Full Length Research Paper

Assessment of knowledge gap and factors affecting consumption of dairy products in Ada'a and Lume districts of East Showa Zone, Ethiopia

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ABSTRACT

A cross-sectional survey was conducted in Ada'a and Lume districts of East Showa zone, Oromia National Regional State of Ethiopia to assess knowledge gap and factors influencing consumption of dairy products. Stratified random sampling technique was used to select 94 households and administer a pre-tested and structured questionnaire. Raw milk, pasteurized milk, fermented milk, skim milk, cottage type cheese and butter were the six most regularly consumed dairy products. Raw milk and skim milk were consumed in higher volume with nearly 18 liters each per month per household and purchasing these products at least 4 times per week. The major sources of milk and milk products for the consumer in the districts were farm gates (32.2%), open markets (24.4), milk shops (18.9%), kiosks (17.8%) and supermarkets (6.7%). Nearly 68 % of the household indicated that they had increased their consumption in the last five years, and 60 % of those households were in Ada'a district, representing 75 % of the Ada'a sample. Price, appearance, hygiene of premises and utensils, adulteration and labeling were the most important parameters that received much of consumers' attention when they purchase dairy products in a market. Though about 51 % of the household had access for standardized dairy products, only one-third of them had experienced in purchasing one or more of these product types. Almost all interviewed household agreed that milk must be produced in hygienic manner and nearly one-third and one-fourth of the respondents' believed that milk and milk products can have microbial and chemical hazards, respectively. Interestingly, use of hot water to wash milk equipments was a common activity for 88 % of the household. More than 90 % of the interviewed household had willingness to pay for extra cost for improved quality and safety of dairy products. According to the respondents, a post harvest loss at consumption or consumer level was low. Though knowledge of consumers in the study area cannot be underestimated, awareness on dairy product handling, public health hazards of raw milk and contaminated post-pasteurized, necessary labeling information on packed products, and quality standards of dairy products need to be enhanced.

Keywords: Dairy product, milk, consumption, quality, safety and East Showa

INTRODUCTION

The cattle population in Ethiopia is estimated to be about 53.9 million, out of which female cattle constitute about 55.4 percent. About 98.95% of the total cattle are local breeds and the remaining are hybrid and exotic breeds (CSA, 2013). Dairy production is a critical issue in Ethiopia-a livestock-based society-where livestock and its products are important sources of food and income, and dairying has not been fully exploited and promoted. The annual milk production is estimated about 3.8 billion liters from cattle and 165 million liters from camel (CSA, 2013).

Food security can be achieved with a strategic development plan which is people centered, environmentally sound, participatory, capable of building local and national capacity for self-reliance. These are the basic characteristics of sustainable human and environmental development. In this regard, there was an increase of food availability globally with the growth of human population for the last three to four decades (FAO, 2010). However, there are still millions of malnourished people in the world which can be explained

in terms of food shortage, improper distribution, low purchasing ability or the poor and low nutritional content of the available food that is affordable by poor people (Bilatu et al., 2012). Alongside crops, livestock play an important role in food security as a source of food, skin, fiber, manure, dispensable capital and providing socio-cultural stability to farmers of developing or under developed nations. In the interest of building strong and healthy nation in the future, among the livestock sub-sector dairy development undertaking is the one that give sustainable results within a relatively short period of time.

On the view of public health hazards, provision of milk and milk products of good hygienic quality is desirable to safeguard the consumers where consumption of raw milk and milk products is common in the country (Zelalem, 2003), which may lead to the transmission of various diseases. Consumption of unpasteurized or contamination of milk after pasteurization has been reported to cause illnesses (Cody et al., 1999). Earlier report by Zelalem and Faye (2006) indicated that hygienic practices during production, processing and handling of milk and milk products in the central Ethiopia were substandard and the quality and safety of milk products is questionable. A range of factors can lead to food being unsafe, such as poor handling and storage conditions, naturally occurring toxins in food itself, contaminated water, pesticides and drug residues, and lack of adequate temperature control. Such safety problems, in extreme cases, can have negative impact on the food security status of a country (FAO, 2011).

Apart from the quality and safety concern, poor handling practices in the country causes postharvest losses. FAO (2011) defines food loss as the decrease in edible food mass throughout the supply chain which could have a significant impact on the livelihoods of many smallholders given that most of them live on the margins of food insecurity. These losses can occur at production, postharvest and processing stages in the chain (Parfitt et al., 2010). For milk, losses at agricultural production level refer to decreased milk production due to dairy cow sickness. At postharvest handling and storage, milk loss is spillage and degradation during transportation between farm and distribution. Spillage during industrial milk treatment such as pasteurization and processing of milk to milk products are an example of milk loss in processing. Losses of milk at distribution and consumption stages include losses and waste in the market system and at the household level. Previous report in the country estimated a post harvest losses of up to 40% from milking to consumption (Felleke, 2003).

