

AN OVERVIEW OF ILL EFFECTS OF STREET FOOD: THE HIDDEN COSTS OF CONVENIENCE

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ABSTRACT

Street food is a necessary aspect of daily life for billions of people around the world, especially in low- and middle-income nations where it is cheap, easy to get, and makes people feel like they belong to a culture. But underneath its ease of use is a public health problem that puts lives, jobs, and long-term development at risk. This paper thoroughly examines the biological, chemical, physical, and nutritional risks linked to street food consumption, highlighting the global disease burden, systemic infrastructural deficiencies, food adulteration practices, and regulatory inadequacies that sustain hazardous behaviours. Based on evidence from the World Health Organisation (WHO), Food and Agriculture Organisation (FAO), Centres for Disease Control and Prevention (CDC), and recent peer-reviewed studies, this work illustrates how street food, despite its essential socio-economic role, can act as a conduit for illness, chronic health issues, and even death. It emphasises the unequal effects on children, women, and other vulnerable groups and looks into how poverty, regulatory failure, and informal food economies are all connected. The study contends that remedies must be both systemic and context-sensitive, including regulatory innovation, vendor education, investment in public health infrastructure, consumer awareness, and technology-driven interventions. This paper argues that street food safety is not just a health issue, but a major development priority that needs action right away from many different sectors. It does this by using tables, case studies, visualisations, and documented global outbreaks.

Keywords: Street Food Safety, Foodborne Illnesses, Biological Hazards, Chemical Contaminants, Food Adulteration, Public Health, Informal Food Sector, Regulatory Gaps, Nutrition, Socio-Economic Vulnerability.

INTRODUCTION

Street food is an important aspect of the food culture and economy of many countries, especially in Asia, Africa, and Latin America. Every day, more than 2.5 billion people around the world eat street food. This shows how important it is for delivering affordable and easy-to-get nutrition to many different groups of people (FAO, 2019). Street food is more than just a meal in nations like India, Nigeria, and Brazil. It's a daily need for people who live in cities, low-income families, students, and migrant workers. Street food is important for more than just meals; it creates jobs for millions of people and adds to the informal economy. According to the NCDC (2024), street vending supports the lives of almost 10 million people in India alone. But the same system that feeds people also has a lot of risks.

Street food is a big public health problem, even though it is important for the economy and society. The World Health Organisation (WHO, 2020) says that unsafe food

causes more than 600 million cases of foodborne illness and 420,000 deaths every year around the world. Alarmingly, 40% of the burden of this disease falls on children under five years old, who die 125,000 times a year. The World Health Organisation (WHO) also says that foodborne infections cause the loss of 33 million Disability-Adjusted Life Years (DALYs) over the world (WHO, 2015). Most of these occurrences happen in low- and middle-income countries (LMICs), where public health systems, sanitation systems, and food safety control are typically not good enough. Unsafe food costs low- and middle-income countries over US\$110 billion a year in lost productivity and medical bills (WHO, 2020).

Eating food that has harmful bacteria, viruses, parasites, poisons, and chemicals in it can get you sick with foodborne diseases. These diseases can vary from diarrhoea to long-term ailments like cancer and neurological disorders (WHO, 2020; CDC, 2023). Street food is especially easy to contaminate because of several factors. For example, it is usually made in public places, doesn't always have temperature control, uses untreated water, and is often sold by vendors who don't have much or any training in food safety and hygiene (Frontiers in Microbiology, 2021). For example, a study done in Mekelle City, Ethiopia, indicated that 74.1% of food handlers had difficulty obtaining water, and 64.1% of them washed their hands with water alone, without soap or sanitiser (ISABB-JFAS, 2020). In Nigeria, 27.7% of vendors didn't wash their hands before preparing food, and 43.9% of them handled money while providing food (Frontiers in Microbiology, 2021).

Also, street food is not only easy to get sick from, but it is also often mixed with chemicals and other physical dangers. A lot of reports from South Asian countries say that things like artificial dyes, chalk powder, and synthetic milk have been added to food (Byju's, 2024; AlgaeCookingClub, 2023). Food poisoning cases linked to fish treated with formalin, spices with lead, and mustard oil mixed with argemone oil show how dangerous these kinds of techniques may be. These deliberate changes are typically made for financial reasons and because the rules aren't enforced very well. They can cause serious health problems such organ failure, reproductive problems, and cancer (ESPubs, 2024).

Street food is also good and bad for your health. In some areas, it provides up to 50% of the daily energy and protein needs of urban adults and children. At the same time, it leads to too much salt, sugar, and trans fats, which causes non-communicable diseases (NCDs) like obesity, diabetes, and high blood pressure (PMC, 2023). A systematic review of street food consumption in developing countries found that these foods often don't have enough important micronutrients like calcium, thiamine and vitamin B12, but they do have a lot of iron and vitamin A Igbino et al., 2021. This creates a paradox of malnutrition where people are both overfed and lacking in micronutrients (FAO, 2020; PMC, 2023).

Street vending is hard to regulate because it's not formal. Most street vendors don't have licenses, professional training, or access to clean infrastructure. In many LMICs, current national food control systems mostly look at the formal sector. This means that the informal street food market is not very well controlled (Food Protection, 2024). In India, China, and Nigeria, for example, limited resources, a lack of educated staff, and unclear legislative requirements make it even harder to enforce regulations Jaffee & Henson, 2024. This creates a regulatory vacuum that lets harmful behaviours continue without being stopped (China CDC Weekly, 2023; NCDC, 2024).

