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Survey of Anthropometric Indices Addicts due to the History of Addiction and Substance Abuse in Qom Province, 2014

Mohammad Hozoori; PhD[1], Shahram Arsang-Jang; MSc[2], Nasrin Ghanbari-Nekou; BSc[3], Azadeh Marzban; MSc[1], Alireza Etminani; BSc[3], Behnam Efati; BSc[3] & Jalal Sadeghizadeh Yazdi; PhD[4]*

[1] *Nutritional Research Center, Qom University of Medical Sciences, Qom, Iran.*
[2] *Department of Epidemiology & Biostatics, School of Public Health, Qom University of Medical Sciences, Qom, Iran.*
[3] *Student Research Committee, Qom University of Medical Sciences, Qom, Iran.*
[4] *Department of Nutrition, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran*

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Corresponding author:
jsyazdy@yahoo.com
School of Public Health, Shahid Sadoughi University of Medical Sciences, Square Alem, Shohadaye Gomname Blvd, Yazd, Iran.

Postal code: 8915173160
Tel: +98 35 38209100

ABSTRACT

Background: Substance abuse has significant impact on nutritional status. Due to the increased malnutrition during drug use and withdrawal, this study aimed at assessing the anthropometric indices in individuals referring to drug treatment centers in Qom. **Methods:** In this descriptive-analytical study, 329 addicted individuals referring to addiction centers in Qom were randomly selected. A questionnaire was used with three parts including demographic characteristics, drug abuse history, and anthropometric indices including measurement of height, weight, waist circumference, arm circumference, and skinfold thickness in triceps and calf muscles. **Results:** The participants consisted of 328 men and only one woman, 29% of whom were in detoxification. The participants' mean age was 39.0 ± 7.1 years. The first and most-frequently used drug was opium. All anthropometric indices were associated with the consumption of opium substances and drug use was associated significantly with some parameters. With the exception of skinfold thickness in the calf, all the indices were affected by the type of consumed substances. The opium addicts had a higher body mass index compared with other drug users. **Conclusions:** Due to the importance of nutrition status in drug abusers' health and their lack of self-care, careful monitoring and evaluation of dietary intake, as well as nutrition status can play important roles in the rehabilitation of these individuals and help to prevent from reappearance of these habits.

Keywords: *Addiction; Anthropometric indices; Nutritional assessment; Heroin*

Introduction

Nowadays, nutrition is one of the important factors in the etiology of various diseases and disabilities. Malnutrition in the form of over-nutrition or under-nutrition can occur if food and nutrient intakes are not balanced for health maintenance. Nutritional screening and assessment constitute an essential part of the treatment process; they also are the first step in the nutritional care process. For proper nutritional interventions, identification of people who are at risk of inappropriate nutrition is important . Addicted people as one of the vulnerable groups of

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society are at risk of malnutrition (Forrester, 2006). In previous studies on addicted participants, dietary intake of vitamins A and E, as well as calcium and zinc, has been found to be less than the recommended allowance, the amount of daily intake of fruits, vegetables, milk, and milk-product food group intake have also been less than recommended (Smit et al., 1996). Such evidences suggest that nutritional status in addicted people is poor and drug abuse exacerbates nutritional deficiencies, this in turn, finally leads to malnutrition.

Generally, among the reasons which make drug abusers susceptible to malnutrition the following are mentioned: anorexia that can be caused by taking stimulants, poverty, unemployment status, lack of access to adequate food, and unawareness or disinterest in the principles of healthy nutrition (Abd El Gawad et al., 2011). However, the diet of such individuals must contain a large amount of micronutrients, some milk, and protein to repair their damaged organs and tissues as well as to improve performance of their nervous and digestive systems (Alves et al., 2010, Neale et al., 2012).

