SURVEY OF LAHORE CONSUMPTION PATTERN AND CONSUMER BEHAVIOR

Survey of Lahore consumption pattern and consumer behavior of poultry meat to provide insight in risk factors for campylobacteriosis.

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INTRODUCTION

Poultry products are the most important source of protein for humans. For this purpose broilers are used as a source of meat and layers are used for the egg production (Kabiret all 2004). In Pakistan Poultry sector generates employment (direct/indirect) and income for about 1.5 million people. Its contribution in agriculture value addition is 4.85%. Poultry meat contributes 24.8 % of the total meat production in the country. The current investment in poultry industry is about Rs. 200 billion (Economic survey 2010- 2011 chapter agriculture page no 16).Pakistan Poultry Association former chairman Abdul Basit said that poultry is the cheapest source of animal protein not only in Pakistan, but the world over. The average daily animal protein consumption in Pakistan is only 17 grams per capita, while the average minimum requirement is 27 gram (Article written by Mansoorahmed published in the news on 4 October 2011). It is believed that world overall poultry consumption and production will increase by 20 % and this expansion is mainly driven due to the increase in the prices of the beef and mutton(European commission 2005). Beside these all the facts which emphasis on the usage of the poultry and its competitive edge over the other products, poultry is also a main vehicle for the bacterial pathogen in humans. The most reported pathogen in the history was salmonella but in previous three decades campylobacter emerge as the one of the most dangerous bacteria that may cause diseases in humans(Sabrina vandeplas et all 2008). Campylobacter is the dangerous human pathogen which led to contaminate the farm poultry up to 100%(Engvall 2001).In Pakistan particularly in major cities poultry consumption is increasing day by day due to cheap price and due to its taste (economic survey 2011). This increase in consumption is very much related to the new types of poultry products, partially and semi cooked products are one of the reason of this fact. Bar b q, saji, shawarma, hamburger, burger and pizza demand is increasing due to fast food trend in Pakistan major cities(Consumption: The fast food factor by B.Khan)[1]. This may cause campylobacteriosis and may lead to dangerous symptoms. Various factors cause the campylobacteriosis which are elaborated with the help of authentic sources in the literature review.

[1]Published in dawn news 17 October 2010. Retrieve on 5.06.2013 from link http://dawn.com/2010/10/17/consumption-the-fast-food-factor/

LITERATURE REVIEW AND CAMPYLOBACTER CHARACTERISTICS

Campylobacter is gram negative, round, spiral and sometime curved rod or helical like structure bacteria. They have flagella which help them to move inside the human body. They are thermophilic species which means that they have ability to grow in range of 37-42 centigrade. But they are unable to grow at 25 centigrade or less (Sabrinavandeplaset all 2008). Campylobacter is an invader (outsider) that enters into the human and attacks the ileum (small intestine) and large intestine, which cause inflammatory diarrhea (VenVeliteet all 2001).Illness usually occurs 2 to 5 days after the attack of Campylobacter and may lasts about a week. It is also reported that one out of thousand campylobacter cause Guillain-Barre syndrome, which is like muscle paralysis (Alos 1997). It is usually estimated that 90 % of campylobacter are contaminated due to meat consumption and 80 % of this is particularly from poultry meat consumption (ICGFI 1999). By improperhandling of poultry and by consuming the broiler meat without proper cooking causes 20-30 % campylobacteriosis (EFSA2010). Improper poultry handling by the consumers causes 40-60 % of the food borne illness, and safety precaution in food material reduces the food borne gastroenteritis (VanAsseltet all 2009).The dispersion of campylobacter can reduce by proper storage and by proper heating (Van Asseltet all 2009). Campylobacter can be spread from poultry by cutting on the same boards and knife thorough cross contamination when handled improperly(Fisheret all 2007).During the slaughtering process, intestinal removal of the poultry increase the risk to contaminate the broiler with campylobacter (Stern and Robach 2003).consumer contamination is un avoidable if chicken meat is not handled hygienically, i.e cross contamination from raw poultry meat to ready to eat food or if the food is not properly cooked before consumption (Humpry et all 2001, kusumaningrum et all 2003).In Denmark, the strategy to control Campylobacter is based on the principles of food safety risk analysis (FAO/WHO, 1995; FAO/WHO, 1997).Campylobacteriosis affects many people in many ways of life in the world over. Foodborne stomach and intestinal diseases are major burdens on society, like causing considerable suffering and loss of productivity due to absentees and lack of interest in the work due to illness. Besides the discomfort felt by sick people, these infections have major economic repercussions by direct illness costs (laboratory diagnosis, consultations, medical cares, hospitalization, etc.)And indirect costs (work inefficacy, days lost work, etc.) (ICGFI, 1999; Bogaardt et al., 2004). A research survey of approximately 3000 person reported by Gallup Pakistan which is affiliated with the Gallup international stated that 45 % people prefer chicken as a source of meat in Pakistan. From 2010-2011 the broiler production of Pakistan was 542.74 million (economic survey 2011). In Pakistan the slaughter procedures are not much hygiene which increases the chance of contamination of the poultry, beside this chicken bar b q and minced recipes are becoming more and more famous which may lead to improper cooking and in houses most of the house wives are not aware with the safety measures to prevent themselves and their family from campylobacteriosis. Due to all these facts it is necessary to check out the consumption pattern and risk related to these consumption pattern of the consumers of Pakistan.

