



## **Evaluating Barriers to Adherence to Dietary Recommendations in Iranian Adults with Metabolic Syndrome: A Qualitative Study Using the Theory of Reasoned Action**

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### **Abstract**

**Background:** Metabolic syndrome (MS) is defined as a pattern of metabolic disorders including central obesity, insulin resistance or hyperglycemia, high blood pressure, and dyslipidemia. Many studies show a clear relationship between diet and components of MS. The aim of the current study was to identify barriers to adherence to dietary recommendations among Iranian MS patients.

**Methods:** The theory of reasoned action (TRA) served as the framework for this qualitative study. Data collection was conducted through six semi-structured focus group discussions, from Apr to Jun 2013. Subjects included 36 married men and women with different levels of education between the ages of 20-50 with MS diagnosed based on IDF's (International Diabetes federation) criteria. All focus group discussions were audio recorded and transcribed. The thematic content analysis method was used to analyze the study data.

**Results:** This study identified the most important barriers to adherence to dietary recommendations. MS patients have problems in their attitude toward MS components and their relationship to nutrition. They also had wrong attitudes toward fats and oils, salt, dairy products, cereals, and sugary drinks and sweets. Subjective norms that affects patient eating identifies too.

**Conclusion:** We identified barriers to adherence to dietary recommendations in MS patients that could be used to prevent MS consequences and provide patients with nutrition education.

**Keywords:** Metabolic syndrome, Theory of reasoned action, Dietary recommendations, Barriers

### **Introduction**

Metabolic syndrome (MS) describes a cluster of abnormalities associated with increased risk of developing coronary heart diseases. Core components of MS include insulin resistance, type 2 diabetes or impaired glucose tolerance, hypertension, dyslipidemia, and central obesity (1). The prevalence of MS is 20-30% among adult populations in most countries (2) and in Iran nearly 30% (3). The essential part of healthcare for individuals with MS is implementation of strategies to reduce

risk for the incidence of serious metabolic consequences of the disease, which include diabetes mellitus, coronary heart disease, and stroke. Effective lifestyle modifications will drastically reduce risk factors contributing to the development of MS. Thus, a combination of drug therapy with lifestyle modification, particularly in dietary recommendations and regimens, can enhance the effectiveness of all control programs (4).

Beyond weight management plans, targeting control and reduction of total calorie intake, and increased physical activity, the diet must include a limited intake of saturated and trans fatty acids, cholesterol, sodium, refined grains, processed meats, and simple sugars. Subjects with MS are advised to increase their consumption of fruits, vegetables, and whole grains (4, 5).

Adherence to a healthy diet and avoidance of a sedentary lifestyle are key components to influencing obesity and consequently MS (6). Despite these facts, peoples' attitudes have been determined to impede effective self-care and healthy behavior. Behavior therapy also plays a major role in managing MS (7, 8). Thus, health behavior change theories to identify and measure healthy/unhealthy behavioral dominants are advised (9).

One of the most successful theories of behavior change is the theory of reasoned action (TRA) created by Ajzen and Fishbein (10). According to this theory, socio-demographic variables play important roles in determining behavior. The proposed framework insists that individuals' intention to perform any behavior is affected by a dynamic interaction between attitudes and subjective norms (11). TRA also suggests that the performance of behaviors that are under an individual's own control is composed of the following three key elements: (a) intention, (b) attitude, and (c) subjective norms (12). The most commonly used theory in food choice behavior is the TRA (13).

Previous studies have validated the application of this theory in evaluating nutrition and eating related behaviors (14-17). This study was designed to identify critical obstacles to adherence to dietary recommendations among Iranian patients with MS using the conceptual frame of the TRA.

