namely social status, financial circumstances within family and social support, as well as affectionate relationships or psychological distress, and lifestyle features, such as cigarette smoking, alcohol intake and physical activity habits (Grewen, Anderson, Girdler, & Light, 2003; Joung, Stronks, van de Mheen, & Mackenbach, 1995; Lorenz, Wickrama, Conger, & Elder, 2006; Waldron, Hughes, & Brooks, 1996; Wickrama et al., 2006). Diet may also be involved. In general, marriage is related to healthful eating habits. For example, being married has been associated with increased fruit and vegetable consumption (Billson, Pryer, & Nichols, 1999; Devine, Wolfe, Frongillo, & Bisogni, 1999; Friel, Newell, & Kelleher, 2005; Pollard, Greenwood, Kirk, & Cade, 2001), eating breakfast (Joung et al., 1995), adherence to the Mediterranean diet (Sofi et al., 2007), or other healthy dietary patterns (Roos, Lahelma, Virtanen, Prattala, & Pietinen, 1998). On the other hand, married individuals in the Bogalusa Heart Study were found to consume more snacks, deserts and alcoholic beverages compared to the non-married (Deshmukh-Taskar, Nicklas, Yang, & Berenson, 2007). Marriage termination has been associated with unfavorable dietary changes, like an increase of commercial meals with concomitant decrease of home-made meals, an increase in alcohol and decrease in vegetable intake (Eng, Kawachi, Fitzmaurice, & Rimm, 2005; Lee et al., 2005; Shahar et al., 2001), although in a cohort of French women, divorcees and widows drank less than married women (Zins, Gueguen, Leclerc, & Goldberg, 2003).

To the best of our knowledge, however, no evidence exists so far on what extent eating patterns and food choices possibly influence the effect of marital status on health. Therefore, our research hypothesis was to evaluate whether eating habits may mediate the relationship between marital status and levels of CVD risk factors among apparently healthy men and women from the ATTICA Study.

Methods

Subjects

The sampling procedure was random, multistage (by city) and it was based on the age-gender distribution of the province of Attica as provided by the National Statistical Service (census of 2001). We enrolled only one participant per household, while all people living in institutions were excluded from the sampling. From May 2001 to December 2002, 4056 inhabitants from the above area were randomly selected and asked to participate in the study. The Attica region has about the 45% of the total Greek population, has about 25% rural areas, and captures all socioeconomic particularities of the total population. Of them, 3042 agreed to participate (75% participation rate), 1514 were men (46 ± 13 years old; age range: 18–87 years) and 1528 women (45 ± 13 years old; age range: 18–89 years). There were no differences regarding age, gender and marital status between those who agreed to