

EatSafe: Evidence and Action Towards Safe, Nutritious Food

Evaluation of Consumer and Vendor Behaviors in a Traditional Food Market in Hawassa, Ethiopia

September 2022

This EatSafe report presents evidence that will help engage and empower consumers and market actors to better obtain safe nutritious food. It will be used to design and test consumer-centered food safety interventions in informal markets through the EatSafe program.

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ACRONYMS AND ABBREVIATIONS

DID	Difference in Difference
FBD	Foodborne disease
EatSafe	Evidence and Action Towards Safe, Nutritious Food
ETB	Ethiopian Birr (local currency of Ethiopia)
GAIN	Global Alliance for Improved Nutrition
KAP	Knowledge, attitudes, practices
USAID	U.S. Agency for International Development
USD	U.S. Dollar

EXECUTIVE SUMMARY

Feed the Future's EatSafe: Evidence and Action Towards Safe, Nutritious Food program is a USAID-funded, five-year program to enable lasting improvements in the safety of nutritious foods in traditional markets by focusing on the consumer. As part of its Phase I (Formative Research) activities in Ethiopia, this report documents behavioral research conducted in Hawassa to inform the design of interventions that leverage consumer demand to improve food safety practices in traditional markets.

To estimate consumer and vendors knowledge, attitude, and practices related to food safety, the EatSafe team in Ethiopia designed two studies described in this report: first, a mixed method study that leveraged in-depth interviews, free listing, and direct observations among 100 respondents (53 consumers and 47 vendors); then, a randomized experiment in which 35 vendors were given a standard cleanliness kit (i.e., an apron, hand sanitizer, a broom, and a bag for food waste) to identify whether improved hygiene leads to consumer behavior change -- as measured by changes in sales over one week in May 2022.

Nearly all respondents agreed in the importance of vendors' personal hygiene (i.e., washing hands, wearing clean clothes), the cleanliness of the vendors' environment (e.g., proper garbage disposal, regular sweeping of the stall), and safe food handling practices (i.e., washing food, lack of dust and insects, clean storage). However, observations often indicated a gap between self-reported perceptions and actual behavior among both consumers and vendors.

Respondents believed in the communal value of food safety: 80% of consumers believed food safety was important, and vendors regularly noted how food safety – beyond being crucial to a successful business – was part of their societal responsibility. While these sociocultural norms may facilitate hygienic practices, they are constrained by structural barriers (e.g., lack of running water and communal trash disposal).

Consumers tend to overestimate their ability to avoid foodborne illness (“overconfidence bias”), leading to relatively low perceived risk – associated with buying from less safe vendors. A majority (60%) of consumers said they had not learned about food safety, and many were unaware of where to find information about it. As a consequence, consumers said it was rare for them to discuss food safety concerns with vendors. Consumers noted they prioritize market proximity, food prices, and food quality over food safety concerns when choosing where and what to buy.

However, EatSafe found that consumers with a high-risk perception (i.e., those who believed they had a higher risk of contracting foodborne disease) were more likely to purchase from a vendor with a visibly clean stall than those with low-risk perception. Consumers' focus on clean stands was confirmed by the randomized experiment, which found that the cleanliness kit was associated with a 24% increase relative to average daily sales prior to the experiment, while control group sales decreased. Those daily and weekly effects were economically significant, corroborating the hypothesis that consumers prefer vendors with visible sanitary conditions when all else is equal.

Improved food safety in traditional markets relies on key decision-making points for both consumers and vendors. Understanding the information sharing pathways, preferences and influencing practices will support the design of food safety interventions to promote better food handling practices of vendors and improved consumer food safety choices in the market.

I. INTRODUCTION

Food safety is one of Ethiopia's most pressing concerns; estimates suggest 60% to 80% of illnesses are caused by pathogens spread via the food supply(1). With a fast-growing economy and increased migration to urban areas, traditional markets – or “informal” food marketplaces – have become critical to food security, nutrition, and livelihoods for millions of Ethiopians. However, with a lack of regulations, compliance, and training for vendors, food safety practices are often limited in traditional markets (2). Therefore, improving food safety practices in traditional markets is critical to protecting public health.

Feed the Future's Evidence and Action Towards Safe, Nutritious Food (EatSafe) program aims to improve the safety of nutritious foods in traditional food markets by developing consumer-focused interventions. In Ethiopia, EatSafe operates in Hawassa city in the Sidama region of Southern Ethiopia. EatSafe's Key Commodities in Ethiopia are lettuce, kale, and tomatoes — all nutritious foods regularly sold fresh in traditional markets throughout the country.

As part of its Phase I (Formative Research) activities, EatSafe conducts research to understand food safety knowledge, attitudes, and practices (KAP) in Hawassa (2,3). Together with this report, these studies provide important context to inform the design of food safety interventions, as well as insights on how to measure changes in KAP.

Sociocultural norms inform KAP and its precursors (e.g., perceptions, beliefs, expectations, habits). These then inform how people perceive their own self-efficacy in managing risk, which is important to EatSafe's goal of empowering consumers to improve food safety. Given this understanding, EatSafe conducted two studies covered in this report – a mixed method study and a randomized experiment to describe and map existing knowledge, as well as the gaps between self-reported and observed behaviors, related to personal hygiene, food handling, and environmental conditions.

1.1 RESEARCH QUESTIONS

While EatSafe focuses on traditional food markets and interactions between consumers and vendors, food safety practices do not begin and end in the market. The wider context, such as personal hygiene and household budgets, are likely to influence food safety practices in the market. These contextual practices are also influenced by broader sociocultural norms related to food safety. This research was design to inform EatSafe on the community belief system on the importance of checking vendors' personal hygiene, food handling practices and stall environments before making a purchase. As such, the research questions are:

1. What is the current level of food safety knowledge and behavior among consumers and vendors at Addisu Gebeya in Hawassa?
2. To what extent do observations confirm the stated preferences of vendors and consumers related to food safety?
3. What are the barriers and facilitators that could influence consumers' and vendors' hygienic standards and food safety behaviors?

4. What are consumers' specific behavioral decision points related to food purchasing at traditional markets, and where could interventions be made to improve food safety?
5. If provided with tools to increase the sanitation in their environment, will vendors use them, and will consumers be more likely to shop from vendors who have cleaner stalls?

1.2 BEHAVIORAL SCIENCE APPROACH

As a foundational principle of behavioral science, the knowledge-action gap refers to the mismatch between people's stated preferences and their actions (4); for example, consumers can say food handling is important, yet they buy food from vendors who have not washed their hands before handling food. To this end, EatSafe leveraged a behavioral science approach to understand the connections between sociocultural norms, self-efficacy, and KAP. These concepts are all important dimensions that underlie individual decision making in behavioral science, as defined in detail in **Table 1**.

Table 1. Definition of behavioral science terms relevant to food safety

TERM	DEFINITION
Sociocultural Norms	<ul style="list-style-type: none"> • The rules that guide behaviors in groups and societies (5) • Impacted by religious or ethnic social group identities • Subtly/overtly affect food purchasing and handling decisions
Risk Perception	<ul style="list-style-type: none"> • An individual's subjective evaluation of risk (e.g., perceived likelihood of foodborne illness from the consumption of unsafe foods) (6) • The degree to which individuals are willing to accept an adverse food-related incident • People's verbal (or non-verbal) communications and reported actions to reduce risk or the probability of harm (6)
Self-efficacy	<ul style="list-style-type: none"> • An individual's subjective perception of his/her capability to make optimal decisions to ensure their food is safe for consumption (7)
Loss Aversion	<ul style="list-style-type: none"> • Individuals' tendency to overweigh the impact of losses compared to gains when making decisions (8) • Moderate amounts can protect oneself from danger, while excessive amounts can limit opportunities/lead to suboptimal outcomes
Heuristics	<ul style="list-style-type: none"> • Cognitive processes that facilitate decision-making (5) • Make complex decisions <i>easier</i> but do not necessarily help people <i>make</i> optimal decisions, because the cues used in the heuristic are based on existing knowledge and practices.
Overconfidence Bias	<ul style="list-style-type: none"> • Occurs when an individual's subjective perception of his/her capability to make optimal decisions is higher than its objective accuracy (i.e., false beliefs that one is more capable than they are) (9) • Linked with higher social status/influence in social identity groups (9)

2. METHODOLOGY

EatSafe leveraged two methods for this research: semi-structured interviews and a randomized experiment. Across both methods, respondents included two groups: vendors and consumers in Addisu Gebeya market who were selling or buying, respectively, EatSafe in Ethiopia's Key Commodities. EatSafe obtained Institutional Review Board approval from the Sidama National Regional State Health Bureau Public Health Institutes for this activity. This research was conducted in Hawassa's second largest marketplace, (Addisu Gebeya). This market has comparable food safety characteristics to EatSafe's target intervention market (Aroge Gebeya), which is Hawassa's largest traditional market.