## **Materials and Methods**

### *Design, settings and subjects*

This qualitative study was based on the theoretical approach of reasoned action. It was conducted from Apr to Jun 2013 at the outpatient department of a main general hospital in the Maha-

bad district in northwestern Iran. Subjects comprised 36 married people (18 men and 18 women) with different levels of education between the ages of 20-50 yr diagnosed with MS based on International Diabetes Federation criteria (18), described as having a waist circumference  $\geq 94$  cm for males and  $\geq 80$  cm for females in addition to having at least 2 of the following characteristics: 1) fasting blood sugar  $\geq 100$  mg/dl or previously diagnosed type 2 diabetes; 2) systolic blood pressure  $\geq 130$  mmHg and diastolic blood pressure  $\geq 85$  mmHg or treatment for previously diagnosed hypertension; 3) amount of triglyceride  $\geq 150$  mg/dl or specific treatment for this lipid abnormality, and 4) amount of HDL  $< 40$  mg/dl for males and  $< 50$  mg/dl for females or specific treatment for this lipid abnormality. Exclusion criteria were mental illness, pregnancy and lactation, cancer and stroke.

A purposive sampling was undertaken; one type of sampling that the researcher chooses the sample based on who they think would be appropriate for the study and this sampling continues until the researcher identifies that data saturation has occurred.

Focus groups discussions were selected because of their ability to enable the researcher to gather rich data, which is not achievable through one-to-one interviews. Six semi-structured focus group discussions were conducted (three separate sessions for males and three for females). The discussions lasted 60 to 90 min. The interviews were conducted in a calm and comfortable place that fully satisfied the participants. Every interview was conducted with two investigators, one of whom took notes and the other of whom noted participants' non-verbal behaviors. All discussions were audio-recorded. Interview questions were pilot-tested and revised as necessary before further interviews were conducted. Eligibility of the data was checked and determined by two researchers.

### *Focus group discussion questions guide*

Semi-structured, in-depth interviews based on a topic guide were used to enable a detailed exploration of participants' views and beliefs. The top-

ic guide included the following prompts: 1) in your opinion, what is the relationship between consuming different foods and MS components? 2) What effects does the consumption of different foods have on health? 3) How do you view healthy eating? 4) What are the barriers to adherence to the nutritional recommendations among peoples having any component of MS? 5) Who influences you in making decision(s) regarding food choice?

The topic guide ensured that a similar range of topics was discussed within different discussion groups. Each focus group discussion was closed when data saturation, defined as no emergence of new themes, was achieved.

### Data analysis

A thematic content analysis method was used to identify and analyze themes related to the aim of this study. The audio-recorded interviews were transcribed word for word. Each transcript was read several times before analysis was begun. Ac-

ording to the reasoned action theory, all themes were clustered as attitude themes and themes of subjective norms. All interview transcripts were indexed, and the main theme and sub-themes were extracted and codified. The development of themes was checked by the project supervisor to ensure the validity of the data analysis.

## Results

Results of the current study are expressed according to the analytical typologies of (a) beliefs and attitudes, and (b) subjective norms, the two key elements of the TRA. Based on the findings obtained from the participants' statements, barriers to adherence to dietary recommendations by adults suffering from MS were categorized into 6 sub-main themes and 20 sub-themes under the theme of attitudes (Table 1) and 1 sub-main theme and 7 sub-themes were identified under the theme of subjective norms (Table 2).

**Table 1:** Classification themes and subthemes of attitude

Sub-main themes (attitude)	Subtheme
<i>Attitudes about metabolic syndrome components and nutrition</i>	• <i>Negative attitudes about obesity and overweight in society</i>
	• <i>Misconceptions about body image</i>
	• <i>Believe that obesity is deeply connected to genetics</i>
	• <i>False belief that not all foods consumed affect blood sugar levels</i>
<i>Attitudes about Fats and Oils</i>	• <i>False belief that there is no connection between diet and development of hypertension</i>
	• <i>False belief about nutritional factors influencing dyslipidemia</i>
	• <i>Lacked a positive attitude toward types of edible oils</i>
<i>Attitudes about salt and salty foods</i>	• <i>Wrong attitude about suitable ways to consume edible oils</i>
	• <i>Not concerned about invisible fats in food items</i>
	• <i>Incorrectly identifying processed salty foods from other types of foods</i>
<i>Attitudes about dairy products</i>	• <i>Incorrect insight about consuming salt and its potential harms</i>
	• <i>Wrong attitudes about consumption of salty canned food, such as canned tuna</i>
<i>Attitudes about cereals</i>	• <i>Misconceptions about full fat dairy products</i>
	• <i>Preferred local unpasteurized dairy products</i>
	• <i>Wrong attitude about traditional cheeses</i>
<i>Attitudes about sugary drinks and sweets</i>	• <i>Incorrectly identifying differences between cereals</i>
	• <i>Misconception about amount and types of grains to be consumed</i>
<i>Attitudes about sugary drinks and sweets</i>	• <i>Incorrect idea about the correct amount of sweets to consume and its effects</i>
	• <i>False belief that eating a lot of sugar had no effect on gaining weight</i>
	• <i>Wrong beliefs regarding soft drinks such as non-Alcoholic beers and fruit juices</i>

