5. SUMMARY AND CONCLUSION

Food is an essential source of power. Food is much more than a substance supplying nutrients for health. Food is a symbol of hospitality and friendship throughout the world. Food is a status symbol. It is an outlet of emotion. Food is a source of security for people to feel reasonably secure when they have enough food stored up to take care of them during periods of scarcity. Familiar foods give a sense of security when one has to eat away from home.

Food businesses have become widespread in recent times, in response to the changing lifestyle and food consumption of people. They offer convenience and ease of access to food to busy individuals, who are unable to prepare their own meals regularly at home. Street foods may be defined as the “ready to eat foods and beverages prepared and sold by vendors and hawkers especially in street and similar other public places”.

The street foods being quickly served, tasty and available at reasonable rates and offering a variety of traditional foods have become an attraction to many customers. The street foods provide considerable amounts of valuable nutrients, depending on the raw ingredients used. Purchase of such ready-to-eat foods often pre-occupied with food price and convenience rather than with food safety, quality and hygiene. Persons who vend the street foods are often free from taxes, thus selling what they want and few existing regulations on the subject are not usually enforced. The street foods with substantial amounts of nutrient contribution are also likely to deteriorate in their quality.

Considering the above facts, this study was undertaken with special interest on assessing the nutritional components and hygienic qualities of the street foods with respect to the homemade foods. The major objectives of the study are as follows:

Objectives

1. To assess the nutrient components of food sold in the streets by mobile food vendors and compare with the homemade food
2. To evaluate the microbiological quality of the foods sold in the streets by mobile food vendors and compare with the homemade food
3. To detect the food adulterants present in the raw ingredients of selected foods sold in streets by mobile food vendors
4. To evaluate the food safety knowledge, attitude and hygienic practices of the mobile food vendors
The methodology followed is as follows:

Selection of area and food samples

For selection of the vendors, places around markets, schools, bus station, highly frequented streets are considered. The places of investigation were Suramangalam, Meyyanur, Gugai and Ammapet of Salem city. A total of 48 small mobile food vendors (shops) participated in the study comprising 12 vendors (shops) from each selected commune.

The researcher had collected twelve food items from each food place and the same food items were prepared at home using standard procedure. The selected twelve food items were as follows.

1. Fast foods & snacks : Pani poori, Vada Pav, Pav bhaji, Cutlet, Samosa
2. Chinese food : Fried rice, Manchurian
3. South Indian : Idly, Oothappam, Pongal, Paniyaram
4. Punjabi food : Roti

Food sample preparation for nutritional Analysis: Freshly prepared twelve food items from four different places were collected from the mobile food vendors. All the food samples were collected and its nutrient content such as pH, moisture, ash, carbohydrate, protein, fat, fiber and vitamins and minerals were analyzed using standard procedure.

Food sample preparation for microbial analysis: From each head, totally 48 food samples was evaluated for microbial analysis.

Analysis of selected raw food items for adulterants: Food adulteration is an act of intentionally debasing the quality of Food offered for sale either substitution of inferior substances or by the removal of some valuable ingredient. The quality of raw materials used in the preparation of street foods is very important as their contamination can persist through preparation and or cooking. Hence, for adulteration test, raw food ingredients from the 48 small mobile food vendors (12 for each recipe from each area) were collected to assess the common adulterants present in them. Both visual inspection and adulterant test has been performed using “Quick test for some adulterants in food” developed by Food Safety and Standards Authority of India (FSSAI).
Assessment Food safety knowledge, attitude and hygienic practices among the selected small mobile food vendors

Food safety knowledge and attitude questionnaire

The questionnaire was organized into the following three (3) main sections i) Socio-demographic information ii) food safety knowledge and iii) food safety attitudes and iv) food safety observation checklist. It was filled in either by the vendor participants themselves or by the researcher for participants with limited education. The socio-demographic section contained information regarding gender, location, age, educational level and training in food safety measures.

The food safety attitude questionnaire section was designed to determine the understanding of vendors about food safety measures. This section contained 20 questions with three possible answers as described above. The same procedure used for evaluation in the knowledge section has been applied. Food hygienic practice observation checklist used to assess the food safety practices of small mobile food vendors. Demographic data such as age, sex, location, educational level and food safety training were recorded from the selected shops.

The collected data were consolidated, statistically analyzed and the results drawn are summarized here under:

Nutritional analysis of selected small mobile vendor’s foods

Panipoori

Based on the nutrient analysis results, it was concluded that nutritionally panipoori, vadapav, phabhaji, cutlet, samosa, friedrice, manchuriyan, idly, oothappam, paniyaram pongal and roti were prepared at home level was rich in both major and micor nutrients than mobile vendored foods.