A well developed animal agriculture in general and the dairy industry in particular has to be in focus in order to respond the growing demand of dairy products in the country owing to the rapidly increasing population size with a growing urban population. To this effect, all parts of possible entry points for intervention across the milk value chain need to be identified; from cow to consumer. Knowledge gap of dairy product consumers' and their perception are important bottlenecks affecting production and consumption of standardized dairy products. Therefore, the objective of the study was to assess knowledge gap and factors influencing consumption of dairy products in Ada'a and Lume districts of East Showa, Ethiopia.

METHODOLOGY

Description of study areas

The study was conducted in two purposefully selected dairy potential districts, Ada'a and Lume, located in East Showa Zone, Oromia National Regional State of Ethiopia.
1.1.1 Ada'a
Ada'a district is found 47 kms southeast of Addis Ababa, the capital of Ethiopia. About 90% of the district belongs to the sub tropical agro-climatic zone having an altitude ranging from 1500 to over 2000 masl. Meteorological data of Debre Zeit Agricultural Research Center indicate that the district receives an annual rainfall of 851 mm with annual minimum and maximum temperature of 11 and 29°C respectively. Though the district is most known for cereal crops (mainly teff and wheat) and legumes, livestock production is an integral part of the system. Cattle, small ruminant, poultry and equines are the major livestock species kept with fast growing smallholder dairy production (IPMS, 2005). About 51% of the land in the district is cultivable, 6.4% covered with natural pasture, 7.4% forests and living area, and the remaining 34.8% is degraded or currently unusable. The district has an estimated total population of 355,343 of which 40.2% of them are urban dwellers (CSA, 2005).

Lume

Lume is the other selected district located about 70 km away from the capital city to South East of the country. Similar to Ada'a, major (80%) portion of the district belong to sub-tropical agro-climatic zone with a wide range of altitudes from 1500 to 2300 masl. According to the meteorological data of the research center the district receives an annual rainfall between 822 to 867 mm. Vegetables, cereals and pulses are an important crop integrated with livestock production. About 54.3 % of the land is arable and 20 % of the land is still unusable. The remain area is covered with pasture, natural forest and living areas (Kassahun, 2008). The district has an estimated total population of 140,030 of which 37.9% of them are urban dwellers (CSA, 2005).

Sampling procedure

A multi stage simple random sampling procedure was
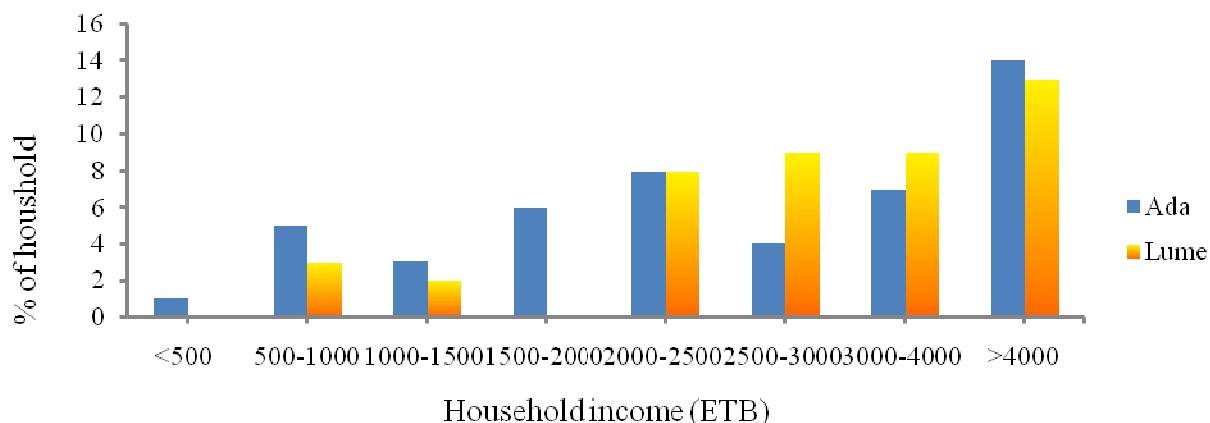
Figure 1. Monthly income category of the household in Ada'a and Lume districts of East Showa zone, Ethiopia

employed to select sample village and households in the selected districts. Based on altitude, land use system, village's situation in representing the district, ethnic group and socio-cultural settings, four villages were chosen from each district in which 10 to 15 household per village were selected randomly. A total of 49 households from Ada'a and 45 from Lume district were used for the study. Both qualitative and quantitative data were collected using multiple subject formal survey by pre-tested, structured questionnaire. Key informant interviews of zonal and districts' administrative bureaus and secondary information were also used to assess consumers' habit of dairy product consumption, their knowledge, preference and associated constraints in purchasing and consumption of the products.

