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## Food Safety Knowledge Attitude and Practice among Households in Khartoum, State

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### المستخلص:

أجريت هذه الدراسة لتقييم مستوى المعرفة والسلوك وممارسة سلامة الأغذية بين الأسر في ولاية الخرطوم. أجريت دراسة وصفية مستعرضة ، وإدارة الاستبيان في ولاية الخرطوم (الخرطوم الشمالية وأمدردمان ، باستخدام أخذ عينات عشوائية بسيطة ، تم جمع البيانات باستخدام استبيان منظم للمقابلة الشخصية يتكون من 4 أقسام ؛ ، الخصائص الديموغرافية والاجتماعية ، المعرفة بسلامة الغذاء ، والموقف تجاه سلامة الغذاء ، والممارسة المتعلقة بسلامة الغذاء . شارك ما مجموعه 345 من الأسر في هذا الاستبيان. تم تحليل البيانات بواسطة (chi square) ، والنتائج: كانت المستجيبات من الإناث ، تتراوح أعمارهن بين 18-80 سنة ، بين 74% منهم متزوجات و 26% غير متزوجين ، وعن المستوى التعليمي للأسر المعيشية ، كانت 92.8% من النساء متعلمات ، وكانت غالبية النساء على دراية بممارسات سلامة الأغذية ، لكن لديهن معرفة جيدة بالنظافة الشخصية 98.3% و 69.6% من معارفهم المعتدلة حول التلوث المتقاطع تتعارض مع معرفتهم بتخزين المواد الغذائية ودرجات حرارة الحفظ كانت ضعيفة مع 55.9% فقط. المستحقة المواقف الإيجابية. لذلك يبدو أنها مرضية ، باستثناء القضايا المتعلقة بتنفيذ مبدأ التبريد ، وموقف سلبي آخر وهو التلوث المتبادل. عند تقييم ممارسات سلامة الأغذية للمستجيبين ، لا يترجمون كل هذه المعرفة إلى ممارسات السلامة ، لذلك لا تزال الممارسات الغذائية غير المأمونة تطبق بشكل متكرر أثناء إعداد الطعام في البيئة المحلية. كان هناك ارتباط كبير بين الشخصية الاجتماعية والديموغرافية وممارسات تداول الأغذية (قيمة  $P > 0.01$ ). في الختام كان لدى النساء معرفة مرضية في مجالات سلامة الأغذية ، النظافة العامة والشخصية ، إجراءات التنظيف. ومع ذلك ، لم تتم ترجمة هذا إلى ممارسات النظافة الغذائية الصارمة. الكلمات المفتاحية: الخرطوم ، سلامة الغذاء ، الأسر.

### ABSTRACT:

This study was conducted to assess the level of the knowledge, attitude and practice of food safety among the households in Khartoum state. A descriptive cross sectional study was conducted , and administration of questionnaire in Khartoum state(Khartoum Khartoum North and Omdurman, by using simple random sampling, Data was collected by using face to face interview structured questionnaire comprise of 4 sections; ,Socio-demographic Characteristics, Knowledge of food safety, Attitude towards food safety , Practice on food safety.a total of 345of households were participant in this questionnaire .Data analyzed by(chi square) . The results: the respondents were females, aged between 18-80 years, among which 74% were married and 26% were single. About the education level of the householdswas 92.8% of the women were literate. The majority of the women were knowledgeable about food safety practice. However, they have good knowledge on personal hygiene 98.3%and moderate knowledge on cross contamination 69.6% contrary their knowledge on food storage and preservation temperatures was poor with only 55.9 % . Respondents showed positive attitudes. So it's seem to

be satisfying, except on issues related to implementation of cooling principle, and another negative attitude which is cross contamination. In assessing the food safety practices of the respondents, they do not translate all this knowledge to safety practices, so unsafe food practices are still frequently applied during the preparation of food in the domestic environment. There was significant association between socio-demographic profile and food handling practices (P value < 0.01). In conclusion the women had satisfactory knowledge in the areas of food safety, general and personal hygiene, cleaning procedures. However, this was not translated into strict food hygiene practices.

