

REVIEW ARTICLE

A viewpoint toward food safety, hygiene and security in Iran: Situations, problems and approaches (Local markets and foods in South Khorasan and Fars provinces)

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ABSTRACT

Diet plays an important role in the risk of non-communicable diseases (NCDs). In the Islamic Republic of Iran, national activities were started after the release of the World Health Organization's (WHO) action plan on the prevention and control of non-communicable diseases. The WHO's five keys to safer food manual is recognized as a global strategy to train food producers to reduce the burden of foodborne disease. The effect of educational intervention based on the WHO's safer food manual on the knowledge, attitude, and behavior. An educational intervention based on the WHO's five keys to a safer food manual can improve the knowledge, attitude, and behavior of women referring to comprehensive health service centers. Therefore, one of the main global challenges in designing strategies to control and manage NCDs in large countries such as the Islamic Republic of Iran is a modification of food traditions. In this article, the author discusses and states the most important aspects of food safety, hygiene, and security in Iran: situations, problems, and approaches with a viewpoint toward local markets and foods in south Khorasan and Fars provinces.

Key words: Approaches, food safety, foods, hygiene, Iran, local markets, problems, security, situations, south Khorasan and Fars provinces

INTRODUCTION

Diet plays an important role in the risk of non-communicable diseases (NCDs). In the Islamic Republic of Iran, national activities were started after the release of the World Health Organization's (WHO) action plan on the prevention and control of NCDs (Moslemi *et al.*, 2020).^[1]

The WHO's five keys to safer food manual is recognized as a global strategy to train food producers to reduce the burden of foodborne disease. The effect of educational intervention based on the WHO's safer food manual on the knowledge, attitude, and behavior.

An educational intervention based on the WHO's five keys to a safer food manual can improve the knowledge, attitude, and behavior of women referring to comprehensive health service centers (Ramezanhkani *et al.*, 2022).^[2]

NCDs are chronic disorders caused by non-infectious agents. NCDs kill 41 million people annually, which represent 71% of all deaths Worldwide. Based on the WHO reports, annual deaths from NCDs are mostly linked to cardiovascular diseases (44%), cancers (22%), respiratory diseases (10%) and diabetes (4%). NCDs are an important health concern in the Islamic Republic of Iran; the annual death rate from NCDs represents about 82% of the total mortality in the country. National studies show a 14.5% increase in deaths from NCDs in the past 20 years. This is of concern, especially as the population is aging. Several factors should be considered when developing and implementing strategies to reduce

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NCDs. For example, diet, and preparation and consumption of foods vary in different societies and according to demographic, cultural and socioeconomic characteristics. Therefore, one of the main global challenges in designing strategies to control and manage NCDs in large countries such as the Islamic Republic of Iran is a modification of food traditions (Moslemi *et al.*, 2020).^[1]

WOMEN ROLE IN ENHANCING AWARENESS AND IMPROVE OF FOOD SAFETY

It is widely understood that most food-borne illness is associated with the inner home environment and that therefore, the role of women in providing, storage and preparation of healthy food is very important. Since the role of women in the family and food consumption is generally recognized, it is essential that women's knowledge, attitudes, and behavior in regard to food safety be examined. It is estimated that between 50 and 87% of foodborne disease outbreaks can be traced to foods that are prepared in the home. Furthermore, the kitchen environment is known as a place that may be heavily contaminated with different bacteria. Because of the situation of rural women, the need for studying food safety among rural women is critical. Moreover, since many women in rural areas are regarded as "illiterate", it is important to explore the relationships between literacy, women, and food safety in rural areas. A recent systematic review showed that low levels of health literacy are a major problem in the United States. This problem was more serious for people with less education. Given the above, the promotion of food safety knowledge is essential to protect public health and achieve sustainable development. It is also suggested that this is more important for women because women are more responsible for the storage and preparation of food at home and they coach and teach their children. Hence, women can play an important role in enhancing awareness of food safety and of better ways to improve food safety. Although in most countries, men have more access to facilities than women, the various functions of women in their communities cannot be ignored (Abedi-Sarvestani and Avarand 2020) [Figure 3].^[3]

