

BMJ Open Understanding how food safety risk perception influences dietary decision making among women in Phnom Penh, Cambodia: a qualitative study

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ABSTRACT

Objectives To determine women's perception of the risk of food safety and how it relates to diet, health and decision making as part of formative research for a market-based intervention that aims to improve the safety of animal-source foods sold in informal markets.

Design Qualitative study including in-depth personal interviews with 24 caregivers were conducted and complemented with a second follow-up PhotoVoice interview, which allowed the women to photograph their meals and perceptions of food safety and nutrition. Interview data were analysed using thematic analysis in MAXQDA. Participants were purposively sampled from a larger Safe Food, Fair Food for Cambodia study, conducted from May to August 2018.

Setting Urban and periurban neighborhoods of Phnom Penh, Cambodia.

Participants 24 female caregivers (mothers and grandmothers) of children under age 5, each interviewed twice.

Findings A primary food safety concern expressed was that chemicals (pesticides and other agricultural additives) in animal-source foods, fruits and vegetables may impact the health of their families by causing diarrhoea and problems during pregnancy. This fear created a lack of trust in markets, which influenced their food purchasing behaviours and strategies for making the food safer for their families. These mitigation strategies, including food selection and cleaning, vary among the women but are perceived as important to be able to provide their families with what they define as safe meals.

Conclusions Interventions that wish to decrease rates of foodborne illness and increase animal source food consumption should also address the belief that the food system has been compromised by the addition of pesticides and agricultural additives.

INTRODUCTION

There is growing recognition of the importance of foodborne disease as a major health concern. Although 1 in 10 people worldwide will fall ill each year from a foodborne illness,

Strengths and limitations of this study

- In-depth qualitative study complemented with PhotoVoice methodology among women from diverse socioeconomic backgrounds.
- New understandings of role of food safety risk perception on food choice decision making and meal preparation in low-resource urban and periurban settings.
- Qualitative methodology used limits generalisability of data beyond participant demographic; further research needed in rural areas of Cambodia.

40% of the deaths resulting from these illnesses will occur in children under 5.^{1 2} A 2015 study conducted by the WHO found that global morbidity and mortality in children under five from foodborne illnesses, particularly those that cause diarrhoeal illnesses, is on par with that of infectious diseases like malaria, HIV/AIDS and pneumonia.³ The WHO study examined this burden and the contaminants causing it by subregions and reported that the disease burden of foodborne diseases was 293 disability-adjusted life-years lost for every 100 000 people in the Western Pacific Regional Office subregion B, which includes Cambodia.

Evidence suggests many of these outbreaks stem from informal 'wet' markets where many Cambodians buy their animal source food products.⁴ These open-air markets sell vegetables and fruits as well as meat and fish, which are usually stored on some ice but still in the open air. Thus, in this setting consumption of animal source foods presents a potential double-edged sword where these foods provide essential vitamins and minerals for preventing malnutrition but also are a

potential source of foodborne disease, including *salmonella*, *Escherichia coli* and *Staphylococcus aureus*.⁴

Despite the risk of foodborne illnesses from biological contaminants, including salmonella, studies on food safety risk perception worldwide suggest there are a host of other factors that may impact a consumer's willingness to purchase food.⁵ These factors include trust, knowledge, subjective characteristics, and sociodemographic factors. In South East Asia, more narrow studies suggest that a perception of chemical contamination in the form of pesticides, additives, and hormones used to produce and raise food products is of great concern when food is purchased.^{5–7} Research on risk perceptions of food safety specifically in Cambodia are limited, and attitudes toward various mitigation efforts consumers use to overcome this barrier have not been examined in depth.

To address food safety in animal-source food products purchased in wet markets in urban Cambodia, a multi-level research and intervention project called 'Safe Food, Fair Food for Cambodia' is investigating the health and economic burden of foodborne disease in animal source food product value chains and pilot a market-based intervention to reduce the incidence of foodborne disease outbreaks associated with animal-source food products. This qualitative study is a part of the formative research for the larger project.

Women in urban and semiurban Cambodia are primarily responsible for cooking and childcare, although many also work either in a home-run business (such as growing and selling flowers) or in garment factories. They have a key perspective into food safety and nutrition and how it affects their families. The traditional Cambodian diet consists of rice, served at nearly every meal, and a large variety of flavorful soups and stewed meats, fish, and vegetables to complement the rice. Several of the photographs taken by the participants show families seated together on the floor, which is the cultural norm. Each family member has their own small bowl, which they will fill from the common bowls of stews, soups, and rice in the centre of the circle.