**Table 2:** Classification theme and subthemes of Subjective norms

Sub-main themes (subjective norms)	Subtheme
<i>Subjective norms about eating, obesity and overweight</i>	• <i>Improper food culture in society</i>
	• <i>The role of mass media in extensively advertisings unhealthy foods</i>
	• <i>Improper nutrition education programs on TV and radio</i>
	• <i>Acceptance of obese and overweight vs. lean people in society</i>
	• <i>The role of friends in food choices</i>
	• <i>The role of spouse in food choices</i>
	• <i>The role of parents and children in together food choices</i>

**Attitudes about MS components and nutrition**

Some participants had a negative attitude about overweight and thought that obesity was not related to the diseases. One participant said: *"I don't want to lose weight and I'm quite satisfied with my fitness .... I don't feel any problem over this."* Some obese participants had no negative body image. One participant said: *"I'm happy about my body shape... my clothes fit me well."*

One of the most critical barriers to adherence to dietary recommendations was the belief that obesity is deeply connected to genetics. Indeed, the majority of participants believed that environmental factors possess limited influence on fat accumulation in the body. One of them said: *"All of my family members look obese. They often eat less, but they won't lose weight."* Another said: *"In my opinion, overweight is a congenital matter. My parents and my brother are obese; I am obese too .... It has nothing to do with eating."*

Another barrier was the false belief that not all foods consumed affect blood sugar levels. One participant said: *"I believe that the only way to control blood sugar is that one mustn't consume sugar and cookies."* Study participants also tended to feel that there is no connection between diet and the development of hypertension, the key component of MS. One expressed: *"Eating does not affect blood pressure. When I'm nervous my pressure rises."* Some participants also had a false belief about the relationship between nutrition and dyslipidemia. One said: *"Oil is very good and does not raise the blood lipids at all, but hydrogenated oil does raise blood lipids."*

**Attitudes about fats and oils**

A large number of people lacked a positive attitude toward types of edible oils, and they often preferred animal fats to any other fats or oils. One participant said: *"Animal fat has an excellent taste. Our parents also consumed them in the past and they are very healthy. I think animal fat is healthier than the other oils available in the market."* Another one said: *"...Rice does not taste delicious with vegetable oil... for cooking rice it's better to use animal fat or hydrogenated oil."* Another barrier to healthier oil choices included wrong attitudes about suitable ways to consume edible oils. One of them said: *"All types of oil are the same and there's no difference in using them before or after cooking."* Another participant was not concerned about invisible fats in food items: *"Although I suffer from hyperlipidemia, my blood sugar is not high, so I frequently consume cookies and sweets since they don't include much fat. So, I can eat them."*

**Attitudes about salt and salty foods**

Some people could not distinguish the difference between processed salty foods and other types of foods. One of them said: *"Fast foods and also canned foods are greasy, but I don't think that they are salty foods."* Some people had an incorrect insight about consuming salt and its potential harm. One individual said: *"My son is used to consuming a lot of salt and is overweight too. I believe that consuming salt leads to gaining weight."* Another one said: *"Salt makes food tasty and in some cases it's a healthy food choice, especially iodized salt that is highly recommended."* Some people considered the consumption of salty canned foods useful. Some also had a simi-

lar misconception: *"Consuming canned tuna is great, because eating fish keeps us healthy."*

### **Attitudes about dairy products**

Most of the participants in this study had misconceptions about full-fat dairy products. They tended to prefer high fat dairy products. One participant said: *"We always purchase full-fat milk or yogurt. The low-fat milk or yogurt is not good at all since it just includes water."* Most participants preferred local unpasteurized dairy products offered by local farms over pasteurized packed milks for its high fat content: *"...We always buy dairy products from the nearby countryside, because it is healthier and better than the pasteurized ones."*