In addicted people, unhealthy diet could not only increase the risk of health problems (such as tooth decay and chronic constipation), but also exacerbate the effects of other dangerous diseases, such as acquired immune deficiency syndrome (AIDS) and hepatitis C (Johansson et al., 1997). Shoma et al., reported social and family aspects, irregular lifestyle, and decreased interest in meal consumption as the factors affecting addicted people's dietary intake (Abd El Gawad et al., 2011). Drugs can affect the reward system in human brain and in addiction treatment phase, extra food, instead of drugs, is used as an alternative to stimulate the reward system in the brain (Banitalebi et al., 2010).

A study on the relationship between drug abuse and weight gain showed that a significant increase in weight and body mass index (BMI) occurred during drug withdrawal (Donnelly et al., 2003). Other studies have also shown the impact of physical activity on addicted people in such a way that it could modify the secretion of hormones, repair damaged neuromuscular tissues, and was effective in weight control (Kazemi et al., 2013). In a study by Kremer, it was reported that during prolonged exercise, sensitivity to effects of morphine and other drugs decreased, while the quality of life improved (Kremer et al., 1995).

Due to the importance of malnutrition in drug addicts, this study aimed to evaluate the anthropometric parameters and determine eating behaviors and their related factors in people who referred to drug treatment centers in Qom, Iran.

Materials and Methods

Study design and participants: In this descriptive study, after obtaining the permission of the addiction treatment centers' management, interviewers were trained on nutritional assessment methods and on how to complete the questionnaire. After readiness announcement and completion of informed consents by participants, the data were gathered through a questionnaire and other instruments. The questionnaire items contained three parts including personal information, drug use history, and eating behaviors.

Measurements: The anthropometric indices were measured, including height, weight, waist circumference (WC); arm circumference and skinfold thickness at the triceps and calf. Height was measured by applying a stadiometer with accuracy of 1 mm and weight was measured by using a precise scale, (Seca769,Germany), with 100 grams precision. To measure waist and arm circumferences, non-elastic tape meter was applied, the subcutaneous fat was then measured by caliper (Saehan skinfold caliper, SH5020, Korea).

Among the available addiction centers in Qom, 9 centers were randomly selected. Next, 340 under-treatment individuals with history of drug abuse were selected, among whom 329 individual met the inclusion criteria and participated in this research.

Data analysis: To describe and analyze data, descriptive statistics, Pearson's correlation test, independent *t*-test, and ANOVA test were conducted through SPSS software version 18.

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Results

In this study, 329 participants with drug abuse history participated; they referred to addiction treatment centers for treatment. 97% of participants were Iranian and only 3% were from other nationalities. Individual characteristics, education, marital status, and participants' overnight resting place are shown in **Table 1**.

Table 1. Anthropometric indices and living conditions and accommodation information and overnight resting place of participants

Variables	n	Mean ± SD
Quantitative variables		
Age (year)	329	39 ± 11
Weight (kg)	329	73 ± 16
Height (cm)	329	172 ± 10
Waist circumference (cm)	329	89 ± 15
Arm circumference (cm)	329	30 ± 4
Calf skinfold thickness (mm)	329	36 ± 22
Triceps skinfold thickness (mm)	329	35 ± 21
Addiction history (month)	329	13 ± 9
Qualitative variables	n	Percent
Education status		
Illiterate	9	7.0
Elementary	35	27.1
Middle school	42	32.6
High school	32	24.8
Academic educated	11	8.5
Living conditions		
Single	59	18.0
Married (live with wife)	250	76.0
Married (live without wife)	8	2.5
Divorced	12	3.5
Accommodation information		
Tenanted	123	37.8
Live with parents	107	32.8
Home owner	92	28.2
Support centers for addicted people	4	1.2
Drugs withdrawal treatment stage		
Detoxification	37	28.7
Psychotherapy	1	7.7
Group therapy	2	15.6
All three methods	89	70.0
Drugs used by participants		
Opium	71	55.0
Heroin	20	15.5
Opium sap	11	8.5
Glass & Crack	10	7.8
Addiction to more than one drug	17	13.2

Among the participants, 68% had full-time occupations, 13% had part-time jobs, 6% were retired, and 13% were unemployed or looking for jobs. Regarding the frequency of drug usage, 45% of participants used drugs three times a day while 31% reported twice. However, 16.5% of participants used drugs more than 3 times a day.