2.1. MIXED METHODS STUDY

EatSafe's first study leveraged three methods, detailed in [Appendix 1](#). Briefly, they include:

- **In-person, in-depth interviews** (30-45 minutes) with six modules covering food safety attitudes and perceptions, including food safety behaviors;
- **Free listing exercises**, open text responses, repeated three times, to indicate salience and knowledge about food safety across three domains of food safety (vendor personal hygiene, food handling, and general sanitation environment); and
- **Direct observations** in the market to understand if vendors' and consumers' stated preferences aligned with their actual practices over 40 minutes using field notes and recording.

Data analysis included:

- Examining the differences between self-reported and observed food safety knowledge and practices in the course of market transactions;
- A thematic analysis of preferences and constraints surrounding food safety; and
- Behavioral barrier mapping that identified specific decision points related to food purchasing at traditional markets in order to identify areas for intervention.

Terminology: In this report, EatSafe categorizes vendors as “clean” or “not clean” using three variables from the observation checklist: i) visibly clean or dirty hands; ii) trimmed fingernails or lack thereof, and iii) clean or dirty appearance of food. “Clean food storage,” used to gauge overall cleanliness of the market, was defined as food that appears to lack dust or dirt.

2.2. RANDOMIZED EXPERIMENT

Following the mixed methods study, EatSafe developed a randomized experiment using a repeated cross-sectional design to identify whether consumer preferences for cleaner stalls resulted in higher patronage. Detailed methods are in [Appendix 2](#). Vendor respondents (n=35) who opted-in to the experiment were randomly assigned to receive a cleanliness kit that included items to improve food safety (i.e., an apron, hand sanitizer, a broom, and a bag for food waste; n=20), with remaining vendors receiving the items one week later to serve as a “waitlist control” group (n=15). Data collection included daily and weekly sales before and after the experiment.

3. RESULTS: RESPONDENT DEMOGRAPHICS

EatSafe enrolled 47 vendors and 53 consumers, for a total of 100 respondents for the mixed method study in the Addisu Gebeya Market. **Table 2** provides background information about the respondents. EatSafe reached an almost equal balance of men and women vendors (46% and 54% respectively), while most consumers were women (81%).¹ Half of vendors attended primary school and a quarter reached secondary school, over a quarter of consumers have a secondary degree — indicating that consumer respondents have more education than vendor respondents. Finally, the age distribution, proxy by median age, suggested that most vendors and consumers surveyed were relatively young.

Table 2. Respondent demographics

	VENDORS (n = 47)		CONSUMERS (n = 53)	
GENDER	Women: 54%	Men: 46%	Women: 81%	Men: 19%
MEDIAN AGE	26 years		26 years	
AGE RANGE	18 – 54 years		18 – 67 years	
EDUCATION	48% Primary		32% Primary	
	26% Secondary		12% Secondary	
	9% Post-Secondary		26% Post-Secondary 14% TVET ²	
ITEMS SOLD	69% sell Tomatoes		N/A	
	13% sell Cabbage			
	9% sell Lettuce			
HH MEMBERS	N/A		4.6	

In the randomized experiment, EatSafe enrolled a subset of vendors (n=35) previously enrolled in the mixed method study. Over half of participants (57%) were women; most were young, aligning with the demographics of the study area, with a median age of 25 and ages ranging from 18 to 40. Most participants (86%) attended primary or secondary schools, with 11% attending post-secondary.

4. VENDORS' FOOD SAFETY KNOWLEDGE AND PRACTICE

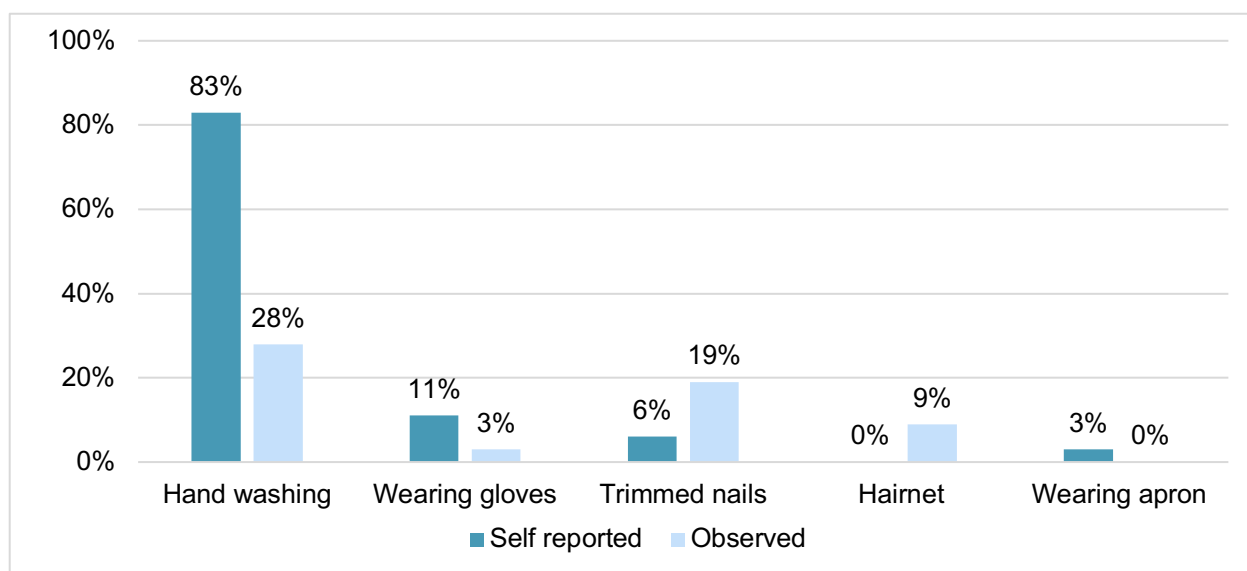
In this section, self-reported food safety practices are compared with enumerator observations of participating vendors, which revealed gaps in all three aspects of food safety, including personal hygiene, handling food properly, and maintaining a clean vending environment (see **Figures 1-3**).

¹ Women are most often the household members responsible for acquiring food for the family.

² TVET refers to technical and vocational education and training.

Personal Hygiene: During the free-listing exercise, vendors highlighted 17 personal hygiene practices, five of which are shown in **Figure 1**. Practices most often mentioned included handwashing (83%), washing clothes (62%), and showering (57%).³ However, only 3% of vendors were seen washing their hands at any point in the market (**Figure 1**), and the hands of nearly two-thirds of the observed vendors contained dirt. It is important to note that there are many structural barriers to handwashing including lack of handwashing stations, and where they are available, relatively inconvenient clean water sources, requiring leaving their stall in order to wash their hands.

Figure 1. Comparison of vendors' self-reported and observed personal hygiene actions



“I have to keep my personal hygiene by washing my hands, tak[ing] a bath, and wash[ing] my clothes. I also have to clean and trim my nails. Other thing[s] I have to [do are] wash my hair and legs.” – 18 years, Female

“[I] wash my feet [and] my hands, brush my teeth, and my face. I usually protect myself from dust and mud.” — 28 years, Male

While only 19% of vendors had trimmed fingernails and 9% wore hairnets, both of these figures were higher than vendors' self-reported actions – suggesting vendors may not perceive some of these practices as directly related to personal hygiene (**Figure 1**). Further, none of vendors changed either their gloves or hairnets throughout the observation time. Similarly, only one vendor claimed to wear appropriate food handling attire (e.g., overcoat, apron), but none were observed to do so.