**Keywords:** Khartoum, Food Safety, Households

**Introduction:**

food safety is a degree of confidence that food would not cause sickness or harm when prepared, served and eaten according to its intended use (WHO, 2003)<sup>1</sup>. It's not only a term to understand, its full management that is required to be legally approved to ensure that produced food items are safe for consumers to eat. Access to sufficient amounts of safe and nutritious food is the key to sustain life and promote good health. Food safety is a major healthy issue. Unsafe food containing harmful bacteria, viruses, parasites or chemical substances causes more than 200 diseases ranging from diarrhea to cancers (WHO, 2005). Food borne and waterborne diarrheal diseases kill an estimated 2 million people annually, including many children (WHO, 2015). Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick (WHO, 2000). Food borne diseases impede socioeconomic development by straining health care systems and harming national economies, tourism and trade, (WHO, 2000)). Major food borne illnesses are usually infectious or toxic in nature and caused by bacteria, viruses, parasites or chemical substances entering the body through contaminated food or water. Food borne pathogens can cause severe diarrhea or debilitating infections including meningitis. Chemical contamination can lead to acute poisoning or long-term diseases, such as cancer. Foodborne diseases may lead to long-lasting disability and death. Examples of unsafe food include uncooked foods of animal origin, fruits and vegetables contaminated with feces, and raw shellfish containing marine biotoxins. (Tirado and Kschmidt, 2000) Illness resulting from food borne disease has become one of the most widespread public health problems in the world today (Lemini *et al.*, 1999) present as a serious threat to the health of millions of individuals. The importance of the home as a point of origin for food borne disease has prompted surveys to evaluate aspects of bacterial contamination in the domestic environment. Extensive surveillance has also been carried out by epidemiologists to estimate the extent of foodborne disease and food related illness in industrialized countries (Evans, 1998). It has been estimated that 130 million Europeans (WHO, 2002), 2.1 million to 3.5 million Great Britons from England and Wales, 76 million Americans and 4.7 million Australians (Mead, 1999) are affected by episodes of foodborne disease and food-related illnesses annually. It has also been suggested that individuals from England, Wales, the United States, and Australia may suffer from foodborne disease at least once every 4 to 5 years (Redmond, 2002). The majority (95%) of cases of foodborne disease are believed to be sporadic (Lerman, 2001). These cases, as well as small outbreaks that originate in the home, typically involve individuals or a small number less likely to be identified by public health authorities (Worsfold, 1997). Therefore, the actual proportion of food borne outbreaks and individual cases originating in the home is likely to be much larger than it has been reported to be (Zaop *et al.*, 1998). (Rusin *et al.*, 1998) found the kitchen environment to be more heavily contaminated with fecal and total coli forms than the bathroom. However, it has been reported that illness from foodborne disease arising from foods

consumed in private homes is three times more frequent than that arising from foods consumed in cafeterias (Borneff, 1989). The safety measures taken by consumers play a critical role in the prevention of foodborne illnesses because they constitute the final step in the food preparation process (Zhang and Penner), and safe food handling by the consumer in the domestic kitchen is considered to be “the final line of defense” Gilbert (1983).to assessment the knowledge ,attitudes and practices (KAP) towards food safety among household, international and local studies done .this one done by Nurhan 2007 in Turkey evaluate the knowledge and behavior related to food safety among household who had the primarily responsibility of food preparation at home .The study found significant difference among education level concerning attitude towards food safety and knowledge. No significant effect of demographic profile of food handling practices was found. Assessment of Knowledge, Attitudes and Practices (KAP) Among Food Handlers Regarding Food Safety by Penilaian *et al.*, (2011) in Malaysia, regarding the aspect of food hygiene and safety, In general, the respondents’ knowledge was moderate with mean point of 57.8%. However, they have good knowledge on personal hygiene and definition of food borne diseases In Sudan, Somiya ,(2006), evaluate the food safety knowledge attitude and practices among the household in Khartoum city the study reveal that there was significant Correlation between the age and the food safety knowledge of poultry,milk and dairy products, and the knowledge of some common food borne disease , food thawing and food labeling. While educational level the correlation with meat, milk and dairy products, food labeling and food borne illnesses. Another by Ola (2014) in Khartoum State revealed that, the degree of knowledge of each individual has strong link with his life style. Television and radio are the most important sources of information for the consumers and there is a direct relationship between the internet and the level of the consumers’ knowledge.

This study done also in Khartoum state among the workers at the federal of animal resources in Sudan by Khaled (2016),the aim of the study to assess the knowledge attitude and practice of food safety, most of the respondents(82%) have between good and excellent level of knowledge, also most of them have good food hygiene practices, high concern about pesticides their residues chemicals and heavy metal, moderate concern about microorganism. At Nile River State , Islam (2008) assess the knowledge attitude and practice among the women in the state, the study reveal that ;there is inappropriate food safety practices ,there is association between lack of knowledge and cross contamination ,most families in the state lack correct adherence to food hygiene during measure of food preparation and storage . The objectives of this study to assess knowledge, attitude, and practice of household toward food safety in Khartoum state.