Some people had wrong attitudes about traditional cheeses, ignoring their high salt content. One said: *"Dairy products like traditional cheese are great. As for me who suffers from hypertension, eating traditional cheese with flat bread is a good option to avoid a high fat diet at night."*

### **Attitudes about cereals**

Some participants were not aware of differences between cereals. One participant stated: *"What's the difference between eating different types of breads? The most important thing is to get full."* Others also had misconceptions about amounts and types of grains to be consumed. They believed that consuming traditional breads effectively satisfies hunger: *"Neither rice nor spaghetti makes me full, but bread does."*

### **Attitudes about sugary drinks and sweets**

There were a significant number of incorrect ideas about the correct amount of sweets to consume. One participant said: *"In my opinion there is no problem concerning eating two or three candies or pastries per day. If one doesn't suffer from blood sugar, he/she can eat more."* Some people had a false belief about sugar, believing that eating a lot of sugar had no effect on gaining weight. One individual said: *"My son eats a lot of sugar, and he's still thin. I think that sugar is just bad for blood sugar. It has no effect on gaining weight."*

The majority of the subjects had wrong beliefs regarding soft drinks such as non-alcoholic beers

and fruit juices. One participant said: *"I never drink carbonated drinks, but I drink a lot of non-alcoholic beers and fruit juices."*

### **Subjective norms about eating, obesity, and overweight**

Most of the study participants believed that Iranian society has an improper food culture. One of them said: *"Most Iranian people have a diverse culture of eating; they like to eat more than their actual requirements as compared to many of the developed countries' citizens who are concerned about the consequences of over-eating."* Many of the participants criticized mass media for extensively advertising unhealthy foods. One said: *"... When I watch TV, it's just advertising potato chips, snacks, and so on; they should not do this."* Some also complained about the improper nutrition education programs on TV and radio. They perceived many media programs as negative and conflicting, saying: *"Nowadays, TV doesn't show any program about nutrition education. They just serve the food industries."*

Some people also said that obese and overweight people are more noticed in society. One said: *"...If I lose some weight, people will tell me: Are you sick?"*

Many participants emphasized the important role of friends and acquaintances in eating behaviors. One said: *"When I go out with my friends, I eat the same food as they eat, and when I'm at a party, I accept compliments and I eat a lot."* Both men and women emphasized the role of a spouse in eating and food choice. One woman said: *"...I'll cook as my husband orders, and I eat that food too."* One man also said: *"My wife cooks any food that she likes, and I'll eat too."* The majority of the participants believed that parents and children can affect food choice. One participant said: *"Sometimes children eat the favorite food of their parents, but nowadays almost always children choose the kind of food."*

## **Discussion**

The present study evaluated barriers to adherence to dietary recommendations by Iranian adults suffering from MS using the conceptual framework of the TRA. We could highlight substantial

conflicts among the study participants regarding their attitudes towards key components of MS in reference to nutrition. Many wrong attitudes on fats and oils, salt, dairy products, cereals, sugary drinks, and sweets exist among the patients together with influential subjective norms in the community. Both the attitudes and adverse subjective norms could impede the healthy behavior of patients.

Globally, the prevalence of MS has been increasing drastically, which in turn results in many lifestyle-related diseases, including diabetes mellitus and cardiovascular diseases (19). The lifestyle changes such as physical activity and dietary modifications are important in the treatment/management of this syndrome (20).

Many factors could affect healthy behaviors such as social, demographic, environmental, personal, and emotional characteristics (9, 21). Patients' attitudes could be an important factor to adherence to dietary recommendations. The patients had wrong attitudes about MS and its components. Interestingly, obvious misperceptions were demonstrated regarding obesity, body image, and food items such as salt. People have a wrong attitude about obesity and those who were overweight or obese had an inaccurate perception of their body image, contrary to people who were underweight or had an ideal weight (22-24). Furthermore, many participants expressed wrong attitudes about salt. Similar findings were also reported by other investigators (25, 26). These results demand the attention of policy makers who need to design and implement health education interventions in such societies.