Data analysis

Descriptive statistics was employed for qualitative and quantitative data sets using Statistical Package for Social Sciences (SPSS) software, version 20 (SPSS, 2011).

RESULTS AND DISCUSSIONS

Socio-economic characteristics

The overall mean family size in Ada'a and Lume districts of East Shewa Zone was 4.66 1.86 persons/household (HH) of which 59.6 % of them were female headed household. The average household size obtained in the current study was comparable with the national average which was reported to be 4.8 persons/HH (CSA, 2006). However, higher value of average family size (6.2 persons/HH) was reported by Kassahun (2008) in the same study area. Overall, 72.3% of the households were followers of the Orthodox Christian church and the rest 16.0, 9.6 and 2.1% were Protestant, Muslims and Catholic religion, respectively. Ethnically, the interviewed households were from Oromo (46.1%), Amhara (39.8%),

Tigre (2.2%) and Southern Nations (11.9%) of Ethiopia. The study also showed that 90.3% of the household head were married while 4.3, 4.3, 1.1% were single, widowed and divorced, respectively. Educational status of the 94 household members with secondary school, elementary schools, diploma, degree and above, and certificate levels were 33.0%, 18.1%, 17.0%, 14.9%, and 9.6%, respectively. The rest 7.4% of the household had no formal education. The interviewed households lived for 21.2±14.4 (ranged 1 to 50) years in the area having an experience of consuming milk and/or milk products. The average amount of expenditure for food and non-food items per month per household was 1604 and 727 ETB, respectively. Monthly household income of the interviewee is shown on figure 1. Wife was the main decision maker on which dairy product to be purchased.

Availability and Consumption trend

Diversified dairy products are available in Ada'a and Lume districts of East Showa Zone. These are unprocessed and various milk products locally processed and/or imported, including raw milk, pasteurized milk, fermented milk, skim milk, powdered milk, butter, cheese and ice-cream. In most cases standardized either imported or locally processed milk products were prevalent in urban areas while locally processed milk products using traditional processing technologies dominated in peri-urban and rural areas of the studied districts. Some of the products such as fermented milk, butter and cheese were mainly processed locally. As in many parts of Ethiopia, the butter available in the market was traditionally made from sour milk by churning in a clay pot. Previous studies in the country estimated that about 20 liters of milk is required to make 1kg of butter (Tesfaye, 2007) and it may contain 16.5 % water, 81.7 % fat, 1.1 % protein and 0.23 % ash (Zelalem, 1999). A cottage type cheese called "*Ayib*" is produced by heating
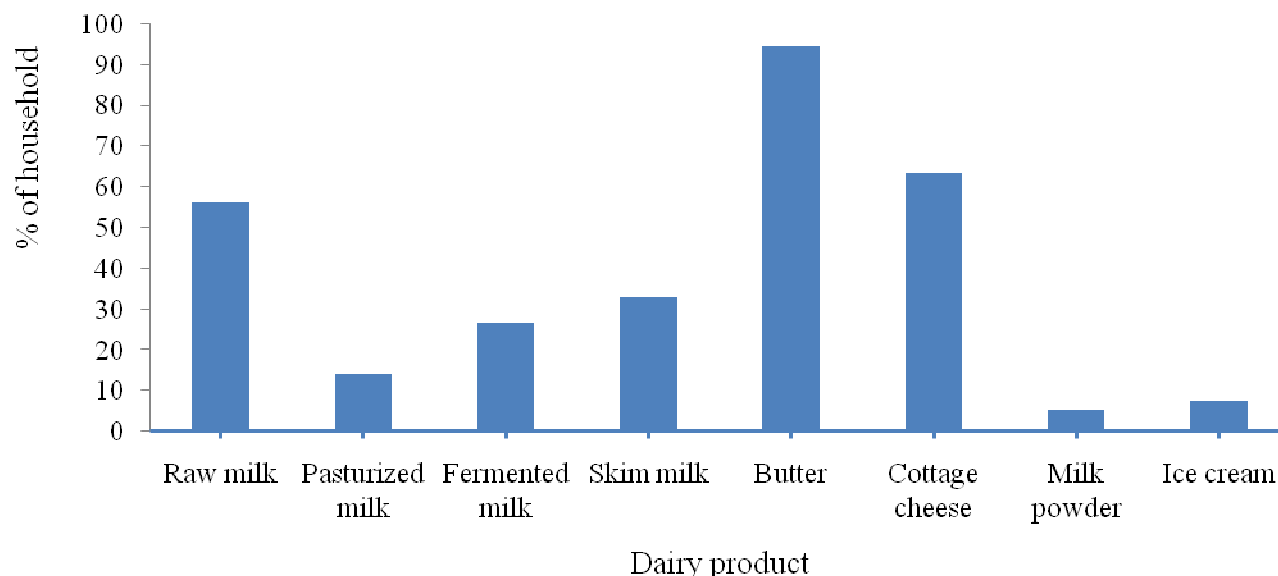
Figure 2. Dairy products commonly consumed by consumers in Ada'a and Lume districts of East Showa Zone, Ethiopia

