



## FOOD SAFETY KNOWLEDGE OF FARMING HOUSEHOLDS IN NORTH-CENTRAL, NIGERIA

Salihu I.T<sup>1</sup>., Adesiji G.B. <sup>2</sup>, M.Ibrahim I.S<sup>1</sup> and Muhammed H.U<sup>1</sup>

<sup>1</sup>Department of Agricultural Economics and Extension Technology,  
Federal University of Technology, Minna, Niger State, Nigeria

<sup>2</sup>Department of Agricultural Extension and Rural Development, Faculty of Agriculture,  
University of Ilorin, Ilorin, Kwara State, Nigeria

Corresponding Author's Email: – ibrahimtyabo@yahoo.com. (08069098599)

### ABSTRACT

The risk of exposure of farming households to unsafe food practices may result in food borne diseases which can have major economic impact on individuals, farming business and even the country. Relying on this, the study assessed the food safety knowledge of farming households in North-Central Nigeria. Multi- stage simple random sampling technique was used to select 256 farming households in the study area. Structured questionnaire complimented with Interview schedule was used to elicit data from the respondents. The responses were analyzed using descriptive statistic. The result of the study showed an economic viable farming households having low literacy level. The major causal factors of food borne diseases among the farming households were poor hygiene; dirty water and faeces/defecating in the open. It was observed that the farming household in the study area had adequate knowledge on almost all the food safety practices and adopted the safety measures based on the mean benchmark. There is need to motivate the farming households in the study area to enhance adoption of food safety practices so as to reduce the level of vulnerability of farming households to food borne diseases.

**Key words:** Knowledge, Food safety, Practices, Diseases, Farming households

### 1.0 INTRODUCTION

The health and safety of food of those involved in farming is important. This is because much of the social and economic welfare of farmers, farm workers, and their local communities depend upon farming and therefore farming must be economically viable to be sustainable. In addition, access to safe food is important and a basic human right (WHO, 2002).

Hence, due care and diligence is required at all times in order to ensure sustainable operation and productivity. However, incidents of food-borne diseases have become a global phenomenon and every person is at risk of food born-illness emanating from consumption of unsafe food.

In African region, the number of consumers including farming households who are



highly vulnerable to food borne illness is growing, the high incidence of diarrhea diseases among newborns and young children are serious indications of poor food hygiene situation. Most children in the region experience five episodes of diarrhea per year and close to 800,000 children die each year from diarrhea and dehydration (Centre for Science in the Public Interest (CSPI), 2005). The underlying high rate of poverty coupled with lack of access to clean water, weak government structures, high population growth, weak agricultural and transportation facilities, poor storage techniques, non-functional sewage and sanitation systems, poor hygiene and public ignorance of food safety knowledge, practices and preparation techniques in developing countries has forced people especially the rural farming households to consume unsafe food or food of low quality that has resulted in high incidences of diarrhea which is the most common symptom of food- borne (and water- borne illness) as well as a major cause of malnutrition in infants and young children (FAO, 2001; and CSPI, 2005).

In Nigeria, the high prevalence of diarrhea as a result of poor sanitation and hygiene practices is about 18.8 percent. This is one of the worst in sub-Sahara Africa and has killed close to 150,000 children under five years (Adejero, 2013). Nigeria has over the years suffered from the problem of food-borne diseases with their implication on social, economic and health costs (Ifenkwe, 2012). The risk of exposure of farming households to unsafe food practices may result to food borne diseases which can have major economic impact on individuals, farming business and even the

country. Increased expenditure on medical care and large proportion of income may be lost by individuals due to reduced agricultural productivity. Farming households' responsibility for the safe handling of food in the home and for adhering to the hygienic principles of food safety practices is crucial in reducing the incidence of risks of food borne diseases and increase productivity through reduction in absenteeism from farm and cost of health care. This will as well promote good living standard for rural areas (Milton and Mullan, 2010).

