



Knowledge about nutrition, eating habits and weight reduction intervention among methadone maintenance treatment patients



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ABSTRACT

Methadone maintenance treatment (MMT) patients are often under-nourished and overweight. The impact of a nutrition intervention program to improve knowledge about healthy food habits and losing weight was studied. Patients were screened for knowledge about nutrition and body mass index (BMI). Those with a low knowledge score or a BMI ≥ 26 ($n = 89$) were randomly divided into either intervention (two lectures on healthy nutrition followed by weight monitoring over 6 weeks), or controls (weighed at baseline, post-lectures and at study closure). The Yale Food Addiction Scale (YFAS), eating behavior rating, and nutrition knowledge questionnaires were used. Knowledge and food habit scores improved in the intervention group (28.4 ± 4.3 , 37.2 ± 3.1 , 32.5 ± 3.9 pre-, post- and 6-weeks post-lectures, respectively), with no change in the controls (28.6 ± 3.4 , 28.2 ± 4.9 , 28.1 ± 5.3 , repeated measured $p(\text{time}) = 0.001$, $p(\text{group}) = 0.001$, $p(\text{interaction}) = 0.001$); food habit (intervention: 35.0 ± 7.0 , 38.4 ± 5.2 , 37.5 ± 5.3 , controls: 34.0 ± 6.9 , 34.7 ± 6.9 , 34.6 ± 7.4 , $p(\text{time}) = 0.001$, $p(\text{group}) = 0.04$, $p(\text{interaction}) = 0.06$). BMI scores however did not change and were similar in both groups ($p = 0.9$). Of all patients, 10.1% met the criteria of food addiction according to the YFAS, 40.4% lost weight and 28% gained weight, with no group differences. There were more symptoms of food addiction among the patients who gained weight vs. those who lost weight (3.7 ± 2.0 vs. 2.6 ± 1.8 , respectively, $p = 0.04$). We concluded that although weight loss was not observed, intervention is recommended for improving knowledge about nutrition and for fostering healthy eating habits with the aim of reducing diet-related morbidity among all MMT patients. Longitudinal program combined with physical activity is needed to study if may lead to weight loss.

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1. Introduction

Opioid use disorder is a significant public health concern that affects the nutritional status of users and frequently leads to under-nourishment, a phenomenon that is commonly associated with underweight during active substance use (Montazerifar, Karajibani, & Lashkaripour, 2012; Nazrul Islam, Jahangir Hossain, Ahmed, & Ahsan, 2002; Neale, Nettleton, Pickering, & Fischer, 2012; NIDA, 2004; Saeland et al., 2011) and overweight during methadone maintenance treatment (MMT) (Peles, Schreiber, Sason, & Adelson, 2016; Rajs et al., 2004; Nolan & Scagnelli, 2007; Okruhlica & Slezáková, 2008, 2012; Fenn, Laurent, & Sigmon, 2015; Mysels, Vosburg, Benga, Levin, & Sullivan, 2011). During active heroin use, subjects were observed to consume quick, convenient, cheap and sweet foods, to eat infrequently and to

have little interest in food (Neale et al., 2012), leading to weight loss (NIDA, 2004). Eating habits of heroin users were reported to be influenced by individual, social, cultural, economic and environmental factors (Neale et al., 2012). Moreover, several studies have reported that drug users demonstrate nutritional deficiencies and unhealthy changes in their food intake (Nazrul Islam et al., 2002; Saeland et al., 2011). Malnutrition is a major cause for diverse morbidities (Stratton, Green, & Elia, 2003). The preference and “craving” for sweets that was reported by heroin users before, during and following drug use was suggested to be a contributing factor (Mysels & Sullivan, 2010). Activation of mu-opioid receptors in the nucleus accumbens selectively promotes hedonically driven eating in the form of increasing consumption of sweet and fatty foods (Berridge, 2009; Kelley et al., 2002).

Obesity, defined as a BMI $> 30 \text{ kg/m}^2$, is associated with lower quality of life and with multiple medical conditions, including hypertension, hyperlipidemia and diabetes (Banks, Marmot, Oldfield, & Smith, 2006). Obesity is also associated with mood disorders (Simon et al., 2006), possibly in part because the condition is stigmatized with a sense of moral failing, which may lead to anxiety, depression and

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perception of discrimination (Puhl & Brownell, 2001). Limitations to physical activities due to obesity or obesity-related chronic illnesses may increase the risk of depression by reducing the extent of involvement in rewarding or pleasurable activities (John, Meyer, Rumpf, & Hapke, 2005). The association between obesity and depression is well established, and more pronounced among females (de Wit et al., 2010).

MMT is the most effective therapeutic approach for opioid use disorder (Mattick, Breen, Kimber, & Davoli, 2014). We recently described weight gain among opioid-dependent persons as a result of entering MMT (Peles et al., 2016), in accordance with the findings of several other reports (Montazerifar et al., 2012; Rajs et al., 2004; Nolan & Scagnelli, 2007; Okruhlica & Slezáková, 2008, 2012; Fenn et al., 2015; Mysels et al., 2011). A number of those reports attributed the weight gain to increased preference for sweet-tasting foods (Rajs et al., 2004; Nolan & Scagnelli 2007; Mysels & Sullivan, 2010). Upon entering MMT, this change accompanied by the acute change in lifestyle from intensive and busy to a period of high availability of time and money that can be filled with overeating may result in overweight (Peles et al., 2016). The possibility of the additional involvement of food addiction has never been studied among MMT patients.