#### **Material and method:**

##### **Study area:**

Khartoum state; is the national capital and the largest city of Sudan its located at the confluence of the white Nile and the blue Nile the two Niles unite to form the river Nile. The state lies between longitudes 31.5 to 34 E and the latitude 15 to 16 N .it consist from three city Khartoum, Khartoum north and Omdurman.

##### **Sample size:**

About 345 households where selected randomly that means not all the households have the same chance for being selected and this was called Non-probability sampling methods as described by Thrusfield (2007).

**Data collection tools and methods :**

it was collected by using face to face interview structured questionnaire comprise of , socio-demographic characteristics, knowledge of food safety, , attitude towards food safety and , Practice on food safety..

**Data analysis:**

data was analyzed by using SPSS (statistical package for social science) version 25,( chi square ).

**Result:**

This study was conducted in Khartoum state for assessment of knowledge attitude and practice of households: the respondents were females, aged between 18-80 years, among which 74% were married and 26% were single. About the education level of the households was 92.8% of the women were literate.

Table (1): showing the socio-demographic data of the participant

Marital status	married	single			
	74%	26%			
Age group	<25years	(25-45)years	>45years		
	25%	46%	29%		
Educational level	Illiterate	Primary school	Secondary school	Graduate	Post-graduate
	7.2%	11.6%	26.7%	50.7%	3.8%

Table 2 showed that the respondent had knowledgeable about food safety hygiene 98.3% knew the important of washing hands, and fruits and vegetable should be washed, and poor knowledge at safe water recognition 39.1% and using the same cutting board for both raw and cooked food 30.4%, moderate knowledge about food preservation temperature 55.9%.

Table(2) knowledge of food safety among the households in Khartoum state

	Positive knowledge % (n)	$\chi^2$ value	P. value
importance of hand washing	98.3 (339)	654.54	0.000
used clothes for cleaning surfaces ,utensils, drying hands can transmit infection	89 (307)	221.9	0.00
if use chopping board	53.3 (184)	168.2	0.05
use of the same chopping board if it look clean for both raw and cooked food	30.4 (105)	3.7	0.00
separation of raw and cooked food during storage	93 (321)	255.6	0.027
suitable temperature for meat preservation is 1-5 c	55.9 (193)	4.8	0.00
cooked meat can be left at room temperature to cool before entering into refrigerator	33.6 (116)	37.0	0.00
cooked food should be preserved very warm before serving it	65.8 (227)	222.1	0.00
freezing food slow bacterial growth	69.6 (240)	52.8	0.00
safe water recognized from its appearance ONLY	39.1 (135)	193	0.00
fruits and vegetables should be washed	97.1 (335)	306.1	0.00

N=345

The women attitudes towards food practice at home food safety was satisfactory in some areas, except on issues relating to thawing frozen food in cold place as shown in table 2. About 36.5% of the respondents agreed that thawing in refrigerator, but 37.7 % disagreed. Most of them using different chopping board (57.4%). About 50, 1% of the women were agreed to preserve the cooked food and leftover at refrigerator, while 25.8% of them were disagreed.

Table (3) The Attitude of food safety among household in Khartoum state

Question	% of people who agree	Not sure	disagree
hand washing before food preparation deserve extra time	69.1	10.2	20.6
maintainance of clean kitchen surfaces decrease risk of infection	95.9	3.5	.6
separation of raw and cooked food decrease risk of infection	89	9.6	1.4
use of different chopping board and knives for raw and cooked food deserve extra effort	57.4	20.6	22.0
soup should be boiled to insure it is safety	88.7	8.4	2.9
thawing food in cold place	36.5	25.8	37.7
cooked food should not be left out of refrigerator more than two hours	50.1	25.8	24.1
expired food should be thrown	69.0	14.2	16.8

Assessing the food safety practices of the women in table 4, most of them had good personal hygiene (87%), general cleaning procedures (78.3%). They used improper cooling procedures for cooked food and leftovers (34.2%). The majority of the women were washed the fruits and vegetable (93.6%).