Table 1. Monthly consumption level and purchasing frequency of dairy products in Ada'a and Lume districts of East Showa Zone, Ethiopia

	Quantity (lit/kg)			Frequency per month		
	Ada	Lume	Average	Ada	Lume	Average
Raw milk	21.3±16.4	15.3±11.7	18.3±14.1	22.1±13.4	16.7±12.6	19.4±13
Pasteurized milk	3.7±3.4	1.2±0.1	2.5±1.75	3.8±2.5	1.2±0.1	2.5±1.3
Fermented milk	5.2±3.9	25.2±19.2	15.2±11.6	2.9±0.9	21.3±17.3	12.1±9.1
Skim milk	10.4±0.1	25.5±7.2	18.0±3.7	10.4±0.1	25.5±7.2	18.0±3.7
Butter	0.9±0.7	1.3±1.1	1.1±0.4	0.7±0.5	1.4±1.2	1.1±0.8
Cottage cheese	0.9±0.6	2.1±1.2	1.5±0.9	0.9±0.7	2.1±1.2	1.5±0.9

the buttermilk remaining after the butter grains has been separated from the whole milk. Raw milk and cottage type cheese were the most consumed milk products by most households while powdered milk and ice cream rarely consumed by less than 10 % of the interviewed households (Figure 2).

We also examined consumers' purchasing behavior and table 1 show respondents purchasing quantity and frequency for the first six regularly consumed dairy products. Raw milk and skim milk were consumed in higher volume with nearly 18 liters each per month per HH and purchasing these products was made at least 4 times per week. Though 94 % and 63 % of the household were responded as they consume butter and cottage cheese respectively, the monthly quantity recorded for these products was less than 2 kg in both districts. Households in Ada'a purchased raw and pasteurized milk more frequently than households in Lume with higher volume per purchase. Whereas, the consumption level and frequency of purchase was higher in Lume district for fermented milk, skim milk, butter and cottage cheese.

When we examine the consumption level of milk and milk products in the studied districts, it was observed that some households had zero consumption of milk products. Though such observations was common for very rarely consumed dairy products such as powdered milk, table butter, soft cheese, cream and ghee, it was also not uncommon for regularly consumed dairy products. Zero consumption observations might be the result of higher price/lower purchasing ability due to low level of income, unavailability or inadequate supplies and/or consumers make infrequent purchases of dairy products, and the timing of the survey did not capture their consumption.

Apart from their own consumption, the major sources of milk and milk products for the consumer in the districts were farm gates (32.2%), open markets (24.4), milk shops (18.9%), kiosks (17.8%) and supermarkets (6.7%). About 38 % of the household member visited milk and milk products market daily, 18 % once in a week, 8 % twice a week and 7 % 3-4 times a week. The rest 29 % of the household were visited market as necessary. According to the interviewee, near to settlement areas,
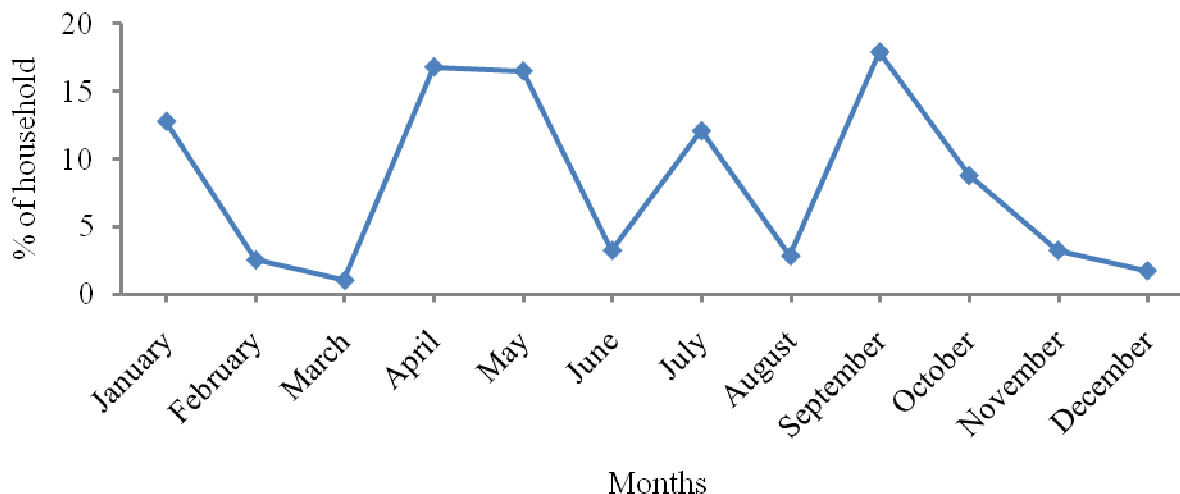
Figure 3. Dairy product consumption status of consumers' in different months in Ada'a and Lume districts of East Showa Zone, Ethiopia