METHODS

Study setting

The study was conducted in five of the 14 districts of Phnom Penh, Cambodia, a city of 1.5 million and the capital of Cambodia. The five districts vary between urban and peri urban. 32% of children in Cambodia suffer from chronic malnutrition, but the rate in urban areas is lower, at 24%.⁸ Multigenerational families often live together in small wood or brick homes raised above the ground in case of flooding during the rainy season; in cases where the mother works outside the home, the grandmother is responsible for childcare.

Study participants and recruitment

Safe Food, Fair Food for Cambodia conducted a risk assessment in a cross-sectional household survey in

Phnom Penh. Two hundred households were selected based on stratified random sampling using city zones and income. This initial survey was conducted in April 2018. For the qualitative research described here, a subgroup of households were purposively chosen from this household survey if a child between 6 months and 5 years resided there and if the woman primarily responsible for the child's nutrition consented to participate. The research team interviewed twenty-six women (20 mothers and 6 grandmothers) in five districts of Phnom Penh.

Participant involvement

Participants were not involved in setting the research questions or in designing this study. The identified themes, however, were developed based on their feedback and the input from the photos they took to show researchers how they perceive food, nutrition and food safety.

Data collection

Activities took place over an 8-month period. The first 3 months (May–August 2018) were dedicated to piloting the research tools and then conducting two in-depth interviews with 26 women. The interview guide and PhotoVoice approach was informed by prior research and developed through an iterative process with local partner organisation.^{9 10} The initial in-depth interviews focused on nutritional habits and how these habits were affected by gender, age, pregnancy status, breastfeeding status and illness. Food security status of each participant was assessed using questions adapted and translated from US Agency for International Development (USAID).¹¹

These initial interviews were complemented by a PhotoVoice project, in which 24 of the women agreed to take photos of their food before preparation, during preparation, and during consumption at meals for 2–3 days and participate in a follow-up interview about the photos, the purpose of which was to show how women go about preparing food for their families, including the barriers to preparing safe, healthy meals. Cameras were provided to the participants, unless they stated that they preferred to take photos with their camera phones. The research assistants instructed the participants in how to use the cameras and they took several practice photos. The research assistants also provided the participants with verbal guidance on what photos to take, including photos of food products and preparation that represented a typical day in the family's life. This approach, as described by Collins,⁹ Dumas¹⁰ and Wang and Burris,¹² allows for additional engagement by the participants by enabling them to tell their own stories by taking photos of their lives. When research assistants returned to collect the cameras, they conducted a second interview with each woman to discuss the photos and their meaning to allow them to participate in determining the key themes they found most important about their nutrition and food preparation rituals. These photos and follow-up interviews added context to the central objective of the study,

as well as guided the development of the overall themes discussed.

The interview asked participants' perceptions and opinions on several aspects of nutrition, including their family's food buying, preparation, and eating habits; how habits change during pregnancy and breastfeeding; how nutritional needs change based on gender and age; and the women's perceptions of food safety. All interviews were conducted in Khmer by research assistants (male and female) from CelAgrid/Livestock Development for Community Livelihood Organisation who were trained in qualitative methods. All interviews were audio recorded and one of the two research assistants present also took written notes to add context. These notes allowed the research team to determine when saturation had been reached.

Two recorded files were corrupted and unusable, and two women declined to participate in the PhotoVoice interview, resulting in 48 interviews (24 initial in-depth interviews and 24 follow-up PhotoVoice interviews with the same women). The audio recordings were transcribed into Khmer and then translated into English. Ten per cent of interviews were transcribed and translated by a secondary translation service for quality control.

Data analysis

Data analysis was completed using the qualitative analysis software MAXQDA. Preliminary themes emerged from debriefs and notes taken at each interview with caregivers. Photos were matched to the corresponding section of text in the interviews based on detailed notes taken during the interviews. Codes included themes determined a priori and those developed using grounded theory, an inductive qualitative research methodology.¹³ SMB developed the codebook and coded all interviews. Codes were revised iteratively with regular debriefing meetings with first author and local research assistants and as new codes emerged through interviews with caregivers. Code and meaning saturation were achieved, as described by Hennink *et al*¹³ and as agreed on by authors.