Only 5% (n = 8) of the participants had the responsibility to provide food for themselves.

Water and fluid intake is an important issue in the recovery process. Participants' attitude to food

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and healthy eating behaviors has been mentioned in **Table 2**.

The relation between treatment stage and method used for drug abuse with anthropometric indices appear in **Table 3**. As shown in this table, there is no correlation between anthropometric indices and treatment stages of participants. As it can be seen, with the exception of WC, other anthropometric indices are associated with methods of drug abuse.

The results of the relationship between the types of abused drugs with anthropometric indices are represented in **Table 4**. All anthropometric indices are associated with the type of abused drug.

The relationship between the first drug abuse and effects of the main drug abuse on anthropometric indices are shown in **Table 5**. The results of this table represent that the first drug abuse is related to weight, WC, arm circumference, and BMI. So, BMI in grass (marijuana) users was 3.07 times less than those in opium users. As it is clear, with the exception of calf circumference, all other indices were affected by the main drug abuse. In the main drug abuse, opium addicted participants had the most BMI (P = 0.012). On the other hand, Crack, Heroin, and Grass (marijuana) addicted participants had less Triceps skinfold index than Opium addicted ones.

Table 2. Participants' eating behaviors and attitude to healthy eating

Eating behaviors and attitude to healthy eating	Totally agree		Agree		Disagree		Strongly disagree		No comments	
	n	%	n	%	n	%	n	%	n	%
Nutrition has a significant impact on health and disease.	128	39.0	45	14.0	4	1.2	3	0.9	7	2.1
My body weight is appropriate.	64	19.4	51	15.5	38	11.5	24	7.3	10	3.0
Bottled mineral water is the healthiest type of available water.	96	29.1	31	9.4	12	3.6	17	5.2	31	9.4
Tea is a good substitute for water.	33	10	31	9.4	48	14.5	64	19.4	11	3.3
Food consumption in restaurants and outdoors is useful for health.	12	3.6	10	3.0	50	15.2	94	25.5	21	6.4
Vitamins and minerals supplements are useful for everyone.	16	4.8	28	8.5	36	10.9	74	22.4	33	10.0
Physical activity is essential for health promotion.	137	41.5	38	11.5	3	0.9	6	1.8	3	0.9
Frying of food is harmful for health.	84	25.5	46	13.9	16	4.8	18	5.5	23	7.0
Iodized salt can be harmful to health.	43	13.0	28	8.5	30	9.1	45	13.6	41	12.4

Table 3. The relation between treatment stage and methods of drugs abused with anthropometric indices

Treatment stage and methods	n	HT (cm)	WT (cm)	WC (cm)	AC (cm)	CST (mm)	TST (mm)	BMI (kg/m^2)
Treatment stage								
Detoxification	11	170.0 ± 7.2	73.0 ± 15.0	90.5 ± 14.0	30.0 ± 3.7	3.9 ± 2.6	3.7 ± 2.2	25.7 ± 9.4
Psychotherapy	5	169.5 ± 3.5	75.5 ± 16.0	90.5 ± 13.4	31.5 ± 4.9	3.5 ± 0.7	5.5 ± 3.5	26.2 ± 4.6
Group therapy	18	177.0 ± 6.2	72.5 ± 10.7	84.3 ± 9.6	30.0 ± 2.0	4.2 ± 2.1	3.8 ± 2.3	23.0 ± 1.9
P-value[a]		0.24	0.99	0.86	0.93	0.37	0.23	0.78
Type of drug abuse								
Oral	83	172.3 ± 6.6	74.5 ± 14.2	92.3 ± 12.8	30.5 ± 3.8	3.9 ± 2.5	3.7 ± 2.2	25.0 ± 4.1
Inhalation	15	171.1 ± 13.0	71.8 ± 15.4	87.1 ± 15.5	30.0 ± 5.0	3.4 ± 1.9	3.5 ± 2.3	25.8 ± 14.9
Injection	7	180.0 ± 7.3	70.1 ± 13.4	84.0 ± 11.4	27.1 ± 3.5	3.0 ± 1.1	3.3 ± 0.5	21.5 ± 3.7
P-value[a]		0.07	0.60	0.05	0.45	0.09	0.72	0.44