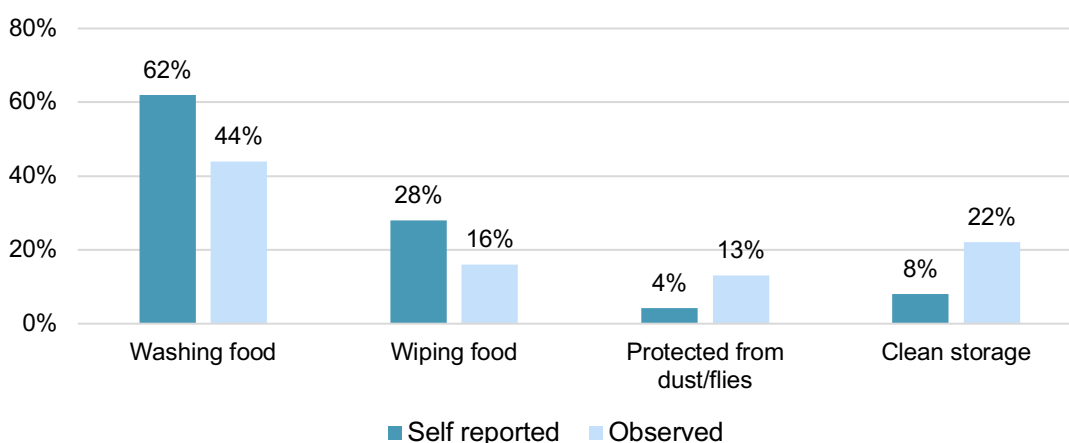
³ Enumerators recorded all behaviors mentioned by the respondent and in which order they were mentioned. In Figures 1-3, the term "self-reported" refers to the percentage of respondents who mentioned the specific food safety measures as being important.

“I wear the overcoat when I come to my workplace to avoid direct contact with the food items, and I also put on workplace trousers. I wear the socks and shoes so that there is no direct contact between the food items and my body. Before starting my day, I clean my work[place] area early in the morning.” — 32 years, Female

“I believe that personal hygiene does have an impact on food safety. Because sometimes rich people can come to the market to buy things; during this time, if I serve them without keeping my personal hygiene [or] washing my hands, hair, and clothes, they may dislike it. They can [insult] me [about] th[e] dirtiness of my clothes, hair, and hands. They may claim that they can no longer buy foods from me.” — 18 years, Female

Food handling: Most vendors reported a variety of food handling practices, washing and wiping food, sorting items by size and quality, throwing subpar items in the trash, and sprinkling water on vegetables to maintain their fresh look. However, observations revealed much lower levels of food washing and wiping when compared to their actual practice, with 62% of respondents reporting washing and wiping produce during the free listing, but just 44% of the produce appeared to be clean during the observation (**Figure 2**). On the other hand, vendors were observed to protect products from flies and properly store food products more often than self-reported,⁴ indicating that some vendors may not perceive some of these practices as directly related to food safety.

Figure 2. Comparison of vendors’ self-reported and observed food handling practices



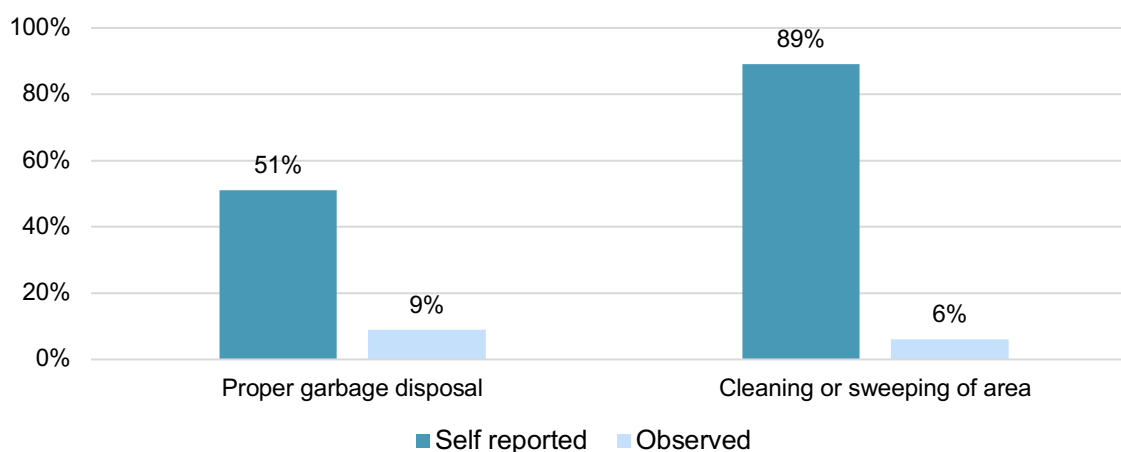
⁴ While both “protection from sun” and “protection from flies/pests” can cause food spoilage, they were included in the observation checklist as separate items because a vendor can protect their foods from the sun but expose it to flies.

“I sweep the dust [off food], sprinkl[e food] with water, and burn the trash.” – 21 years, Female

“The particle that emerges from cabbage may contribute to garbage, but people require it for animal feed. I kept [it covered] until people came and took it for their animals because it stinks. [Otherwise] I sweep my surroundings and deposit [trash] in a garbage cart.” – 22 years, Female

Vending environment: Previous EatSafe research defined a clean vendor environment as one that is free of dirt, dust or waste that could endanger the safety of the foods available for purchase (10). Though almost all vendors noted the importance of frequently sweeping their vending environment, only 6% of vendors were observed sweeping during the 40 minutes observation period (**Figure 3**). Actual rates of proper garbage disposal were much lower than self-reported levels.

Figure 3. Comparison of vendors’ self-reported and observed environmental actions



More than 90% of vendors believed that other vendors in the market are aware of the importance of food safety. Nearly all emphasized how crucial food safety is to their business and ability to maintain or increase profit. Vendors asserted that unsafe food may disincentivize potential new customers, cause a loss of current customers, and increase consumers’ risk of foodborne disease. Additionally, vendors considered food safety to be their societal responsibility.

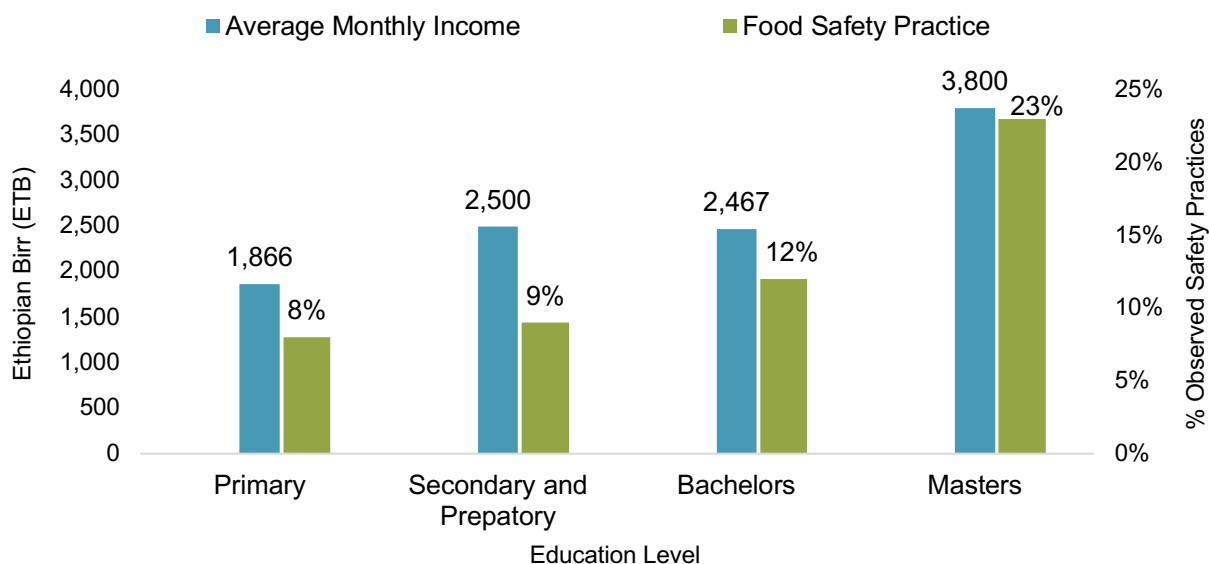
“We are serving the community. We have to care of the community health; we will be satisfied when the community gets [the] best and health[iest] products from our market.” — 30 years, Male

“Proper handling of the products attracts better price[s because] people pay more for such products.” – 19 years, Male

4.1. RELATIONSHIP BETWEEN EDUCATION AND BEHAVIORS

EatSafe analyzed the relationship between participant demographics and observational data of 20 food safety practices, finding that higher levels of education were associated with greater practice of basic food safety behaviors (**Figure 4**). For example, vendors with a master's degree were observed to practice about five of the checklist behaviors, compared to only two by those with a primary school education (23% vs. 8%, respectively).