Responses from the adapted food security questionnaire were analysed following guidance from the USAID.¹¹ We intended to conduct stratified analysis by food security status to examine how risk perception may vary according to household food security, but the themes remained consistent regardless of food security status. Results are presented in aggregate.

RESULTS

Participants resided in five districts around Phnom Penh. Primary caregivers included 6 grandmothers and 20 mothers (table 1). The youngest child in the home was, on average, 24.7 months old (range: 7–48 months). The average number of children residing in the home was 2.45 (range: 1–10). Around half of caregivers reported working outside of the home. Food insecurity was high in

Table 1 Characteristics of Cambodian caregivers (n=24)

Variable	%
Relationship to child	
Grandmother	25
Mother	75
Caregiver Working Outside Home	
Yes	46
No	54
District	
Sba Ampov	25
Chroy Chong Va	21
Sen Sok	17
Moan Chey	17
Po Sen Chey	21
Food Insecurity*	
Secure	21
Mild	29
Moderate	21
Severe	29

*Food insecurity assessed using the USAID Household Food Insecurity Access Scale for Measurement of Food Access.¹¹ USAID, US Agency for International Development.

this region with 29% of household reporting severe food insecurity.

Risk perception

Although the focus of the larger research project is on foodborne illnesses, the women did not discuss this or consider this a major concern. Overwhelmingly, women in this study reported concerns about chemical contaminants such as pesticides as a risk to food safety. Participants used the term 'chemicals' to refer to known and unknown foreign additives perceived to adulterate food. Participants described both a concern of pesticides as well as other perceived unknown agricultural additives that were used to improve the appearance of foods, either making them larger or the colours brighter. Within this primary theme, several sub-themes emerged that, together, offer a nuanced look at how the participants perceive food safety, the barriers to safer foods, and the strategies they use to mitigate the risks they associate with eating food contaminated with pesticides and other chemicals.

Themes

Chemicals affecting food

'If any vegetables use too many chemicals, the stomach-ache occurs immediately when eating. Especially my husband, it is very fast, when he eats, if they put a lot of chemicals, he will surely get diarrhoea' (Participant 15, mother of 4).

All women discussed chemicals affecting their food, particularly food purchased from the market. Many

specified vegetables, including lettuce, Chinese kale, chives, lemongrass, cucumbers and morning glory, as being of particular concern. Meats, however, were not exempt; multiple women referenced pork and chicken being contaminated with chemicals as well. For example, one woman explained, 'Because nowadays there are many chemical injected meats. Such as a few days ago, I bought half a kilogram of pork. It smelled very bad and I got a little sick at that time. I then tried to marinate it and dried it under the sun; however, it still had a bad smell. The smell was getting worse as I cooked it. That's why I abstain from pork. I won't buy those meats anymore since then' (Participant 4, mother of 3).

The women felt that in the markets, chemicals were difficult to avoid. 'They have chemicals. Now, even vegetables have chemicals, meat has chemicals, farmed fish,' said one woman (Participant 13, mother of 2). Another said, 'But I know most foods sold now are mostly exposed to chemicals. ... They mostly use chemicals. But we can't escape from it. That's why we don't eat vegetables as often as before' (Participant 21, grandmother of 2).

It was commonly believed that these chemicals cause illness. Those who did describe how the chemicals affected their families generally referenced diarrhoea or general food poisoning, as shown in the opening quote of this section.

Pregnant women and their fetuses were perceived to be at particular risk. 'First, I'm afraid that it will affect the baby because of those chemicals in the vegetables. It is okay for us to eat them but the baby in the womb cannot handle all those chemicals that they receive from us,' explained one participant. This belief carried through to children after birth, as well. Natural foods (or foods that were not produced using chemicals) were seen as beneficial to the health of infants and children, as explained by one woman: 'When each of my children and grandchildren are born, I rarely let them eat snacks, I don't let them eat them, so the baby is healthy because of natural vegetables' (Participant 4, mother of 3).

Home grown as safe

'They are all not safe. If we want organic vegetables, we have to plant by ourselves. Even morning glory also has chemicals in it. I wanted to have Chinese kale, chive, choy sum, so I bought a pack of fertilizer and planted those on my land. It will be safe' (Participant 4, mother of 3).