This review tries to find out the many different health effects of eating street food by putting together information from the WHO, FAO, CDC, peer-reviewed publications, and national disease surveillance reports. It looks at the biological, chemical, and physical risks of street food in a methodical way, checks for nutritional imbalances, and shows that there have been outbreaks in different areas using epidemiological data Lu et al., 2023. The study also talks about the problems with the way regulations and infrastructure work together, as well as the social and economic factors that keep people eating and making street food in

unsafe settings. The report goes into great detail about the hidden costs of street food using pictures, graphs, and real-world case studies. It stresses that food safety needs to be reinterpreted not just as a health issue but also as a key part of sustainable development.

Major Categories of Hazards in Street Food

Street food is often necessary for many people living in cities and towns, but it may also be quite dangerous to your health because it can be contaminated in numerous ways. These risks are usually put into three groups: biological, chemical, and physical. Each one poses a different harm to the health of the people who buy them.

Biological dangers are the most urgent and well-known danger in places where street food is sold. Pathogens like *Salmonella* spp., *Escherichia coli* (especially strains that make Shiga toxin), *Staphylococcus aureus*, and *Listeria monocytogenes* can contaminate food and cause stomach problems. Some of these problems can turn into systemic infections or long-term problems like haemolytic uremic syndrome (WHO, 2020). Viral pollutants, including Norovirus and Hepatitis A, are key causes of outbreaks that spread through the faecal-oral route. Poor hygiene and dirty water supplies make this worse (CDC, 2023). Parasitic illnesses, including those induced by *Taenia solium*, *Ascaris*, and *Giardia*, exacerbate the burden, especially in regions deficient in adequate sanitation (FAO, 2020). Microbial contamination is extremely sneaky because foods that are contaminated may look, smell, and taste normal, making it almost impossible for people to tell (Frontiers in Microbiology, 2021). In places like Ethiopia and Nigeria where clean water, refrigeration, and places to wash hands are hard to come by, microbiological dangers spread without any checks (ISABB-JFAS, 2020).

Street food can be dangerous because of chemicals that come from both pollution in the environment and people who add chemicals on purpose. Aflatoxins, which are made by moulds on grains, are an example of a naturally occurring toxin that can cause serious long-term health problems, such as liver cancer and a weakened immune system (WHO, 2020). Heavy metals like lead, cadmium, and mercury are neurotoxic and carcinogenic (CDC, 2016). They commonly get into food through polluted water or soil. Persistent organic pollutants, such as polychlorinated biphenyls and dioxins, build up in animal fat and dairy products, which can mess with hormones and cause problems with growth (WHO, 2020). Intentional adulteration, which is done for financial gain, is probably the most worrying. In 1998, an epidemic of dropsy in Delhi killed more than 60 people and sent 3,000 to the hospital. This was caused by milk mixed with detergents, mustard oil mixed with argemone oil, and coloured sweets that contained illegal synthetic dyes like Rhodamine B or Metanil Yellow (NCDC, 2024). Adulterants can be added at any stage, from making the product to selling it, and its long-term effects, such as kidney failure and cancer, sometimes go unrecognised until the damage is done.

Physical hazards are a major cause of food-related accidents and unhappy customers, even though they don't always kill people. Food can get foreign items including metal shards, glass splinters, stones, hair, nails, and plastic pieces in it when it is not handled properly, cleaned properly, or the equipment is getting old (FoodDocs, 2023). These toxins can hurt people in many ways, including cuts in the mouth, broken teeth, and even choking. This is especially dangerous for kids and older people (CPD Online, 2023). Also, the presence of these kinds of contaminants frequently means that there are bigger problems with cleanliness that could also be dangerous because of biological or chemical dangers. For example, insect droppings or rust flakes from equipment that isn't adequately cared for show a bigger problem with cleanliness and safety.

The type and severity of the danger are often linked to the area's economy and infrastructure. In low-income countries, poor waste disposal, not enough access to clean

water, and no refrigerated storage make it easy for all three types of dangers to spread. Street food is not only a possible source of disease, but it is also a sign of bigger public health problems because of the combination of biological, chemical, and physical hazards. These concerns are made worse by insufficient enforcement of rules and a lack of education for vendors. This means that the cost of convenience is often hidden and long-lasting, affecting the health of consumers.

Sources and Contributing Factors to Street Food Contamination

Street food contamination happens because of a complicated mix of bad weather, people's actions, and problems with the infrastructure. Food handlers' lack of cleanliness is one of the key reasons why street food is less safe. Studies have shown that almost 90% of food vendors in Nigeria and Ethiopia don't have the right training in food safety. Up to 64.1% of them only wash their hands with water, without any soap or disinfection (ISABB-JFAS, 2020; *Frontiers in Microbiology*, 2021). Also, 43.9% of food handlers in Ethiopia were seen handling food and money at the same time without changing gloves or washing their hands, which made it easier for microbes to spread. These habits are made worse by the lack of protective gear, such as bare hair, long or fake nails, and shared wiping cloths, which raises the danger of contamination even more.

Another big cause of foodborne illness is cross-contamination. In a lot of informal settings, the same knives and chopping boards are used for both raw and cooked items, and surfaces aren't often cleaned well between usage. In Ethiopian city marketplaces, researchers observed that 23.4% of sellers use the same plate for both raw and cooked food. This makes it more likely that infections like Salmonella or E. coli will move from uncooked food to cooked food (ISABB-JFAS, 2020). A big gap between what people know and what they do makes these hazards much worse. Ninety percent of Nigerian vendors said they had heard of foodborne diseases, but only 15.6% knew how they spread or how to avoid them. This shows that there is an urgent need for training programs that are more practical than just theoretical (*Frontiers in Microbiology*, 2021).