MATERIALS AND METHODS

Research population

In order to gain the insight behavior of the consumption patterns of Lahore consumer behavior of storage and handling of poultry meat, the survey was directed to the sample population of Lahore, ages of 18 years or older, who are involved in shopping and cooking meals at home .250 sample size is used, and after screening 200 survey were selected. Majority of the questionnaires were distributed to fill out among female students of University of Engineering and Technology Lahore and house wives which are directly involved in cooking and handling of poultry products.

Questionnaire:

We use replica methodology as used byImcaSampers , Dirk Berkvens , LiesbethJacxsens , Maria-Cristina Ciocci , Ann Dumoulin and MiekeUyttendaele for their paper "Survey of Belgian consumption patterns and consumer behavior of poultry meat to provide insight in risk factors for campylobacteriosis".The survey instrument consisted of a questionnaire containing closed end questions with answering categories based on preliminary literature review. The survey in particular included questions to collect information on risk factors related with campylobacteriosis due to consumption of poultry meat. Through the present survey, data collection on following four items were made to target the risk exposure of campylobacteriosis, these item was: frequency of consumption of various types of poultry meat, home storage conditions of poultry meat, probability for cross-contamination and probability for undercooking of poultry meat and in particular poultry meat preparations . To facilitate the statistical processing all options below each item options are given numeric symbols such as, a option is given the symbol of 1,b with 2,c with 3,d with 4 and e with 5, further options are indicated with safety 0 is for not and 1 is with safety, and risk is indicated with the options 0 for not and 1 for risk . Some of the question is in between of risk and safety like melting in the refrigerator and/or the microwave was considered acceptable and melting on the kitchen bench or table as not recommended (Mitakakis et al, 2004). This is true in the case of most harmful bacteria. But in the case of Campylobacter this is a bit opposite, as Campylobacter survives poorly at room temperature, it even dies much more quickly than at refrigeration temperatures (Park, 2002). In the case of question B.4., as freezing reduces the number of Campylobacter spp. (Nauta, Jacobs-Reitsma, Evers, van Pelt, &Havelaar, 2005; Ritz et al., 2007; Sampers et al., 2008, 2010). For the questions with regard to consumption frequency of various types of poultry meat, double checks technique is used. Participant were asked about their poultry consumption by two different ways (A.1. and A.2.) which of the different types of poultry meat (broiler, poultry parts (wings, legs, breast not marinated/seasoned), poultry parts marinated/ seasoned, and minced poultry meat products) are consumed by indication of how often they consumed these (rarely, monthly, weekly, more than once a week or daily) and by ranking them for 1(eaten the least) to 4 (eaten the most).

Table 1
Self-reported behaviour questionnaire on consumption patterns (A), home storage (B), undercooking (C) and cross contamination (D) with risk (R) 0 or 1 or safety (S) 0 or 1.