Most cases of food-borne diseases that cause illness are preventable if hygienic food safety principles are followed from production to consumption and if farming households have the knowledge on how to minimize the presence of pathogens or their toxins in food. However, studies on knowledge, attitude and practice on food safety in rural communities of the study area are few and the number of consumers who are highly vulnerable to food-borne illness is growing in this region. Limited knowledge and attitudes of rural farming households towards hygienic food safety practices raises serious concerns on the risk of exposure of individuals in the households to high incidences of food borne illnesses. The study conducted by Manning and Snider (1993) revealed that there were deficiencies in attitudes, knowledge and practices on safe food handling practices among food handlers in many households. Food safety education is limited in most African regions especially on the knowledge, attitudes, beliefs and practices on food safety issues (CSPI, 2005; Sudershan *et al.*, 2009). Despite the



recognized importance of food-safety, a large number of consumers do not practice adequate hygienic food safety in the home (Milton and Mullan, 2010). Therefore, the research on knowledge and food safety practices of farming households is required to ascertain how food is handled by the farming households and to know the level of awareness of farming households and their willingness to adopt food safety practices to prevent the spread and outbreak of diseases in the community.

Deficiency in knowledge of farming households towards food safety practices has serious implication for the future of the agricultural sectors productivity, the vulnerability to food borne diseases, health status of farming households and the socio-economic living standard of the rural population in the study area. The study on knowledge and food safety practices of farming households would provide information on the role played by food preparers in promoting healthy rural households and prosperous local community.

Giving the vital roles played by women in agricultural production and in the households especially in food preparation (Ogunlela and Mukhtar, 2009). It is important to know the level of awareness of farming households on food safety practices, how food borne diseases at farming households can be combated; and to know where vital technical and extension support is required, the need to consistently provide gender specific food safety practical techniques and information to improve households, health status, increase productivity, income and socio economic status of the rural households.

Measures to ensure safe food at home are presently of public concern and action is required to reduce the likelihood of home derived food borne diseases which reduces farming productivity, increased medical bills costs, income loss (due to absence from farm work) which ultimately affects the socio-economic livelihood of the households (Eze and Anyaegbunam, 2014). Since most of the activities involving food handling and food preparation are mostly carried out by females, it is important to obtain the baseline food safety knowledge, attitudes and practices of the rural farming households so that strengths and deficiencies can be noted and appropriate educational intervention can be planned. It is against this back drop the research initiative raises the following objectives to assess knowledge on food safety practices of farming households in North-Central Nigeria. The specific objectives were to: describe the socio economic characteristics of the farming households in the study area; assess the knowledge of farming households on food safety practices in the study area and to examine the food safety practices used by the farming households in the study area. The following hypothesis was formulated for the study  $H_0$ : There is no significant relationship between the food safety knowledge level and food safety practices of farming households in North Central Nigeria.

## 2.0 MATERIALS AND METHODS

The study was conducted in the North-central region of Nigeria which comprises six states. The region has a total land area of 296, 898 km<sup>2</sup> representing about 32% of the total land area of the country. It is



located between latitude  $6^{\circ}30'N$  to  $11^{\circ}20'N$  and longitude  $2^{\circ}30'E$  to  $10^{\circ}30'E$ . The research design was a descriptive survey method and the population of the study comprised of farming households in the study area. The respondents were households' food preparers or their representatives who are in charge of the responsibility of preparing foods for the entire household. Multi stage random sampling technique was employed for the study. The first stage involved random selection of two states from the North central Nigeria which comprises of six states.

The second stage involved random selection of one agricultural zone from each of the selected states. In the third stage, simple random sampling technique was also applied to select four (4) LGAs from each of the selected agricultural zone. Furthermore, simple random sampling technique was equally applied to select four (4) rural areas in each of the selected LGAs and lastly, 8 farming households were randomly selected from each of the selected rural areas through simple random sampling technique. In all, a total of 256 farming households were selected for the study. Structured questionnaire complimented with interview schedule was used to elicit data from the respondents. The responses were analyzed using descriptive statistic such as frequency counts, measures of central dispersion and Likert scale (3 and 4 points). In order to assess the knowledge level of farming households on food safety practices in the study area list of eleven (11) questions bordering on food safety practices related to the WHO 5 keys safe food guide were presented to the respondents and the

options of 3 points Likert rating scale of Agree = 3, Disagree = 2 and Undecided = 1 was used to achieve the objective. Similarly, food safety practices used by farming households were examined by presenting to the respondents list of sixteen (16) statements bordering on food safety measures that will reduce the of risk exposure of households to incidences of food borne diseases and the options of 4 points Likert rating scale which were scored as Always (A=4), Frequently (F=3), Sometimes (S= 2) and Never (N = 1) was used to achieve the objective. Pearson product moment correlation (PPMC) was used to test the formulated hypothesis