The safety of street food depends a lot on the infrastructure of the environment. Many vendors work in places where there is no clean water, reliable refrigeration, or suitable ways to get rid of trash. In Mekelle City, Ethiopia, 74.1% of vendors said they had trouble getting clean water, and 35.5% said they didn't have the minimum cooling equipment they needed; thus they kept perishable goods at room temperature, which is perfect for bacteria to flourish (ISABB-JFAS, 2020). These ambient temperatures often go above 30°C in tropical settings, which speeds up the growth of microbes by a lot. Waste disposal procedures make the problem worse because liquid waste is often dumped in open locations and solid garbage is thrown away nearby, which attracts flies, rodents, and cockroaches. These pests are mechanical carriers of germs that can get into both raw ingredients and cooked dishes World Health Organization, 2015.

Many foodborne outbreaks start with raw materials that have been contaminated. Unsafe water supplies, produce that has been treated with chemicals or pesticides, and meat or dairy products that have already been contaminated all help spread disease. For instance, street food cooked with poorly treated chicken or eggs may already have Salmonella or Campylobacter in it when you buy it. Vendors often get these ingredients from supply chains that aren't regulated and don't have any safety or quality inspections. Also, ordinary things like not reheating food that was already cooked enough or keeping it at room temperature for too long let microbes multiply very quickly, turning food that was just slightly contaminated into dangerous meals.

These ways of getting contaminated are not just because people are careless or don't know about them; they are often because of economic pressure. Street vendors, many of

whom don't make much money, have to find a balance between saving money and following health rules. For example, people sometimes think they must make trade-offs like buying untreated water, not using ice or refrigerators to save on electricity, and cleaning less often. This implies that even merchants that know a little about food safety can't accomplish everything they want to do since they don't have the resources. Because of this, food safety becomes a systemic problem that is profoundly rooted in bigger problems with society, the economy, and infrastructure.

The combined influence of these factors shows us something very important: changing how people act alone won't make street food safer. For long-term improvement, it is important to make structural changes like providing access to clean water, subsidising cold storage technology, and making sure that trash is picked up on time. Food safety is a public health issue that everyone should work together to solve. Local governments, urban planners, health agencies, and civil society all need to work together to make it happen.

Nutritional Implications and Dietary Imbalances

Street food is both a source of sustenance and a risk. It meets the dietary needs of millions of people who rely on it for their daily calories, especially in areas that are quickly becoming urbanised, where time, money, and availability to home-cooked meals make it hard to find other options. Research indicates that street food can provide between 13% and 50% of the daily caloric needs for adults and children in poor nations (PMC, 2023). But these foods often have a lot of bad fats, sugars, and salts in them, which makes them unhealthy.

Many popular street foods, like fried snacks, sugary drinks, and processed meat rolls, are high in calories but low in nutrients. For example, fried dough, samosas, sweetened drinks, and deep-fried meats are all heavy in saturated fats, trans-fats, added sugars, and sodium. This type of diet is directly linked to the rise in obesity, diabetes, and heart disease. A systematic analysis from 2023 found that in some cities, street food made up more than 40% of the overall fat and carbohydrate intake (PMC, 2023). The widespread availability of inexpensive, palatable, and satiating yet nutritionally deficient food options promotes eating habits that are inconsistent with long-term health.

In addition to these problems, there is a problem with not getting enough micronutrients. Street food can give you up to 50% of the required daily intake (RDA) for proteins and a good quantity of iron and vitamin A, especially if it has meat, liver, or leafy greens in it. However, it generally doesn't have enough of other important nutrients. Calcium and thiamin are often lacking, as are vitamins B12, riboflavin, folate, zinc, and iodine (FAO, 2020). This means that people may look like they are getting enough calories, but they may not be getting enough important vitamins and minerals that are important for immune function, brain development, and reproductive health.

The ensuing paradox is referred to as the “double burden of malnutrition,” characterised by the simultaneous presence of undernutrition (micronutrient deficiencies) and overnutrition (excess caloric intake) impacting the same populations—and occasionally the same individuals. This happens a lot in urban slums and homes with poor incomes, where cheap street food is a daily meal. Malnourished children and overweight adults frequently coexist in the same household, compelled by a mutual dependence on food that alleviates hunger yet lacks nutritional equilibrium (FAO, 2020).

These nutritional abnormalities have social and economic repercussions that go beyond the health effects. Kids who eat street food a lot are more likely to have stunted growth, bad grades in school, and weak immune systems. Adults are getting more non-communicable illnesses (NCDs) like high blood pressure, stroke, and type-2 diabetes. These disorders make things more expensive by raising healthcare expenditures and lowering productivity. This change in diet, where processed, high-fat, and sugary street foods replace

traditional balanced diets, is happening all across the world, but it has a bigger effect in places where public health safety nets aren't strong.

More than just teaching people about food is needed to solve this problem. Policies must facilitate the change of the street food business by implementing incentives for healthy preparation methods, integrating the supply chain for nutrient-dense raw materials, and establishing consumer awareness initiatives. Regulatory efforts could also include limiting the amount of sodium and trans fats in street foods and encouraging the use of fortified products. The main problem is making healthy food just as easy to get and cheap as junk food. Until systemic improvements are implemented, street food will persist in its dual role: providing sustenance while compromising long-term nutritional health.

