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Title: Street Food Vending: Vendor Food Safety Practices and Consumers' Behaviours, Attitudes and Perceptions

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STREET FOOD VENDING: VENDOR FOOD SAFETY PRACTICES AND CONSUMERS' BEHAVIOURS, ATTITUDES AND PERCEPTIONS

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2. ABSTRACT

In developing countries, the need for street foods is growing. Alongside this, is the risk of contracting a food borne illness. This is a factor that the stakeholders must be aware of especially the vendors. The consumers' perception can be influenced by the practices of the vendor. This research sought to investigate street food vending practices in Tobago; vendor food safety practices and consumers' behaviours, attitudes and perceptions.

The vendors and consumers were selected systematically. The data was collected by observation from vendors and by questionnaires from consumers. It was analyzed using SPSS and presented in tables and graphs which showed frequencies, percentages and significances.

From the observation of vendors, 72.7% had no gloves, 68.2% had no visible food badge, 72.7% handled the money themselves without sanitation after, 90.9% did not wash hands / change gloves. The consumers, 56.9% were 'very concerned' about illnesses, 64.1% said they were 'somewhat safe' to eat. <18 age group had the highest mean perception score M = 17.16. Regularity of purchase, 'regularly' had the highest M = 17.45. Concern about illnesses 'very concerned' had the lowest M = 13.55.

Conclusively, 66.7% of consumers had an overall low/negative perception of street foods. There were significant associations for age, gender, regularity of purchase, concern about illnesses and safety of street foods against perception scores. Those with the lower scores had a more low/negative perception. Vendors need to improve their handling practices so that an improvement of a more positive perception from the consumers may be seen.

3. INTRODUCTION

3.1 Background

Trinidad and Tobago with a population of little over 1.3 million people (CSO 2013) had a food importation bill in 2009 of $4 billion dollars (Allaham 2012), with the majority of imports to the country coming from the US. At 3000 deaths per year from food borne illness and outbreaks of salmonella and listeria over the past 2 years, the US has sought to implement new food safety rules (Guardian Media Limited 2013). This raised the issue of the importation of contaminated foods which added to the already shortcomings of food safety in Trinidad and Tobago. During a review period from 1981 to 2005, of the 42,973 reported food borne illness cases, the majority was from Trinidad and Tobago (38%). These illnesses are diseases that are generally either infectious or toxic, via agents that go into the body upon ingestion of the contaminated food (CAREC 2013, 1). When talking of the safety of foods and food borne illnesses, no conversation can be complete without the mention of street foods.

In developing countries, the need for street foods has been constantly growing. This can be attributed to urbanization and the needs of these populations for employment and food (Draper 1996, 1). Street foods also have significant socio-economic importance. It was said that those operations can allow for entire families to gather the raw materials, prepare and cook the foods and aid in its sale. It was also said that the potential for the employment of women and the role they play in street foods was crucial (FAO 1995). According to Food and Agriculture Organization, the definition of these foods are ready-to-eat food made and put for sale by vendors and hawkers particularly in the streets and other related public areas (Darnado 2003, 2). The type of street foods to be found, differ by geographical areas. The similarity was however, that they were common place in their respective societies and catered for individuals who were on the go, seemingly regardless of economic status. It was no different in Trinidad and Tobago with a plethora of different peoples, the street food options reflect that melting pot and as such are highly varied. Most notably souse, gyros, pastries, pow, doubles, etc. The latter of which was undoubtedly the country's most popular (Mankee, et al. 2005, 601). Along with the increased need for these types of foods

was the ever-present risk of contracting one of the many food borne illnesses. This was a factor that all stakeholders in the food industry needed to be aware of especially the vendors, who were directly involved and require a great level of knowledge about food safety and proper handling practices. It was said that a lack of this crucial knowledge among these vendors as to the causes of food borne illnesses was a serious risk factor (FAO 2013).

There were several studies that have been done in great detail on various facets of food safety in Trinidad (Badrie, Gobin, et al. 2005), (Benny-Ollivierra and Badrie 2007), (Odwin and Badrie 2008) among others. However, research on the street food sector in Tobago has been lacking. There have not been any studies done as yet on food safety and by extension street food vending, which specifically targets Tobago's population. Tobago with its economy primarily fueled by tourism and the number of festivities that are held on the island to woo visitors, street vending has been highly seen around those times. Even on a day to day basis, doubles, souse, pastry and hamburger sellers can be seen by the roadside throughout Tobago.

The uniqueness of this research lies in the fact that a study such as this has not been done before on the island. Although, when speaking of street foods, Trinidad comes to mind, it was imperative that Tobago not be left out of being researched, as street foods was a component of the sister isle. Thus, this research sought to investigate street food vending in Tobago; vendor food safety practices and consumers' behaviours, attitudes and perceptions.

3.2 Rationale

As the population and economy of this country has steadily been growing and there has been an increase in urban living, street foods have seem to become a necessity. These foods have formed part of the fabric of Trinidad and Tobago. Although street foods have usually become seemingly synonymous to Trinidad and research done was commonly limited to that island, Tobago does have a budding street food sector and with no known studies, this solidified the need to explore this sector in Tobago. Consequently,

this study sought to investigate vendor food safety practices and consumers' behaviours, attitudes and perception of street food safety in Tobago.

3.3 Research Question

What are street food vendors' food safety practices and what are consumers' behaviours, attitudes & perceptions towards the safety of street foods in Tobago?

3.4 Objectives

The general objective of this study was to observe street food vendors' food safety practices and to determine consumers' behaviours, attitudes & perceptions towards the safety of street foods in Tobago so any necessary recommendations can be made to the appropriate bodies, to better the experience for both consumers and vendors.

Specific objectives were to:

1) Determine if proper food safety practices are performed by street food vendors in Tobago

2) Identify and recommend any strategies to improve the street food sector in Tobago

3) Determine consumers' purchasing behavior

4) Assess consumer attitudes and perceptions towards street foods in Tobago

5) Determine whether public perception of street food is founded in Tobago

3.5 Hypothesis

1) Consumers' attitudes and perception of street foods is associated with how often they purchase street foods.

2) Consumers have a negative perception of street foods

3) Men purchase street foods more than women

4) Street food vendors are not observing standard food safety measures

3.6 Key terms

Food safety; Tobago; Issue; Vendors; Practices; Street foods; Perception; Attitude; Consumers; Improve

4. LITERATURE REVIEW

Street foods can be found in virtually any part of the world. The success or failure of this sector is mainly dependent on two key stakeholders, the vendors and the consumers. There is countless literature for example, (Badrie, Joseph and Chen 2012), (Boegh-Peterson and Tostesen 2012), (Rane 2011), (Muinde and Kuria 2005) among others, chronicling different facets of and within street foods in different countries. Some studies touch on the knowledge and practices of the vendor, others on the consumers' thoughts on street foods. Microbial and chemical analyses, in addition to observational studies are also found throughout the literature. The appearance of the vendor, their handling techniques, surroundings and storage methods are some areas of the operation that if done incorrectly by the vendor, can negatively impact their livelihood and compromise food safety, thus exposing their costumers to an increased risk of illness from food borne pathogens. This can then affect the behaviours, attitudes and perceptions of consumers towards these foods. Therefore, proper food safety practices are needed to be adopted by vendors, which can result more favourably with respect to consumers' behaviours, attitudes and perceptions towards them.