### 3.0 RESULTS AND DISCUSSION

#### 3.1 Socio-economic characteristics of the respondents

**Age of respondents:** Age is often assumed that as human age increases the rate of experience on various activities also increases and it is most often used to classify rural population into targetable groups (Tyabo *et al.*, 2014). The result in Table 1 shows that about 38% of the respondents are in the age range of 31 to 40 years. The mean age of the respondents is 37 years which is an indication that most of the food handler of farming households are young adults who are still strong and capable of undertaking rigorous activities in the households. This means that, the respondents are in their active age, have the ability to supply the labor required to carry out activities for food preparation for the entire farming household and this can influence their food safety practices or behaviours (Rahman *et al.*, 2012; Mohammed, 2013). This finding agrees with the report of Safe food (2002); Sanlier



2009) and Nee and Sani (2011) that food safety knowledge tends to increase with age and practice; and there was a significant difference between food safety knowledge and food preparation practices of young and adult consumers (in favour of adult consumers).

**Level of education of respondents:** This refers to the educational attainment of respondents which is not only an important determinant of adoption of new practices but also an instrument for successful implementation of new practices that equips individuals with the required knowledge of how to make a living. Result in Table 1 reveals that 45% of the respondents had no formal education and only 24% of the total sampled population had up to secondary education. This implies that the educational level of the respondents was relatively low in the study area. This can be related to a similar study conducted by Musa and Akande (2003) who reported that majority of the food vendors in Ilorin had no formal education. The trend of the results may lead to low acceptance and use of good food safety practices which may increase the tendency

of their exposure to the risk of food borne diseases in the study area. Low education may lead to inadequate information on food safety practices (CSPL, 2005). Bizatu and Negga (2004) also reported that the habit of hand washing after defecation is significantly associated with the educational status of the respondents ( $P < 0.01$ ).

**Number of health service workers visit or contact with farming households:** The result in Table 1 is a response of number of times the farming households have personal contact with health service workers in the last 12 months. The result revealed that only 41.40% of the respondents in the study area had 3 to 4 times contact with health service workers. The mean number of contacts between health service workers and farming households is 3 times in a year. This implies that the number of contact is low. This will have a negative impact on creation of awareness and education of farming households on food safety measures to adopt at home especially the sanitation of their environment to safeguard against occurrence of food borne diseases.

**Table 1: Socio-economic characteristics of respondents in the study area (n = 256)**

Characteristics	Frequency	Percentage	Mean
Age (Years)		24.20	
19 - 30	62	38.30	
31 - 40	98	21.50	
41 - 50	55	13.30	
51 - 60	34	2.70	37
>60	7	100	
Total	256	43.40	
Levels of education		20.70	
No formal education	111	2.30	
Quranic education	53	7.00	
Adult education	6		
Primary education	18		



Secondary education	62	24.20	
Tertiary education	6	2.30	
<b>Total</b>	<b>256</b>	<b>100</b>	
<b>Number of visits by health service workers to farm households per annum</b>			
<3 times	91	35.50	
3 to 4 times	106	41.40	
>4 times	59	23.00	3 times
<b>Total</b>	<b>256</b>	<b>100</b>	

### Knowledge of foods that can increase one's risk of exposure to food borne diseases

The results in Table 2 showed that majority (89.80%) of the respondents admitted that undercooked meat and chicken, unwashed vegetables and fruits (88.70%), unpasteurized milk (66.80%) and raw seafood or undercooked seafood/fish (66.70%) can increase one's risk of exposure to food borne diseases. This implies that, the respondents in the study area are aware of the risks associated with consumption of these types of food and the likely effect it may have on their health status.