Public Health Burden and Long-Term Health Consequences

The effects of eating street food go beyond only short-term stomach problems. They add a lot to the global public health burden, hurting not just people's health but also healthcare systems and national productivity. The World Health Organisation (WHO) says that about 600 million people get sick every year from eating contaminated food, which kills about 420,000 people around the world (WHO, 2020). The effects on kids are especially bad: 40% of the deaths, or 125,000 each year, are in kids under five. Unsafe food causes 33 million disability-adjusted life years (DALYs) to be lost around the world every year. Many experts think this number is too low (WHO, 2015).

The economic effects of foodborne infections are just as bad. The yearly cost of medical care, lost work time, and early deaths caused by foodborne illnesses in the United States was expected to be US\$75 billion in 2023 (GAO, 2023). The problem is significantly worse in countries with low and moderate incomes. Unsafe food costs these countries some \$110 billion a year in lost productivity, healthcare costs, and early deaths (WHO, 2020). These numbers show that food safety is not just a health issue; it is also a key issue for economic growth.

Foodborne infections can also cause a lot of long-term and even permanent health problems. Salmonella infections, although frequently self-limiting, may progress to extra-intestinal illnesses, including bacteraemia, osteomyelitis, or meningitis in immunocompromised persons and children (CDC, 2023). Reactive arthritis is one of the worst things that can happen because of these illnesses. It can last for months or even years, especially in those between the ages of 15 and 35. Escherichia coli, especially Shiga toxin-producing strains (STEC), is significantly more deadly. It can develop to haemolytic uremic syndrome (HUS), which can be deadly and causes kidney failure, low platelet counts, and haemolytic anaemia (Marler Clark, 2023). HUS is the most common cause of kidney failure in kids under 10. Up to 25% of the kids who survive it will have long-term kidney damage that needs dialysis or a transplant. Also, 30–60% of people who survive HUS have long-term neurological problems include seizures and learning deficits (WHO, 2020).

Another major bacterial danger in street food is campylobacter infection, which can lead to serious neurological problems, the most well-known of which is Guillain-Barré syndrome (GBS). GBS is an uncommon but serious autoimmune disease that can induce muscle weakness and paralysis, and in very bad cases, it can even cause respiratory failure. According to the CDC (2023), Campylobacter is thought to be responsible for 5–41% of GBS cases over the world. Listeria monocytogenes is another bacterium that can grow at cold temperatures and is especially dangerous for pregnant women and newborns. Pregnant women may only have minor flu-like symptoms, but listeriosis can cause miscarriage, stillbirth, premature delivery, or serious illnesses in newborns. Infants born with listeriosis may experience permanent developmental difficulties, such as cerebral palsy, blindness, and organ malfunction (Cleveland Clinic, 2024).

Often, these long-term problems are not reported or are wrongly attributed to other causes since there is a time gap between the first foodborne sickness and the start of chronic symptoms. Consequently, there exists a public health “blind spot” about the comprehensive effects of street food intake. This gap makes both preventive initiatives and clinical treatments less effective because the real burden is often hidden in health data systems.

The disproportionate impact on vulnerable groups—including small children, the elderly, immunocompromised individuals, and pregnant women—further amplifies the moral and social gravity of this issue. Foodborne illnesses not only threaten immediate health but also degrade the quality of life and reduce life expectancy among the most marginalised people. In many impoverished countries, where getting medical care is hard, even issues that can be treated can be deadly. For example, the 1998 pandemic dropsy outbreak in Delhi, which was caused by mixing argemone oil with mustard oil, killed more than 60 people and sent 3,000 to the hospital. Most of the people who got sick were poor people who relied on cheap street food (NCDC, 2024).

Foodborne disease can potentially affect people for a long time. Kids who survive serious gastrointestinal infections may not grow as tall or develop their brains as quickly as they should. Pregnant women who meet *Listeria* or toxins are more likely to have babies who die shortly after birth or have developmental problems. These effects on different generations make the cycle of poverty, hunger, and limited economic mobility even worse. This is why food safety is not only important for health, but also an important goal for development.

These data make it clear that the negative consequences of street food cannot be seen only as short-term pain or occasional outbreaks. Instead, they are a widespread, often hidden epidemic that wastes resources, makes life harder, and keeps inequity in place. To deal with this, public health systems need to take a life-course approach to food safety. This means looking at, predicting, and reducing the long-term effects of eating contaminated food.

Epidemiological Insights: Documented Outbreaks and Case Studies

To fully understand the health dangers of street food, we need to look at both theoretical ideas and real-world facts. Documented foodborne outbreaks are important proof of trends that happen again and over again, differences between regions, and problems with the way food safety is run. Outbreaks get a lot of media attention and prompt emergency actions, but they are only a small part of a much bigger problem. Most cases of foodborne illness are sporadic, not recorded, or misclassified. This is especially true in low- and middle-income countries where surveillance systems are weak or broken (CDC, 2023).

China has one of the most complete sets of data on foodborne outbreaks. From 2010 to 2020, 15.69% of all reported foodborne outbreaks in catering establishments were connected to street vendors. These were responsible for 2,876 of the 18,331 total outbreaks, which resulted in 206,718 recorded illnesses, 68,561 hospitalisations, and 201 fatalities (China CDC Weekly, 2023). *Vibrio parahaemolyticus*, *Salmonella* spp., and *Staphylococcus aureus* were the most common causes. Other prominent causes were chemical poisonings and eating plants or animals that were poisonous. Improper food storage and accidentally eating tainted materials were some of the things that made the problem worse, and mobile food enterprises weren't always properly regulated.