availability of fresh and variety products, reputability of the market and reasonable price appear to be the four most important reasons influencing where consumers purchase their dairy products, with a household percentage of 42.5, 33.9, 14.5 and 9.1, respectively. On average consumers in Ada'a district had to go 1.30 km to reach the nearest market while the Lume's consumer were relatively in shorter distance, 0.64 km, to the market around their settlement area. A recent study by Kassahun (2013) indicated that consumers have to go long distance to obtain milk products from open markets and supermarkets of Ada'a district. This author asked dairy consumers to explain the distance in minutes from their home in a simple walk, and estimated about 51 minutes for open markets and 20 minutes for supermarkets though supermarkets are accessible only for urban high income groups in the area.

Currently consumption of dairy products is increasing globally which driven by the growing evidence and awareness that dairy products can provide essential nutrients and other health benefits (McGill et al., 2008; Warr et al., 2008; Boniface and Umberger, 2012 and Bilatu et al., 2012). The current study area can be taken as an example of this change, where traditionally, dairy products had become a common ingredient in a regular meal in addition to the usual drinking of fluid milk with bread and alone. To understand how consumption is changing in the study areas, consumers in both districts were asked if they had increased their consumption of dairy products in the past five years. If consumers replied as they had increased their consumption then they were asked to indicate which dairy products. Nearly 68 % of the household responded as their consumption was increased in the last five years, and 60 % of those households were in Ada'a district, representing 75 % of the Ada'a sample. Pasteurized milk, raw milk, powdered milk, fermented milk and cheese were among the milk

products that had increased their consumption, with a respondents proportion of 38, 18, 13, 10 and 10 %, respectively. Approximately 5 % of the consumer showed increased consumption of butter. In contrast, the rest 32 % of the household was responded as dairy product consumption was declined in the past five years mentioning the increased milk price was the major reason attributed to for the decline of consumption.

Variation in consumption of dairy products observed with months in a year, and fasting was the major (68%) reason for this variation especially for low consumption (Figure 3). Annually there are about 200 fasting days in Ethiopian Orthodox church during when consumption of animal origin food is abstained. Particularly 55 days between February and early April, and 15 days in August, almost every household member of the Orthodox church follower usually fast except children less than 7 years of age, where over 72 % of the household in the current study were Orthodox Christian. In addition to every Wednesdays and Fridays, the other major fasting periods are 45 days between late November and early January, and about 20 to 40 days usually around June and July. Previous studies in different parts of the country showed that during fasting period's demand of dairy product is getting lower than non-fasting time (Sintayehu, 2007; Tesfaye et al., 2007 and Kassahun, 2008). Availability and consumption of these products was high immediately after fasting as most of the milk during fasting period is processed into other dairy products for later sales and consumption. And usually after the major fasting periods there is holidy when demand for milk products is relatively higher with higher prices. In this regard, butter can be mentioned as a good example where traders usually store large amount of butter until the end of fasting and sell it afterwards. Other influencing factors contributing to consumption change among months were festival, availability and price variation.