Figure 4. Income and food safety practice, by education level



One potential explanation for this trend is the higher income that is linked to higher education, which would then provide vendors the resources to buy food safety equipment. However, causation could follow the opposite direction (i.e., vendors with higher education follow more food safety practices, thus leading to higher incomes).

5. CONSUMERS' FOOD SAFETY KNOWLEDGE AND PRACTICE

EatSafe identified a similar discrepancy between stated and observed food safety behaviors among consumers as well as vendors.

Sociocultural norms: The finding that society values food safety, including personal hygiene, food handling, and cleanliness of the stall environment, with over 80% of consumers saying that society thought these to be very important or important, is one example of social norms that could facilitate food safety. However, although the community values cleanliness in general, some social norms pose challenges. One of these is the presence of superficial societal beliefs that minimize the effects of germs, as shown by the adage that they are immune to germs. Second, it is less typical in society to provide feedback to vendors regarding food safety. Thirdly, it is generally acceptable to sell fresh produce on the ground. Finally, consumers' practices for food safety often conformed to the behaviors of others last around them. Several consumers

expressed the sentiment that they do not demand cleaner food conditions because they fear the approbation of other consumers for doing so. Similarly, some consumers avoid bringing food safety related things up because they believe others would react negatively.

“There is a proverb in the neighborhood that goes, ‘Germ cannot kill Habesha.’ I therefore suggested that they use vinegar and lemon.” — 25 years, Female

“People do [not] comment [on] sanitation and price. They need to mind it instead and the sellers need to be ready to accept them and act accordingly.” — 20 years, Female

“It is custom[ary to] stor[e] food products on the ground. I think it is better [to] set some shelf, vegetable bed, cot, [or] bunk to arrange them properly.” — 30 years, Female

“I think the community members will exclude me [if I complain] and they will not have good interactions with me. Therefore, I will not say anything, I will buy [what I need] and [go home].” — 27 years, Female

“Other community members may react by saying that it is none of my business...They may assume that I am the only one [who cares about food safety].” — 30 years, Female

Knowledge about food safety: Consumers generally did not seek out information about food safety, as 57% of respondents reported never learning about food safety. Moreover, consumers were unaware of where to find such information. However, some consumers reported spending time learning about food safety from older people, watching television and videos on YouTube, and/or talking to healthcare workers (particularly when mothers visit health facilities with children). It was also found that consumers' practices for food safety conform to the behaviors of others around them.

“I took a training to improve my health and career in cooking.” — 47 years, Male

“I [listen to] older people [because] they know so much about cooking and how to prepare food [and] handle it. They are somehow experts.” — 19 years, Female

“During COVID-19, I was watching cooking and food programs. There were different advertisements about how to safely handle food.” — 23 years, Female

“I watch videos on YouTube about how to prepare and boil various foods. Technology allows me to prepare foods that I [previously didn't] know how to.” — 37 years, Female

Experience with FBD: When asked about their ability to prevent FBD, consumers displayed an overconfidence bias: 39% felt they could be susceptible to FBD, and 70% believed they could personally avoid it. Further, only half of surveyed vendors thought that their peers would be effective in preventing FBD.

“I have never imagined [I will be vulnerable] because I've been buying items from here for almost 4 or 5 years and have never gotten sick.” — 32 years, Female

“I am highly confident [as] I always take care of the food items, including cleaning them immediately.” — 35 years, Female

Deciding where to go for food: The study market, Addisu Gebeya, meet the underlying consumer needs of proximity, product variety, and cost effectiveness of food. ⁵ Food safety did not appear as a primary consideration in the criteria used by consumers to choose a market:

- Proximity to residential areas;
- Absence of transportation costs to farther markets;
- A variety of goods to choose from, including specific and unique products;
- Discounted food prices;
- Fresh food options;
- Better relationships with vendors; and
- Ability to support local businesses.
- Ability to support local businesses.

“I choose this market because it is close to my home. Other markets are far [and] I'll have to pay more money [to get there].” — 32 years, Male

“Who else is going to buy from this [market] if it [we don't]? We shop here because it was built for us.” — 67 years, Female

“I consider markets that are [closer] because I don't want to incur transportation costs again.”— 18 years, Female

“This area is known [for] its poor sanitary conditions, but I come here sometimes [only] to get some unique products.” — 35 years, Female

“[We come here if] there is a price reduction of one or two [ETBs], which is especially important during this period of high inflation. So, we go to places where we can get good deals.” — 28 years, Female

Planning what to buy: Consumers considered many factors when planning what food items to purchase at the market, including: their ability to pay (i.e., budget), food prices, discounts, or promotions, what foods are needed for the household, food quality and perishability, and limitations on food quantity given lack of refrigeration or other storage. Overall, **consumers are budget conscious, often looking for cheaper alternatives that may have promised quality.**

⁵ It should be noted that both Addisu Gebeya and Aroge Gebeya, EatSafe's target market, appear to meet consumers' needs as described.

“I choose sellers based on the price discounts they offer me, the quality of product they sell, and if they are easily accessible.” — 47 years, Male

“First, I will check the hygiene of the seller and the sanitation of the environment [by] looking at how they have arranged their goods. [This way] I know [whether] they are clean people or not.” — 19 years, Female

“I [am] more likely [to] purchase from sellers that ha[ve] good behavior, gives better discounts, [and sells] good quality products [that are] on display.” — 23 years, Female

“I examine items for freshness. I know I can go to some vendors when I need fresh [food], and I can borrow from them [then] pay later if do not have the money [on] hand.” — 32 years, Male

“I may take into consideration product cost. I prefer to shop in places that offer discounts, but good quality and quantity must be sold [there too].” — 47 years, Male

Selecting a vendor: Cost savings, product quality, personal hygiene, and established consumer-vendor rapport are the salient factors that determine which vendors choose to visit. Once at the market, consumers select vendors using similar criteria as choosing a market:

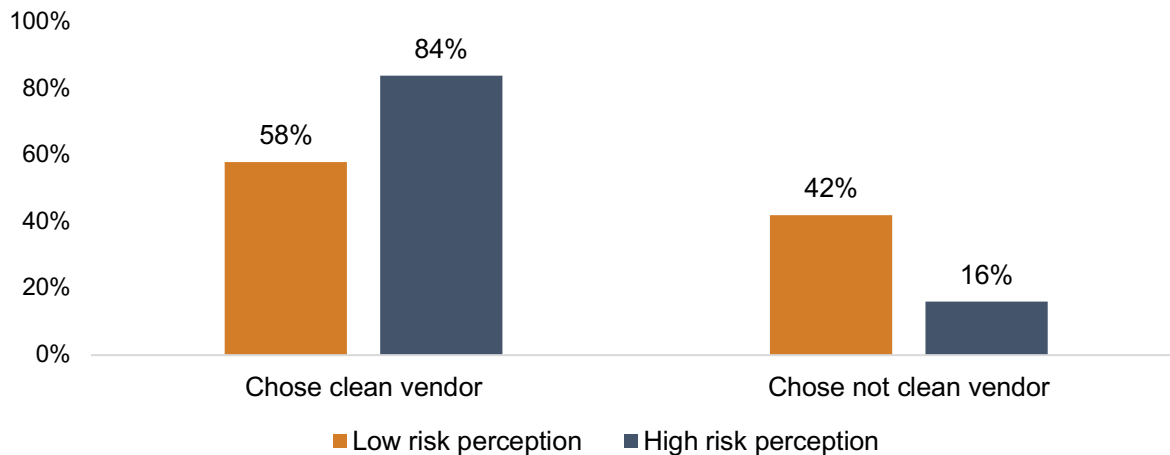
- Prices and discounts offered on products, with preferences for cheaper items;
- Established relationships with vendors, including rapport and interpersonal skills, and thus possibility of purchasing on credit;
- Kind of food products available;
- Quality and attractiveness of food items on display;
- Quantity required (e.g., some may only need to buy a single item or in bulk).;
- Vendors personal and stall hygiene.