India has had similar problems. The Integrated Disease Surveillance Programme (IDSP) found that almost half of the outbreaks reported from 2011 to 2016 were caused by foodborne and diarrhoeal diseases (NCDC, 2024). One well-known case is the 2007 outbreak in Madhya Pradesh, where eating “bhalla,” which is formed from deep-fried potato balls, made more than 100 people sick. Another instance is the 1996 botulism outbreak in Gujarat associated with “sevu,” a deep-fried gramme flour snack, which impacted 34 kids. In

1998, an epidemic of dropsy in Delhi killed 60 people and sent more than 3,000 others to the hospital. This is probably the most famous incidence of mustard oil being mixed with argemone oil. These stories show that the risks of street food are real, and they have had sad and substantial effects.

Nigeria has one of the highest rates of foodborne diseases in Africa. More than 200,000 people die each year because of poor food handling, storage, and preparation (The Nation, 2024). Research from 2021 said that food poisoning was responsible for 25% of deaths in local government health systems. Many people have died because of cases of yam flour, fish, and soups that were contaminated with fake or spoilt ingredients (Frontiers in Microbiology, 2021). This is especially true in rural and peri-urban areas. In the same way, Kenya has had big outbreaks linked to chickens sold in open marketplaces, where high temperatures and lack of refrigeration make it easy for microbes to multiply quickly. In 2014 and 2016, there were incidences of gastroenteritis caused by *E. coli* and *Salmonella enterica*. These examples show the dangers of selling food in public places without supervision (Purdue University, 2022).

Latin America is dealing with its own problems with street food safety. Foodborne illnesses affect about 77 million people in the area each year, and 9,000 people die from them (MDPI, 2023). Norovirus, *Campylobacter*, *E. coli*, and non-typhoidal *Salmonella* are the most common pathogens. Street sellers have been recognised as significant sources of pollution in Brazil. A study of foodborne outbreaks that were confirmed in the lab between 2009 and 2018 indicated that *E. coli* (24%), *Salmonella* spp. (11.2%), and *Staphylococcus aureus* (9.5%) were the most common pathogens discovered (SciELO, 2023). Investigations in areas like Rio de Janeiro and São Paulo found that street food is very dirty because of bad hygiene, not having enough access to clean water, and not having enough government oversight.

Experts think that the numbers that have been recorded are only a small part of the real number of people who become sick from food. The "iceberg phenomenon" of foodborne disease refers to the huge number of cases that go untreated, unreported, or misdiagnosed and are concealed from public health surveillance. In developing countries, less than 1% of foodborne illness cases are officially reported, while in high-income countries, roughly 10% are (NCDC, 2024). There are many reasons why this happens, such as not enough labs, bad reporting systems, not enough people knowing about it, and the fact that people think food-related disease is typical.

One thing that stands out across geographies is how consistent the core reasons are. In Asia, Africa, and Latin America, bad vendor hygiene, not having enough clean water, not throwing away trash properly, not storing food properly, and not enforcing rules are all problems that happen repeatedly. These common weaknesses show that even if the food and cultural contexts may be different, the ways that food is contaminated are basically the same. To fix these problems, we need solutions that are based on global knowledge but are also personalised to each location. Examples include decentralised inspection systems, mobile sanitation services, and vendor education programs that are available in the local language and level of literacy.

These case studies show that becoming sick from street food is not unusual. They are the expected result of systematic negligence, inconsistent rules, and unequal social and economic conditions. For real change to happen, we need to see breakouts not as one-time failures but as signs of problems with the system. Only then can the street food industry become a safe, welcoming, and long-lasting part of the world's food system.

Regulatory Gaps and Socio-Economic Challenges

Street food vending is hard to regulate because it is so informal. This is especially true in low- and middle-income nations where institutional frameworks are often broken, underfunded, or not in line with what is really happening on the ground. Most of the time, traditional food safety rules are developed for the official food business, which has licensed facilities, traceable supply chains, and standardised production methods. Street food, on the other hand, is made and sold by a labour that is very spread out, movable, and sometimes not documented. Because of this mismatch, there is a systemic regulatory gap that lets harmful activities continue without much oversight.

National food control regimes in many countries, such as India, Nigeria, and Kenya, focus on larger, easier-to-track businesses. On the other hand, the informal sector is not subject to these regulatory agencies' effective control because vendors change frequently, move around a lot, and don't have to register formally. Studies have indicated that in Benin City, Nigeria, 73.9% of vendors had not had official training in food safety, and numerous individuals were deficient in fundamental information regarding foodborne pathogens or hygiene norms (Frontiers in Microbiology, 2021). In Ethiopian cities, more than 40% of vendors worked without access to clean water or places to throw away trash (ISABB-JFAS, 2020).

In many low-income areas, regulatory frameworks often include problems including overlapping mandates, not enough money, and not enough experienced inspectors. As a result, enforcement is often inconsistent, shallow, and biased towards the most obvious areas. Even though street food sellers are legally required to follow hygienic rules, it is nevertheless hard to police these rules because there are no designated vending areas, inspection records, or dependable ways to communicate. In certain places, laws are either old or not clear about whether safety rules for big catering also apply to small street vendors (Food Protection, 2024).

The regulatory mismatch itself is another big problem. Mobile vending stalls, pushcarts, and temporary kiosks work in ways that don't follow the usual rules for inspections. When people try to impose rules about where things can be stored, including cold storage, plumbing, or access to approved kitchens, they often punish vendors instead of making things safer. This not only goes against the regulatory objective, but it also breaks down confidence between street sellers and public health officials, making it harder for them to work together.