The women stated that it is the farmers who use the chemicals. There seemed to be a disconnect between various parts of the food chain; the women felt farmers are responsible for using chemicals, and do not trust the vendors unless they personally know them, as was the case for several women. A proposed solution was to simply exit the market altogether. Women who purchased all the food the family ate expressed a desire to be able to grow their own vegetables, while women whose families relied in part on food that was either grown on the family's land, caught by someone in the family (fish), or raised by the family (chickens or pigs) expressed confidence

that this food was safer because it was free of chemicals. Several also described food that is not grown or raised using chemicals as natural—and that is preferable for the health of their families.

Multiple women said that that Cambodian farmers use chemicals, but that the foods coming from Vietnam are worse. 'They say that the products imported from Vietnam use more chemicals than we do here. They use them a lot' (Participant 25, mother of 1).

Both the desire to grow or catch their own food or the feelings about imported food being worse seemed to revolve around trust. 'We won't know unless we grow them ourselves. We can't know if they grow them. It's better to eat what we have like luffas, papayas, morning glory, that we use cow and chicken manure on' (Participant 18, grandmother of 2). This also emerged when women spoke about purchasing items at the market. There were some sellers at the market that they trusted because they knew them. 'There's a man who picks stuff from the farms. We buy those because they're safer,' explained one woman (Participant 1, grandmother of 2). Others said they purchase from their neighbours and feel safer because the women knew each other. Whether they grew or caught the food themselves or purchase it, the women preferred for the food to be grown naturally.

Purchasing strategies

'See if they're natural. If they're farmed fish, I only buy when I really need to, but just a small amount. If I go to the market and see flat fish, I'll buy them if they look free of chemicals. But we're still not sure if there are more or less chemicals' (Participant 18, grandmother of 2).

If they cannot grow or raise their own food, women would prefer to purchase food at natural-food stores: 'I heard that they are mostly at the natural or organic vegetable stores. I heard that there are a lot in Phnom Penh' (Participant 25, mother of 1). Because of the barriers to specialty commercial food stores and growing and raising their own food, they instead resorted to a variety of mitigation strategies. These can be grouped into two sub-themes: purchasing strategies and cleaning strategies. In each, the strategies themselves are diverse, but the existence of a strategy with the specific goal of limiting the exposure to chemicals was consistent.

In markets, some women stated that they prefer to buy the vegetables that do have bruises or evidence of worm damage because that suggests that pesticides were not used, or that they were not used as much. One woman said, 'I buy the better-looking ones. For vegetables, if they don't look good, I don't buy them. ... (pause) ... But look at the goodness, if they look too good, I don't buy it too. If there's some caterpillar or something, we can wash them more. Those don't have too many chemicals' (Participant 7, grandmother of 2).

However, others intentionally selected the cleanest, freshest looking vegetables. They avoided bruised vegetables, those with holes or other signs of damage, particularly by insects and focus on colour. These women,

however, did not seem to see this as an indicator that the food was not contaminated with chemicals—just that they purchased them anyway. ‘I choose the fresh vegetables... no caterpillars. I don’t know if they have chemicals, as long as they look good’ (Participant 16, mother of 1). Flies, however, are consistently labelled as unhygienic. Some women insisted that they only purchase things that had been refrigerated and that they would refrigerate in their homes to kill viruses on the food, and that refrigeration was what made supermarkets a safer option for purchasing food, while others suggested that supermarkets may also use chemicals to extend the life of food beyond its natural state and was, therefore, also problematic: ‘I think supermarkets are more likely. But I am also afraid that they store the products for too long. So, they would use some medicine (preservative/chemicals) to keep those products fresh’ (Participant 8, mother of 1).

Money was also a major factor in purchasing decisions. While a food security questionnaire was included at the end of the in-depth interview, the responses did not impact women’s opinions on food safety or barriers to safer food. They chose one market over another because of the overall cost. ‘Here, they sell for 12 000 Riels (\$3) but at the market, they sell for 10 000 Riels (\$2.50) or so. It’s about two thousand 2000 Riels (\$0.50) difference. So, I can save some money by going to the market so that I can buy additional groceries and stuff,’ said one woman (Participant 1, grandmother of 2). However, for other women, the cost of getting to a market is prohibitive, so they purchased food from their neighbours or mobile vendors, even if the food may be more expensive.