There is a certain appearance that is expected to be adopted by individuals in the food industry, included in this are street food vendors. The appropriate wear is of utmost importance since it is one of the first things to be noted by the buyer. A covered head and apron are basic requirements in the preparation and sale of food items. They are not only needed to protect the wear of the vendors but to prevent particles, most notably hair, from getting into the food. A study by (Benny-Ollivierra and Badrie 2007, 73) examined the hygienic methods by 'doubles' vendors and the public's perception of these practices in Trinidad. An observational checklist and a face to face questionnaire were used on 120 vendors in Central and South Trinidad to gather the data. They noted that 55% of them seemed 'outwardly clean' while in the process of vending. Ninety-nine point two percent of the vendors wore aprons and head coverings making them appropriately dressed. This study seems to indicate that the vendors are aware of the importance of their physical appearance when conducting their practice, since

the appearance of a vendor can strongly influence the consumers' purchasing decision and their perception of the safety of the food. However, in a study conducted by (Muinde and Kuria 2005, 8) in Nairobi, Kenya in the Dandora and Kayole districts, which looked at the hygiene and sanitation of such vendors, the results were different. It was conducted on 80 street food vendors with a similar methodology to the study in Trinidad. The results showed 81.3% of the vendors did not have on aprons while 65% did not cover their hair. These results imply that there may be a lower level of appreciation by the vendors towards the importance of their appearance to costumers. These similar studies with yet contrasting results, highlights how varied the sector is with respect to appearance.

Another critical part of vendor food safety, is the way in which the vendor handles the food for the buyer. This is an aspect that can compromise the safety of the food for the consumer. Unclean and unsanitary hands are undoubtedly a main transmitter of germs and by extension, food borne pathogens. A report done by (Burt, Volel and Finkel 2003, 472-474) evaluated 10 processing mobile food hawkers in the city of Manhattan for their research on the safety of foods prepared by these individuals which was done via observation. They noticed that the majority of vendors 67%, were seen with their bare hands in contact with served foods, 4 had dirty hands or gloves and were still serving customers and noted was the fact that not one vendor decided to wash their hands or use a new pair of gloves within the 20 minutes of observation. Unclean hands and gloves are a resting place for bacteria and as such, they should be cleaned and changed as often as required to mitigate the chances of spreading diseases. Included in the handling element of street foods, is the way in which a vendor deals with the money received. The main purpose of street food vending for the hawker is to make money. However, it is this money, when not treated by a vendor appropriately by not having someone else handle the money or sanitizing their hands after taking the money, can be a cause for a serious safety concern. A study to determine the food safety awareness, attitude and methods of food hawkers and the food microbiological and chemical quality assessment by (Cuprasitrut, Srisorrachatr and Malai 2011, 32) on 92 street food vendors in the Ratchathewi District in Bangkok, who they observed and noted results via a checklist, found that in

general the vendors did not wash their hands after handling money before returning to the food. Money is another potential key dwelling place for pathogens, as money changes hands very often bringing with it germs and bacteria with each change.

The surroundings are another critical deciding factor in the success or failure of a street food stall. As with appearance, how a vending unit and the immediate areas surrounding it can affect whether consumers purchase or not and whether they perceive the foods to be safe. The surrounding and immediate areas can be full of air borne diseases and other potential dangerous substances. An unclean food area can attract flies, rodents and stray animals to linger in the premises becoming a safety concern. (Badrie, Joseph and Chen 2012, 27) conducted a research on the safety practices with respect to food by street hawkers and they also conducted a microbiological quality analysis of 27 street bought hamburger patties in Trinidad. The vendors were assessed by observation. They found that largely, the immediate area was not littered and bins were available for garbage, nonetheless, a few stray dogs were noted on the site. Contrastingly, in a research done by observation in Kumasi, Ghana by (Rheinlander 2006, 41) which looked at food quality, hygiene and safety in a qualitative study based on their local practices and perceptions on 8 vendors, found that the vendors had no dustbins and refuse was piled and remained on the cooking and vending sites to be taken away later. However, what was also found was that whenever the food was available for customers, great emphasis was put into making sure the vending site was neat by cleaning the area and washing used utensils. The studies stress that vendors are aware of the importance of surroundings, however, the latter neglects to show the same effort with the preparation of the foods. The preparation of food in dirty surroundings, only to be displayed in a tidy area thereafter, is not conducive to proper food safety measures. It is this façade that can fool consumers and open them to food borne illnesses.

In addition, storage is an element that vendors need to ensure is up to par. The way in which food is stored can influence the safety of the product. (Rane 2011, 103) did a study on hazard analysis of street vended foods in developing countries, states that when foods are kept for long periods at high ambient

temperatures, it becomes a contributor to outbreaks of food poisoning. This can have severe public health consequences, if an outbreak of food poisoning is to occur. Storage should not only be limited to a source of protection for the food but protection should be considered for the general vending area as well. (Ackah, et al. 2011, 193) conducted a study in Accra, Ghana on 50 street food vendors. The study looked at the vendors' safety practices, knowledge of hygiene and their socio-economic status and the method of data collection was by questionnaire. It was found that only 8% of vendors had their station covered with a tent, while 26% were in the open air and 62% had a permanent shelter. They went on to say that vendors should have protection from dust because they can hold microbes which if remained on the foods can become pathogenic. All of the aforementioned, with regards to ensuring optimum food safety, are factors that can influence consumers' thoughts and resultant behaviours pertaining to these foods.

In the world of street foods, these consumers are pertinent to its success. Though not all individuals choose to indulge in street foods, their attitudes and perception towards them still count, as they can influence others around them either positively or negatively. In an article by (Radam, Abu and Yacub 2010, 36) who surveyed 243 respondents using questionnaires, about their perception and attitude towards beef stated that, influencing consumers' decision making process and their buying behavior is their perceptions and attitudes. The criteria for purchasing street foods differ from consumer to consumer and are heavily influenced by these perceptions. Trust in the vendor and taste, are two factors that highly impact consumers' purchasing. In a research paper by (Boegh-Peterson and Tostesen 2012, 23-24) who studied street foods in Calcutta, conducted face to face interviews with consumers and found that the outcome of the study indicated that although consumers do have concerns about hygiene, many of them lean more towards taste as the key deciding factor when choosing street foods. They also went on to say that several consumers preferred to buy foods from a vendor they know on a personal level and it is this social bond that is the deciding factor when searching for a trusted food stall. Another important point raised was that their consumers avoided certain foods because of perceived food safety risks. A report by (Winarn and Allain 1991), which looked at lessons from Asia in terms of street foods in developing

countries, stated that consumers, who may lean towards convenience and the low cost of the food, may neglect to pay attention to hygiene and sanitation. This may be due to busy consumers who just want to satisfy their need for nourishment without it being a burden on their pockets.

Conclusively, the appearance, handling techniques, surroundings and storage methods of street vendors can greatly affect the safety of foods and sway consumers' behaviours, attitudes and perceptions. They are needed to be ideal, to lessen any risk of transmitting food borne diseases to consumers via contaminated foods. The literature has highlighted that selected places have shown an appreciation for holding the safety of the foods with importance, while others have neglected some of those aspects. It is necessary to note that some studies evaluated the knowledge of the vendors and the consumers, whereas others did not. The knowledge of these two parties can significantly impact their approach to and perception of street foods.

5. MATERIALS AND METHOD/METHODOLOGY

5.1 Vendors

5.1.1 Subjects/Participants

The subjects/participants were 22 street food vendors in Tobago, in the Scarborough, Crown Point and Buccoo area. These locations were chosen because Scarborough is the capital of the island and Buccoo & Crown Point are tourists' hot spots and they would therefore have a high number of street vendors.

The street food vendor is one that sells food on the streets and not in a closed establishment. Common street foods are 'souse' which is a dish where the meat is cooked and soaked in a mixture of lime juice, vinegar, salt, fresh seasonings, cucumber and pepper; 'doubles' which is a dish where channa, sauces (tamarind, shadon beni), pepper is put between two bara (fried bread); pastries, etc. These vendors were selected systematically. This was where every other vendor was observed for the study.

5.1.2 Design

This study was a cross-sectional study. This is where a section of the target population is observed at a specific time.

5.1.3 Procedure

At a distance, the street food vendors were observed for a period of 20 minutes during peak hours. These were early mornings (6am – 9am) and in the evenings (6pm – 9pm). The vendors were evaluated on 4 basic proper food handling practices procedures: Appearance, Handling, Surroundings and Storage. During a slowdown period of customers, the vendors were asked how long they were selling and their level of education. The vendors' gender and type of food sold was also observed.