HT: Height; WT: Weight; WC: Waist circumference; AC: Arm circumference; CST: Calf Skinfold thickness; TST: Triceps skinfold thickness; BMI: Body mass index; [a] :One way ANOVA

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Table 4. The relation between the types of used drugs with anthropometric indices

Anthropometric indices	Type of used drugs				P-value[a]
	Opium (n=112)	The sap of opium (n=38)	Glass & Crack (n=19)	Hashish (n=42)	
Height (cm)	170.2 ± 12.0	170.2 ± 12.3	171.8 ± 7.2	176 ± 9.9	0.081
Weight (kg)	73.0 ± 12.0	73.0 ± 16.6	73.3 ± 13.1	69.2 ± 13.0	0.022
Waist circumference (cm)	89.7 ± 16.0	89.7 ± 15.9	91.4 ± 12.3	84.6 ± 14.8	0.002
Arm circumference (cm)	30.0 ± 4.8	30.1 ± 4.8	29.8 ± 4.0	29.0 ± 3.7	0.006
Calf skinfold thickness (mm)	3.4 ± 2.1	3.4 ± 2.1	4.1 ± 3.0	2.8 ± 1.3	0.003
Triceps skinfold thickness (mm)	3.2 ± 1.7	3.2 ± 1.7	3.8 ± 1.8	2.6 ± 1.4	<0.01
Body mass index(kg/m²)	26.1 ± 14.0	26.6 ± 13.8	24.9 ± 4.5	22.5 ± 4.8	0.014

[a] One way ANOA

Table 5. The relation between first drug abuse and main drugs abused with anthropometric indices

First and main drugs abused	n	HT (cm)	WT (cm)	WC (cm)	AC (cm)	CST (mm)	TST (mm)	BMI (kg/m^2)
First drug abuse								
Opium	254	171.6 ± 9.3	73.8 ± 15.0	90.7 ± 15.7	30.4 ± 4.5	3.8 ± 2.5	3.6 ± 2.3	25.6 ± 1.9
The sap of opium	5	176.3 ± 10.7	82.3 ± 14.4	87.6 ± 22.0	31.9 ± 2.6	4.3 ± 2.6	4.0 ± 2.2	26.3 ± 2.1
Glass & Crack	6	147.4 ± 5.9	78.2 ± 7.8	92.4 ± 9.0	30.2 ± 2.3	2.6 ± 1.1	2.4 ± 8.9	25.7 ± 2.6
Hashish	46	171.5 ± 8.5	66.2 ± 13.7	82.8 ± 13.3	28.4 ± 3.9	2.8 ± 1.4	3.0 ± 1.6	23.8 ± 2.7
Heroin	8	169.4 ± 4.9	63.6 ± 13.7	79.6 ± 12.6	27.6 ± 3.7	2.5 ± 0.5	2.8 ± 1.2	22.1 ± 3.9
P-value[a]		0.317	0.013	0.006	0.052	0.104	0.544	0.002
Main drugs abused								
Opium	223	171.1 ± 11.5	73.4 ± 14.6	90.4 ± 15.7	30.3 ± 4.6	3.6 ± 2.2	3.4 ± 2.0	25.9 ± 2.1
The sap of opium	23	172.9 ± 6.9	77.1 ± 16.3	93.7 ± 16.6	31.6 ± 3.6	4.6 ± 2.9	4.7 ± 2.7	25.7 ± 4.5
Glass & Crack	33	171.2 ± 6.2	71.8 ± 14.6	89.7 ± 13.0	29.8 ± 4.1	3.6 ± 2.8	3.2 ± 1.7	24.4 ± 4.3
Hashish	6	172.7 ± 6.3	63.4 ± 11.5	77.3 ± 6.9	27.5 ± 4.0	2.2 ± 0.8	2.2 ± 0.4	21.1 ± 2.7
Heroin	37	173.1 ± 7.6	66.1 ± 14.5	81.6 ± 13.6	28.1 ± 3.6	3.2 ± 1.6	3.3 ± 1.5	22.1 ± 4.5
P-value		0.572	0.041	0.05	0.027	0.08	0.002	0.009