Table 2. Factors influencing dairy product purchasing behavior of Ada'a and Lume districts' consumers, East Showa Zone, Ethiopia

Dairy product	Parameters		1=Lowest	2=Low	3=Medium	4=High	5=Highest	Mean	Std.Dev.	N
Raw milk	Labeling		71.1	13.2	14.5	1.3	0	1.46	0.79	76
	Hygiene premises utensils	of and	6.3	16.3	36.3	32.5	8.8	3.21	1.03	80
	Appearance		2.5	13.8	30	38.8	15	3.5	0.99	80
	Adulteration		22.5	36.3	16.3	16.3	8.8	2.53	1.25	80
	Price		1.3	7.5	27.5	36.3	27.5	3.81	0.97	80
Pasteurized milk	Labeling		5.3	0	10.5	57.9	26.3	4	0.94	19
	Hygiene premises utensils	of and	10.5	0	21.1	57.9	10.5	3.58	1.07	19
	Appearance		15.8	15.8	10.5	52.6	5.3	3.16	1.26	19
	Adulteration		35.3	35.3	11.8	5.9	11.8	2.24	1.35	17
	Price		5.6	5.6	33.3	33.3	22.2	3.61	1.09	18
Fermented milk	Labeling		26.7	46.7	26.7	0	0	2	0.76	15
	Hygiene premises utensils	of and	0	33.3	33.3	22.2	11.1	3.11	1.02	18
	Appearance		5.6	11.1	44.4	16.7	22.2	3.39	1.15	18
	Adulteration		44.4	38.9	11.1	0	5.6	1.83	1.04	18
	Price		5.9	11.8	29.4	52.9	0	3.29	0.92	17
Cottage cheese	Labeling		55.2	14.9	22.4	7.5	0	1.82	1.03	67
	Hygiene premises utensils	of and	3	19.4	49.3	25.4	3	3.06	0.83	67
	Appearance		4.5	9.1	34.8	36.4	15.2	3.48	1.01	66
	Adulteration		38.5	15.4	27.7	16.9	1.5	2.28	1.19	65
	Price		0	16.4	19.4	37.3	26.9	3.75	1.04	67
Butter	Labeling		59.1	19.3	15.9	4.5	1.1	1.69	0.98	88
	Hygiene premises utensils	of and	5.7	26.1	40.9	23.9	3.4	2.93	0.93	88
	Appearance		3.4	13.5	32.6	32.6	18	3.48	1.05	89
	Adulteration		28.7	18.4	19.5	24.1	9.2	2.67	1.36	87
	Price		0	10.1	21.3	41.6	27	3.85	0.94	89

Out of the interviewed dairy consumer 7.4 % were producing milk in their home. The daily milk production of these producers was 12.3±5.8 liters per household. The average volume of daily milk production per household recorded for these producers was higher than many previous reports in different part of the country, including 3.0 liters in East Shoa Zone (Lemma et al., 2005), 2.4 liters in Shashemene-Dilla areas (Sintayehu, 2007) and 6.3 liters in Metema districts of North West Ethiopia (Tesfaye, 2007). The higher milk production in the districts might be related to the breeds with relatively highr milk production potential. About 94% of the milk produced was sold while only 6% was retained for home consumption showing the producers provide good service to the community in the area by serving as a good source of milk supply. Kassahun (2008) also indicated the allocation of higher amount of milk for sale in the same study area. In consistent with the current result Mohammed et al. (2004) indicated that most of the milk produced in urban areas of Ethiopia was allocated for sale. Similarly, studies conducted around the capital city (Azage and Alemu, 1998) and Mekele area of Northern region (Nigussie, 2006) revealed that 73 and 79% of the milk produced by urban dairy farmers, respectively, was marketed.

Consumer perception of quality and safety

Consumers' perceptions of dairy product quality are complex and differ across countries (Francesconi et al.,

2010 and Boniface and Umberger, 2012). In Australia, consumers perceive whole milk to be of lower quality than other types of milk (Bus and Worsley, 2003). Hatirli et al. (2004) reported that in Turkey, households' choice of fluid milk sources is influenced by the number of children living in the household and education levels of the respondent. A similar study of Taiwanese consumers who purchased greater amounts of fluid milk had higher levels of household incomes than consumers who purchased mostly yoghurt drinks (Hsu and Lin, 2006). A study in U.S showed that low fat milk consumption is positively related to age, education level and income (Robb and Abdel-Ghany, 2007). The current assessment study of consumers indicated that price was the most important influencing factor to consume dairy products than quality and safety parameters. The perception of consumer for different attributes of dairy product was determined through evaluation of a 5-point scale degree of importance, 1 for lowest and 5 for highest (table 2). Price, appearance, hygiene of premises and utensils, adulteration and labeling were the five most important parameters got consumers' attention when they purchase dairy products in a market with an overall average score point of 3.7, 3.4, 3.2, 2.3 and 2.2 respectively. Though they are not sure for the safety of the products, nearly half of the respondents were believed that raw milk (52%) and traditionally processed milk products, cheese (53%), butter (52%) and fermented milk (47%) available in local markets were of good quality.