A lot of socio-economic factors affect both the supply and demand sides of the street food ecosystem, in addition to systemic regulation failure. On the supply side, street sellers are frequently people who don't have many job options and rely on street vending as their main or extra source of income. Setting up a street food stall doesn't cost much money compared to opening a legal restaurant, which makes it a good choice for people who are on the fringes of society, such women, migrants, and the unemployed. But this low price means that the infrastructure is not as good, there aren't as many food-grade materials available, and safety-enhancing technology like refrigeration, handwashing stations, or pest control methods can't be used.

Due to fierce competition, rising input costs, and customers' sensitivity to prices, vendors often have to put profit ahead of cleanliness. In many cases, people don't do risky things like recycling wash water, cutting corners on storage, or using low-quality foods because they don't know better; they do it because they have to. A lack of consumer understanding and regulatory penalties makes these methods even more common, creating a feedback loop where food safety is not a top priority.

On the demand side, the cost and ease of getting street food are important factors, especially for people with low incomes. For workers, students, and families with little time or money to cook at home or eat at fancy restaurants, street food is sometimes the only

genuine choice. Surveys conducted in metropolitan India, Sub-Saharan Africa, and Southeast Asia consistently indicate that cost is the predominant factor influencing customers' preference for street food over alternatives (FAO, 2020). For these people, the option isn't between safe and hazardous food; it's between food and famine. Because of this dynamic, consumers are often willing to accept health risks even when they know about them.

Food safety in this setting is closely linked to poverty, gender inequity, and marginalisation in cities. Women, who are generally the ones who have to feed their families, are hit the hardest. In many situations, they make and eat street food, but they can't make sure the food is healthy because of gender-based barriers to income, education, and infrastructure. For example, women who don't have enough food may have to rely more on cheap, calorie-dense street food, but they may also not be able to get training and certification that could help them improve their vending practices (ResearchGate, 2023).

These vulnerabilities—regulatory, economic, and gendered—work together to make a cycle of poverty, hazardous food, and sickness worse. Eating street food that isn't safe makes people sick more often, which raises medical costs for families and lowers their ability to earn money, which makes food poverty worse. Malnutrition and foodborne illness keep each other going, which leads to long-term developmental deficits, especially in kids. This cyclical dynamic shows that food safety is not only a health or regulatory concern; it is a deeply rooted development problem that needs to be solved with coordinated efforts from many different areas.

Regulation alone will not be enough to change the informal food market in a meaningful way. Public health solutions need to have both top-down control and bottom-up empowerment. This involves giving sellers realistic and easy-to-understand training, setting up clean vending areas, giving microfinance or subsidies for infrastructure improvements, and making people more aware of food safety. Street food can only become a sector that provides both nutrition and safety without losing economic potential if everyone works together to make sure that rules and regulations match up with real-life social and economic conditions.

CONCLUSION AND RECOMMENDATIONS

Street food is culturally diverse, economically vibrant, and essential for food availability, but it also poses significant and generally overlooked health hazards. The extensive use of these informal food systems makes people and the public more vulnerable to biological, chemical, and physical dangers that harm health. Street food can make you sick in more ways than just becoming sick right away. It can also include harmful chemicals and sharp items. These concerns can lead to both short-term problems like diarrhoea, vomiting, and food poisoning, and long-term problems like kidney failure, neurological problems, and developmental delays in children. The effect is especially bad for those who are already weak, like children under five, pregnant women, the elderly, and people with weakened immune systems. These people are the least able to deal with the physical effects and the cost of foodborne illnesses.

The information shows a sad truth. Unsafe food makes over 600 million people sick each year, which leads to 420,000 deaths and 33 million disability-adjusted life years lost around the world (WHO, 2020). Low- and middle-income countries lose US\$110 billion a year in productivity and healthcare expenditures. Outbreaks in India, Brazil, and Nigeria have demonstrated time and time again that street food is a major source of illness. This is often because of poor hygiene, bad infrastructure, or the intentional addition of harmful substances. But these well-known incidents are just the top of the iceberg. Most foodborne diseases happen just once in a while, aren't reported enough, and are hard to see, especially in informal economies where rules are weak and resources are poor.

The rules that are in place right now don't work well for street food selling because it's always changing, moving, and informal. Existing food safety standards are hard to enforce on mobile carts, roadside stalls, and improvised kitchens because they were made for official enterprises. As a result, there are two systems: one for formal businesses that are checked and watched, and one for informal vendors that are mostly out of the reach of regulators. The absence of skilled staff, little financing, and unclear or unenforceable rules exacerbate this imbalance. Even when there are rules about food safety, they are often not enforced consistently and don't always fit with the way things are in the area.

Street vendors are not just sitting by and letting this calamity happen; they are stuck in a web of economic problems and government negligence. Many sellers don't have access to clean water, refrigeration, or safe storage spaces—not because they want to, but because the infrastructure isn't working properly. When there are no cheap options, they do things that are dangerous, including recycling wash water, utilising bad chemicals, and working in places where pests are likely to be. Many merchants don't have much education, and they don't know much about foodborne pathogens and hygiene regulations. Even when they know better, vendors often put profit ahead of safety because of money problems.

People, especially those with modest incomes, are in the same situation. Street food is not just an option for many people; it is a need. In busy cities, it is often the only meal that is cheap and easy to get. This economic pressure makes people choose between food safety and hunger comfort. Because of this, low-income families are more likely to eat unhealthy food, which makes health differences even worse. Women, who commonly buy and cook food, must deal with more than one burden: they are carers and informal food businesses. They also have less access to formal training or money to help them deal with these hazards.