5.1.4 Statistical Analyses/Empirical Models

The data was input and analyzed using the Statistical Package for the Social Sciences (SPSS) Software, version 12.0. Frequency and percentage distributions were used.

5.2 Consumers

5.2.1 Subjects/Participants

The subjects/participants were 246 consumers in the Tobago. It was not limited to one particular area. This was done to better gauge the general consensus of the population. The consumers were selected systematically. This was where every other 5 persons were asked to answer a questionnaire for the study. The consumer was any individual who is a resident of Tobago.

5.2.2 Design

The study design was cross-sectional. This is where a section of the target population is observed at a specific time. The independent variable was the consumers' perception and the dependent variable was their attitudes and behaviours towards street food.

5.2.3 Procedure

The respondents were given self-administered questionnaires. The participants were informed about the study and gave verbal approval before being proceeding with the questionnaires. The questionnaire was pretested with 10 consumers before they were given out to finalize the language and order of the questions to avoid ambiguity and ensure clarity and validity. A sample of the questionnaire can be found in the appendix. The questionnaires consisted of thirteen questions which were divided into three sections. They were as follows:

- General street food behavior and knowledge questions - five questions which addressed their regularity of purchase, why they purchased these foods, their concern about street foods and the knowledge that illnesses can be contracted through the consumption of street foods
- Attitudes and perceptions- four questions, including a five point Likert scale with seven statements which were: I always think about food safety when I purchase street foods; I always

look for the vendor's food badge; I trust the street food vendors to ensure that the food is safe; I always observe the vendor when they are handling my food; For me, eating street foods is worth the risk; Street food vendors you think need to improve their food safety practices and street food safety is a problem in Tobago

- Demographics - the sex, age, level of education and type of street foods usually bought

5.2.4 Statistical Analyses/Empirical Models

The data was input and analyzed using the Statistical Package for the Social Sciences (SPSS) Software, version 17. Frequency and percentage distributions were used and cross tabulations using the Chi squared test using a p value of <0.05 to compare variables. The responses to the Likert scale were given a score and the total overall score for each respondent was calculated, perception score. Analysis of Variance (ANOVA) was used to test the difference in means for the perception scores. The Tukey's b post hoc test was then used to compare the means.

6. RESULTS

6.1 Vendors

6.1.1 Demographics

The demographic data shows that the bulk of the vendors were female, accounting for 61.2% (number (n) of vendors = 15) while the males made up 31.8% (n = 7). The number of years the vendors were selling split evenly between < 5 years 36.4% (n = 8) and 6 - 10 years 36.4% (n = 8) while the 11 – 15 years range was 18.2% (n = 4). Only two vendors observed sold for > 15 years 9.1% (n = 2). The education level of the vendors showed that the majority had secondary education 68.2% (n = 13) while the others had primary level education 31.6% (n = 6). No vendor observed had tertiary education. All had some level of education.

Table 1 - The demographic data of the vendors

Demographics	**Frequency**	**Percentage %**
Gender		
Male	7	31.8
Female	15	61.2
Years selling		
<5 years	8	36.4
6-10 years	8	36.4
11-15 years	4	18.2
>15 years	2	9.1
Level of Education		
Primary	6	31.6
Secondary	13	68.2
Tertiary	0	0
None	0	0

6.1.2 Observations

The demographic data shows that in the area of appearance 27.3% (n = 6) wore gloves and 72.7% (n = 16) did not. The percentage of vendors who wore apron and head covering was 63.3% (n = 14) while 36.4% (n = 8) had none. The number of vendors that had a visible food badge was 31.8% (n = 7) while 68.2% (n = 15) did not. In the area of handling, 27.3% (n = 6) were observed talking over the food while 72.7% (n = 16) were not. One vendor touched their mucous membranes, 4.5% while the majority 95.5% (n = 21) did not. When handling money, 72.7% (n = 16) dealt with the money themselves while 27.3% (n = 6) did not handle the money themselves. Two vendors were observed changing their gloves / washing their hands 9.1% while the majority 90.9% (n = 20) were not observed doing that. In the area of surroundings, the majority was observed having their immediate surroundings clean 81.8% (n = 18) while 18.2% (n = 4) had untidy immediate surroundings. Vendors with a nearby waste disposal and those without had even numbers 50% (n = 11). The majority of vendors did not have toilet facilities nearby 68.2% (n = 15) while 31.8% (n = 7) did. Thirteen point six percent of the vendors had flies&/ rodents (n = 3) while the majority did not have any, 86.4% (n = 19). With respect to storage, the majority of vendors had the proper serving utensils 68.2% (n = 15) while 31.8% (n = 7) did not have such utensils. The majority of vendors kept their food warm/cold while being served 86.4% (n = 19) while 13.6% (n = 3) did not do that. The bulk of the vendors had the foods stored to avoid contamination 68.2% (n = 15) while 31.8% (n = 7) were observed not doing that.

Table 2 - The food handling practices of vendors who sell on the streets

Observational vendor practices	Frequency	Percentage %
Appearance		
Is vendor wearing gloves?		
Yes	6	27.3
No	16	72.7
Is vendor wearing an apron & head covering?		
Yes	14	63.3

No	8	36.4
Does the vendor have a visible food badge?		
Yes	7	31.8
No	15	68.2
Handling		
Are they constantly talking over the food?		
Yes	6	27.3
No	16	72.7
Has the vendor touched any part of his/her mucous membranes?		
Yes		
No	1	4.5
Does the vendor handle money themselves?	21	95.5
Yes		
No	16	72.7
Does the vendor wash his/her hands /change gloves?	6	27.3
Yes		
No	2	9.1
	20	90.9
Surroundings		
Is the immediate area clean?		
Yes	18	81.8
No	4	18.2
Is there any waste disposal nearby?		
Yes	11	50.0
No	11	50.0
Are there any toilet facilities?		
Yes	7	31.8
No	15	68.2
Are there any signs of flies &/ rodents?		
Yes	3	13.6
No	19	86.4
Storage		
Does the vendor have proper serving utensils?		
Yes	15	68.2

No	7	31.8
Is the food being kept warm/cold while being served?		
Yes	19	86.4
No	3	13.6
Are the food products stored to avoid contamination?		
Yes	15	68.2
No	7	31.8

6.2 Consumers

6.2.1 Demographics

The data shows that females made up the majority of the consumers 59.8% (n = 147), males were 40.2% (n = 99). The age group that had the most consumers was the 19 – 29 which accounted for 44.3% (n = 109), next was the 30 – 49 age group with 34.6% (n = 85), >50 had 11% (n = 27) and <18 10.2% (n = 25). The majority of the respondents had tertiary level education 51.6% (n = 126), secondary was 43.4% (n = 106), primary had 4.9% (n = 12).

Table 3 - The demographic data of consumers

Demographics	Frequency	Percentage %
Gender		
Male	99	40.2
Female	147	59.8
Age		
<18	25	10.2
19 - 29	109	44.3
30 - 49	85	34.6
>50	27	11.0
Level of Education		
Primary	12	4.9
Secondary	106	43.4
Tertiary	126	51.6
None	0	0

6.2.2 Responses

The data shows the when it comes to how often the respondents purchase street foods, the majority 'hardly' bought them 57.8% (n = 141), 34% (n = 83) bought them 'sometimes' and 20% (n = 20) 'regularly' bought them. The respondents, when asked how often they purchase from the same vendors 37.1% (n = 93) said 'hardly', 33.3% (n = 82) said 'sometimes' and 28.3% (n = 69) said 'regularly'. Those who chose 'regularly' or 'sometimes' for the previous question, when asked their reasons 40.7% (100) said because 'it seems clean and safe', 35.4% (n = 87) said because 'it was close to their school or work', 'I get my money's worth' 33.7% (n = 83), 'I get a quality product' was 26.8% (n = 66) and 'I know them personally' 22.4% (n = 55). The majority of respondents cited 'convenience' as the reason for buying street foods 76.8% (n = 189), 'taste' 37% (n = 91), 'price' 22.4% (n= 55) and 'health' was 1.6% (n = 4). When asked whether they knew that food borne illnesses can be transmitted by consuming foods e.g. street foods, 83.7% (n = 206) said 'yes', 6.5% (n = 16) said 'no' and 9.8% (n = 24) were 'not sure'. The majority of respondents were 'very concerned' for contracting a food borne illness from street foods 56.9% (n = 140), 'moderately concerned' 37.4% (n = 92) and 'not concerned at all' 5.7% (n =14). When asked how safe they thought street foods were to eat 64.1% (n = 157) said 'somewhat safe', 32.2% (n = 79) thought 'not safe at all' and 3.7% (n = 9) said 'very safe'. The majority of respondents 69.7% (n = 161) claimed 'yes' there were certain foods they did not buy because of food safety while 30.3% (n = 70) claimed 'no'. The majority of respondents said 'more enforcement of rules' 67.9% (n = 167), 'more education' 41.9% (n = 103) and 'more regulations' 30.9% (n = 76).