Food preparation and storage questions	S	Food preparation and storage questions	R	Food preparation and storage questions	R
A.1. How often do you consume the following products: (broiler, none marinated/seasoned parts, marinated/seasoned parts and minced poultry)		*B.6. What is the storage time in the freezer?* Less than a week		*D.13. Washing hands is done with* Cold water	
Never		1–4 weeks		Warm water	
Rarely (Few times a year)		1–3 months		Cold water and soap	
Occasionally (monthly or more)		Longer than 3 months		Warm water and soap	
Once a week		*B.7. Thawing took place in…*		*D.14. When you handle raw poultry meat, then*	
Few times a week		the refrigerator	0	you wash your hands only before you handle the poultry meat.	1
Daily		room temperature	1	you wash your hands only after you handled the poultry meat.	0
A.2. Of which category do you eat the most? Order from 1 to 4 (with 1 eaten the least and 4 the most)		microwave	0	you wash your hands only before and after handling the poultry meat.	0
Broiler		*B.8. Thawing in the refrigerator or room temperature took…*		*D.15. When you eat poultry meat, how often do you serve fresh produce (e.g. tomatoes, lettuce, carrots, …)?*	
None marinated/seasoned parts		half a day		Never	0
Marinated/seasoned parts		whole day		Rarely	0
Minced poultry meat		overnight		Occasionally	1
A.3. How frequent do you cook?		*C.9. Hamburgers are usually prepared …*		Often	1
Rarely (Monthly)		by frying in a pan		Always	1
Occasionally (weekly)		at the barbecue		*D.16. Cutting the fresh produce occurs…*	
Often (multiple times a week)		in microwave		After the poultry was handled (thus first poultry meat and next vegetables)	1
Daily		*C.10. How do you prefer to eat your minced chicken meat preparations? (Also asked for broiler, not marinated/seasoned and marinated/seasoned poultry parts)*		on the same surface where you will cut first vegetables next poultry meat	0
B.4. When poultry was purchased, then the products were consumed …				on a different surface/location	0
directly (within 2–4 h)	0	Raw	1	Same surface/location, but with cleaning in between.	0
stored at room temperature	0	Medium (slightly pink inside)	1	*D.17. Cutting the fresh produce occurs…*	
stored in the refrigerator	0	Well-cooked (white inside)	0	with the same knife used for cutting poultry first	1
stored in the freezer	1	*C.11. Whether the poultry meat is well-cooked is tested by*		with the same knife which will be used for cutting the poultry meat	0
B.5. What is the temperature of your refrigerator?		Not	1	another knife	0
No idea		Cutting the meat	1	Same knife, but with cleaning in between.	0
Less than 4 °C		Look to the exterior	1	*D.18. When cooking poultry meat preparations, then*	
4 °C		Using a thermometer	0	these are put immediately from the packaging in the frying pan	0
Between 4 and 7 °C		*C.12. Would you consume not well barbecued poultry meat?*		these are put on a plate before they are heated	1
7 °C		Yes	1	*D.19. Do you put cooked poultry on the same plate where raw poultry meat has been? (Barbecue)*	
More than 7 °C		No	0	Yes	1
				No	0

Researchlimitations

- Low number of respondents
- limited to population of Lahore because it was difficult to survey on whole population of Pakistan
- Short time period for research

Analysis

The sample distribution frequencies are tested and analyzed on spss 17.

RESULTS

250 questionnaires were carried out, out of which 200 were selected after screening the survey. Survey with the missing values and same answers for all options are rejected. 40 % of the participant is female and 10 % is male. Below results are given for the each item.

Consumption patterns

First three questions are prepared for this item. According to the results the answer of the consuming the poultry products, 42 % said once a week then 36 % said occasionally and 14 % said few times a week. In question A2, the highest rank of the consumption is whole broiler which is 50 % than 18 % emphasis on the marinated seasoned part. A3 is based on the cooking schedule of the people in which 32 % cook rarely while 32 % cook occasionally and 36% cook multiple times in the week.

Storage condition

In the first question of this part consumer consumption behavior after the purchase is targeted, in the response of this question 10 % of the sample size consume the poultry instantly after the purchase of it, while 48% stored the poultry in the refrigerator for future use, while 40% store poultry for the future use at room temperature, only 2% store it in freezer. In the second question which is B5 consumers were asked about the temperature which he/she maintain at their refrigerator, the response was don't know 34%, below 4 centigrade 16%, between 4-7 6%, more than 7 centigrade 12%. In B6 storage duration is asked by making different time range, store in freezer less than a week, 1-4 week or 1-2 months and their answers were 66%, 12%, and 22% respectively. Last questions of this category were about the melting or defrosting technique use for the poultry whenever is necessary and defrosting time required, so 12% defrost poultry at the refrigerator, 74% let the poultry melt at room temperature, 14% defrost in the microwave, and 84% take half a day to defrost poultry at room temperature.

UNDERCOOKING

Undercooking was tab by four questions. Poultry products like hamburgers were prepared by different methods in Lahore, 64% fries their hamburger in the fry pan, 22% prepare it in microwave, 14% bar b q it. C10 was about the preference about the cooked color of the poultry and in the response 70% like to eat poultry when it is white from inside mean full cooked. On the safety measure aspect, C11 4% consumer check the poultry well-cooked by thermometer, 52% check the poultry interior by cutting it, 14% don't bother to check either it is cooked or not. In the last question consumer love for the poultry is checked by asking them about the eating of semi cooked poultry meat like bar b q food, and 44% reply yes in response to consuming the semi cooked food.

Cross contamination

Different cross contamination routes are accessed in this category. Cross contamination is one of the major causes of the disease spread. 10% wash their hand before cutting or

touching the poultry meat,26% wash their hand after touching or cutting the poultry meat and 64% of the sample size washes their hand before and after touching or cutting the poultry. D 15 is about the contamination from the fresh vegetable and salad eats with the poultry product, 48% use mostly, 24% always, 12% occasionally, 10% rarely and 6% never ever.