To deal with these many problems, we need a multi-sectoral, evidence-based, and socially inclusive approach. First and foremost, rules and regulations need to be changed to fit the informal sector. This means making food safety rules that are flexible and take into account the situation, as well as giving local governments more power to work with street sellers. Municipal organisations should have the right to set up approved vending areas with essential infrastructure such access to water, trash disposal, and sanitation. Instead of punishing vendors, those who follow safety rules should be given incentives and small subsidies.

Investing in infrastructure is just as important. In places where street food is common, governments and development agencies need to make sure that fundamental public goods like clean water, refrigeration, waste management, and pest control come first. We should use innovation to make cheap devices like portable handwashing stations or solar-powered chillers. If these changes are made along with ways to pay for them, they can greatly increase safety without hurting the businesses of the vendors.

Any long-term intervention must include training and creating capacity as its main goals. Vendors should get regular, hands-on training on how to keep things clean, handle food safely, and deal with risks. This training must be relevant for the language and culture of the people it is for, and it should be given by local NGOs, community health workers, or peer-education models. Vendors can create confidence with customers and make their business more official by getting certified.

To stop people from purposely adding things to food, we need strong law enforcement, market surveillance, and consumer education. Adulteration is generally done for money, hence there need to be harsh punishments, like quick legal action and making violators known to the public. At the same time, people need to learn how to spot food that might be spoilt or mixed with something else, so they can make smart decisions and hold businesses accountable.

Food safety should also be a part of larger plans for public health and development. Unsafe food is not only a vector for disease; it also hinders educational achievement, labour productivity, and economic growth. It makes malnutrition and maternal death worse and makes it harder to reach Sustainable Development Goals related to reducing poverty, improving health, and promoting gender equality. If we see food safety as a key part of sustainable development, it would be easier for ministries of health, agriculture, education, and finance to work together.

One of the most important yet frequently ignored ways to make a difference is to raise consumer awareness. Markets respond when people want safer food. Public awareness campaigns may make this demand even stronger by training people how to recognise harmful activities, push for infrastructure improvements, and hold the government accountable. Citizen participation can change public health from a top-down mandate to a community-driven objective when combined with grassroots monitoring.

In the end, the hidden costs of street food are too big to overlook. The illnesses, deaths, lost productivity, and systemic inefficiencies call for a comprehensive solution that strikes a compromise between giving people more economic power and strict safety requirements. A new street food economy that protects health without hurting jobs is achievable, but only if everyone involved acts quickly, works together, and cares about each other. Buying safer street food is more than just buying food; it's also an investment in individuals, communities, and the future of public health.

