Food Safety in Developing Countries: An Ignored Public Health Issue

Rabel Khawaja and Abdul Sattar Khan*

Family and Community Medicine Department, College of Medicine, King Faisal University, Saudi Arabia

***Corresponding Author:** Abdul Sattar Khan, Family and Community Medicine Department, College of Medicine, King Faisal University, Saudi Arabia.

Abstract

Public health is the main concern of every country including developing countries; however, still the developing countries are fighting against many challenges and demands and ignoring the most promising component of public health that is "Food Safety". This mini review highlights some important challenges and solutions for addressing the food safety in developing countries. The food safety issued is ignored as a public health problem in developing countries.

Keywords: Food Safety; Food Contamination; Food Borne Diseases

Introduction

Last at least two decades, food safety has become an essential component of public health and attracts the attention of policy makers globally. There is a growing public concern that foodborne diseases are on the rise [1]. The World Declaration on Nutrition addressed this issue and mentioned that millions of people suffer from communicable diseases, caused by food and water [2]. Many developing countries rely heavily on agricultural exports; therefore, they produce enough stuff to export and are bound to follow international standards of practices (SOPs). However, domestically the situation handles differently [3] and for a range of reasons, people living in developing countries face a higher level of exposure to contaminated foodstuffs than developed countries [4]. In these reasons, the tropical climate favors proliferation of pests and naturally occurring toxins, unsafe water supply for cleaning of foodstuffs and no SOPs are developed or if established, those are not being enforced completely, are considered the main reasons [5]. One more perception is also there related to the quality of foodstuff that is the farmers and the traders export high quality foodstuff outside the countries and domestically consumers use the leftover of less quality foodstuff. The rapid urbanization makes situation worst in these countries and making people more dependable on the markets. These all situations raise many concern related to public health [6], however, the policy makers are in developing countries have other priorities therefore, this public health issue is highly ignored. There are two strategies which have been implemented for managing food safety, however, how accurately and appropriately these strategies apply in countries is still under discussion.

Hazard analysis and critical control points (HACCP)

The HACCP system [7], which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on product testing. Any HACCP system is capable of accommodating change, such as advances in equipment design, processing procedures or technological developments.

HACCP can be applied throughout the food chain from primary production to final consumption and its implementation should be guided by scientific evidence of risks to human health. As well as enhancing food safety, implementation of HACCP can provide other significant benefits. In addition, the application of HACCP systems can aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety.

The successful application of HACCP requires the full commitment and involvement of management and the work force. It also requires a multidisciplinary approach; this multidisciplinary approach should include, when appropriate, expertise in agronomy, veterinary health, production, microbiology, medicine, public health, food technology, environmental health, chemistry and engineering, according to the particular study. The HACCP system consists of the following seven principles.
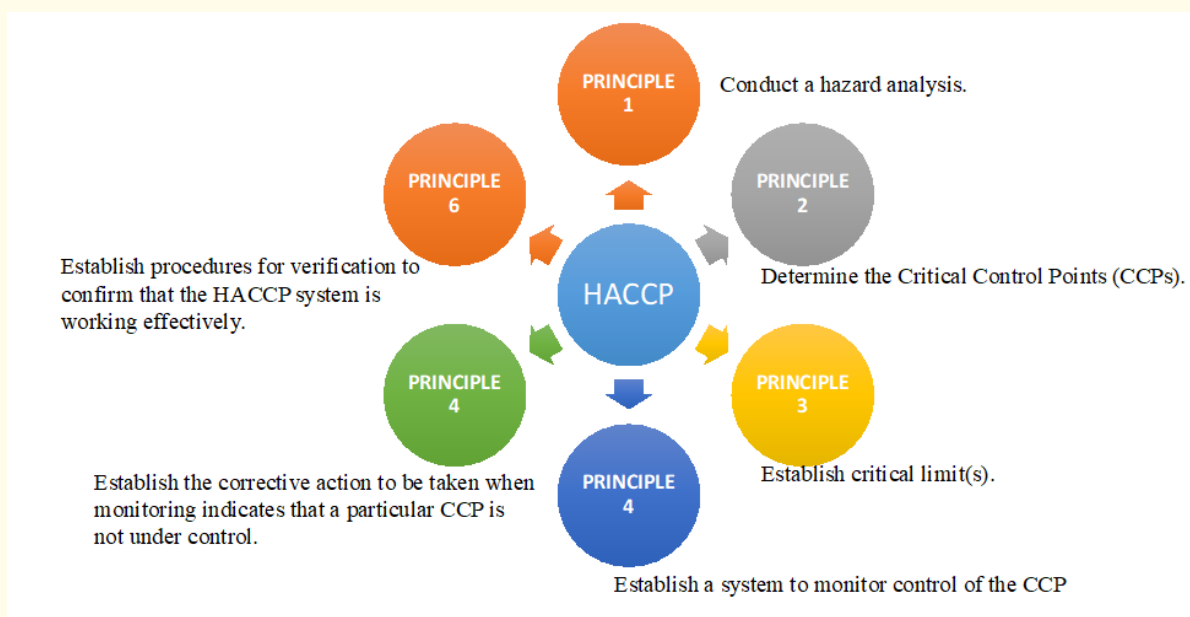

Figure 1: 7 Principles of hazard analysis and critical control points (HACCP).