While 90% of consumers reported that they would consider vendors’ personal hygiene and the selling environment before making a purchase, no consumers were observed to purchase from observed vendors who matched these standards. Consumers with a high-risk perception (i.e., they believed they had a higher risk of foodborne disease) were much more likely to purchase from a vendor with a visibly clean stall than those with low-risk perception (84% selected clean vendors vs. 16% did not) (**Figure 5**). Those with a low-risk perception varied much less (i.e., 58% selected clean vendors, while 42% did not). However, it is important to note that structural barriers (e.g., lack of running water at the market), constrains vendors’ ability to accomplish these standards.

Choosing the product(s): When choosing the exact product to purchase from the vendor, factors taken into account include mostly looking for the types of produce needed, with some occasional impulse buying, as well as the quality of the product (i.e., product does not have defects), freshness of the produce, cleanliness of the produce, hygiene of the environment the

produce is sold in, and balancing ripe (for immediate use) and unripe produce. Budget may influence the priority customers give to price when making purchases. **Choice and preference for produce is mainly prioritized by its freshness, quality and price.**

Figure 5. Consumers’ choice of vendors, by risk perception level⁶



“I prefer lower prices because of my financial capacity. I will also look for what I specifically need so that I am not impulse buying [anything].” — 47 years, Male

“Other than price, I consider the quality of the food. I know if the food is spoiled or not, and that’s why I don’t send someone, but I go by myself.” — 23 years, Female

“I will buy food expense for the house [on a monthly basis]. I will buy haricot beans, four kilograms of non-ripe tomatoes, cabbage, and onions, and a half kilogram of garlic.” — 27 years, Female

“[What I buy] depend[s] on the availability of good quality food items. I prefer to buy quality product [given] my health condition.” — 32 years, Female

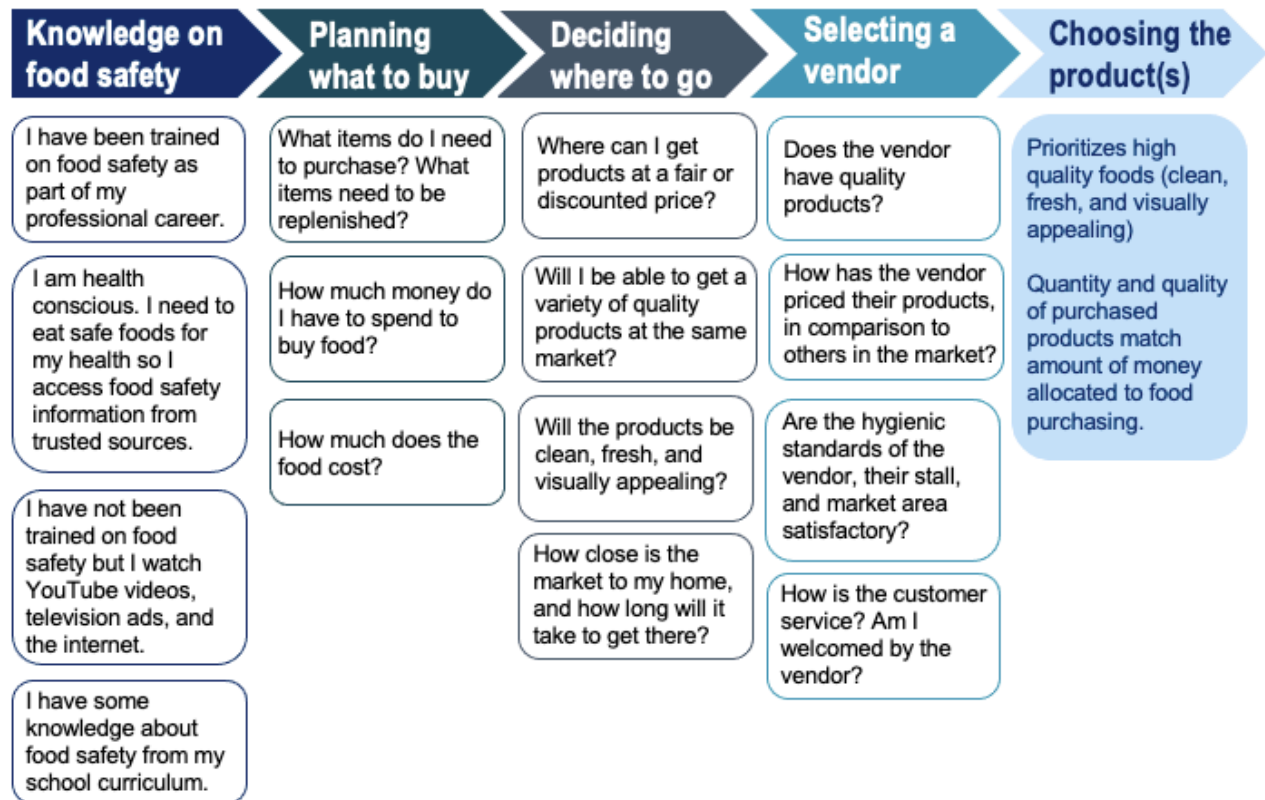
5.1. CONSUMER BEHAVIORAL MAPPING ON FOOD SAFETY

Results from the mixed methods study indicate there are five consumer decision points that characterize the purchasing journey of safe food (see **Figure 6**). First, consumers have a baseline level of knowledge about food safety before starting to plan a shopping list. As part of the decision stage, consumers consider distance to the market, price, and quality of available

⁶ Figure 4 includes data from 51 consumers, as data was missing from two participants who were not observed to purchase any food. The Methods section of this report defines “clean vendor.”

food.⁷ After selecting a market, consumers choose which vendor to visit based on similar criteria to the market choice. Finally, consumers purchase quality foods (i.e., visibly clean, fresh, and usually appealing items) that are within their budget. [Appendix 3](#) provides a first-person example of this process.

Figure 6. Consumers' food safety behavior mapping



⁷ In deciding where to go, consumers likely use these criteria to compare markets. For this research, EatSafe assumes Addisu Gebeya Market meets most of these factors.

6. RESULTS: RANDOMIZED EXPERIMENT

Results from the mixed methods study suggest that important food safety signals include vendors' hygiene (e.g., wearing appropriate professional attire, keeping hands clean), and maintaining a clean environment. EatSafe conducted a randomized experiment by providing a subset of vendors who opted into the experiment (n=35) a cleanliness kit (i.e., an apron, hand sanitizer, a broom, and a bag for food waste) to test the following two related hypotheses over one week:

1. If vendors have access to necessary tools, they will use them to improve the sanitary environment in which they work; and
2. Consumers will be more likely to shop from vendors who prioritize cleanliness.

Economic significance: Results indicate the cleanliness kit was associated with a 220 ETB (USD \$4.30) increase in *daily* sales compared to the control group who did not receive a kit (**Table 3**). This is equivalent to a 24% increase relative to average daily sales prior to the experiment. Over the one-week period, the kit was associated with an increase of 2,397 ETB in sales (USD \$47.74), while control group sales decreased by 29% (-878 ETB; **Figure 7**). While confounding factors may have contributed to this difference, these effects are economically significant, corroborating the hypothesis that consumers prefer vendors with visible sanitary conditions when all else is equal.