### Knowledge of what can cause food borne diseases in the households

The result in Table 2 reveals that majority (93%) of the respondents agreed that poor hygiene, dirty water (91%),

faeces/defecating in the open (86.70%), contaminated food (84.40%) and dirty hands (63.70%) can cause food borne diseases in the household. This result is an indication that knowledge of what can cause food borne disease is high in the study area although this may not translate to practice. This can be supported by the findings of Nee and Sani (2011) who reported that most of the food handlers in their study gave positive answers in respect to knowledge of what can cause food borne diseases but might not practice them when handling foods at home. Hence, it will be important to provide efficient training and motivation not only on knowledge of what can cause food borne diseases but the need to encourage farming households, food handlers to practice appropriate food safety practices in accordance with the knowledge of what they know.



**Table 2: Knowledge of Foods that can Increase one's Risk of Exposure to Food Borne Diseases and what can cause Food Borne Diseases in the Household (n = 256)**

Foods that can increase one's risk of exposure to food borne diseases	Yes	No
	Frq. (%)	Frq. (%)
Half-boiled eggs	7 (2.7)	249 (97.30)
Unpasteurized milk	171 (66.80)	85 (33.20)
Raw seafood or undercooked seafood/fish	163 (63.70)	93 (36.30)
Undercooked meat and chicken	230 (89.80)	26 (10.20)
Unwashed vegetables and fruits	227 (88.70)	29 (11.30)
Consumption of raw egg	85 (33.20)	171 (66.80)
<b>What can cause food borne disease in the household</b>		
dirty water	233 (91.00)	23 (9.00)
Contaminated food	216 (84.40)	40 (15.60)
Poor hygiene	238 (93.00)	18 (7.00)
Dirty hands	163 (63.70)	93 (36.30)
Feces/defecating in the open	222 (86.70)	34 (13.30)

**Level of knowledge on food safety practices**

On the basis of the mean score, the result in Table 3 revealed that out of eleven statements bordering on the knowledge level of food safety practices of respondents, the statements with highest mean score include food should always be cooked thoroughly (2.976), washing of cooking utensils before and after eating will reduce the incidences of food borne diseases (2.906), protecting foods from insects, rodents and other animals can reduce the incidence of food borne diseases (2.882), and cooking utensils should be washed with water and soap after usage (2.813). On the contrary, the statement with the lowest mean scores were contact between raw foodstuffs and cooked foods can cause contamination (1.699), and water

used for cooking and other household purposes should always be separated (2.133). The trend of the result implies that the knowledge level of respondents on the above stated food safety practices are on the high side except on contact between raw foodstuffs and cooked foods can cause contamination. The implication is that, the respondents do not know the consequences of allowing contact between raw and cooked foods in the study area. Hence, sensitization is highly required in the study area in this aspect of the aforementioned food safety practice. This study can be supported by the finding of Nee and Sani (2011) who reported that majority of his respondents had good knowledge of personal hygiene practices but they do not always put the knowledge into practice.



**Table 3: Distribution of Respondents on Level of Knowledge on Food Safety Practices (n = 256)**

Knowledge on food safety practices	Agree	Disagree	Undecided	Mean(STD)	Rank
	Freq.(%)	Freq.(%)	Freq.(%)		
Do you know, you should always cook your food thoroughly?	253(98.80)	-	3(1.20)	2.976(0.216)	1 <sup>st</sup>
Washing of cooking utensils before and after eating will reduce the incidences of food borne diseases	240(93.80)	8(3.10)	8(3.10)	2.906(0.385)	2 <sup>nd</sup>
Do you know that protecting foods from insects, rodents and other animals can reduce the incidence of food borne diseases?	237(92.60)	8(3.10)	11(4.30)	2.882(0.436)	3 <sup>rd</sup>
Cooking utensils should be washed with water and soap after usage	226(88.30)	12(4.70)	18(7.00)	2.813(0.542)	4 <sup>th</sup>
Covering of food protect food from flies and animals	222(86.70)	5(2.00)	29(11.30)	2.754(0.634)	5 <sup>th</sup>
Do you believe that using safe water for cooking/drinking will reduce the incidences of food borne diseases?	214(83.60)	7(2.70)	35(13.70)	2.699(0.697)	6 <sup>th</sup>
Covering of food keep the food safe from contamination	213(83.20)	17(6.60)	26(10.20)	2.731(0.977)	7 <sup>th</sup>
Food should be covered during and after cooking	187(73.00)	27(10.60)	42(16.40)	2.559(0.775)	8 <sup>th</sup>
Cooking utensils should be washed with water only after usage	58(22.70)	195(76.40)	3(1.20)	2.215(0.439)	9 <sup>th</sup>
Water used for cooking and other household purposes should always be separated	138(53.60)	9(3.50)	109(42.60)	2.113(0.977)	10 <sup>th</sup>
Do you know contact between raw foodstuffs and cooked foods can cause contamination?	54(21.10)	71(27.70)	131(51.20)	1.699(0.797)	11 <sup>th</sup>