Table 4 - The responses from the consumers to the questionnaire

Questions	Frequency	Percentage %
How often do you purchase street foods?		
Regularly	20	8.2
Sometimes	83	34
Hardly	141	57.8
How often do you buy from the same vendor?		
	69	28.3

Regularly Sometimes	82	33.3
Hardly	93	37.1
If you chose regularly or sometimes, why?*		
I get my money's worth	83	33.7
I know them personally	55	22.4
They seem clean and safe	100	40.7
I get a quality product	66	26.8
It is close to my work or school	87	35.4
Why do you buy street foods?*		
Health	4	1.6
Taste	91	37.0
Convenience	189	76.8
Price	55	22.4
Do you know that food borne illnesses can be transmitted by consuming foods e.g. street foods?		
Yes	206	83.7
No	16	6.5
Not Sure	24	9.8
How concerned are you of contracting a food borne illness from street foods?		
Very concerned	140	56.9
Moderately concerned	92	37.4
Not concerned at all	14	5.7
How safe do you think street foods are to eat?		
Very safe	9	3.7
Somewhat safe	157	64.1
Not safe at all	79	32.2
Are there any street foods you do not buy because of food safety?		
Yes	161	69.7
No	70	30.3
What do you think can be done to ensure the safety of street foods?*	103	41.9

More education	76	30.9
More regulations More enforcement of rules	167	67.9

*Multiple response with only numbers of chosen displayed

6.2.3 Likert Scale

The results below show the results from a Likert scale. When it comes to always 'I always think about street food safety' 40.4% strongly agreed, 38.8% agreed, 10.2% were neutral, 10.2% disagreed and 0.4% strongly disagreed. When it comes to always 'I always look for their food badge' 40.1% strongly agreed, 27.7% agreed, 14.5% were neutral, 13.2% disagreed and 4.5% strongly disagreed. For 'I trust the vendor to ensure food safety' 9% strongly agreed, 38.4% agreed, 18% were neutral, 24.1% disagreed and 10.6% strongly disagreed. When it comes to 'I always observe the vendor', 69.3% strongly agreed, 24.9% agreed, 2.1% were neutral, 2.9% disagreed and 0.8% strongly disagreed. When questioned about whether 'Eating street foods is worth the risk', 7.1% strongly agreed, 12.9% agreed, 24.1% were neutral, 27.4% disagreed and 28.6% strongly disagreed. 57.4% strongly agreed that 'Vendors need to improve their practices', 33.6% agreed, 5.3% were neutral, 1.6% disagreed and 2% strongly disagreed. When asked whether 'Street food safety is a problem in Tobago', 19.6% strongly agreed, 26.9% agreed, 33.1% were neutral, 15.5% disagreed and 4.9% strongly disagreed.

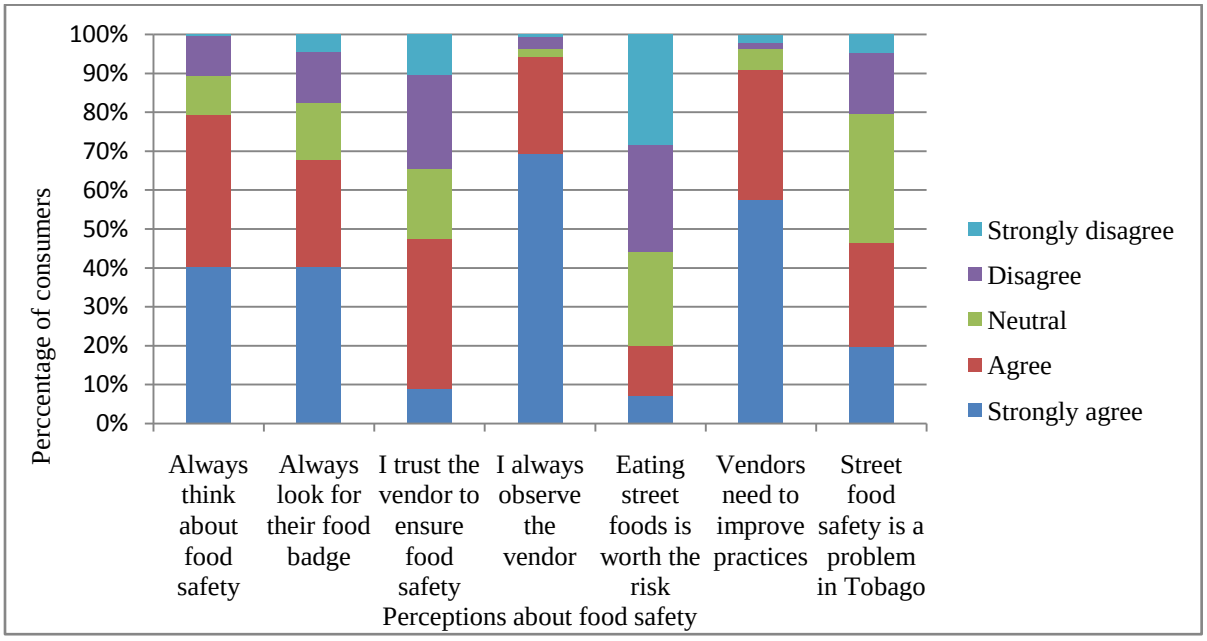

Figure 1 - Percentage (%) of consumers' responses about their perception of street foods

6.2.4 Age (ANOVA)

The means of the perception scores of street foods differed significantly, F (3, 242) = 3.450, p = 0.017 with respect to age. A comparison of the age groups indicated that the <18 age group (M = 17.16, 95% Cl [16.00, 18.31]) had the highest mean perception of street foods among the age groups and was significant when compared to the 30 - 49 age group (M = 14.43, 95% Cl [13.64, 15.22]), p = 0.009. Comparison with the >50 (M = 14.66, 95% Cl [12.82, 16.50]) and 19 – 29 age group (M = 15.03, 95 % Cl [14.31, 15.75]) was not significant as well as comparisons between other groups at $p < 0.05$.

Table 5 – Associations with age groups to consumer perception scores

Age Group	Mean Score	95% Confidence interval for mean
< 18	17.16 ± 0.56^{ab}	16.00, 18.31
19 - 29	15.04 ± 0.36^{b}	14.33, 15.75
30 – 49	14.44 ± 0.39^{ab}	13.65, 15.23
> 50	14.66 ± 0.89^{b}	12.82, 16.50

[a] Significant at the 0.05 level with another group

[b] Not significant at the 0.05 level with other groups

6.2.5 Regularity of purchase (ANOVA)

The means of the perception scores of street foods differed significantly across how often the individuals purchased, F (2, 241) = 10.966, p = <0.01. A comparison of the three options indicated that individuals who 'regularly' purchased street foods had a highest mean perception (M = 17.45, 95% Cl [15.65, 19.24]) and was significant when compared to those who 'hardly' bought street foods (M = 14.12, 95% Cl [13.47, 14.76]), p = 0.001. Comparisons with and between the other age groups were not significant at p <0.05.