Farm to fork strategies (FOF)

Farm to fork [8] is another strategy in which food production, processing, distribution, and consumption are incorporated to improve the environmental, economic, social and nutritional health of consumer. The FOF chain is a long process because consumers are much further removed from their food resources. Majority are unacquainted of composite food preservation and transportation required to deliver them fresh and high-quality food. The cumulative complexity of the process is forcing every level of supply chain to closely monitor their tasks in order to avoid contamination before reaching to consumer. There are four main components involved in FOF i.e. food origin, processor, transportation, storage, and consumer.
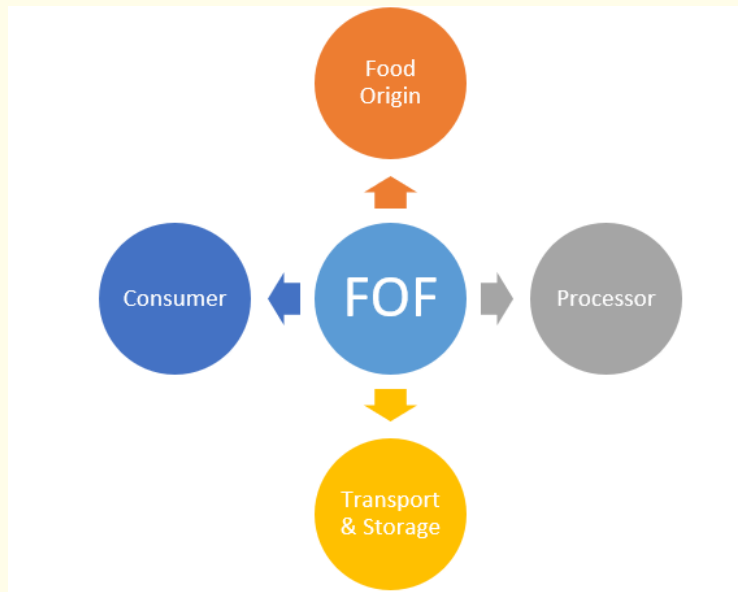
Figure 2: *Basics of farm to fork strategy (FOF).*

The risk of contamination is different and of major importance at every level individually. The first and foremost component is the origin of food. Majority of the food products are derived from agriculture while others are livestock and seafood. The farmers utilize natural and synthetic chemicals to fight pests and to promote high crop yield and the livestock needs proper vaccination and handling before dispatch. However, the chemicals used in agriculture if not removed properly lead to pesticide poisoning. Similarly, poultry and meat need vaccination and on-farm handling to eliminate pathogenic bacteria from the environment and intestinal tracts of live animals. Processing of the food is the level, which includes slaughtering, harvesting, packing, refrigerating and additives. Meat and poultry industries need to incorporate potassium lactate, sodium diacetate or another approved antimicrobial to the product formulation to restrict pathogen growth during the shelf life of the product. Transportation and storage plays more important role between food manufacturers and consumers. The retailers, distribution centers and warehouses and collectively they all are held responsible for potential safety for food hazards such as cross contamination, improper storage container and inadequate storage and transport temperatures. As the last stage, "the fork" plays their own critical role in ensuring the food safety. Many food-borne diseases at the consumer level are direct results of inadequate preparation, leaving food at room temperature for longer time, cross contamination and storage.

Discussion

Global health through food safety is the main concern because of emergence and reemergence of foodborne pathogens have made microbiological safety and quality of food of public and health important [3]. In developing countries, still children up to 5 years' age are suffering with diarrhea where food plays a major role in the epidemiology of this and other diseases. There are approximately 1.5 billion episodes of diarrhea every year in developing countries [9].

The above two concerning food safety, two catch phrases have become omnipresent: "Hazard Analysis and Critical Control Points" (or HACCP) [7] and "farm to fork" strategies. HACCP, a 7-step method developed in the 1960s for controlling microbiological contamination of

processed foods for the US space program, has been expanded to cover a range of different types of contamination, in a variety of production circumstances. The "farm to fork" [8] notion is that quality needs to be managed not only in the processing factory, but also along the entire supply chain, from the initial stages of raw material production to the final stages of food preparation for consumption.

According to the World Health Organization, the morbidity and mortality resulting from unsafe food lead to productivity losses of about USD 95 billion in low- and middle-income countries [11]. Food safety has been neglected in developing countries and is impeded by two major group of factors, weak empirical knowledge and inadequate value-chain engagement. The empirical knowledge requires good quality data of the country regarding the incidence of foodborne diseases, the economic costs of unsafe food, and the efficacy of domestic food safety interventions. The policymakers and researchers often do not know the extent of the problem in their country which is basic issue in developing world. Second concern is related to institutional challenges such as fragmented food value chains and policies. The inadequate application of SOPs make it difficult to establish comprehensive, cohesive programs to address food safety issues [12]. Food safety is not the responsibility of a single stakeholder but is a partnership between value-chain actors. The management of food safety needs to be considered as a joint action that needs cooperation between the government, enterprises, customers, and civil societies [13]. The quandary of laboratory facilities in the developing country makes circumstances worst for safe food. Laboratories are essential tools in the food safety system, as an input into quality assurance programs and the regulatory process [12]. They are also expensive to set up and operate, particularly in poor countries, where spare parts are harder to come by and where the basic infrastructure services (water, electricity and gas) are often in irregular supply. The way society should go about managing food safety, as a shared responsibility of different parties - government regulators, private industry, and consumers. Consumers' roles are two-fold: as the last link of the supply chain - "farm to fork" imagery, and as advocates and watchdogs for the regulatory process. Moreover, public information, education, and communication are primarily the responsibility of government and university and research institutions, but industry and media also play a role, with respect to specific products, especially when problems occur with a product [14].

Conclusion

In conclusion, the safe food is identified as a fundamental right many years ago, however, in reality this is far from being put into practice [2]. A collaborative model among government, farmers or foodstuff handlers and consumers can play an important role to work ethical and practical issues of "marketing" safety, the degree to which HACCP "pays off", both financially and in terms of increased safety [14].

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