“Food addiction” is based on *The Yale Food Addiction Scale* (YFAS) (Gearhardt, 2009) is a tool used to assess markers of substance dependence with the consumption of high fat/high sugar foods in the past year. It resembles loss of control over food intake, and aligns mainly with DSM-5 criteria for binge-eating disorder (Canan, Karaca, Sogucak, Gecici, & Kuloglu, 2017). “Food addiction” and substance use disorder share a similar neurobiological and behavioral background, particularly in the way that both disrupt the parts of the brain involved in pleasure and self-control. Repeated consumption of high sugar/fat food can produce dopamine signaling changes in the brain which result in abnormally sustained stimulation of the reward system (Bello & Hajnal, 2010). When combined with intermittent periods of food restriction, a sugar-enhanced diet can lead to the same excessive pattern of intake and the same behavioral symptoms that can be observed when animals are exposed to addictive drugs, such as heroin (Crowin, Avena, & Baggiano, 2011). According to Pedram et al. (2013), the prevalence of food addiction in the general population in Canada was 5.4% (6.7% in females and 3.0% in males), but was higher (7.7%) in overweight/obese (BMI \geq 25) subgroups (11.4% in female and 3.3% in males). The prevalence of food addiction associated with obesity among MMT patients is unknown. Together with the weight gain, the more worrisome findings are that this population consumes below the minimally required amount of vegetables, fruits and grains in preference for sweet-tasting foods, while consuming foods with low vitamin content and proteins (Bogucka-Bonikowska et al., 2002).

It follows that knowledge about food habits and eating behaviors of individuals with opioid use disorder are vitally important for planning an educational program about nutrition in the promotion of good health in that population. To that end, we evaluated the contribution of a program for disseminating information on nutrition among MMT clinic patients compared to a control group with the goals of increasing general knowledge on nutrition, improving attitudes towards healthy eating, impacting food choices and reducing the patients' body mass index (BMI). We evaluated the effectiveness of the intervention as a possible solution to the nutritional deficits of MMT patients. Specifically, the objectives of this study were: 1. to examine the impact of an intervention program on knowledge about nutrition, food habits and changes in BMI among men and women in MMT compared to a control group; 2. to study the prevalence of food addiction among MMT patients; 3. to determine whether there is any correlation between weight change, obesity, food addiction and mood.

2. Materials and methods

The study was approved by the Helsinki Committee (IRB) of the Medical Center, and all the participating patients provided informed consent.

2.1. Setting

Patients from a MMT clinic participated in the study. They all met criteria similar to those of the U.S. Federal Regulations for initiating methadone treatment (i.e., DSM-IV-TR criteria of dependence on opioids for at least one year) and a minimum of two institutional detoxification failures (in keeping with the Israel Ministry of Health guidelines). There were 330 patients in treatment at the MMT clinic in January 2015.

2.2. Sample (Diagram 1)

Inclusion criteria: Hebrew speakers with minimum of 6 months in treatment and negative urine specimens for amphetamines and cocaine during at least 3 months, who were either overweight (BMI \geq 26) or had poor knowledge of healthy nutrition as measured by the nutrition knowledge questionnaire (Moynihan et al., 2007) developed by Parmenter and Wardle (1999) (score $<$ 28.5, meaning \geq 40% responses were incorrect). One-hundred and eighteen of the 240 available patients were randomly selected and screened for BMI levels and knowledge on nutrition score, and the 23 participants with a BMI $<$ 26 and a knowledge score \geq 28.5 were excluded. Based on a 60% knowledge score before and an expected knowledge score of 85% in the intervention group, 49 participants were needed in each group to have 80% power with an alpha of 5%.

A total of 95 individuals had negative urine specimens for cocaine/amphetamine and either high BMIs (\geq 26) or low scores for their knowledge about nutrition ($<$ 28.5). Specifically, 30 patients had high BMIs and low knowledge scores, 51 patients had high BMIs and high knowledge scores, and 14 patients had low BMIs and low knowledge scores. These 95 patients (including 30, 51 and 14 patients subgroups) were randomized, each group separately, into either the intervention ($n = 45$) or the control ($n = 50$) groups. During the study, six patients were excluded (two from the intervention group [one who died from a myocardial infarction and one who abused cocaine] and four from the control group [two left treatment, one was arrested and one moved to another facility]), leaving 89 patients (44 in the intervention group and 45 controls) for final analyses.

2.3. The nutrition intervention program

The nutrition intervention program was carried out between January and April 2015. The intervention included two 45 minute nutrition education lectures, which were given by a registered clinical dietitian. The lectures were given in the morning once weekly over two consecutive weeks, and the group consisted of 20–24 participants. At the first lecture, the participants were served a healthy breakfast that included all the food groups. The researchers emphasized and demonstrated what healthy food choices are.

The lectures focused on macronutrients and their primary sources in the food groups, understanding the food guide pyramid, the importance of breakfast, the benefits of fruits, vegetables and water, and the way to use the food labels in order to make an informed food choice for meals and snacks. The participants received a booklet which was created by the investigators. This booklet contained explanations about the food guide pyramid and recipes for healthy cooking based on a Mediterranean diet. A summary of the lecture was also distributed to the participants in order to reinforce the information that had been presented.

The participants were weighed and the weight was recorded every other week. They were asked if they had made any lifestyle changes and whether they were motivated or encouraged to make any changes. They were also provided with tips for healthy nutrition, such as “Eat different kinds of vegetables and fruits every day. Variety is the spice of life ...” “When you feel you cannot give up pizza, ask for a vegetable topping, like peppers, onions, mushrooms, etc.”... “Choose salads and baked potatoes instead of French fries when you eat out”... “Drink more water and add lemon fresh mint leaves to make it taste better”.

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