Table 6 – Associations with regularity of purchase to consumer perception scores

Regularity of Purchase	Mean Score	95% Confidence interval for mean
Regularly	17.45 ± 0.85^{ab}	15.65, 19.24
Sometimes	15.87 ± 0.34^{b}	15.18, 16.57
Hardly	14.13 ± 0.32^{ab}	13.49, 14.77

[a] Significant at the 0.05 level with another group

[b] Not significant at the 0.05 level with other groups

6.2.6 Concern for contracting an illness (ANOVA)

The means of the perception scores of street foods differed significantly across all levels of concern, F (2, 243) = 31.8, p = <0.01. A comparison of all three levels of concern shows that those who were 'very concerned' had the lowest mean perception score (M = 13.55, 95% Cl [12.93, 14.16]), 'moderately concerned' was (M = 16.64, 95% Cl [16.03, 17.24]) and 'not concerned at all' had the highest mean perception (M = 18.78, 955 Cl [16.72, 20.85]), all with a p value of <0.01.

Table 7 – Level of concerns to consumer perception scores and concern for contacting an illness

Level of Concern	Mean Score	95% Confidence interval for mean
Very concerned	13.56 ± 0.31[a]	12.95, 14.17
Moderately concerned	16.64 ± 0.30[a]	16.03, 17.24
Not concerned at all	18.78 ± 0.95[a]	14.53, 15.49

[a] Significant at the 0.05 level with another group

[b] Not significant at the 0.05 level with other groups

6.2.7 Overall perception of street foods

The chart below shows the perception scores to street foods of the consumers divided into ranges. Low/ Negative (7 – 16), Neutral (17 – 26) and High/ Positive (27 – 35). 66.7% of consumers had an overall low/negative perception of street foods while 33.3% were neutral. No one had a High/ Positive perception of these foods.

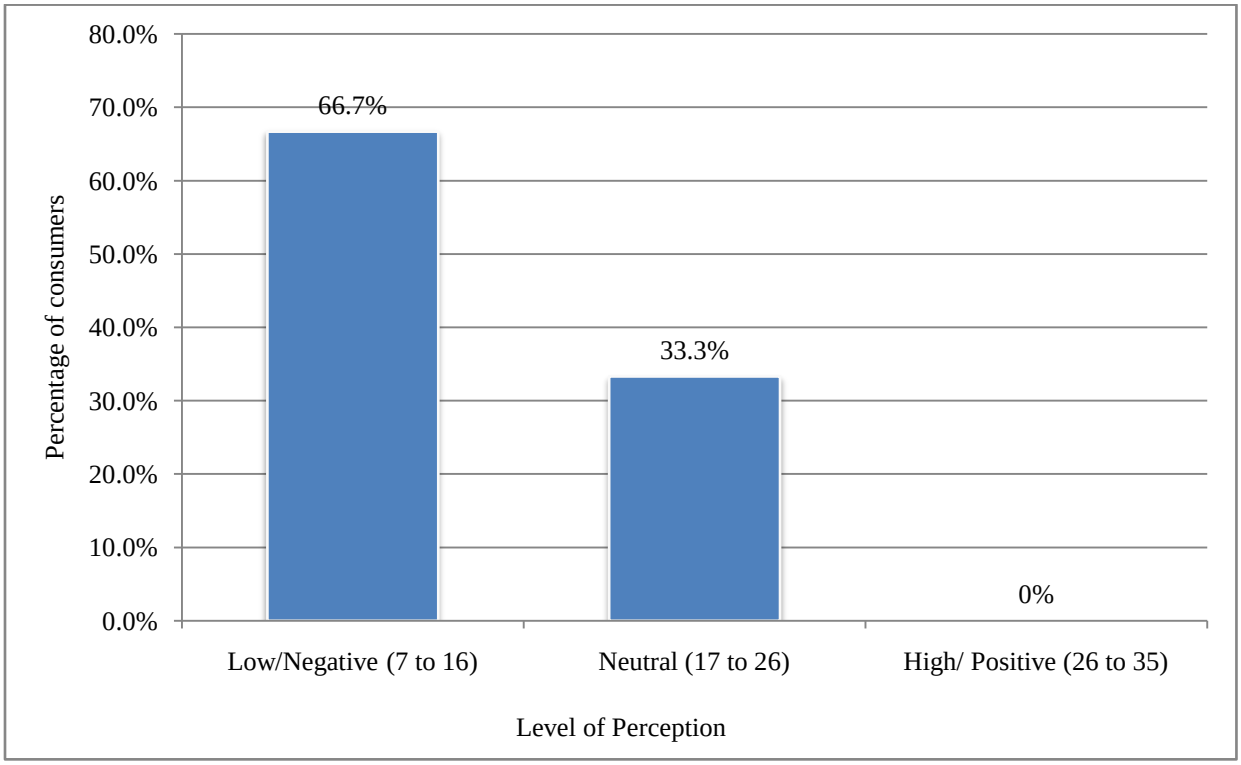

Figure 2- Percentage of consumers' overall perception of street foods

6.2.8 Gender (Chi-squared)

The results below indicate a significance (p value 0.005) with gender, females n = 108 had a low/ negative perception of street food whilst n = 39 were neutral. For males n = 56 had a low/negative perception and n = 43 had a neutral attitude towards street foods. None of the respondents, male nor female had a high/positive perception of street foods.

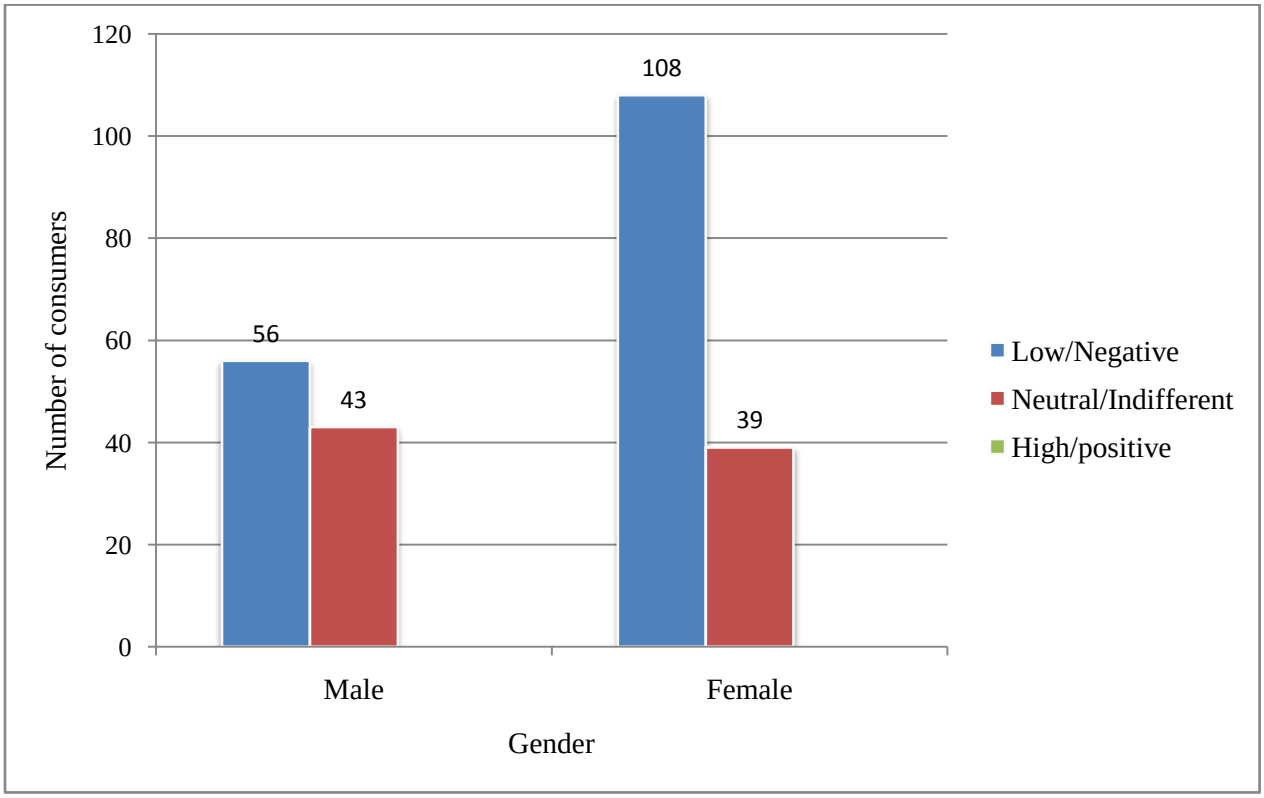

Figure 3 - Significance between overall perception of street foods to gender

6.2.9 Regularity of purchase (Chi-squared)

The results below indicate a significance (p value 0.006) with perception and regularity of purchase. It shows that the number of consumers who had a low/negative perception 'hardly' bought street foods n = 105, n = 49 'sometimes' bought it and n = 9 'regularly' bought it. Those who had a neutral perception of street foods n = 36 'hardly' bought them, n = 34 'sometimes' bought and n = 11 'regularly' bought them.