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ANNEXURES

Annexures 1 to 4

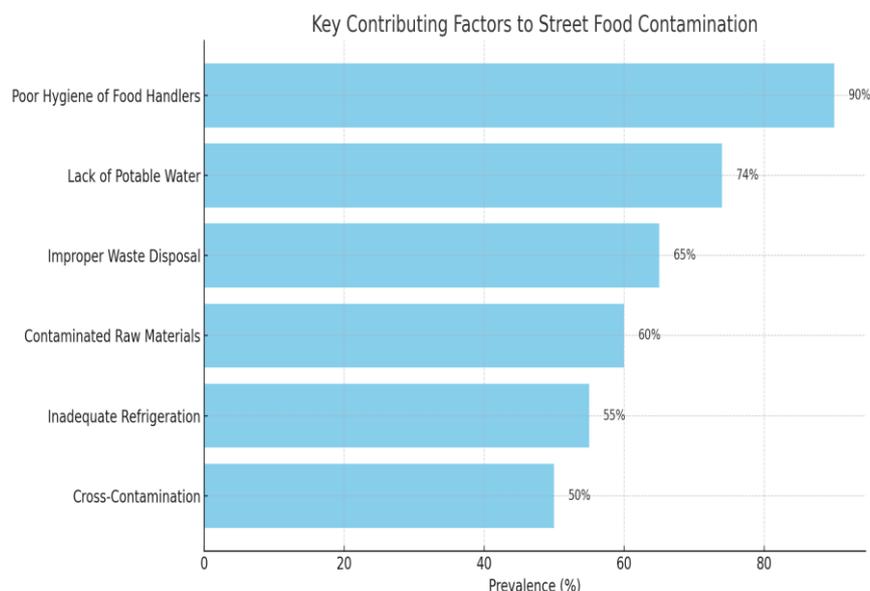


FIGURE 1
KEY CONTRIBUTING FACTORS TO STREET FOOD CONTAMINATION
ACROSS VARIOUS COUNTRIES BASED ON PREVALENCE

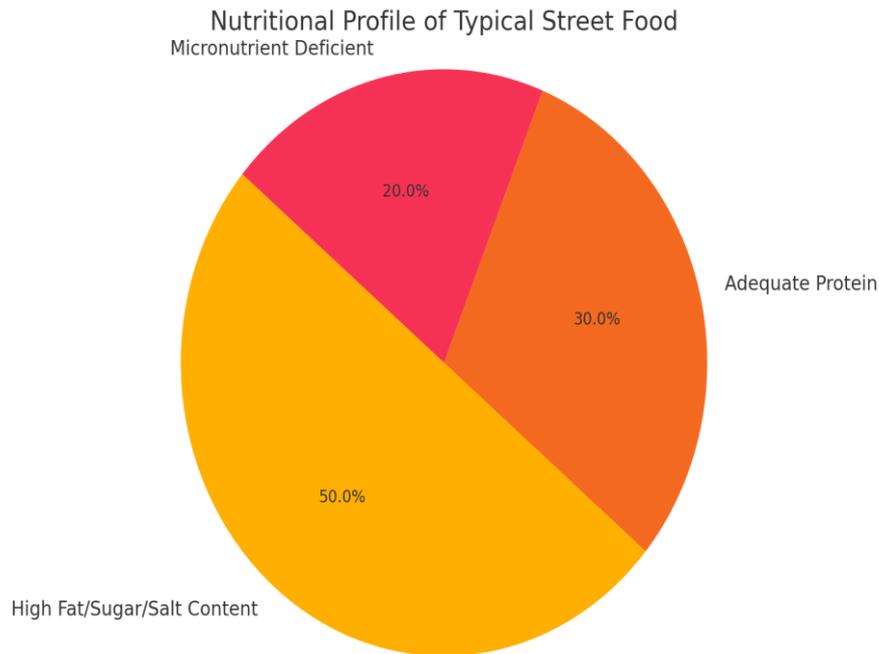


FIGURE 2
NUTRITIONAL COMPOSITION OF TYPICAL STREET FOOD ITEMS,
INDICATING HIGH LEVELS OF FATS, SUGAR, AND SALT

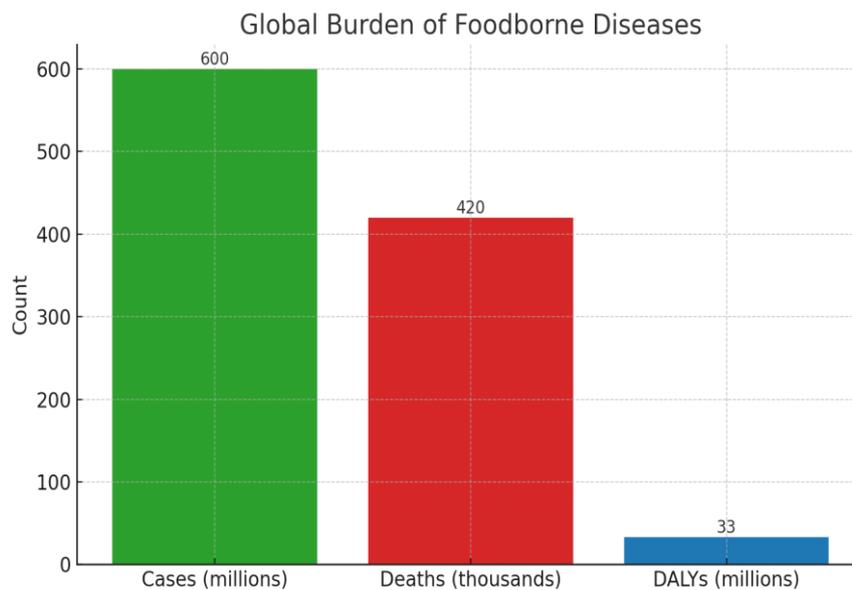


FIGURE 3
GLOBAL BURDEN OF FOODBORNE DISEASES IN TERMS OF ANNUAL CASES,
DEATHS, AND DISABILITY-ADJUSTED LIFE YEARS (DALYS).

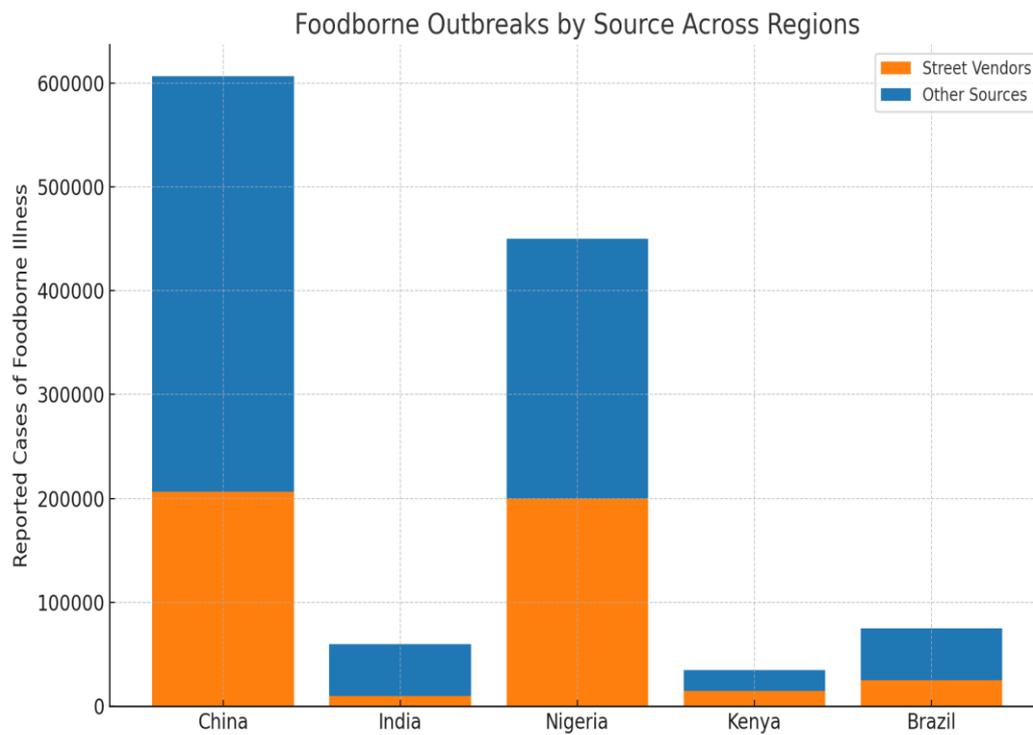


FIGURE 4
DOCUMENTED FOODBORNE ILLNESS OUTBREAKS BY VENDOR TYPE
ACROSS SELECTED COUNTRIES

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