### Food safety practices used in the households

From the result presented in Table 4, the major practices adopted by majority of the respondents includes cooking food thoroughly (3.906), washing of cooking utensils before and after use with soap and water (3.785), washing hands after eating (3.699), thoroughly cooking meat, chicken and fresh fish before consumption (3.672) and ensuring dogs, cats, pigs and cockroach are not found around the kitchen (3.606). In the same vein, food safety practices that fall

within the medium category include washing hands before eating (3.441), covering foods during and after cooking (3.386), washing hand after defecating (3.167) and meat/chicken/fish should be fried in boiling oil (3.066). On the other hands, practices with low mean scores include different knives are used for cutting raw meats, vegetables and cooked foods (2.315), washing hands after changing baby wears (1.660), washing hands before feeding children (1.312) and washing hands after coughing /sneezing (1.101). The finding





from this result implies that majority of respondents in the study area mostly observed 6 (six) food safety practices presented to them while four out of them were the least practiced by the respondents in the study area. Hence, there is need to increase their awareness through educational programmes that will not only boost their knowledge on the risks

associated with neglecting practices with medium and lower mean scores but will also motivate them to adopt these practices so as to reduce their level of vulnerability to food borne diseases. This may lead to change in attitudes and behaviours towards some of the practices that are not always or sometimes/never adapted by the respondents in the study area.

**Table 4: Distribution of respondents according to food safety practices used in the households (n = 256)**

Food safety practices	Always	Frequently	Sometimes	Never	Mean	Rank
	Frq. (%)	Frq. (%)	Frq. (%)	Frq. (%)		
Cook food thoroughly	237(92.60)	14(5.50)	5(2.0)	-	3.906***	1 <sup>st</sup>
Cooking utensils are washed before and after use with soap and water	222(86.70)	13(5.10)	21(8.20)	-	3.785***	2 <sup>nd</sup>
Wash hands after eating	179(69.90)	77(30.10)	-	-	3.699***	3 <sup>rd</sup>
Meat, chicken and fresh fish are thoroughly cooked before consumption	195(76.20)	39(15.20)	21(8.20)	1(0.40)	3.671***	4 <sup>th</sup>
Dogs, cats, pigs and cockroach are not found around the kitchen	200(78.10)	18(7.00)	31(12.10)	7(2.70)	3.605***	5 <sup>th</sup>
Wash hand before eating	157(61.30)	55(21.50)	44(17.20)	-	3.441**	6 <sup>th</sup>
Cover foods during and after cooking	138(53.90)	80(31.20)	37(14.50)	1(0.40)	3.386**	7 <sup>th</sup>
Wash hand after defecating	130(50.80)	31(12.10)	95(37.10)	-	3.167**	8 <sup>th</sup>
Use separate water for cooking	98(38.30)	86(33.60)	63(24.60)	9(3.50)	3.066**	9 <sup>th</sup>
Wash hand with soap/ash before preparing food	112(43.80)	41(16.00)	101(39.50)	2(0.80)	3.027**	10 <sup>th</sup>
Separate water used for cooking and other household purposes	95(37.10)	76(29.70)	77(30.10)	8(3.10)	3.007**	11 <sup>th</sup>
Cooked foods are separated from food preparation areas	78(30.50)	100(39.10)	76(29.70)	2(0.80)	2.992**	12 <sup>th</sup>
Wash fruits and vegetables before eating	67(26.20)	101(39.50)	88(34.40)	-	2.918**	13 <sup>th</sup>
Meat/Chicken/Fish should be fried in boiling oil	84(32.80)	70(27.30)	95(37.10)	7(2.70)	2.902**	14 <sup>th</sup>
Wash hands after handling raw meat or vegetables	44(17.20)	126(49.20)	78(30.50)	8(3.10)	2.804**	15 <sup>th</sup>
Knives are washed after usage	40(15.60)	100(39.10)	116(45.30)	-	2.703**	16 <sup>th</sup>
Wash hand before food preparation or cooking	14(5.50)	145(46.60)	16(6.20)	81(31.60)	2.359*	17 <sup>th</sup>
Different knives are used for cutting raw meats, vegetables and cooked foods	43(16.80)	35(13.70)	137(53.50)	41(16.00)	2.312*	18 <sup>th</sup>