Although their desire was to feed their families safe, healthy food, money often dictated what they could ultimately purchase, even if they were not experiencing food insecurity at the time of the interviews. They felt that safe food does exist in the country, at organic shops, but that food is more expensive and further away.

Cleaning strategies

‘Blanch to get rid of that stuff. I even clean it for three or four times. I soak it to eliminate the contaminated substances. I am afraid that they are exposed or are injected with chemicals. I’m afraid that it would cause diarrhea when eaten’ (Participant 5, mother of 3).

Each of the women interviewed also had a cleaning routine involving some combination of washing the items multiple times, usually with salt, blanching (briefly putting the product in boiling water), and then cooking well to get rid of harmful chemicals. ‘If we buy beef and stuff from the market, like I said a few times already, we need to wash it two to three, four, five times or so then soak it ten minutes or so and wash them and rinse them dry. Make sure the water is well boiled then soak again before cooking’ (Participant 1, grandmother of 2).

Because they felt that there was no way to fully avoid purchasing food items contaminated by chemicals, they relied on their cleaning strategies at home to make sure they provide their families with the healthiest meals

possible. One woman explained, ‘We don’t know what to do. It’s no choice. We can’t get if we don’t buy it. The meat at the market is never good. The pork now uses the chemicals, so does the chicken. We can’t avoid it, then just buy it and boil water to blanch it’ (Participant 22, grandmother of 2.) Cleaning strategies were also used for vegetables.

Conceptual model

The combination of these individual themes can be conceptualised as a decision tree. [Figure 1](#) visually depicts the decision process women go through to try to feed their families safe, nutritious meals. Their fear of chemicals in the food chain leads them to prefer to either purchase food from a fancy supermarket or grow or catch their own food. Ideally, women would prefer to grow their own vegetables, catch their own fish, and raise their own chickens and pigs. Many women do grow some of their own vegetables and herbs and were confident that these were not contaminated with pesticides.

Although they felt options to obtain safe food exist, the women identified several resource limitations that prevent them from being able to purchase food at supermarkets or grow and catch their own food. These limitations were time, money and access to land. The women felt that they did not have the time to dedicate to the amount of gardening, animal-raising and fishing it would take to provide safe food for their families. Supermarkets are also located far from their homes, making them difficult to access in addition to being very expensive. Many women reported not having the space to dedicate to a large garden or many animals.

Where purchasing their foods at supermarkets or growing or catching their food is not possible, women reported that they purchase their family’s food at the informal markets and used a variety of mitigation strategies to make the food safer. These various strategies enabled the women to feel that they were feeding their families the safest, healthiest food possible.

Importance of family meals

Women took photos of their food and food preparation, but when asked what their favourite photo was, the women who took a photo of their family eating together chose that photo. They put a great deal of importance on family meals and providing healthy meals for their entire family. One woman said about a photo she had taken, ‘That one is important because we were having a meal together’ (Participant 13, mother of 2.) The importance they place on the food they feed their families is key to understanding the mitigation strategies they use to reduce the perceived risk of chemical contaminants affecting the health of their families.

DISCUSSION

This study explored women’s perceptions of nutrition and food safety and identified a common fear of foods