HT: Height; WT: Weight; WC: Waist circumference; AC: Arm circumference; CST: Calf skinfold thickness' TST: Triceps skinfold thickness; BMI: Body mass index; [a] : One way ANOVA

Discussion

The present study was designed to evaluate the anthropometric indices of addicted participants with history of drug abuse. The results showed that all anthropometric indices were associated with the consumption of opium substances. Regarding the relationship between drug consumption and anthropometric indices, with the exception of skin fold thickness in the calf, all the indices were affected by the type of consumed substances. Surprisingly, the opium addicts had a higher body mass index compared with other drug users.

Some habits and behaviors such as physical activity, dietary pattern, smoking, and drug abuse have strong effects on health and disease. Studies showed that half of deaths occurring in the U.S. per year are preventable by modifying some behaviors and habits. Furthermore, 40% of patients in U.S. hospitals were admitted for reasons related to drug or alcohol abuse (Tomba, 2011). Nowadays, addiction is known as one of the major health problems in the world (Abd El Gawad et al., 2011). Despite the accepted effects of nutrition on the health of addicted people (Neale et al., 2012, Stungo, 1945, Waters, 1977),

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some nutritional problems such as underweight, malnutrition, as well as lack of essential nutrients and vitamins were mentioned for them (Neale et al., 2012). Results of the present study also agree with these outcomes. In addition to inadequate food consumption, irregular food intake, inadequate fruits, vegetables, and protein, rich food intake coupled with increased consumption of simple sugars and sweet foods are the most important nutritional problems of these people (Neale et al., 2012). The use of some types of drugs is associated with changes in appetite and desire for food (Gosnell and Krahn, 1993). In one of the pioneer researches on nutritional status, Heathcote (1981), investigated 16 heroin addicted participants and found that although inadequate intake and nutritional deficiency were not observed, the blood levels of vitamin C, vitamin B6, and albumin of them were significantly less than those in the control group (Heathcote and Taylor, 1981). In one of the rare available studies, 38 addicted participants were compared with compatible individuals in the community, Morabia found that although energy intake in both groups was similar, addicted people substituted the foods rich in protein and fat with those rich in simple sugar, which were poor sources of vitamins and minerals (Morabia *et al.*, 1989a). However, this is not always true. For example, morphine increases the desire for fat intake and would tend to reduce carbohydrate intake (Gosnell and Krahn, 1993). Another study carried out by Alves et al., and entitled as "the effects of demographic and social indices on the BMI and eating habits of heroin addicted people under methadone treatment", nutritional assessments and anthropometric indices showed that BMI in drug addicts who lived with their spouses were significantly higher than the others. This finding is consistent with the results of the current study. Because the majority of people who referred to addiction treatment centers (76%) lived with their wives. The study by Alves also found that unemployed addicted participants consume more fat, while heroin addicted participants consume less rapid absorbed carbohydrate (Alves et al., 2010). In addition, the results of the study carried out by Naele et al. on heroin addicted participants showed that addicted people desire cheap foods, especially sweet foods (Neale et al., 2012). These findings are consistent with those of the study conducted by Morabia (Morabia *et al.*, 1989b), but in contradiction with the results of Alves' study (Alves et al., 2010). With heroin withdrawal, the dietary pattern is improved and so is the body weight, especially in woman (Neale et al., 2012). As it was found in the current study (**Table 3**), all anthropometric indices linked to weight and body fat storage, could be affected by the type of drug abuse, that is in controversy with the results of Alves (Alves et al., 2010), Naele (Neale et al., 2012), and Morabia (Morabia *et al.*, 1989b). Thus, for better comprehension, further studies are recommended.