NECESSITY OF INVESTMENT IN GIRLS' EDUCATION FOR FOOD SAFETY

In general, two main views of literacy can be distinguished. In one view, literacy is attributed to a combination of skills needed to understand and produce written forms of a language. This "skills" view is widely accepted in developing countries. However, today the concept of literacy is not considered solely as the ability of reading, writing, and counting but as functional literacy. It is claimed that functional literacy facilitates access to knowledge and boosts the process of empowerment and self-esteem from which all human beings benefit without literacy, a person remains ignorant and unable to learn. Literacy learning needs to be accompanied by learning about areas, such as lifestyle, biodiversity, cultural heritage, poverty reduction, disaster risk reduction, and safety as well as civic engagement to be fully functional. The alternative view sees literacy, not as an ability (to read and write, or to read and write functionally, or to read and write and learn) that a person possesses or does not possess and which can be learned in a classroom, but as a set of practices that take place in the course of everyday life. Sometimes called the New Literacy Studies but more generally called "literacy as social practice", this approach points out that there are multiple literacies, such as religious literacies, occupational literacies, and academic literacies. It draws on the work of Professor Brian Street whose work in Iran was the basis for his major study of literacy in theory and practice. Associated with this view of literacy practices is critical literacy seen as a means to help people to be aware of their position and be ready to accept and make positive changes, associated with the work of Paulo Freire (Abedi-Sarvestani and Avarand 2020) [Figure 3].^[3]

SALT AND OIL MISUSE EVIDENCES IN IRAN

Salt is necessary for normal body function and food preservation. Nonetheless, excessive daily salt intake results in diseases, such as high blood pressure, cardiovascular diseases, and gastric cancers. For example, a sodium intake of 3480 mg/day, equal to 8.8 g/day of salt, was the main contributor to cardiometabolic diseases, mainly in

elderly people, in the United States of America. This intake is similar to the daily intake of salt in the Islamic Republic of Iran in 2016–9.52 g. Based on the clinical adverse effects, the WHO has recommended a maximum salt intake of 5 g/day, which allows normal function of the human body with no adverse effects on health. Since the national salt intake in the Islamic Republic of Iran was about twice the WHO-recommended level, regulatory authorities brought in new restrictions. Mandatory reformulation of popular foods is the most cost-effective approach to decreasing disease burdens associated to salt. It is worth noting that the daily salt intake is still higher than that recommended by the WHO and further restrictions through reformulations are not practical because of technical limitations. For example, other than the flavor and preservative roles of salt, the addition of salt to the dough for bread baking is responsible for texture due to the electrostatic interactions between amino acids and its effects on the hydration of proteins. Therefore, to achieve further reduction in salt intake, consumers' awareness of their salt consumption should be promoted. About 50–60% of daily salt intake is from salt that is directly added to food by the consumer, which is currently equal to 3.44–4.12 g/day in the Islamic Republic of Iran (Moslemi *et al.*, 2020).^[1]

WHO recommends that <1% and 10% of total dietary energy intake per day should come from trans and saturated fats, respectively. Cardiovascular diseases impose heavy financial burdens on governments annually because of productivity losses and healthcare expenses. Other than salt contribution, the high cardiovascular disease rates are possibly due to the consumption of saturated and trans fats. Trans fats have further hazards as they can induce thrombogenesis and atherogenesis. Despite previous reports, new findings have shown that ruminant-produced and industrial trans fatty acids adversely change the ratio of low-density lipoprotein cholesterol to high-density lipoprotein cholesterol in the human body. However, the adverse effects of industrial fatty acids are greater than those of ruminant isomers in normal diets. This effect possibly occurs because of the presence of bioactive components and nutrients in ruminant-derived foods containing trans fats. Therefore, lower intake of these two fatty acids or their substitution

with cis-unsaturated fatty acids results in healthier blood lipid profiles.^[1]

NUTRITIONAL TRAFFIC LIGHT IN IRAN

According to the Codex Alimentarius, “labeling includes any written, printed or graphic matter that is present on the label, accompanies the food or is displayed near the food including that for the purpose of promoting its sale or disposal.” To minimize the negative contribution of overweight and obesity to NCDs, simple policies to inform consumers, including nutritional labeling, were introduced for preventive purposes in the Islamic Republic of Iran. Nutritional labeling helps consumers to choose healthy products within various commercial brands based on their daily food baskets and calorie intakes. This strategy also helps the government to control NCDs and reduce budgets for medical care as a result of NCDs. Experiences in other countries show that nutritional traffic light labeling is a preferred method compared with other labeling guides, such as octagons, nutritional claims, logos, and numerical levels per serving sizes. Therefore, the design of a graphical feature showing total calorie, salt, sugar, fat, and trans-fat indices was motivated by the Iran Food and Drug Administration. The campaign included educational programs at schools, interviews in the media, and public advertisements. However, this is the beginning of nutritional traffic light labeling in the country and further research must be carried out on consumer perceptions to have a better understanding of the effectiveness of this policy (Moslemi *et al.*, 2020) [Figure 1].^[1]