Though about 51 % of the household had access for standardized dairy products such as packed low fat pasteurized milk, yoghurt and table butter in their localities, only one-third of the household had experienced in purchasing one or more of these products. Ethiopian Quality and Standards Authority had developed milk and dairy products standards in the year 2001. These standards were then revised in 2005 to be harmonized with the Common Market for Eastern and Southern Africa accepted Standards. However, only 6 % of the household in the current study area knew the standards, and one-fifth of respondents had traditional dairy product standards in their locality. Nearly 7 % of respondents reported purchases of only imported dairy products due to lack of domestic product and the safety of the imported milk products. Only 27% of respondents had information about hazards consequent of using substandard dairy products in which one-fourth of them had evidenced of public health risks after consumption of these products.

In developing countries like Ethiopia, where production of milk and various milk products takes place under poor production and processing practices, the safety of dairy products with respect to food-borne diseases is a great concern. Milk picks up many bacteria from the time it leaves the teat of the cow until it reaches to the table for consumption or further processing and as a result microbial contamination of the dairy product is

the overall effect gained during milk production and handling, including cleanliness level of the milking utensils, condition of storage, manner of transport as well as the cleanliness and healthiness of the udder of the individual animal. Almost all interviewed household agreed that milk must be produced in hygienic manner and nearly one-third and one-fourth of the respondents' believed that milk and milk products can have microbial and chemical hazards respectively. Less than 5 % of respondents had information about hazard analysis critical control point (HACCP) system. To assess the perception about danger of milk contamination, consumers were requested to state the danger level as not dangerous at all, less dangerous, somewhat dangerous, dangerous and very dangerous, and the respondents percentage obtained was 4.3, 21.5, 12.9, 33.3 and 28, respectively. The majority of the respondents indicated that children less than 3 years of age (82%) and pregnant women (17%) were the most vulnerable family members to dairy borne food illness. The safety concern of consumers were very high particularly when they buy milk and milk products from producers, open markets and milk shops in that order of importance (Figure 4).

About 89% of respondents knew cooling is useful to keep milk fresh and 37% of them had refrigerator in their home and stored raw milk in a temperature range of -2 to 5 $^{\circ}$C. Similar result was reported by Zelalem and Bernand (2006) in the central high lands of Ethiopia where about 40% of peri-urban households were preserved the raw milk using refrigerator. Interestingly, use of hot water to wash milk equipments was a common activity for 88 % of the household in the current study area.

To examine consumers' evaluation criteria of packed dairy products, they were asked what labeling information was very important and the survey result revealed that expiry date and nutritional information were the main criteria. However, less than half of the respondents check expiry date and 15 % nutritional values like fat and protein content, and other compositional labels. About 80 % of the respondents were agreed on the idea that it is necessary to provide the extra safe milk with a special label which can easily be distinguished from the regular one. More than 90 % of the interviewed household had willingness to pay for extra cost for improved quality and safety of milk and milk products. Consumers had not recorded health problem faced by consuming standardized dairy products. There was no problem of cultural taboo in the area to utilize milk and standardized dairy products.