DISCUSSION

Consumption pattern

Results show that 42 % of the sample size use poultry few times in a week that shows poultry is one of the preferred food that use eat. Only 4 % said that they never use the poultry, when ranking of poultry product is asked, 50 % replies with the whole broiler that shows that in Lahore most of the families purchase the whole broiler than made different cuts to the broiler according to their needs. Thus this survey confirms that poultry is one of the basic food for consumption.

Storage condition

40 % of the respondents store the poultry at room temperature, according to Sabrina vendeplas et all, favorable temperature for the campylobacter is between 37-42 centigrade, in summer and spring usually the atmospheric temperature is above than 30 centigrade in Lahore, that shows, there is very high chances of the campylobacter to reproduce and thus cause disease. Campylobacter is thermo- tolerant in nature; he can survivesupto 4 centigrade under the humid condition (bahaduri and Cottrell 2004). Only 2 % of the respondent store meat at freezer and only 12 % of the respondent freezer temperature is below than 4 centigrade, 34 % of the respondent doesn't know about the temperature of their of freezer or fridge. This is also providing risk factor for the campylobacteriosis. When asked about the storage time in freezers 22 % told they store poultry from 1-4 months in the freezer, this is the enough time for the campylobacter to reproduce and spread into the whole broiler. 74 % of the respondents melt their poultry at room temperature which also lead to risk for campylobacteriosis.

Under cooking

Undercooking questions are designs to target the poultry meat quality in terms of proper cook or not, chances of the meat to be undercooked and how much people willing to eat proper cook (Malakar and Barker,2008). Consumers consumes the poultry meat in various forms, like minced, raw food, bar b q in which chances of contamination with campylobacteriosis are high, these kinds of mishandling may lead to factors that cause infection from campylobacter (Malakar and Barker,2008). (Habib et all, 2009) prove with their experiments that campylobacter species require at least 100 centigrade temperature for about 2 min to make the meat safe for human consumption. 64 % of the respondents fry their hamburger at frying pan. Frying pan did not apply full heating and become a cause of some kind of under-cooking, 14 % make hamburger at bar b q, which is also unsafe, only 22 % cook in microwave. 20 % of the respondent eat the poultry either it is in raw form which means consumers endanger their life for sake of poultry, while 20% may take the food

cooked in medium form and 60 % only take meat if it is properly cooked. 14% people don't care about to check the meat either it is proper cooked or not, that is an alarming stage. This trend may lead the population to the diseases.

Cross-contamination

Cross-contamination is identified as arisk factorfor campylo- bacteriosis (Luber, 2009).If a cook uses a cutting board or knife to cut raw chicken and then uses the same knife or cutting board without washing it to slice tomatoesfor a salad, the tomatoes can be contaminated by the bacteria from the chicken. Thus this salad also act like the vector because salad may contain Campylobacter by cross- contamination of food within the home (Evans, Ribeiro, & Salmon, 2003). A few studies demonstrated several cross-contamination routes in the kitchen (De Boer &Hahne, 1990; Fravalo et all, 2009; Kusumanigrum et all 2004; Moore et all 2003; Verhoeff-Bakkenes et all2008).The important cross-contamination paths (cutting board, cutlery, hands) from raw poultry meat to cooked meat and/or ready-to-eat (RTE) food were assessed: no hand washing after handling raw poultry meat founded (10%), putting cooked meat at the same plate which was usefor the raw meat before (10%), using the same knife (10%) or cutting board (20%) for the vegetables for which first poultry meat cutting was done.

CONCLUSION AND RECOMMENDATIONS

During food preparation Campylobacter can tolerate the environment temperature stick itself with the food material and enter into the consumer body which led to illness. Clean and hygienic atmosphere is the minimum requirement to maintain safety and avoid from diseases. This updated information on consumption and consumer behavior during preparation of poultry meat and poultry meat preparations, give further insight in possible risk factors in campylobacteriosis for the Lahore adult population. 4 dimensions are used to capture the whole picture of campylobacteriosis. Undercooking and storage condition is found one of the major causes of the campylobacter. Proper cooking must be took place in the oven or in the frying pan, and proper cleaning of the knife and cut-board must be done before and after cutting poultry and vegetables in order to control the campylobacteriosis. Poultry must be placed at freeze below the 4 centigrade. In Lahore storage condition is one of the most neglected places even at big hotels and restaurant. Government food safety department tries their hard but no consolidate result has been found. Electricity shortage cause electric load shedding which results in freezer and refrigerator malfunctioning and responsible for the helping in the spreading of the campylobacter. Advertisement on media, government and NGO'S responsibility is to enlighten the people through campaigns about the risk factors and causes of the campylobacteriosis. Strict emphasis must be made on the food safety deployment departments. Poultry is the cheap source of protein and it is preferred by every age group. By little efforts will make this food becomes much healthier for us.

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