STABILITY OF FOOD SECURITY IN IRAN; CHALLENGES AND WAYS FORWARD

Food security, which is considered to be a public health-related socioeconomic factor, ensures the health of society's people and plays a significant role in improving governance. This concept is closely related to the concept of stability of food. The stability of food means that there should be adequate, quality, and nutritious food for all human beings, in all places and at all times, and no factor should prevent this important issue. Stability in food

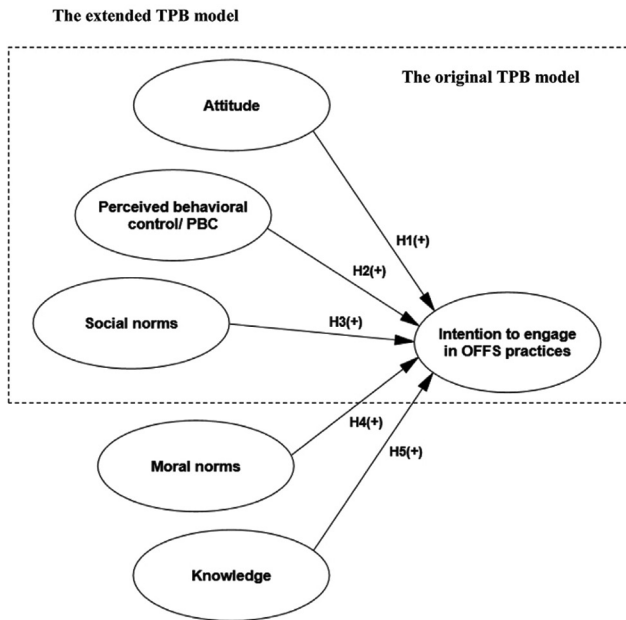


Figure 1: Theoretical research framework for achieving on-farm food safety (Rezaei *et al.*, 2018)^[4]



Figure 3: Scientific tour of author and his students from Gastaj and Forg historical villages of Ferdows city (275 and 70 km distances to Birjand city, center of South Khorasan Province, east of Iran) with the help of Dehyariha organization for introducing and visiting rural people life, activities, self-employment of women, traditional foods and medicines, ceremonies, women, men and children work and activities, culture, etc. (March and April, 2018). (Golmohammadi, 2018)^[5]



Figure 2: Author visiting from local and weekly market of Jomeh Bazar (Friday Market) in Birjand city, center of South Khorasan Province, East of Iran. This local and weekly market provides many opportunities for self-employment of men and women, supplying traditional foods and medicines, etc. with lower costs and prices compared to other markets and shops and perhaps lower conditions of safety and hygiene because of wide range of suppliers and weak safety and hygiene controls, etc. (Pictures by author. January 31, 2025)

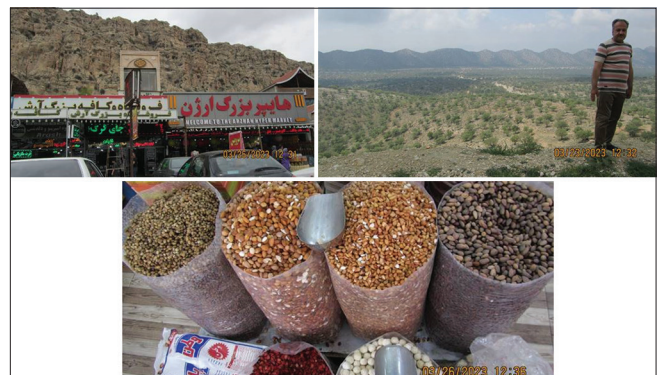


Figure 4: Field research visiting of author from forests of trees of medical plants of *Pistacia atlantica* and *amygdalus elaeagnifolia/Amygdalus orientalis* in Arjan Fars plain, in Fars Province, South West of Iran. These medical plants are very resistive to drought and dried conditions and high degree of salinity and salt amount in their water and soil, plus weak soil conditions in depth, slope and organic matters. (Pictures by author. March 26, 2023)

production and supply is at the heart of food security and makes food systems resilient in times of crisis.