Milk and milk product losses

According to the estimate of FAO (2011) nearly one-third of the edible parts of food produced for human
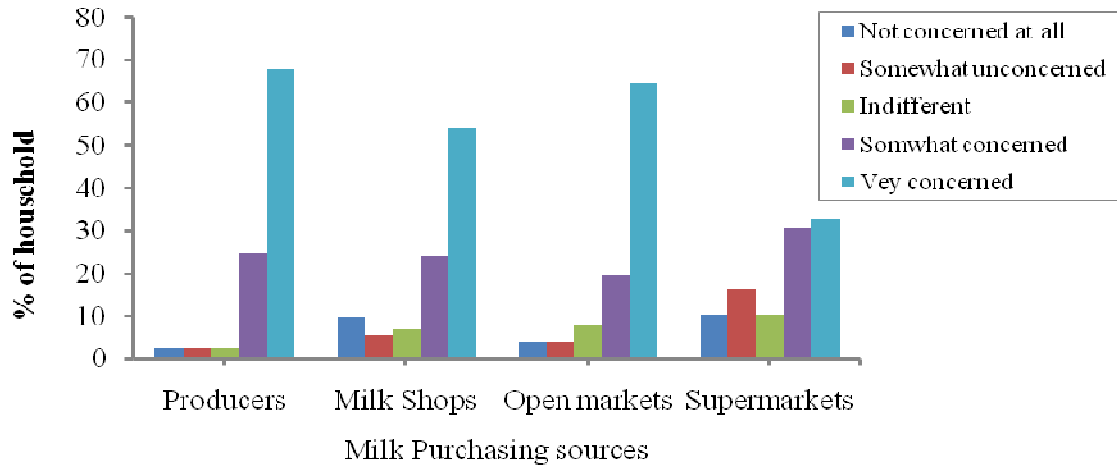
Figure 4. Safety concern of consumers when they buy milk and milk products from different sources in Ada'a and Lume Districts of East Show Zone, Ethiopia
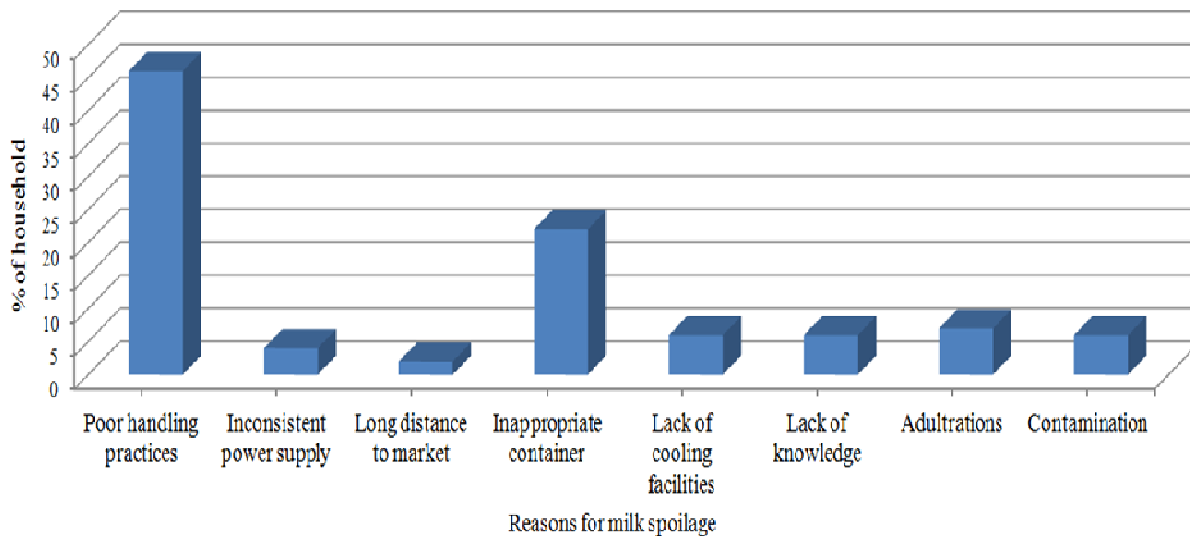
Figure 5. Major factors contributing milk spoilage in Ada and Lume districts of East Shewa Zone, Ethiopia

consumption, gets lost or wasted globally every year and in developing countries more than 40 % of these losses take place at post harvest and processing levels. However, losses of dairy product at consumption level in the current study were found to be low (less that 1%). Similarly, Hodges et al. (2011) argue that in developing countries the issue is inefficient postharvest agricultural systems that lead to poor quality food in markets whereas failure to consume available food is not a big concern. FAO (2011) also concluded that a food loss at consumer level is minimal in developing countries as the limited income makes them to buy smaller amount of food that often enough for meals on the day of purchase.

Only 5.4 % of the household indicated that there

was milk product loss due to spillage and these respondents thought reduction of this loss could increase food availability by reducing physical losses. About 14 % of the household showed they encountered problem of spoilage occasionally, and poor handling practices and inappropriate container found to be the most probable cause of dairy product spoilage (Figure 5). Majority of the interviewed household (65%) were used refrigerator to prevent spoilage. The other spoilage prevention methods were storing in cooler place (15%), boiling (13%) and boil and store at cooler place (7%). Consumers were also asked to explain the fate of spoiled milk products and 55 % of them responded as they dump the product and 45 % give to pet animals.

CONCLUSIONS AND RECOMMENDATIONS

Although the current assessment result does not provide a clear picture of dairy product consumption, can be used as baseline information for further studies in Ada'a and Lume districts. Almost all sampled households had the experience of consuming milk and milk products indicating the presence of no taboo against consumption of these products except during Ethiopian Orthodox Christianity fasting period. The study clearly showed that price was the most important factor than safety and quality attributes to determine household consumption level and choice of product, and therefore attention has to be given to explore use of low-cost production and processing alternatives that can be afforded by most households. Though knowledge of the consumers in the study area cannot be underestimated, awareness on dairy product handling, public health hazards of raw milk and post-pasteurized contamination, necessary labeling information on packed products, and quality standards of dairy products, need to be enhanced.

ACKNOWLEDGEMENT

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