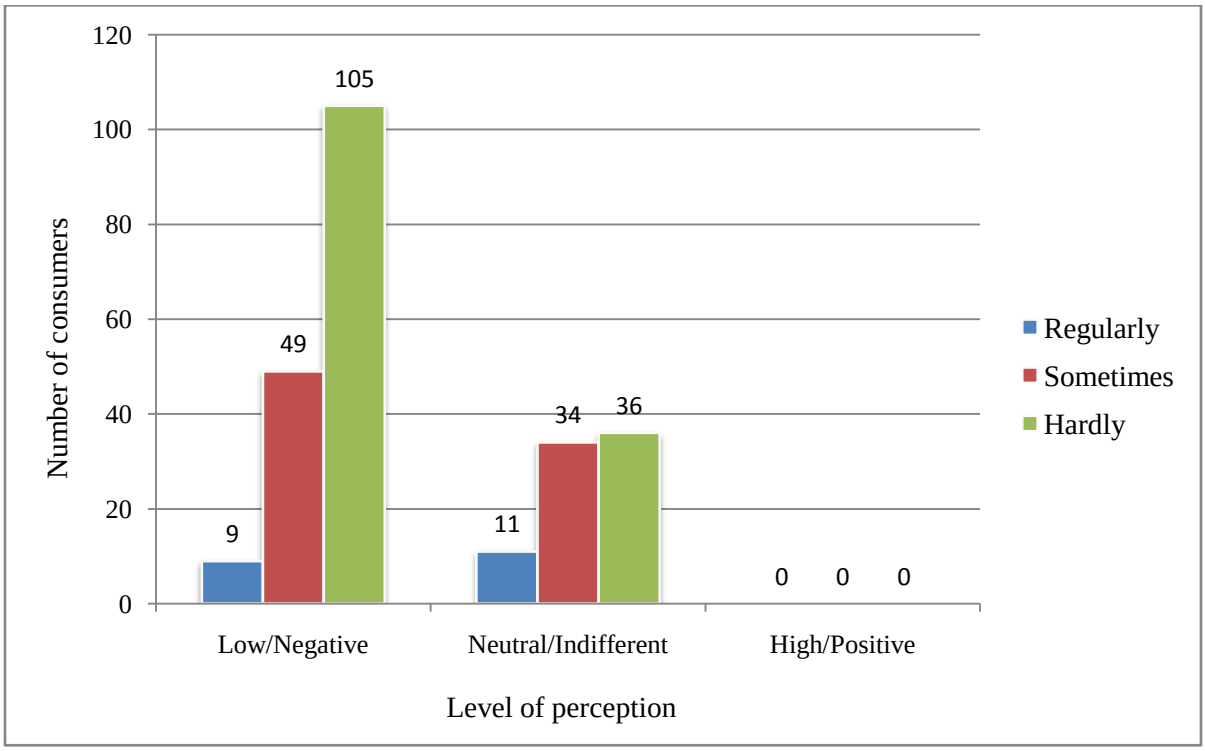

Figure 4 - Significance between overall perception and how often consumers purchase street foods

6.2.10 Concern for contracting an illness (Chi-squared)

The results show a significance (p value <0.01) between perception and concern for contracting an illness. It highlights that n = 114 who had a low/negative perception were the most concerned about contracting an illness, n = 46 who had low/negative perception were only moderately concerned while n = 4 who had low/negative perception were not concerned at all. Those who had a neutral perception to street foods n = 26 was very concerned, n = 46 was moderately concerned and n = 10 was not concerned at all.

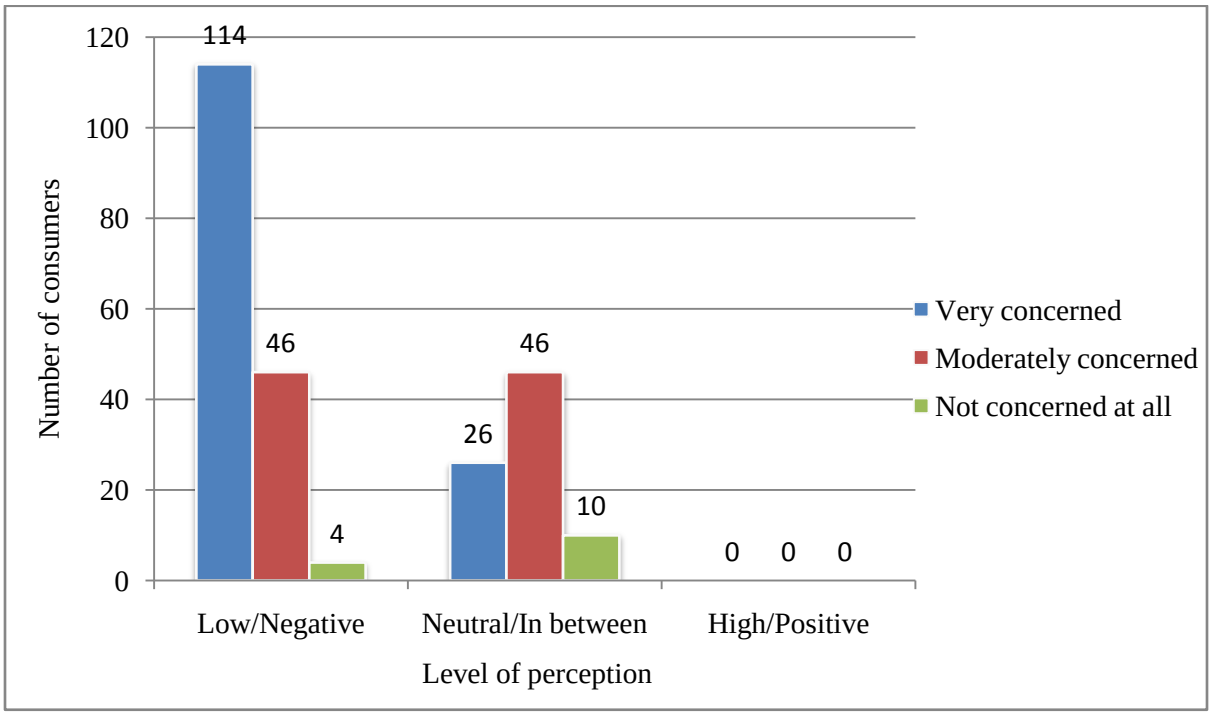

Figure 5 – Significant associations between perception and how concerned consumers are for contracting an illness from street foods

6.2.11 Safety of street foods (Chi squared)

The results show a significance (p value <0.05) with perception and how safe the consumers think street foods are. The majority of respondents who had a low/negative perception of street foods thought them to be 'somewhat safe' n = 96, n = 61 said 'not safe at all' and n = 6 said 'very safe'. Those respondents who had a neutral overall view of street foods, the majority said 'somewhat safe' n = 61, n = 18 said 'not safe at all' and n = 3 said 'very safe'.