The negative impact of climate change on agricultural production, intensified inflationary trends, high food prices, increasing food waste, increasing the need for food imports, and, more significantly, ongoing international sanctions make it difficult to access affordable food and pose challenges to Iran's food security. Moreover, the COVID-19 crisis has reduced the incomes of families and the government by intensifying economic pressures on government incomes as well as rising unemployment, which has directly exacerbated food insecurity [Figure 2].^[6]

THE CONSUMPTION OF FRUITS AND VEGETABLES (FV)

The consumption of FV is a key indicator of a healthful diet, which is associated with positive health outcomes such as a reduction in the incidence of cardiovascular disease and cancer. Research on health promotion often frames explanations for individual health decisions within an ecological context. In the case of food choices such as FV consumption, the ecological context has been conceptualized as the nutritional or food environment. The food environment, specifically the accessibility of healthful food, has been determined to influence a range of dietary health indicators including obesity rates, as well as the consumption of FV and low-fat dairy products. Research on food access often examines spatial disparity, which refers to the unequal distribution of goods among different spatially embedded populations. These studies often focus on urban rather than rural environments.

Considering these facts, the Food and Agriculture Organization and the WHO call on all the engaged stakeholders in the production, process, sell, or preparation of food, either being individual practitioners or corporate or government-level entities, to put continuous efforts in keeping the food safe. In this regard, the two United Nations agencies, particularly, recommend the below five ways in which stakeholders can make a sustained difference in food safety:

- a. Ensure food is safe
- b. Grow food safely
- c. Keep food safe
- d. Check that food is safe
- e. Team up for safety (Dean and Sharkey, 2011) [Figure 4].^[7]

FOODBORNE DISEASE IN IRAN

There are no comprehensive food composition data on minerals and phytic acid contents of Iranian foods, which is an important pre-requisite when assessing nutrient intake and nutritional status of the population. An adequate intake of zinc (Zn) is necessary to maintain good health, growth, and development. Deficiency results from an inadequate dietary intake of bioavailable Zn and is common in many parts of the world. Adequate Zn nutrition is particularly important during childhood. The first case of human Zn deficiency ever detected was in Iran in 1961 when a dwarf male adolescent with retarded sexual maturation responded positively to Zn supplementation. Since then, human Zn deficiency has been found in many other regions of the world, in particular in developing countries.

On the other hand, a similar study involved the use of the health belief model to predict food safety behaviors, and 18% of the variance of the food safety behaviors could be predicted by the model (Momayyezi *et al.*, 2020).^[8]

Notes:

- theory of planned behavior
- on-farm food safety
- good agricultural practices
- perceived behavioral control.
- Fresh FV
- FV (Momayyezi *et al.*, 2020).^[8]

CONCLUSION

The negative impact of climate change on agricultural production, intensified inflationary trends, high food prices, increasing food waste, increasing the need for food imports, and, more significantly, ongoing international sanctions make it difficult to access affordable food and pose challenges to Iran's food security. Moreover, the COVID-19 crisis has reduced the incomes of families and the government by intensifying economic pressures on government incomes as well as rising unemployment, which has directly exacerbated food insecurity. Iran is vulnerable to the arable land equipped for irrigation, food imports over total merchandise exports, and the cereal imports dependency ratio while being resilient per capita food production and food supply variability (Ghalibaf *et al.*, 2022).^[6]

Health and food safety is one of the most important issues of nutrition science. It is therefore necessary to hold training programs through workshops or to include courses in the curriculum of majors that lack such credits. Annually millions of people in the world suffer from food-borne diseases through consumption of contaminated food. Increasing outbreaks of transmitted diseases indicate the expansion of public health problems in low - and middle-income countries which threaten consumers' health and affect their economy by imposing medical expenses (Dehghan *et al.*, 2017).^[9]

The System of Health Accounts framework has been described by the WHO as “an internationally recognized methodology that tracks all health spending in a given country over a defined period of time regardless of the entity or institution that financed and managed that spending” (United Nations- Islamic Republic of Iran, 2020).^[10] However, it seems that the establishment of this template in the field of food safety is too essential in developing countries such as Iran to reduce the cost as well as the burden of food-borne diseases. Hence, it is proposing that “Food Safety Accounting” must be investigated and implemented to provide valuable expenditure information about food surveillance spending in the country (Rahimzade, 2017).^[11]

It is widely understood that most food-borne illness is associated with the inner home environment and that therefore, the role of women in providing, storage and preparation of healthy food is very important (Abedi-Sarvestani and Avarand 2020).^[3] As knowing food safety behavior and its relationship to education can help health promotion planning, knowing the level of behavior of food safety among women in the preparation and storage of food and its relationship to education is an important factor in public health. Women have the most important role in the preparation of food at the home environment. Therefore, the promotion of knowledge and attitudes of women towards appropriate food safety behavior can improve the nutritional status and health of

rural people and reduce many health problems and illnesses that come from foods.

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