The results of this study indicated a preference for animal fat, more specifically local ghee, to vegetable oils. This finding was in agreement with a report that consumption of animal fat was significantly higher than all types of oils consumed by families (27). The high intake of animal fat by families could be possibly because of improper food culture together with lack of suitable nutrition education in the society.

Ecological studies suggested high consumption of saturated fat, like animal fat resources as a significant risk factor for cardiovascular disease,

which is one of the major metabolic consequences of MS. Although, observational studies showed that there might be no benefits if saturated fat reduction is associated with an increase in carbohydrates, these findings suggest that health education programs targeting on substantial decrease on lowering saturated fat intake alone needs to be expanded greatly to encompass several other key components of the diet including increased consumption of healthy foods (28).

The current study also showed a wrong and even positive attitude about salt and salty foods as another barrier to adherence to healthy recommendations among patients suffering from MS. Attitude was the most important factor of predicting salt consumption in people (17, 29). With regard to the effect of salt on blood pressure, as one of important MS component, more emphases must be put on nutrition education programs. In addition, we could focus on salt alternative to reduce salt intake in society.

MS patients preferred eating high fat dairy products like local unpasteurized dairy products. These results agreed with those of other works conducted in different regions of the country (30, 31). We also determined the existence of a wrong attitude toward differences in types of grain (refined and whole). The consumption of whole grains has a paradoxical relationship with MS and the consumption of refined grains has a direct relationship with it (32, 33). In a study, people had a wrong attitude about whole grains (34). Immediate action is necessary to help improve both knowledge and attitudes regarding healthy food choices in many developing countries.

Another important finding of this study was that many patients had wrong beliefs regarding soft drinks such as non-alcoholic beers and fruit juices. There was a strong belief that these beverages are harmless vs. carbonated drinks. Some previous studies have shown a relationship between sugary drinks and MS (35, 36). Basically, diets with high sugar-sweetened beverages including carbonated beverages, sodas, energy drinks and fruit juices are associated with incidence of diabetes and obesity with subsequent effects on further increase in the prevalence of cardiovascular diseases.

es, stroke, cancers and many other chronic diseases (28). Thus, appropriate public health policies will be more effective to improve the health of such populations and reduce healthcare costs. Even small reductions of population exposure to large risks and improvement food pattern will yield substantial health gains (37).

A key finding of the current research was the fact that the society's food culture may serve as an important barrier. The food culture of Iran's society was negatively affected by various unhealthy attitudes, which could affect the diet patterns of any individual in the society. The inter-relationship could be and is an influential factor on the nutritional behavior of their study subjects (38).

According to the findings of the present study, the media role in advertising unhealthy foods increases the consumption of those foods. Media has an important role in promoting unhealthy food consumption and that educational programs regarding dietary recommendations are rare. Previous studies also noted the media's role in people's choices regarding nutrition (39, 40). According to the results of this study, another factor affecting the nutrition of people was the roles of parents, children, and friends, which include the important factor of social pressure on an individual. Previous studies have also depicted the role of parents, children, and friends as affecting the nutrition of people (38, 41). This qualitative study was conducted in a population that is limitation of the study and suggested duplicate this study in another population.

## Conclusion

Substantial wrong attitudes exist among those suffering from MS. Misconceptions were identified in many aspects of MS, including the components of the disease as well as interrelated dietary factors including attitudes towards the role of nutrition, fats and oils, salt, dairy products, cereals, and sugary drinks and sweets. The study was also able to recognize problems with regard to subjective norms. It is suggested that identify-

ing barriers to adherence to dietary recommendations by individuals suffering from MS are helpful in implementing strategies to manage the increasing prevalence of MS and the subsequent consequences of this syndrome by teaching healthy ways of eating and promoting the nutritional attitude of people.

## Ethical considerations

The participants' information, recorded sound files, and their names were kept secret. Written informed consent was obtained from all study participants, and they all had the right to withdraw from the study at any time. The study was ethically approved by an authorized ethics committee at Tabriz University of Medical Sciences, Tabriz, Iran (Reference no.;5/4/3189).

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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