Table (4) practice of food safety among the households in Khartoum state

Question	Always	Usually	Sometimes	Never
hand should be washed before and after food preparation	87	10.4	2.3	0.3
cleaning chopping board and cutting surfaces before using it again	78.3	15.7	5.5	0.6
separation of chopping board used for cooked food from those for raw food	59.4	21.2	14.2	5.2
separation of raw and cooked food during storage	71.6	10.2	8.1	4.1
heating food till it become very hot	37.4	20.3	32.3	10.2
thawing of food in refrigerator or any cold place	32.2	19.7	23.2	24.9
cooked food and leftover get in refrigerator not more than two hours	34.2	20.9	28.4	16.5
dispose expired food	81.4	6.4	6.1	6.1
washing fruit and vegetables with safe water before eating it	93.6	2.9	3.2	0.3
When I am sick I don't prepare food till I become healthy	42.6	20.9	26.1	10.4

This study assessed the knowledge, attitude and the level of practice of food hygiene among the households in Khartoum State, it revealed that, In the present study, the respondents were mainly within the ages of 18 - 80 years who are either illiterate or in a different level of education.

To assess the food safety knowledge of different age and education levels Of the households in Khartoum state, the food handlers who participated in this study demonstrated good knowledge of personal hygiene and cleaning procedures (98.3%) but not on cross-contamination (55.9%), while they had poor knowledge at safe water recognition ( 39.1 % ) , moderate knowledge about food preservation temperature ( 55.9%). Our finding was in agreement with other studies in

Sudan, study used by Islamin Nile River State(2004) outside asinMalaysia by Penilaian (2011) and others .Significant effect of demographic profile of food handling practices was found . Study done by Ola 2014 revealed that, the degree of knowledge of each individual has a strong link with his life style

A reduction in the incidence of food-borne illnesses is strongly influenced by the attitudes of food-handlers towards the implementation of food safety plans. Thus, there is a strong linkage between positive attitudesand maintaining safe food handling practices. In our study most of the consumers implement positive attitude on personal and general hygienic and cleaning procedures, separation of raw and cooked food, cook thoroughly, half of them implement negative attitude towards using different chopping board and knife for raw and cooked food, leave cooked food and leftovers out of refrigeratorfor prolonged time (more than two hour) which will encourage the proliferation of microorganisms.

Many consumers do not adhere to safety guidelines of prompt refrigeration, about63.5% not following the correct procedures when thawing frozen food,30.9%of the women do not dispose the expired food.Behaviors such as these help to determine the food safety attitude of consumers and can also contribute to an understanding of their actual food safety behaviors. , and their behaviors were found to be satisfactory in some areas, however food were left outside the refrigerator to defrost and hot foods were left outside for prolonged periods of time before storage in most participant (Table 2), similar observation was found in other studies done in Turkey 2005by Nurhan, and by Elisa et al 2011 in Italy.

This study indicate that substantial proportions of foodborne-disease can be attributed to food preparation practices used in the domestic environment.The study's results demonstrated cross-contamination. Substantial numbers of still implement unsafe food handling practices. For example, up to 65.8%ofstudy participants failed to implement all correct cooling practices..... And more than 40% of the participants failed in avoiding cross contamination. Knowledge of food safety concepts does not generally correspond to practices for most food safety behaviors .For example ,although 98.3% of consumers indicated that they knew that the implementation of hand-washing procedures can reduce the risk of food poisoning ,only 69.1% of consumers reported actually implementing such procedure.

Therefore consumers may not even be aware that they are implementing unsafe practices for example in temperature control practices(eg.thawing frozen food at refrigerator or any cold place, only 32.2%of the respondents agree, and do not leave cooked and leftoverfood more than two hour after it prepared only 34.2%agree. This indicate alack of awareness of the risks arising from the use of unsafe food preparation practices,which constitutes substantial cause for concern.

Because of some unsafe food hygiene practices observed in the study reviewed here were associated with cross contamination there is aneed to minimize behaviors conducive to cross-contamination during the preparation of food. Conclusion; this study provides information about the level of knowledge, attitude, and practice in food safety of household in Khartoum state. They had satisfactory knowledge in the areas of food safety, general and personal hygiene, and cleaning procedures. However, this did not translate into strict food hygiene practices. This results was taken at studies example in Gana,by Fortune, 2017.Nigeria by Anthony,Kenechi,2017.