From this nutrient analysis it was concluded that there was a significant difference in the nutritive values of the collected food samples sold in the streets by mobile food vendors of different areas as compared to homemade food. So the null hypothesis was rejected.

Microbial analysis of selected food samples collected from small mobile vendors

The sample was collected from 4 different places and their microbial quality was assessed and compared with that of homemade food. Some of these products have low (acidic) pH as compared to homemade food. The number of CFU in vended food sample was much more almost double as compared to homemade food. Therefore by hygienic point of view the quality of such food is poor can be considered as deteriorated food product.
The number of spore formers present in vended food was very high (area A and area D) almost five times than that of homemade panipoori, vadapav, pavbhaji, cutlet, samosa, fried rice, manchuriyan, idly, oothappam, pongal, paniyaram and roti. These spore formers generally are acquired from dust, which is most prevalent in conditions, environment where these foods are prepared. The spore formers can easily survive in dust, for longer periods of time and also in adverse environmental conditions like acidic pH. But when they get suitable environmental conditions, they can germinate & proliferate. When these are pathogenic their presence in food is a cause of concern, they can cause food poisoning. The number of yeast cells present in vended food is also high (minimum 50% more) as compared to homemade food.

Whereas in vended food shows presence of gram negative CFU on agar medium a clear indication of its being contaminated with coli form group of microorganisms. These microorganisms (gram negative) can be further confirmed by growth on selective media. Thus it can help us to know which microbial organism (specific genus) is present, so that we can ascertain the chances of type of infection, that can be speeded by such type of contaminated food, when consumed. The number of gram positive Cocci present in branch and chain in vended food is also very high as compared to homemade food. They are generally 4 to 6 times more in vended foods as compared to homemade food. Their presence in food indicates unhygienic conditions and practices during its preparation as well chances of water, which is used in preparation being fecal, contaminated.

From this microbial analysis it was concluded that there was a significant difference in the microbial quality of the collected food samples sold in the streets by mobile food vendors of different areas as compared to homemade food. So the null hypothesis is rejected.

**Food adulteration analysis test among the selected food samples**

**Panipoori**

The adulterant presences were resultant atta or cheap flour, boric acid. Rawa collected from suramangalm, gugai and ammapet area samples showed the presence of sand, soil, insects, webs, lumps, rodent hair and excrete though visual examination. Other ingredients such as salt, sugar and water was not adulterant with any other materials.

**Vadapav**

Mustard seeds were adulterant by malachite green which was fund through visual examination and the same adulterant mustard seeds were used in suramangalam and gugai
area. Turmeric powder was adulterant with argemore seed and oil was adulterant with prohibited colour. Ginger was adulterant with coloured saw dust in suramangalam area.

**Pavbhaji**

Among the raw ingredients of pavbhaji, suramangalam and gugai channa dal was faulted with Metanil Pellow (a non permitted coal tar colour) and it was proven by visual examination. Suramangalam, aguagi and ammapet area turmeric powder was contaminated with Chalk powder or Pellow soap stone powder and it was found through FSSAI method analysis test. Four area Oil samples were adulterant with prohibited colours.

**Cutlet**

Among the raw ingredients of cutlet, suramangalam and gugai area oil samples were faulted with Prohibited colour and it was found through FSSAI method. Corn flour collected from suramangalam, gugai and ammapet area samples were adulterant with chalk powder. A green pea which was used in cutlet preparation was adultrant with artificial colour and it was found by FSSAI method. Refined flour was adulterant with Resultant atta or cheap flour though visual examination and by FSSAI method boric acid was also adulterant with this refined flour.

**Samosa**

Among the raw ingredients of samosa, suramangalam and gugai area oil samples were faulted with Prohibited colour and it was found through FSSAI method. Turmeric powder collected from Gugai and ammapet area was adulterant with either colored saw dust or chalk powder or pillow soap stone powder. Jeera collected from ammapet area was faulted with grass seed coloured with charcoal dust.

**Fried Rice**

Among the raw ingredients of fried rice, oil collected form suramangalam, gugai and ammapet area samples were adulterant with prohibited colors.

**Manchurian**

Among the raw ingredients of manchuriyan (veg), rice flour collected from four areas (suramangalam, meyanur, gugai and ammapet) were adulterant with resultant atta or cheap flour and it was found through FSSAI method. Corn flour collected from suramangalam and ammapet area was faulted with Chalk powder. Oil collected form suramangalam, meyanur, gugai and ammapet area samples were adulterant with prohibited colors.