Wash hand after changing baby wears	4(1.60)	51(19.90)	55(21.00)	146(57.00)	1.660*	19 <sup>th</sup>
Wash hand before feeding children	-	15(5.90)	50(19.50)	191(74.60)	1.312*	20 <sup>th</sup>
Wash hands after coughing /sneezing	-	-	230(89.80)	26(10.20)	1.101*	21 <sup>st</sup>

\*Mean score of  $\leq 2.5$  are = low; \*\*mean scores between 2.5 to 3.5 = medium; and \*\*\* mean scores  $\geq 3.5$  = high or major practices adopted.

### Relationship between the food safety knowledge level and food safety practices of farming households

The result in Table 5 shows significant relationship between food safety knowledge and food safety practices of farming households ( $r = 0.416$ ,  $p = 0.000$ ) at 0.01% level of significance. This implies that an increase in knowledge on food safety will lead to positive increase in the adoption of food safety practices. This result supports the reports of Yap *et al.* (2010); Rahman *et al.* (2012) that higher

knowledge score is among the significant predictor that influences individual attitudes and practices. On the contrary, Ehiri and Morris (1996) as cited by Nee and Sani (2011) reported that knowledge alone is not sufficient to promote positive food safety practices among food handlers. Hence, efficient training and motivation will be required to encourage farming households, food handlers to practice appropriate food safety practices in accordance with the knowledge of what they know.

**Table 5: Pearson product moment correlation between the food safety knowledge level and food safety practices of farming households**

Variable	R value	P value	Decision
food safety knowledge level and food safety practices	.416***	.000	Significant

\*\*\* Correlation is significant at the 0.01 level of probability.

### 4.0 CONCLUSION

### 5.0 RECOMMENDATION

From the result of the study it can be inferred that the farming households in the study area had knowledge of what can cause food borne disease although this may not translate to practice. Hence, there is need to motivate them to adopt the practices so as to reduce their level of vulnerability to food borne diseases. Efforts should be made by policy makers and Non-Governmental Organizations (NGOs) to enhance the status of the health service workers to be committed to increase the number of

contacts with farming households and conduct food safety educational programmes. This would help to build their knowledge about food-borne diseases, their causes, symptoms and implications and also food safety measures to adopt at home especially the sanitation of the environment to safeguard against occurrence of food borne diseases.

### REFERENCES

Adejero, L. (2013). Proper Food Safety Practices and Hand Washing Prevent Food Borne Diseases. *Daily Times* of 3<sup>rd</sup> December, 2013. Retrieved on 3<sup>rd</sup>



March,

2014

from

[www.dailytimes.com.ng](http://www.dailytimes.com.ng)

*Journal of Medical Science*, 20(1):  
22-25.

Bizatu, M and Negga B. (2010).

Community based assessment on household management of waste and hygiene practices in Kersa Woreda Eastern Ethiopia. *Ethiopia Journal of Health Development*, 24(2):103 - 109.

Center for Science in the Public Interest (CSPI) (2005). Global and Local Food Safety Around the World. Pp 4-28 Retrieved June 10, 2113, from [www.safefoodinternational.org](http://www.safefoodinternational.org)

Eze, N. and Anyaegbunam, N. (2014). Household Food Safety Awareness of Female University Workers in South East Nigeria. *Food Science and Quality Management*, 29: 29 – 34.

Food and Agriculture Organization of the United Nations (FAO), (2001). Consultative Group on International Agricultural Research Technical Advisory Committee. Report from the Standing Committee on Priorities and Strategies (SCOPPAS): A Status Note on Food Safety retrieved 12<sup>th</sup>/09/2013 from <http://www.fao.org>:1-30

FAO/WHO. (2003). Codex Alimentarius. Basic Text on Food Hygiene. 3<sup>rd</sup> ed., Italy.