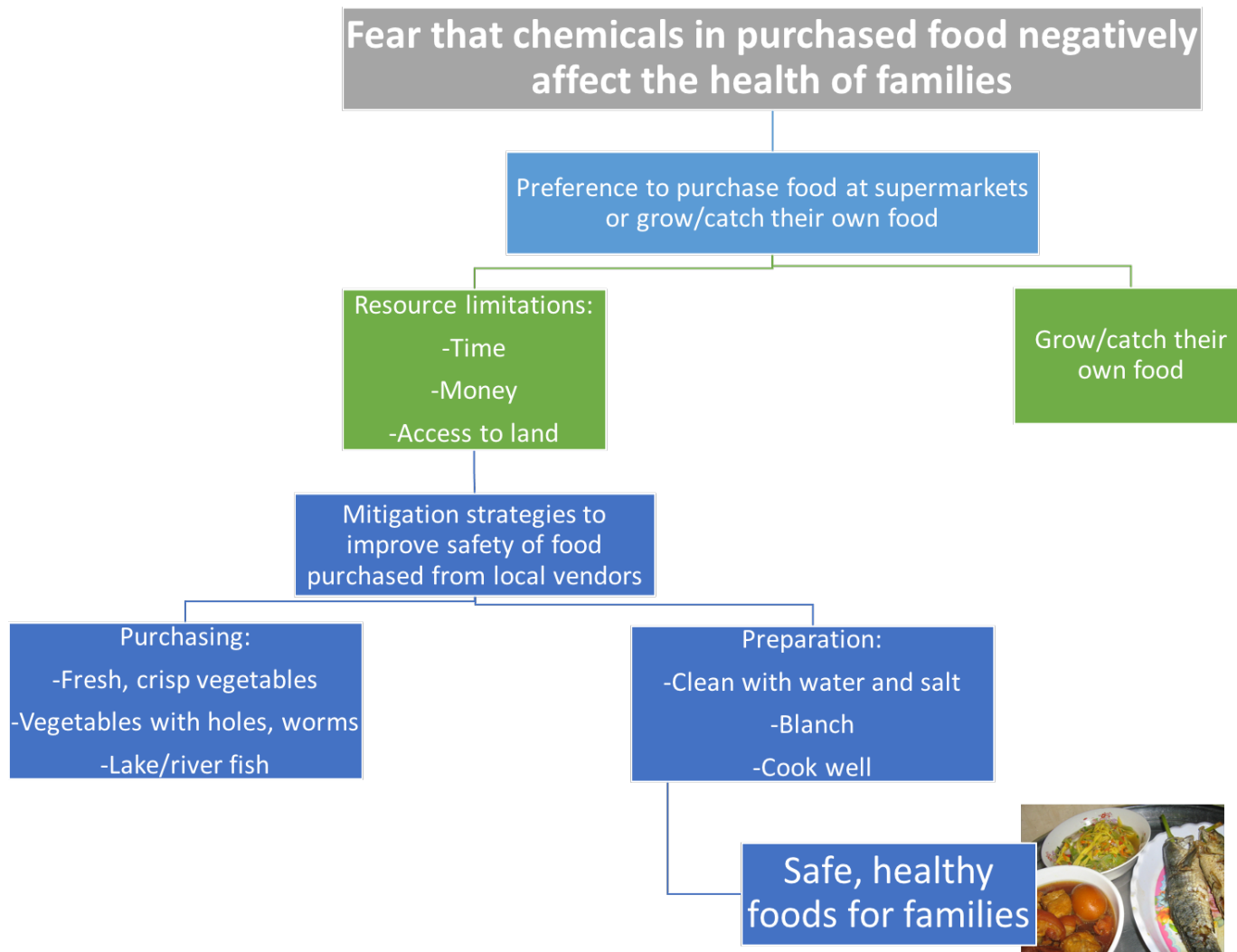


Figure 1 Conceptual model: Women's decision process and strategies for feeding their families safe and healthy meals.

being contaminated with chemicals which in turn drives their food preparation and purchasing decisions. While this concern has been examined in other research,^{5-7 14 15} it is particularly noteworthy here because these themes emerged organically; participants were not asked directly about pesticides, but instead about whether or not they thought the food they purchased was safe, and what they do to improve the safety. Women shared the decisions they must make in order to feed their families safe and nutritious foods. Women frequently reported that they feel that the chemicals and pesticides used during the production of their food (both animal source food products and fruits and vegetables) negatively impacts the health of their families, causing ailments such as cough, fever and diarrhoea, and even negatively impacting the health of a fetus if the mother eats contaminated foods during pregnancy. Because of the barriers to accessing food free of chemicals, they instead use various mitigation strategies both when they purchase and when they prepare foods in an effort to reduce chemicals in the meals they feed their families.

Trust was also an important factor in Cambodia for women deciding what to purchase. If they do not trust that the products are safe, they will try to avoid them. This could negatively impact the nutrition of their families, particularly when the foods they are avoiding are so critical to the nutrition of infants and young children, like meat, fish and vegetables.⁴ The country report for Cambodia from Consumers International reported limited regulations to protect consumers and concerns about safety from consumers.¹⁶ In accordance with our findings, the report mentioned that consumers worry most about the chemicals in their food,¹⁷ despite experts being more concerned about biological hazards.¹⁸ Animal-source food products sold in wet markets in Cambodia have been associated with *E. coli*¹⁹ and salmonella,²⁰ both causes of food-associated illness.