Saeland et al. studied 123 men and 72 women, addicted to drugs, and found that the sugar added to foods provided about 30% of their total daily calorie intake and 61% of participants preferred to consume sweet foods. Triglyceride and cholesterol concentrations in 32% and 35% of participants were respectively higher than the normal values. Interestingly, foods bought by drug addicted individuals contained less nutritional value than the food purchased by other family members (Saeland et al., 2011). The results achieved through this study confirmed that only 5% of participants purchased the required food themselves. Zador, in a study on methadone users in Australia found that the diet of participants lacked sufficient energy, while it included excessive consumption of simple sugars (122g daily), increased share of sugars in energy (31%), and reduced fiber (10.7g). This dietary pattern is associated with increased dental caries and incidence of constipation (Zador et al., 1996). The decrease in fruit and vegetable consumption in drug abusers is related to the reduction of antioxidants intake, which has been confirmed in previous studies (Abd El Gawad *et al.*, 2011).

The results of another study revealed that weight and BMI in addicted people are similar to those of

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the general populations; accordingly, the researcher has suggested that this index is not a good indicator of nutritional status in this population (Morabia *et al.*, 1989b). These results are in controversy with those of the current study in which the relation between anthropometric indices and the type of abused drug was investigated (**Table 4**). Moreover, the first drug abuse is related to weight, arm and WC, as well as body mass. In addition, there is a significant difference between the types of drugs and BMI mean in participants. Also, in the current study, the methods of drug abuse were associated with WC (**Table 3**).

Cowan studied 103 drug addicts selected from 6 locations in New York city and found that after receiving the required education on nutrition, their fruits and vegetables consumption had increased by 42%, while their energy, desserts, and sweets consumption decreased. In these patients, WC was reduced significantly. These results demonstrate the beneficial impact of educational interventions on eating behaviors and anthropometric indices of addicted participants (Cowan and Devine, 2013).

According to the results of Banitalebi's study et al., 40% of addicted participants are physically active for more than an hour in a week. They mentioned tiredness from the work as the main reasons of their lack of physical activity (Banitalebi et al., 2010). Findings of this research are consistent with those of this study regarding the "motivation" item (**Table 2**). As it can be observed from **Table 2**, more than half of the participants agreed that physical activities are essential for health. This study comes with some limitations; the methodology applied in assessment of body composition might dispossess complete accuracy. For example, the studies conducted on wrestlers indicated that Standard Errors of Estimate (SEEs) in both skinfold thicknesses method and bioelectrical impedance analysis have been limited, i.e., 3% to 3.5% (Ackland TR, 2012). Therefore, application of more precise methods such as hydrostatic weighing for complementary evaluations is proposed.

Conclusions

Given the importance of nutrition and the prevalence of nutritional problems in addicted participants and their inaccuracy in self-care, educational programs are recommended to improve the quality and quantity of their diets. Moreover, due to the effect of food intake on improvement of cognitive function and brain, precise monitoring over eating habits can play an important role in rehabilitation of drug addicts and prevent them from these misbehaviors and habits.

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Authors' contributions

Hozoori M designed research; Ghanbari-Nekou N, Etminani A and Efati B conducted research; Arsang-Jang S analyzed data; and Hozoori M, Sadeghizadeh Yazdi J and Marzban A wrote the paper. Sadeghizadeh Yazdi J had primary responsibility for the final content. All authors read and approved the final manuscript.

Conflicts of interest

The authors declare no conflicts of interest.

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