**Idly**

Among the raw ingredients of idly, idly rice collected from three area (suramangalam, gugai and ammapet) was adulterant with Dust, pebble, stone, straw, weed seeds, damaged
grain, weevil led grain, insects, rodent hair and excreta and was found through visual examination. Urad dal was adulterant with Clay, stone, gravels, webs, insects, rodent hair and excreta.

**Oothappam**

Among the raw ingredients of oothappam, idly rice collected from three area (suramangalam, gugai and ammapet) was adulterant with dust, pebble, stone, straw, weed seeds, damaged grain, weevil led grain, insects, rodent hair and excreta and was found through visual examination. Raw rice collected from four areas were adulterant with Dust, pebble, stone, straw, weed seeds, damaged grain, weevil led grain, insects, rodent hair and excreta. Rice flour and refined flour samples were adulterant with resultant atta or cheap flour. Sugar collected from ammapet area sample was adulterant with yellow colour (Non permitted). Oil collected from suramangalam, meyanur and ammapet area samples were faulted with prohibited colour.

**Pongal**

Among the raw ingredients of pongal, raw rice collected from suramangalam and ammapet area was adulterant with dust, pebble, stone, straw, weed seeds, damaged grain, weevil led grain, insects, rodent hair and excreta. Split gram was adulterant with Dust, pebble, stone, straw, weed seeds.

**Paniyaram**

Idly rice collected from three areas (suramangalam, gugai and ammapet) was adulterant with dust, pebble, stone, straw, weed seeds, damaged grain, weevil led grain, insects, rodent hair and excreta and was found through visual examination. Raw rice collected from four areas were adulterant with dust, pebble, stone, straw, weed seeds, damaged grain, weevil led grain, insects, rodent hair and excreta. Rice flour and refined flour samples were adulterant with resultant atta or cheap flour. Mustard seeds collected from suramangalam, meyanur and ammapet were adulterant with argemone seed. Oil collected from suramangalam, meyanur and gugai area samples were faulted with prohibited colour.

**Roti**

Wheat flour collected from gugai area was faulted with excess bran or chalk powder and sugar collected from gugai and ammapet area was adulterant with chalk powder, urea, yellow colour (Non permitted).
From this adulterant test it was proved that there was an adulterants in the collected raw ingredients of selected foods sold in the streets by mobile food vendors. So the null hypothesis is rejected.

4.4. Assessment Food safety knowledge, attitude and hygienic practices among the selected small mobile food vendors

Demographic characteristics of small mobile vendors revealed that, among the selected subjects 56.3% of male and 62.5% of the females belonged to the age group of 35-40 years and 15% of males and 25% of females belonged to the age group of 41-50 years. Majority of 46.25% of males and 25% of the females were did their elementary school and 25% of the subjects did their high school levels. Regarding the food safety training, 66.25% of the male and 62.5% of the females were not under vent any training.

Assessment of vendor’s food safety knowledge of vendors

The results show that the majority of the vendors did not know that hepatitis A virus (88.8% of the respondents), Salmonella (89.38%) and Staphylococcus aureus (91.9%) are pathogens that are responsible for foodborne diseases and Almost half (44.4%) of the vendors failed to discern the groups at risk of foodborne diseases. 74.4% knew that bloody diarrhea can be transmitted by food whilst 77.5% recognized that AIDS cannot be transmitted by food. On the other hand, 86.3% knew that it is necessary to take leave from work during cases of infectious skin diseases and 88.1% knew that microbes can be found in the skin, mouth and nose of healthy handlers. 57.5% of vendors did not know that abortion could be induced by foodborne diseases. 61.9 % of them believed wrongly that washing utensils with detergents leave them free of contamination. 55% did not know that eating and drinking in the work place increased the risk of food contamination. A considerable proportion of vendors were aware of the critical role of hand washing (93.8%) and proper cleaning of utensils (71.9%) in the prevention of foodborne diseases. However, only 61.9% knew that the use of gloves is important in reducing risk of contamination. 74.4% of the vendors knew that a swollen can might contain microorganisms. 30% of the customers incorrectly thought that the reheating of foods can contribute to food contamination whilst only 60% were able to answer correctly the question about whether the preparation of foods in advance can reduce the contamination of foods.