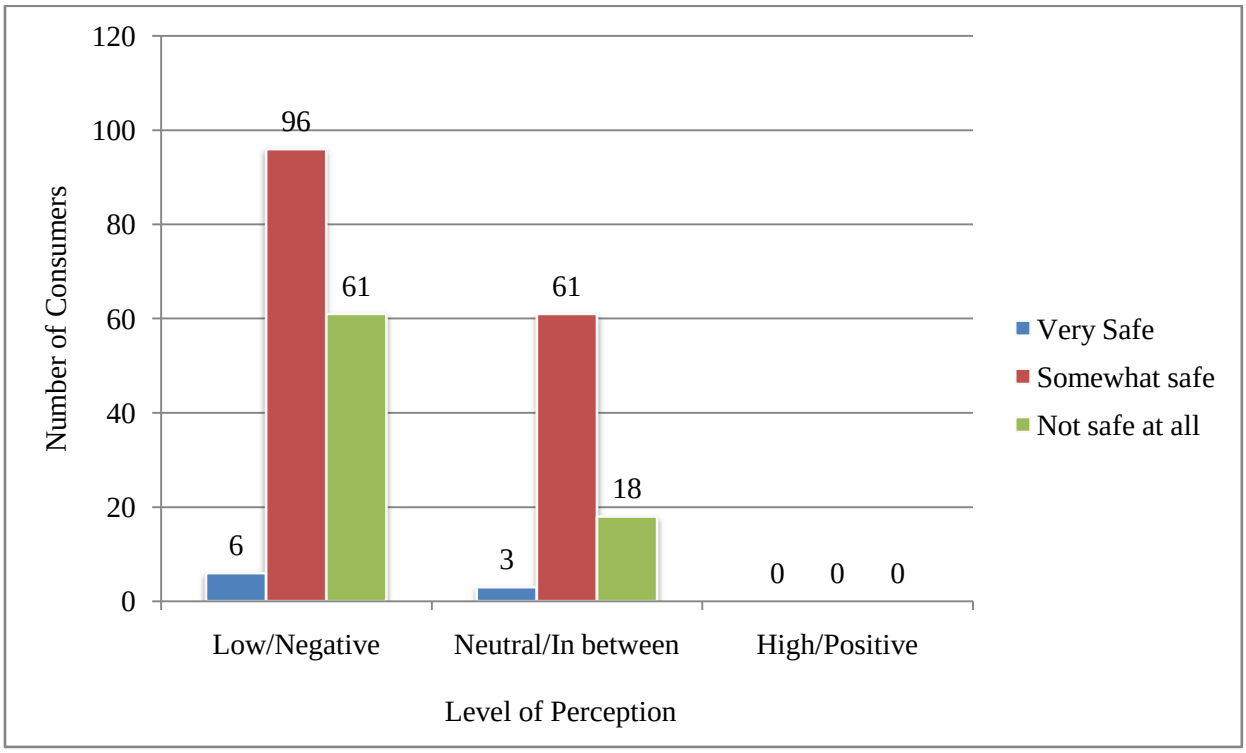

Figure 6 – Significant associations between perception and how safe the consumers think street foods are

7. DISCUSSION

7.1 Vendor Practices

The results displayed showed the observations of the vendors, the responses from the consumers and a few significant outcomes noted that were pertinent to the study. In appearance, the vendors seemed not to show as much regard in certain areas. The majority had no gloves 72.7% and visible food badge 68.2%, however, a higher percentage were wearing aprons and head coverings than those without 63.3%. These results were similar to the results of (Benny-Ollivierra and Badrie 2007, 73) in that the majority of the vendors from their study seemed outwardly clean and a high percentage wore aprons and head covering. However, the vendors' lack of gloves was a cause for concern as it can lead to the compromised safety of the food. In the area of handling, although the majority of vendors was not constantly talking over the food 72.7%, nor touched any part of their mucous membranes 95.5%, there was still concern because the bulk of the vendors handled money themselves 72.7% and did not change their gloves or washed their hands 90.9%. The latter two results were comparable with the results of (Cuprasitrut, Srisorrachatr and Malai 2011, 32) and (Burt, Volel and Finkel 2003, 472-474) who had majorities of vendors handling money themselves and not washing hands or changing gloves respectively. This indicates that there is room for improvement in that area because dirty hands from the not keeping the hands clean or especially when dealing with money and not adopting proper sanitizing methods thereafter can affect the safety of the food. Overall, the surroundings of the vendors were kept in order. Eighty-one point eight percent kept their immediate areas clean, 86.4% had no flies &/ rodents, half of the street food vendors had a waste disposal nearby and only 7% had toilet facilities nearby. These results were similar to (Badrie, Joseph and Chen 2012, 27) who noted in their study, the majority of vendors having clean surroundings and available bins. This can be seen as the vendors putting emphasis on having clean surroundings. The vendors showed good results with respect to storage. The bulk of the vendors had the proper serving utensils 68.2%, kept the food warm/cold while being served 82.4% and their products were stored to avoid contamination 68.2%. These findings are consistent with proper food handling procedures

and lessen the risk of the foods being unsafe. The results of the storage aspect of the study demonstrates a much better approach by the vendors than those in the study by (Ackah, et al. 2011, 193) whose vendors were lacking in this area as only 8% of vendors had their station covered with a tent, while 26% were in the open air and 62% had a permanent shelter.

7.2 Consumer Perception

The majority of consumers of this study did not partake in street foods 57.8%. However, of those do and do so often bought from a vendor regularly because they seemed clean and safe 40.7%. Another outcome of the study is that although taste played a role in why consumers buy street food 37%, convenience was the main reason 76.8%. This is in contrast to the study by (Boegh-Peterson and Tostesen 2012, 23) where their consumers ranked taste as the deciding factor although expressing concerns about hygiene and to a report by (Winarn and Allain 1991) who indicated that consumers, who lean towards convenience and the low cost of the food, may neglect to pay attention to hygiene and sanitation. The consumers of this study appear to pay attention to cleanliness even when choosing these foods because of convenience. This clearly shows that consumers are indeed aware of the importance of cleanliness. In general, the outcome of the Likert scale showed that most consumers in Tobago have a neutral followed by a low/ negative view of street foods. Adding to this was that when asked if there were any street foods not eaten because of a food safety concern, 69.7% said yes of which the most widespread response was doubles. Although it is arguably the most popular street food, it seemed to be negatively associated with food safety. It was similar for a study by (Boegh-Peterson and Tostesen 2012, 24), who, when interviewing the consumers had responses where they the consumers cited certain food products they were afraid to eat because of the uncertainty of its safety.

A significance noted was that gender played a role with respect to perception, as women had a more negative perception of street foods than men (p value 0.005). This may be explained in a study by (Patil, Cates and Morales 2005, 1884), who found that males, when compared to their female

counterparts, had greater consumption of raw or undercooked foods, worse hygiene and worse practices to avoid cross contamination. This shows that women are likely to put more emphasis on food safety and this can be extended to their approach to safety with respect to street foods. Another demographic significance was that among age groups the <18 age group had the highest mean perception of all the other age groups M = 17.16. This age group was made up of school aged children who may not be knowledgeable about the dangers of street foods or who disregard its importance as opposed to other groups. This can be seen in a study by (Neffati, et al. 2004, 43) who studied street food among school children, they found that the bulk of them were satisfied with the nutritional and hygienic quality of the food but their thoughts varied drastically when compared to their parents. The other significances that resulted from the study were that how often a person purchases street foods, their concern for contracting an illness and how safe they think street foods are, are influenced by their perception. Persons who 'hardly' bought street foods, as well as those who were 'very concerned' about contracting an illness had the lowest mean score perceptions when asked the particular questions M = 14.12 and M = 13.55 respectively. All these results can be linked to the study by (Radam, Abu and Yacub 2010, 36), which said that influencing consumers' decision making process and their buying behavior is their perceptions and attitudes**.** The implications of these results show that for the street food sector to flourish, the vendors need to find favour in the minds of the public. In order to accomplish this, their vending practices need to be up to standard.