In general infected food handlers are often the source of food contamination, so some of the foodborne illness can be transmitted from person to person,caregivers can become sick from patients with foodborne illnesses,soin our study we askedwomen if they handle food when they

are sick only 42.6% had positive practice. There was significant association between demographic data, especially educational level of the participant and their practice. Therefore continuous food safety education and motivation of various demographic backgrounds with special attention paid to those with lower levels of education would complement other interventions that pursue the enhancement of food safety systems in Khartoum state. Food safety education should be given not only to the households but also to managers and staff working in food and beverage processing business the adoption of positive attitude and bring behavioral changes to ensure the delivery of wholesome food to the consumers, to allow people enjoy food without risk. In this study, results may not be generalized to the Sudanese population, so further studies will be necessary among other groups of consumers in different geographical areas.

#### Reference:

1. Borneff, J.R. (1989). Effective hygienic measurements in households to day. Zentralbi Baktriol Microbiol. Hyg. B. 187 (4-6): pp. 404-13.
2. Evans, Maden (1998). General outbreak of infectious intestinal disease in England and Wales: 1995 and 1996. Commun. Dis. Public Health 3: 165-171.
3. Gilbert J. (1983). Foodborne infections and intoxications—recent trends and prospects for the future, p.47-66. In Food microbiology advances and prospects for the future
4. Gilbert, J. (1983). Food borne infections and intoxications – recent trends and prospects for the future. Food Micro. Adv. Prosp. 18, pp.47-66.
5. Islam, A.M. (2008). Knowledge, Attitude and practice of food safety among the women in Nile river state. M.Sc. Thesis, SUST.
6. Khaled A.M. (2016). Knowledge, Attitude and practice of food safety among workers at Fedral Ministry of Animal Resources. M.Sc. SUST.
7. Lemini, M; Motarjemi, V. and FK. (1999). International Association for Food Protection
8. Lerman (2001). Clinical and microbiological feature of suspect food poisoning. Commun. Dis. Public Health. 4 (3). 209-12.
9. Mead P.S. (1999). Food related illness and death in the United States. Emerg. Infect. 5 (5). 607-20.
10. Nurhan Ünüsan. (2007). Consumer food safety knowledge and practices in the home in Turkey. Food Control 18(1):45-51 DOI: 10.1016/j.foodcont.2005.08.006
11. Ola, E. (2014). Assessment of Knowledge, Attitude and practice of consumer in Khartoum state regarding food safety. M.Sc. Thesis, SUST.
12. Penilaian Pengetahuan, Sikap serta Amalan Pengendali Makanan di Kolej Kediaman dan Kantin Terhadap Keselamatan Makanan. (2011). Assessment of Knowledge, Attitudes and Practices (KAP) Among Food Handlers at Residential Colleges and Canteen Regarding Food Safety. Sains Malaysiana 40(4)(2011): 403-410.
13. Redmond E.C (2002). Food handling risks in the home: development, application and evaluation of a social marketing food safety education initiative. Ph.D. thesis. University of Wales, Cardiff.
14. Thrusfield, M. (2007) Veterinary Epidemiology. 3rd ed., Ch. 13. Black Well Science Ltd., United Kingdom. p228-246.
15. Rusin, I; Orosz-Coughin,; Gerba, C. (1998) . Reduction of faecal coliform, coliform and heterotrophic plate count bacteria in the household kitchen and bathroom by disinfection with hypochlorite cleaners. J. Appl. Microbiol. 85(). pp.819-28.
16. Somiya (2006) KAP among house hold in food safety in Khartoum state M.Sc. thesis Alahfad university school of health science.

17. Tirado C and Kschmidtced.( 2000). Journal of Food Protection,Vol.66,No.1,2003,Pages130– 161 Copyright
18. WHO (2000) Tirado C. and Kschmidtcer WHO surveillance program for control of food borne infection and intoxication in Europe.
19. WHO (2002) Theimpactoffoodandnutrition onpublichealth—thecaseforafoodandnutritionpolicyandactionplanfortheEuropeanregionofWHO
20. WHO (2003) five keys to safer food manual (WHO) department of food safety, zoonoses and food borne disease
21. WHO (2005)
22. WHO (2015) fact sheet
23. Worsfold.D. (1997).Food safety behaviours in the home. British Food Journal. 99 (3). Pp. 97-104
24. Zhang.P.and.K.Penner. (1999).Prevalenceofselectedunsafefood consumptionpracticesandtheirassociatedfactorsinKansas. J. Food Saf. 19:289–297.
25. Zhao,P, T. Zhao;O,l M. P. Doyle,,l J. R. Rubino,z and J. Meng. (1998). Development of a model for evaluation of microbial cross contamination in the kitchen. Journal of Food Protection. 61 (8),pp.960-963.
- 26.<http://en.m.wikipedia.org>