Table 3. Randomized experiment results

VARIABLE	COEFFICIENT	STD ERROR	T-VALUE	Pr(> t)
DAILY SALES ¹				
Intercept	543.3	296.1	1.835	0.071
Treat	555	391.7	1.417	0.161
Post	-117.3	418.8	-0.28	0.78
Treat: post	219.8	554	0.397	0.693
WEEKLY SALES ²				
Intercept	3058.3	2218.2	1.379	0.173
Treat	2619.6	2934.4	0.893	0.378
Post	-878.3	3137.0	-0.280	0.780
Treat: post	2397.1	4149.8	0.578	0.565

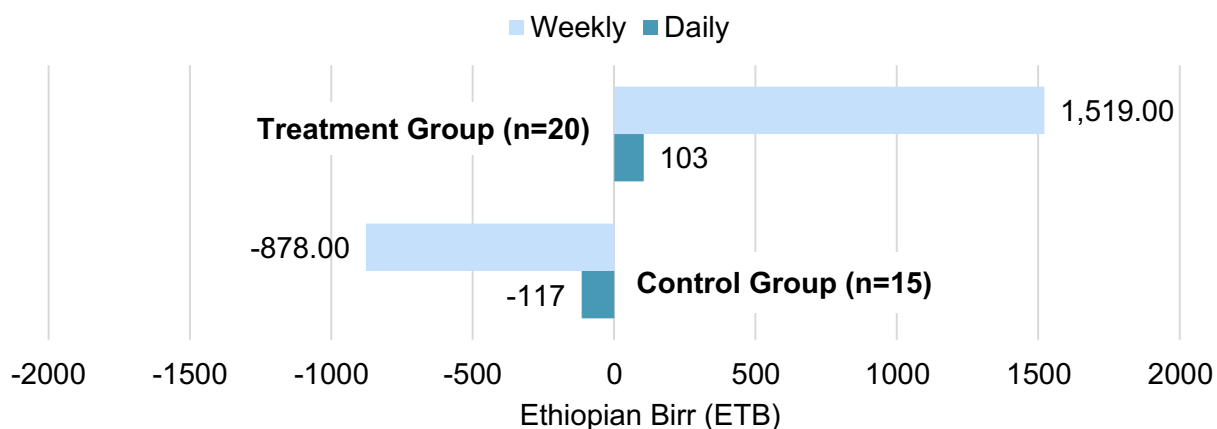
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

¹ DID with 1-day sales as outcome and outlier censoring.

² DID with weekly sales as outcome and outlier censoring

Statistical significance: As expected, given the small sample size of this experiment, the effect is not statistically significant. While it is not possible to attribute differences to random fluctuation in sales, there were similar effects observed in daily and weekly sales.^{8,9}

Figure 7. Average change in daily and weekly sales, by group¹⁰



Consumers appeared to shift from visiting vendors who do not have sanitary items to do those who do, though the increase for the treatment group is larger than the loss for the control group. Results of the experiment suggests that consumers care about hygiene and are willing to change their purchasing behavior when greater hygienic options are available. It cannot, however, determine which components of the kit that most influenced consumers, nor how much *more* money consumers would be willing to pay for improved sanitary conditions across the market.

The impact of the kits may be underestimated due to the overconfidence bias (i.e., consumers' tendency to believe that they would not get sick merely because they never had been sick before). Similarly, the sustainability of this intervention could be impacted by the vendors' loss aversion and lower self-efficacy behavior, which may hinder them from making additional similar investments when needed.

⁸ Post-hoc power calculations assuming a true effect size of 0.16 standard deviations and 0.9 autocorrelation in a difference-in-differences framework indicate the study would need n=240 respondents to detect this effect 80% of the time. With n=35, significant results would only occur 38% of the time. The minimum detectable effect size (i.e., reaching statistical significance in a sample of 35 over 80% of the time) is 0.43 standard deviations.

⁹ Two larger scale vendors were randomly assigned to receive the kit, so the treatment group already had higher sales, on average, prior to the experiment. However, this should however not influence the 'change' in sales to a great extent — the outcome of interest in this experiment.

¹⁰ *p*-value (H_0 : difference in control group = difference in treatment group) = 0.57.

7. DISCUSSION

This study aimed to generate knowledge useful for the design of the Ethiopian EatSafe intervention in Hawassa. EatSafe uncovered several important consumer and vendor contextual behaviors that are relevant for designing the intervention.

7.1. CLEAR CONSUMER PREFERENCES

Consumers in Hawassa had clear, stated preferences for increased food safety. When there is variation in the standard of food safety across vendors, the results of the randomized experiment suggest that consumers will “vote with their wallet” for more sanitary vendors. Additionally, positive behavioral change can often be viewed as a sequence of smaller actions or psychological changes, called journey points, even when people are not consciously aware of them. For the change to occur the right circumstances need to be in place at each of these stages. These are also the moments when the tools of behavioral science – small cues (i.e., heuristics) in the social or physical environment – can have the most impact. According to the consumer behavioral mapping findings, food safety becomes cognitively salient when the consumer starts choosing the vendors and products they are going to purchase. On the other hand, it was also found that other factors, including proximity, price, budget, and items that must be refilled, influenced purchasing decisions, including the decision where to buy.

7.2. RISK PERCEPTION AND OVERCONFIDENCE BIAS

Consumers do not appear to know very much about food safety. As a result, they overestimate their ability to avoid foodborne disease. This “overconfidence bias” seems to be a key driver of consumer behavior in continuing to buy from unsafe vendors. Considered together, these attitudes can be key facilitators in leveraging consumer demand through interventions that correct inaccurate information about the ability of consumers to control their risk of foodborne illness.

7.3. KNOWLEDGE-ACTION GAPS

While vendors appear to understand the basics of safe food handling, they only intermittently practice what they know in the market. Moreover, 60% of consumers said they had not learned about food safety in any direct manner. Consumers and vendors do not appear to have explicit discussions about food safety. Although there is a large gap between what consumers say they want and the type of vendors they typically buy from, it appears that this is due to a lack of choice under the existing market circumstances.

7.4. INVESTMENT IN FOOD SAFETY MAY BE PROFITABLE FOR VENDORS

Results from the experiment indicate that vendors may benefit financially when they visibly signal to consumers how important they deem cleanliness. EatSafe found that at a cost of 700 ETB (USD \$13.36), vendors could recoup their investment in the cleanliness kit within three days. None of the participating vendors had previously invested in these materials, suggesting structural or social barriers (e.g., lack of credit for the initial purchasing; believing that taking action has no value if other vendors do not also participate). This latter barrier, sometimes

referred to as loss aversion, by which vendors, like most people, may be more afraid of losing their investment than motivated by the prospect of financial gains.

7.5. SOCIOCULTURAL NORMS AND SELF-EFFICACY

Since little variation in food safety practices was observed within the market, vendors may lack examples of better practices from lived experience. Similarly, they may suffer from low self-efficacy, or the belief in their own ability to control their environment, preventing them from being the first to make changes.

7.6. LACK OF COLLECTIVE ACTION AMONG VENDORS

Like consumers, vendors express a desire for better food safety in the market, and they believe that their peer vendors also value hygienic food conditions. However, they report feeling that they have low self-efficacy to change the current status quo of food conditions in the market. They also do not trust that other vendors will cooperate collectively, thus experiencing a negative sociocultural norm of inaction. These findings indicate that if organized into collective action and provided with accountability mechanisms for the maintenance of public goods (e.g., waste management), vendors may be able to act together to improve food safety standards.

7.7. KEY STRUCTURAL BARRIERS

Key structural barriers remain to ensure a sanitary environment and adherence to best practices in food safety. Specifically, Addisu Geyeba lacks running water or communal waste disposal, as well as physical barriers to prevent animals from polluting the market.

7.8. STUDY LIMITATIONS AND AREAS FOR FURTHER RESEARCH

As discussed above, the experiment lacks statistical power given the small sample size of vendors. Second, while the results can reliably be applied to EatSafe's target market (Aroge Geyeba), they cannot be generalized to a larger population beyond Hawassa. Third, the assessment of how consumers' subjective risk preference impacted their market choice lacked comparison to consumers who chose other venues with more hygienic food standards (e.g., supermarkets). Lastly, given the sample was predominantly female, there is not enough information to understand any gender differences in consumer demand for food safety. Future research and interventions should consider the rationale behind the use of food sanitation measures and questions such as:

- What are longer-term effects of providing food safety tools to vendors? In particular, could this create a new social expectation for all vendors to take similar measures?
- If public goods such as running water and communal waste disposal were available to vendors, would they use and maintain them?
- What are the community relationships within vendors and between vendors and the local authorities that could be leveraged to enforce better food safety standards?