Gul, R. (2012). Hand washing practices of food handlers in the hospitality establishments of Peshawar city.

Ifenkwe, G. E. (2012). Food Safety Regulations. Reducing the Risk of Food-borne Diseases in Rural Communities of Abia State, Nigeria. *Agricultural Science Research Journals*, 2(7): 384-389

Kevany, S., Murima, O., Singh, B., Hlubinka, D., Kulich, M., Morin, S.F., and Sweat, M. (2012). Socio-economic Status and Health care Utilization in Rural Zimbabwe. *Journal of Public Health in Africa*, 3(1): 46 - 51.

Liu, P. (2007). Potentially Unsafe Food Safety Behaviours Related to Gardening in Southeast Ohio. A Master Degree Thesis presented to the Faculty of the College of Health and Human Services of Ohio University: 86 – 96.

Manning, C. K., and Snider, O. S., (1993). Temporary Public Eating Places: Food Safety Knowledge, Attitude and practice. *Journal of Environmental Health*, 56 (1): 24-29.

Milton, A and Mullan, B (2010). Consumer food Safety Education for the Domestic Environment: A systematic review. *British Food Journal*, 112 (9): 1003 - 1022.

Mohammed, S. G.S (2013). Food Safety Knowledge among Women in Selected Areas in Khartoum City.



*International Journal of Science and Research (IJSR)*, 2 (2): 519-525.

- Musa, O. I. and Akande, M. T. (2003). Food Hygiene Practices of Food Vendors in Secondary Schools in Ilorin. *The Nigerian Postgraduate Journal*, 10 (3): 192-196.
- Nee, S.O.I. and Sani, N.A. (2011). Assessment of Knowledge, Attitude and practice (KAP) Among Food Handlers at Residential Colleges and Canteen Regarding Food Safety. *Sains Malaysian*, 40 (4): 403-410
- Ogunlela., Y. I. and Mukhtar., A. A. (2009). Gender Issues in Agriculture and Rural Development in Nigeria: The Role of Women. *Humanity & Social Sciences Journal* 4 (1): 19-30
- Rahman, M. M., Taha Arif, M., Bakar, K., and Tambi, Z. (2012): Food Safety Knowledge, Attitude and Hygiene Practices among the Street Food Vendors in Northern Kuching City, Sarawak. *Borneo Science*, 31: 95 - 103.
- Safefood (2002). Top improper Food Handling Practices and Common Job Hazard. Retrieved May 12, 2013, from [www.foodsafety.com](http://www.foodsafety.com)
- Sanlier. N. (2009). The knowledge and practice of food safety by young and adult consumers. *Journal of Food Control*, 20:538-42.
- Sudershan. R.V., Rao, P. and Polasa, K (2009). Food Safety Research in India: a review. *Asian Journal of Food and Agro-Industry*, 2(03): 412-433.
- Tollefson, L. (2012). Food Safety Challenges and Opportunities: Public health Approach. A Report of 6<sup>th</sup> Meeting of the PAN-American Commission on Food Safety (COPAIA) 6/4.1 Pp2-8.
- Tyabo, I.S., Ibrahim, M., Ndanista, M. A. and Umar, I.S. (2014). Assessment of participation of Rural Women in Farming Activities in Shiroro Community of Niger State, Nigeria. *International Journal of Physical and Social Sciences*, 4(4): 573-586.
- Warnock, F (2007). Community Based Intervention Study of Food Safety Practices in Rural Community Households of Cambodia. *Final Report Submitted to World Health Organization Regional Office for the Western Pacific*. Pp15.
- World Health Organization. (2002). *Food safety and food - borne illness*. Retrieved June 27, 2013, from <http://www.who.int/mediacentre/factsheets/fs237/en/>
- Yap, J., Vernon J Lee, V. J., Yau, T. Y., Pin Ng, T., and Tor, P. (2010). Knowledge, attitudes and practices towards pandemic influenza among cases, close contacts, and healthcare workers in tropical Singapore: a cross-sectional survey. *BMC Public Health*, 10:442