Assessment of vendor’s food safety attitude of vendors

Regarding food safety attitude of the vendors, the study found that the majority of vendors answered correctly one third of the questions (questions 1, 2, 3, 4, 7, 8, 9, 10, 11 and 13) with correct responses range between 50 to 60. However most of them wrongly believed
that a well-cooked food is free of contamination (45.8%) and that the ideal place to store raw meat was the bottom shelf of the refrigerator (50%). Most of vendors incorrectly thought that eggs should be washed as soon as possible after purchase (41.7%) and that the best way to thaw a chicken was not in a bowl of cold water (60%). 46%, of the vendors defrost food on a counter top and 10% defrost in warm water. 35% agreed (wrongly) that defrosted foods can be refrozen and only half of them (51.3%) were able to identify wearing masks as an important practice to reduce the risk of food contamination. As observed for the vendors, it can be seen in Table 90-94 that the majority of the vendors also correctly answered approximately one third of the questions (questions 1, 2, 3, 4, 7, 8, 9, 10, 11, 13 and 14) used to assess their food safety attitudes. The range of correct responses (77.5-100%) was similar to those of the vendors. The vendors had the same difficulties in answering the same questions that the vendros also could not answer. The lowest percentage of correct answers (22.5%) was observed for the question concerning whether or not well-cooked food is free of contamination.

**Food safety observation checklist for vendors**

Regarding the kind of materials used in stalls, 50% of the vendors used zinc materials, 80% of them used stainless steel, and other materials like wooden tables, canopy’s were not used by any one. Regarding food is preparation 83% of them used to prepare food at home and on site. 85% of the vendors stall was protected from sun. All vendors’ stalls were having the easy portable water facility. 83% of them were having the hand washing facilities and only 58% of stalls were having adequate waste water or food disposal facilitates. Based on environment in and around the stall, 80% of the stalls were surrounded with clean and devoid of far from rubbish, waste water, toilet facilities, open drains and animals. 90% of operators and food handlers were wear out neat, clean and presentable clothes. 60% of the food handlers were handle money while serving foods. 80% of the food handlers were not washing their hands after visiting the toilet and 90% of them were not properly covered their hair while handling food. 80% of the stalls remove their dirt’s through bared hands, apron and dirty cloths. 90% the stall operators used the same utensils and knives for both raw and cooked foods. Majority (80%) of the vendors were not covering the food storage containers. Most of the vendors were not following to keep the cooked foods under ice box or refrigerator. 80% of the utensils were not covered properly and 70% of the utensils were cleaned every time after the use. Majority of the stalls were cleaned their utensil through soap water.
Form this food safety knowledge, attitude and hygienic results it was clearly depicted that there was poor food safety knowledge, attitude and hygienic practices among the mobile food vendors. So the null hypothesis is accepted.

CONCLUSION

It is recognized that street vended foods play an important role in terms of employment potential, particularly for women. It also serves the food requirements of vendros at affordable prices to both the lower and middle class income groups. The economic significance of street vended foods is immense and it is estimated that millions of shillings change hands every day through sale of street foods. Sale of street foods plays a big role in Salem city even though they are not officially recognized. The street food vendors are considered a nuisance especially when they sell their foods on pavements or roadsides. This creates obstruction and disturbances to the citizen.

From this study, while Mobile Street vended foods play an important role in food supply they were also recognized as health risks if not prepared nutritionally and handled hygienically. For example, there was a significant difference in the nutritive values and microbial content of the collected food samples sold in the streets by mobile food vendors of different areas as compared to homemade food. Regarding the food adulterant, majority of the raw materials were adulterant with the unwanted food materials.

The major factors that led of contamination of the mobile vended foods in this study were defective hygienic practices, in particular use of bare hands to serve food and unsanitary environment such as wastewater sewage. Holding of foods for long periods at uncontrolled temperatures for more than 6h and sometimes selling leftover food items were also identified as contributing factors to food contamination. These factors were mainly due to lack of knowledge in basic food hygiene and preparation. For the vendors who had basic food hygiene knowledge, the hindrance was the enabling environment.

The most importance of mobile street-food vending in Salem City and further provides evidence of the importance of trading in the city as a means of survival for both men and women in order to earn a living. Principally the importance of the food safety training of street-food vendors on health and hygiene, customer care as well as skills for developing a business plan was also indicated. An overriding principle is that in training street-food vendors the aim should be to foster a clear awareness of the interdependence of, and concern about, economic, social, political and ecological issues. In addition, it should seek to provide opportunities to individuals to acquire the food safety knowledge, values, attitudes, commitments and skills needed to protect and improve the environment in which they were
working. Furthermore, food safety practices of educated and knowledgeable street vendors will improve and the food that is sold will effectively be reliable. Finally, overcoming the problems of street vendors and the ill-treatment imposed on them needs joint cooperation of government, consumers and vendors themselves in order to improve and sustain their economic activities.