7.3 Vendor practices and consumer perceptions

The results of the vendors and the consumers can be connected. Consumers were asked how often they look for food a vendor's food badge. When agreed and strongly agreed were combined 67.8 % said that they do but almost the equivalent of the vendors however did not have a visible food badge 68.2%. This result may be due to the vendors taking this requirement for granted or it is possible that those vendors do not have a food badge. (Benny-Ollivierra and Badrie 2007, 72) conducted a study and found that 62.5% of their respondents always purchased from a vendor displaying a food badge. This shows

that it is important to many consumers that the vendors not only have but display this badge. The majority of consumers always observe the vendors 94.2% when strongly agreed and agreed was combined and it is imperative that they do because, 27.3% of the vendors were talking over the food while 72.7% dealt with the money themselves and only 2 were observed changing their gloves / washing their hands. The study by (Rheinlander 2006, 45) stated that the bulk of their interviewees prefer to observe the vendors during the preparation of the food, this way they can assess the safety of it by overseeing the cooking and its environment. By observing the vendors, consumers can make a verbal complaint to or a mental note about the vendor, to ensure that their safety is assured. In terms of consumers' thoughts about vendors needing to improve their practices, 91% when strongly agreed and agreed was combined believed this statement. This seemed to be backed up by the vendors' practices as major basic food handling practices, namely the use of gloves, was overlooked. Overall the consumers were asked about street food safety being an issue in Tobago, the results were split up 19.6% strongly agreed, 26.9% agreed, 33.1% were neutral, 15.5% disagreed and 4.9% strongly disagreed. The vendors varied between having good and bad food handling practices in certain aspects, as some areas had the majority of vendors adhering to proper food handling practices while other aspects needed much improvement. It may be based on these variations in practices, as to why the responses were scattered. To combat this issue, many consumers thought it best to have more enforcement of rules (67.9%) and more education (41.9%).

8. LIMITATIONS

8.1 Vendors

- The vendors' knowledge about food safety was not noted
- The vendors were only observed for one period of time

8.2 Consumers

- They may have interpreted the questions different to what was intended
- There was a considerable difference in the amount of men to women
- They may not have responded honestly when answering the questionnaires

9. CONCLUSION

Street food is a sector that is not only pertinent to the many individuals who are on the go but plays an important part in the lives of the vendors themselves who are dependent on the thoughts of the public. The results of the vendors showed that there is need for improvement as 72.7% did not wear gloves, 68.2% did not have a visible food badge, 72.7% handled the money themselves without proper sanitation after and 90.9% were observed not their washing hands / changing gloves. Generally, the vendors had proper food handling practices in certain areas. However, in other aspects the vendors were lacking. Regarding consumers' purchasing behaviour 57.8% 'hardly' bought street foods. Concerning consumer attitudes and perceptions, 56.9% were very concerned for contracting a food borne illness and 64.1% said that street foods are somewhat safe to eat. There were significances ($P<0.009$) between perception and age. The <18 age group had the highest mean perception of street foods $M = 17.16$ and was significant when compared to the 30 - 49 age group $M = 14.43$. Regularity of purchase was also significant with perception as individuals who 'regularly' purchased street foods had a higher mean perception $M = 17.45$. Regarding concern for contracting an illness, the means of the perception scores was also significant across all levels of concern. Those who were 'very concerned' had the lowest mean perception score $M = 13.55$, 'moderately concerned' was $M = 16.64$ and 'not concerned at all' had the highest mean perception $M = 18.78$. Chi squared results showed significances ($p<0.05$) for how safe consumers think street foods are, p value 0.047 as well as gender, p value 0.005. The results have the capacity to influence consumers' perception. Consumers observing practices that are not up to par may have found their low/ negative perceptions upon this. Vendors need to improve their handling practices in all areas and with this improvement a different perception from the consumers may be seen. The risk of food borne illnesses is ever present and can hurt the street food industry if vendors do not give the necessary attention to food safety. It can be concluded that public perception of street food in Tobago is founded.

10. RECOMMENDATIONS

- There should be more enforcement of the rules, as there are rules put in place but they are not heeded.
- More noticeable presence of measures ensuring food safety. If consumers see this they may be more likely to trust the street food vendors.
- Mandatory sessions for registered vendors on food safety as well as making it optional for consumers. This allows for education of the vendors to improve their practices and for consumers to be aware of what to look for.
- A crack down on vendors unregistered food vendors. This ensures that only those vendors who are registered and undergone the education sessions can sell.

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12. ANNEXES/APPENDICES

12.1 Consumers' questionnaire

Dear Respondent,

The survey being carried examines "Street food vending: Vendor food safety practices and consumer behaviours, attitudes & perceptions". You are asked to answer the questions truthfully. Your participation is voluntary and your identity will be kept confidential.

Street foods (roadside) e.g. souse, doubles, pastry, etc .refer to foods bought from vendors selling on the streets and not in a closed establishment

SECTION I

1. How often do you purchase street foods?

Regularly ☐ Sometimes ☐ Hardly ☐

2. How often do you buy from the same vendor?

Regularly ☐ Sometimes ☐ Hardly ☐

If you chose regularly or sometimes, why? (*Tick as many)*

I get my money's worth ☐ I know them personally ☐

They seem clean and safe ☐ I get a quality product ☐

It is close to my work or school ☐ Other_____

3. Why do you buy street foods? *(Tick as many)*

Health ☐ Taste ☐ Convenience ☐ Price ☐

Other_____

4. Do you know that food borne illnesses can be transmitted by consuming foods e.g. street foods?

Yes ☐ No ☐ Not Sure ☐

5. How concerned are you of contracting a food borne illness from street foods?

Very concerned ☐ Moderately concerned ☐ Not concerned at all ☐

SECTION III

1. How safe do you think street foods are to eat?

Very safe ☐ Somewhat safe ☐ Not safe at all ☐

2. Are there any street foods you do not buy because of food safety? Yes ☐ No ☐

If yes, please name_____

3. Please tick the box of your choice.

Statement	Strongly Agree	Agree	Neither disagree nor agree	Disagree	Strongly disagree
I always think about food safety when I purchase street foods.					
I always look for the vendor's food badge					
I trust the street food vendors to ensure that the food is safe					
I always observe the vendor when they are handling my food					
For me, eating street foods is worth the risk					
Street food vendors you think need to improve their food safety practices					
Street food safety is a problem in Tobago					

4. What do you think can be done to ensure the safety of street foods?

More education ☐ More regulations ☐

More enforcement of rules ☐ Other_____

SECTION III: DEMOGRAPHICS

1. Sex : Male ☐ Female ☐
2. Age: ≤ 18 ☐ 19-29 ☐ 30-49 ☐ ≥ 50 ☐
3. Level of education: Primary ☐ Secondary ☐ Tertiary ☐
4. Type of street food usually bought _____

Thank you for your time! Have a blessed day! ☺

12.2 Vendor observation checklist

OBSERVATION OF STREET FOOD VENDORS

VENDOR #_____

APPEARANCE

1) Is vendor wearing gloves?	Yes	No
2) Is vendor wearing an apron & head covering?	Yes	No
3) Does the vendor have a visible food badge?	Yes	No

HANDLING

4) Are they constantly talking over the food?	Yes	No
5) Has the vendor touched any part of his/her mucous membranes?	Yes	No
6) Does the vendor handle money themselves?	Yes	No
7) Does the vendor wash his/her hands /change gloves?	Yes	No

SURROUNDINGS

8) Is the immediate area clean?	Yes	No
9) Is there any waste disposal nearby?	Yes	No
10) Are there any toilet facilities?	Yes	No
11) Are there any signs of flies &/ rodents?	Yes	No

STORAGE

12) Does the vendor have proper serving utensils?	Yes	No
13) Is the food being kept warm/cold while being served?	Yes	No
14) Are the food products stored to avoid contamination?	Yes	No

Gender	Male	Female		
Years selling	<5 yrs.	6-10 yrs.	11-15 yrs.	>15yrs
Level of education	Primary	Secondary	Tertiary	None

Type of food sold_____