8. IMPLICATIONS FOR INTERVENTION DESIGN

In the context of the behavioral economic principles, various food safety mechanisms that influence preferences and choice drivers among vendors and consumers were found. The behavioral mechanisms of loss aversion and social norms might be leveraged to incentivize the uptake of food safety to improve their business income. Among consumers, other behavioral mechanisms of relevance for intervention design include heuristics and overconfidence bias.

Finally, EatSafe found that most consumers lack sufficient knowledge of food safety and are unaware of where to find such information. The behavioral journey map (see **Figure 5**) is important because it pinpoints the moments when food safety will start to be top of mind in consumers' minds. By utilizing these moments, the intervention design can leverage consumers' behavior to achieve the desired outcome on the one hand, and prompt them to consider food safety if they haven't already. Furthermore, considerations including product price and proximity are more important or cognitively salient to consumers than the overall state of the vendor's or the market's food safety. Overall, the behavioral mapping activity highlights key points where EatSafe might want to intervene, such as ensuring that information on food safety is readily available and that consumers are conscious of food safety.

9. REFERENCES

1. Temesgen M, Abdisa M. Food Standards, Food Law and Regulation System in Ethiopia: A Review. *Public Policy and Administration Research* [Internet]. 2015;5(3). Available from: <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.989.7442&rep=rep1&type=pdf>
2. Global Alliance for Improved Nutrition (GAIN). Review of Food Safety Policy and Legislation in Ethiopia [Internet]. *EatSafe: Evidence and Action Towards Safe, Nutritious Food*; 2022 Jan. (U.S. Agency for International Development (USAID) EatSafe Program Report). Available from: <https://www.gainhealth.org/sites/default/files/publications/documents/Review%20of%20Food%20Safety%20Policy%20in%20Ethiopia.pdf>
3. Global Alliance for Improved Nutrition (GAIN). *EatSafe in Ethiopia Municipal Roundtable Discussion on Developing Safe Markets for Nutritious Food in Hawassa* [Internet]. *EatSafe: Evidence and Action Towards Safe, Nutritious Food*; 2022 Jul. (U.S. Agency for International Development (USAID) EatSafe Program Report). Available from: <https://www.gainhealth.org/sites/default/files/publications/documents/EatSafe%20in%20Ethiopia%20Municipal%20Roundtable%20Discussion%20on%20Developing%20Safe%20Markets%20for%20Nutritious%20Food%20in%20Hawassa.pdf>
4. Sligo F x., Jameson AM. The knowledge—behavior gap in use of health information. *Journal of the American Society for Information Science*. 2000;51(9):858–69.
5. Tversky A. *Preference, Belief, and Similarity*. Cambridge, Massachusetts: The MIT Press; 2004. (Bradford Book).
6. Slovic P. Perception of risk. *Science*. 1987 Apr 17;236:280–6.
7. Davis G. External Locus of Control. In: Gellman MD, Turner JR, editors. *Encyclopedia of Behavioral Medicine* [Internet]. New York, NY: Springer; 2013 [cited 2022 Jan 19]. p. 743–4. Available from: https://doi.org/10.1007/978-1-4419-1005-9_250
8. Koan I, Nakagawa T, Chen C, Matsubara T, Lei H, Hagiwara K, et al. The Negative Association Between Positive Psychological Wellbeing and Loss Aversion. *Frontiers in Psychology* [Internet]. 2021 [cited 2022 Sep 28];12. Available from: <https://www.frontiersin.org/articles/10.3389/fpsyg.2021.641340>
9. Kennedy JA, Anderson C, Moore DA. When overconfidence is revealed to others: Testing the status-enhancement theory of overconfidence. *Organizational Behavior and Human Decision Processes*. 2013 Nov 1;122(2):266–79.
10. Global Alliance for Improved Nutrition (GAIN). *Consumer and Vendor Perspectives and Practices Related to Food Safety in Ethiopia: A Review* [Internet]. *EatSafe: Evidence and Action Towards Safe, Nutritious Food*; 2021 Sep. (U.S. Agency for International Development (USAID) EatSafe Program Report). Available from: <https://www.gainhealth.org/sites/default/files/publications/documents/Consumer%20and%20Vendor%20Perspectives%20and%20Practices%20Related%20to%20Food%20Safety%20in%20Ethiopia%20A%20Review.pdf>
11. Hodge V, Austin J. A Survey of Outlier Detection Methodologies. *Artificial Intelligence Review*. 2004 Oct 1;22(2):85–126.

10. APPENDICES

10.1. APPENDIX 1: DETAILED METHODS FOR THE MIXED METHODS STUDY

Inclusion criteria for the study were:

- Participants must be willing and able to give informed consent.
- Participant's age at the time of the survey is at least 18 years old.
- Consumers must have been purchasing the selected food from the market on a regular basis, at least once a month.
- Vendors must have been selling the specified foods to consumers at the chosen market at least once a week for the past three months.
- The respondent representing the vendor is a core member of the stall's personnel and is responsible for replenishing, organizing food on display, storage, client interaction, cleaning or upkeeping the stall.
- Vendors in the same food vending business who were already enrolled in the EatSafe cohort study were excluded.
- An attempt was also made to include respondents from a variety of backgrounds, including age, gender, education, and income level.

Enumerator recruitment and training: Seven enumerators who visited the selected market to collect data were recruited considering educational level, experience, and language and communication skills. Enumerators were selected according to the following criteria.

- Hold a minimum of bachelor's degree in social science
- Had prior data collection experience
- Can speak the relevant local language needed for the data collection.
- Good interpersonal communication skills.

The study recruited local field officers who could speak local languages in consideration of the city's diverse linguistic background, which would necessitate tailoring the interview to the respondent's language preferences. Four vendors requested that the interview be performed in Sidama, and the remaining interviews were conducted in Amharic.

Prior to data collection, enumerators received rigorous training. Throughout data collection, EatSafe staff worked closely with enumerators in the field.

VENDOR SURVEY

Module V1: Demographic and Socioeconomic Background

- Name of the respondent
- Phone number
- Marital status of the respondent
- Name of the vendor
- Respondent's gender

- Age of the respondent
- Age of the Vendor stall
- Grade Completed
- Religion
- Length of time selling specified food(s)
- Price of the food(s)
- Average daily sale of the targeted food (in ETB)
- Total capital
- Monthly income

Module V2: Vendor Stated Food Safety Behaviors

- When you think of the personal hygiene of vendors in this market, what list of words do you think of?
- What list of words come to your mind when thinking about food handling of vendors in this market?
- When you think about the food safety environment of vendors in this market, what words come to your mind?
- Probe (for all questions): Could you please rank the words in descending order, starting with the words that best define this market?

Module V3: Vendor Knowledge, Attitudes, and Action Gap

STATEMENT	QUESTION (PROBE)
<i>"Many vendors understand the importance of safe food handling."</i>	Do you agree/disagree with the statement? (Why?)
What are some of the actions you can take as a vendor to ensure safe handling of food?	
Are there things you feel you could have done more?	
What do you think are the challenges to do so?	
<i>"Many vendors are aware of the need of personal hygiene for maintaining food safety."</i>	Considering this market - do you agree/disagree with the statement? (Why?)
<i>"When we spoke with vendors, we discovered that some saw personal hygiene as a requirement for keeping the food they sell safe, while others did not see the connection."</i>	Which one do you support? (Why?)
What are the kinds of actions you are currently taking with respect to personal hygiene?	
Are there areas you feel you could have done better?	
What do you think are the challenges to do so?	
<i>"A lot of vendors realize how important it is to maintain their environment safe."</i>	Considering this market - do you agree/disagree

with the statement?
(Why?)

What are some of the actions you can take as a vendor to ensure a safe environment?

What do you think are the most challenging aspects of these actions?