This risk assessment can be at least partly explained by the psychology of risk perception. Multiple studies have documented that factors beyond objective facts go into how people perceive risk and therefore make choices.^{21 22} These factors can include controllability

of risk, alternatives to the risk situation, and degree of trust in regulatory authorities.^{23 24} When making choices about the food they purchase, the Cambodian women in our study may feel that they can, to some extent, control the amount of pesticides their families consume if they use strategies to mitigate the exposure, while the risk of foodborne illness from pathogens is something uncontrollable. Further research into how these mitigation strategies may impact the risk of foodborne illness should be conducted.

The use of pesticides and the perceived and real risks associated with their use have been documented extensively in south east Asia, but far less so in Cambodia specifically.^{6 7 15} One study focused on the knowledge, attitudes and practices of farmers in Vietnam, Cambodia and Laos. This limited study found that 96% of long-bean farmers in Cambodia used pesticides on their crops, but that basic knowledge about their intended use and the risks associated with them were limited.²⁵ In Vietnam, where pesticides and hormones are also used extensively in farming and raising livestock, respectively, Ha *et al*, delve into the complex food safety risk perceptions among urban and rural consumers.¹⁵ Their survey and accompanying focus groups similarly found that concerns about pesticide residue and hormones in livestock were key drivers of consumer decisions in markets.

Our study adds to the body of evidence on the perception that pesticide use is a primary food safety risk in south east Asia, but it also adds nuance, specifically with regard to how women, who are the ones primarily responsible for providing meals for the family, attempt to control this. Their purchasing decisions revolve around attempting to purchase foods with the least pesticide use, but their ultimate goal is to exit the wet market economy altogether by growing and raising their own food, which could have implications for the local market.

In our study, caregivers reported very specific cleaning strategies. Some of these have been examined in controlled trials, with specific vegetables, with varying success at reducing the amount of pesticide residue.^{26 27} In one study using okra, blanching the vegetable (a common method described by the participants above) was able to reduce pesticide residue by 48.95%.²⁸ Without additional research into what pesticides are being used and how much residue commonly remains on products, it is unclear in Cambodia if these methods are necessary or sufficiently effective. Participants also expressed similar concerns and similar strategies with animal-source foods. Future research is needed to address these misperceptions and provide evidence-based food safety in communities.

Further research should analyse the relative burden of biological vs chemical contaminants in the wet markets in Cambodia, as well as on the safety and nutritional quality of foods purchased at wet markets. The current literature on the use of pesticides and hormones in farming and livestock, respectively, in Cambodia is limited.²⁵ A 2010 WHO analysis suggested foodborne disease burden per capita in Cambodia was high, however.²⁹ The results of

these can be included in public health policy-making and public messaging to improve food safety and nutrition.

Additionally, this study has implications on informing the design of future integrated food safety-nutrition interventions. Understanding the primary concerns of women and their decision-making process for food preparation and purchasing allows possible misconceptions to be effectively addressed. If women feel that the food at the market is contaminated with chemicals, they may avoid it altogether, which may reduce the diversity of the diet they feed their children. Additionally, their mitigation strategies during preparation may impact nutrient bioavailability and quantity and quality of nutritious foods consumed in the household.

A limitation of our study is that we did not conduct interviews with market vendors or farmers or male household members. Their perceptions may be different from the women who participated in this study and important to include in future work. Strong participation in the second interview, based on the photos, was sometimes lacking, possibly due to a lack of time or understanding of the depth of the topic. Participants took photos of the food as it was being prepared and served, but the discussions largely confirmed what had been discussed previously. Participants did not take photos of the food at the markets, which are the source of many of the issues raised.

CONCLUSIONS

When asked for recommendations about the health of their communities, many women said they would like farmers to stop using chemicals in the food because it makes their families sick. This perception is an important take-away from this study, as the concern of chemical contamination of foods was identified as key driver of food purchase decision making and household food consumption. The women use various mitigation strategies to improve the quality of their food, which may or may not be effective, especially when it comes to animal-source food products. This study provides insight that will be helpful to address in the development of future food safety and nutrition interventions.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants. Emory University Institutional Review Board IRB#0010343 reviewed this study and participants gave informed consent to participate in the study before taking part.

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