Module V4: Vendor Observation – Revealed Behavior (Enumerator action, not an interview)

- Does the vendor wash/sanitize hands after handling currency?
- Do the vendors hands appear clean?
- Does the vendor have trimmed and clean fingernails?
- Does the vendor use a hairnet?
- If yes, does it appear clean?
- Does the vendor use gloves?
- If yes, do they appear clean?
- Were the gloves changed over the course of observation?
- Does the vendor use aprons?
- If yes, does it appear clean?
- During the observation period, did the vendor sneeze in an unsafe/unhygienic way? - meaning **not** in elbow/tissue.
- Is the food the vendor is selling protected from dust and flies?
- Is there a clean storage in place?
- Does the displayed food appear clean?
- Does it appear that clean water is used to wash the targeted food?
- Is there handwashing nearby?
- Is there a covered garbage disposal system in place at the vendor?
- Is the vendors' display of the targeted food kept clean?

CONSUMER SURVEY

Module C1: Demographic and Socioeconomic Background

- Name of the respondent
- Phone number
- Marital status of the respondent
- Respondent's gender
- Age of the respondent
- Household member size
- Grade completed
- Religion
- Length of time buying specified food(s)
- Kebele

Module C2: Consumer Stated Preferences of Food Safety

- When you think of the personal hygiene of vendors in this market, what list of words do you think of?
- What list of words come to your mind when thinking about food handling of vendors in this market?
- When you think about the food safety environment of vendors/stall in this market, what words come to your mind?
- Probe (for all questions): Could you please rank the words in descending order, starting with the words that best define this market?

Behavioral mapping

- Have you ever spent time learning more about food safety? why/why not?
- [if yes] Where did you find the information? [If no] Would you know where to look for the information?
- When you are still at home thinking about what to eat for the week - what do you consider when you plan what to buy?
- What factors do you consider when you decide where to shop?
- What makes you choose Addisu Gebeya?
- Once you are here - How do you select which vendor to buy from? What do you look for at the vendors?
- When you choose the vendor, how do you decide exactly which of their products to buy?

Module C3: Consumer Stated and Revealed Preference Gap

STATEMENT	QUESTION (PROBE)
<i>"Many consumers are aware of the necessity of proper food handling."</i>	Considering this market - do you agree/disagree with the statement? (Why?)
Do you consider the vendor's proper food handling while you buy at this market?	What specific aspect of vendors' food handling might make you decide not to buy at a particular vendor?
<i>"Many customers are often aware of the importance of vendors' maintaining personal cleanliness in order to preserve food safety."</i>	Considering this market - do you agree/disagree with the statement?
Do you consider the vendor's personal cleanliness while you buy at this market?	
What specific aspect(s) of a vendor's personal hygiene make you want to buy from them?	
<i>"Many customers are aware that they should buy from vendors that take care of the cleanliness of the vendor stall environment."</i>	Considering this market - do you agree/disagree with the statement?
Do you check the cleanliness of the vendor stall environment while you buy at this market?	What specific aspect of a vendor stall environment might make you decide not to buy at a particular vendor?

Module C4: Consumer Risk Preference

Perceived vulnerability	<p>People have varying expectancy regarding whether or not they will contract illness. On a scale of 1 to 5, how likely do you consider yourself to be to encounter foodborne illness in the coming year as a result of purchasing the targeted food at this market? (Probe: Would your answer change if you had to compare yourself to others in your age group?)</p> <p>Scale: 1 = Very Much Likely, 2=Likely, 3= Neutral, 4= Unlikely, 5= Very Much Unlikely</p>
Perceived severity	<p>Individuals have different beliefs about how serious a particular illness will impact them. On a scale of 1 to 5, how bad would it be if you will acquire foodborne illness in the coming year as a result of purchasing the targeted food at this market?</p> <p>Scale: 1: Not bad at all, 2: Not so bad, 3: It would be bad, 4: Very bad, 5: Extremely bad (have very serious impact on one's life)</p>
Response efficacy	<p>On a scale of one to five, how effective do you believe consumers are in preventing foodborne illness?</p> <p>Scale: 1=Very effective, 2=Effective, 3=Neutral, 4= Ineffective 5=Very ineffective</p>
Self -Efficacy	<p>On a scale of one to five, how confident are you that you can prevent getting foodborne illness?</p> <p>Scale: 1=Very confident 2=Confident, 3=Neutral, 4= Not confident 5= Not very confident</p>
Risk seeking for gain	<p>Imagine that <i>with the rising cost of medical expenses in Hawassa, a one visit medical cost today requires at least 400 ETB if someone gets sick.</i> Assume that you wanted to buy a kilogram of Avocado, and its price in this market is 30 ETB, and someone offers to sell it to you for 25 ETB, but you felt that the Avocado is less safe to eat, would you buy the Avocado? Why?</p>
Risk seeking for loss	<p>Imagine <i>there is one vendor that sells high quality lettuce, although some consumers think that the price is slightly higher than other vendors.</i> If you know that vendor, do you want to buy from him? Why?</p>

Module C5: Consumer Social Norms

- What are some of the food safety social norms that you believe should be changed?
- What would the people say if you attempted to change (or act against) such norms?
- What are some of the food safety social norms existing?
- On a scale of 1 to 5, to what extent do people in your community think that when buying food, it is necessary to check the vendor's personal hygiene?¹¹

¹¹ For questions 4-6, scales used were: 1: Very necessary, 2: Necessary, 3: Neutral, 4: Not necessary, 5: Not necessary at all,

- On a scale of 1 to 5, to what extent people in your community think that buying food from someone who keeps a clean vendor environment is vital?
- On a scale of 1 to 5, to what extent people in your community believe that it is vital to pre-check the vendor's food handling conditions before purchasing food?

Module V6: Consumer Observation – Revealed Behavior (Enumerator action, not an interview)

- Did the vendor who sold the food to the consumer wash his/her hands after handling money?
- Does the vendor who sold the food appear to have clean hands?
- Does the vendor who sold the food have trimmed fingernails?
- Is the vendor who sold the food wearing hairnet/coverage of hair?
- [If yes] Does the hairnet/coverage appear clean?
- Is the vendor who sold the food wearing gloves?
- [If yes] Do the gloves appear clean?
- Is the vendor who sold the food wearing an apron?
- [If yes] Does the apron appear clean?
- Did the goods bought by the consumer look like they had been washed?
- Does the vendor's stall where the consumer bought from look clean and orderly?
- Is the vendor's stall where the consumer bought from free from dust and flies?

10.2. APPENDIX 2: DETAILED METHODS FOR EXPERIMENT

Recruitment: A total of 35 of the 47 respondents who participated in the mixed method study consented to take part in the experiment. Of which the treatment group consisted of 20 vendors, and the 'waitlist' control group was composed of 15 vendors. They were told they would receive a package from the research team either on the day of the first visit or one week later.

Randomization: Each vendor picked a paper at random from a bag containing notes with 20 saying "today" and the other 15 saying "next week."

Data collection: Sales data was collected twice, one week apart. Sales information was gathered from both the treatment and control groups on the day the treatment group received the food safety package. The items selected were based on consumer and vendor responses to the interviews, including the free-listing exercise. After a week, the food safety package was distributed to the waitlist control group while sales information was simultaneously gathered from both groups. After gathering the data, the issue of outliers was resolved because some of the outliers were really far from the mean (11). Such outliers can lead to imbalances across treatment arms and have a significant impact on outcomes in a sample size this small.

From the experiment, vendor sales pre-post was compared and information from direct observations was used to identify whether the vendors who received the food safety package were using it. A difference-in-differences (DID) regression specification was used to estimate the impact of the food package intervention on sales.

$$Y_{ijt} = \alpha_j + \beta_j TREAT_{it} + \delta_j POST_{it} + \gamma_j POST_{it} * TREAT_{it} + \varepsilon_{ijt}$$

Where Y_{ijt} refers to outcome j (weekly or daily sales) for vendor i at time period t (either baseline or endline), $TREAT$ is a binary indicator for whether the vendor was in the treatment group and $POST$ is a binary indicator for the endline. The interaction coefficient γ_j is the estimate of the impact of the intervention.

The DID specification for pre- and post-intervention was preferred over a first difference (sometimes known as analysis of covariance) estimation strategy as difference-in-differences has higher statistical power when the outcome measurement is subject to a level of autocorrelation above 0.5. In this case, vendor sales have an autocorrelation coefficient of 0.9 at the daily level and 0.7 at the weekly level.

10.3. APPENDIX 3: FIRST PERSON EXAMPLE OF BEHAVIORAL MAP

