



Knowledge; Hygienic Practice among Milk and Cottage Cheese Handlers in Districts of Gamo and Gofa Zone, Southern Ethiopia

Edget Abayneh*, Minale Getachew, Wasihun Seyoum and Ephram Tora

Department of Animal Science, College of Agricultural Science, Arba Minch University, Ethiopia

***Corresponding Author:** Edget Abayneh, Department of Animal Science, College of Agricultural Science, Arba Minch University, Ethiopia.

Received: June 19, 2020

Published: June 30, 2020

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Abstract

A cross-sectional questionnaire survey was conducted in Arba Minch Zuria and Demba Gofa districts of Gamo and Gofa Zone of the Southern nation nationalities and people's regional state with the objectives of assessing knowledge of hygienic practice of milk and cheese handlers in both study area. For this a total of 102 farmers who involved in milking, collecting and retailing of milk were included in the study area. Data obtained from questionnaire survey were analyzed by descriptive statistics and Chi-square test, using the Statistical package for social science (SPSS Version 17). The participants of this study were woman of different age group and 27 (52.9%) of participants in Arba Minch Zuria and 32 (64.7%) in Demba Gofa were >36 years old. The majority of participants 21 (41.2%) and 22 (43.1%) were educated up to grade 1-8 in Arba Minch Zuria and Demba Gofa, respectively. This had an impact on hygienic practice of milking and milk handling. The difference in hygienic handling, training obtained and cheese making practice among the study areas were statistically significant ($p < 0.05$). There was also a statistically significant difference in hand washing and utensil as well as manner of washing between the two study areas ($p < 0.01$). Finally this study revealed that there were no variation in Antibiotic usage and Practice of treating sick animal in both study area ($p > 0.05$) with significant difference in Prognosis, Level of skin infection and Selling practice among study participants in both study areas ($p < 0.05$). Good manufacturing; handling practice as well as hygienic milking and cleaning practice should be improved in both study areas.

Keywords: Arba Minch Zuria; Demba Gofa; Farmers; Milking Practice; Antibiotic Usage

Introduction

The safety problem of milk with the respect to foodborne disease is great issue around the world. This especially true in developing countries like Ethiopia where handling of milk and milking practice often takes place under unsanitary condition and the consumption of raw milk and cottage cheese which are typically produced at farmer level under unsanitary hygienic condition is common practice [1].

Milk is an excellent growth medium for a large number of micro-organisms [2]. Microbial contamination of milk usually occurs during the milking processing, handling, distribution and this depends on the sanitary condition of the environment, utensils used for milking and the milking personnel [3]. The health of the cow, its environment, poor sanitary, improper handling of milk product, absence of good manufacturing practice, lack of trained milk

handler as well as poor personal hygiene of the milk handler aggravate the problem in milk and cottage cheese which are serve as the source sources of microbial contamination of milk and cheese of and the potential source of foodborne pathogen in the world especially in developing country [4].

Some pathogens naturally inhabit human nostril and there is an obvious contamination of milk and cottage cheese. The milk handlers doesn't give attention on the hygienic handling of milk product and most importantly it is common practice of touching the nose with hand and handle the milk and cottage cheese these results in the contamination of milk and milk product.

The habit of consuming raw milk and cottage cheese is very common practice in both study area of Demba Gofa and Arba Minch Zuria district. The preformed enterotoxin of microorganism can

survive even the pasteurization temperature and impose a long range of health problem in the consumer. Beside that there is also occurrence of drug resistance microbes is very common due to irrational use of veterinary drug by farmers to treat their animal and lack of knowledge on milk withdrawal period. Having these facts, research was not yet done on the knowledge of milk handlers about hygienic handling practice and health management of dairy cattle.

Objective of the Study

Therefore the objective of this study was to assess the knowledge of milk and cheese handlers on hygienic practice as well as health management of dairy cattle in both study area.

Materials and Methods

Description of the study area

The study was carried out from January 2018 to December 2018 in Arba Minch Zuria and Demba Gofa district. Arba Minch Zuria was a part of the Gamo Zone located in the Great Rift Valley, Arba Minch Zuria is bordered on the south by the Dirashe special woreda, on the west by Bonke, on the north by Dita and Chencha, on the northeast by Mirab Abaya, on the east by the Oromia Region, and on the southeast by the Amaro special woreda. This woreda also includes portions of two lakes and their islands, Abaya and Chamo. Nechisar National Park is located between these lakes. City of Arba Minch is surrounded by Arba Minch Zuria. The district has high cattle population with mixed agriculture activity. This district has high mid and low land agro-ecological zones [5] and Demba Gofa is one of the woredas of Gofa Zone in South Nation Nationalities Peoples Regional State. The administrative center, Sawla town, is located at a distance of 525 km from Addis Ababa, capital of Ethiopia in the Southwest direction. The Woreda is divided into 38 rural Kebeles. Population number of the district was estimated to be 125,889 and Agro-ecologically Demba Gofa is divided into low land (Kolla) 75%, midland (Woyna Adega) 15% and high land (Dega) 10%. Maximum and minimum rainfall of the district is 900 and 1100 mm, respectively. In the district the live hood of farmer s depends a great extent on Agricultural production (99%) mainly on livestock and crop production and 1% on trading (Woreda unpublished Data).

Sample size determination and sampling technique

The total sample size for this study was determined using probability proportionate sampling technique [6]:

$$n = \frac{z^2 * p * (q)}{d^2}$$

$$d^2$$

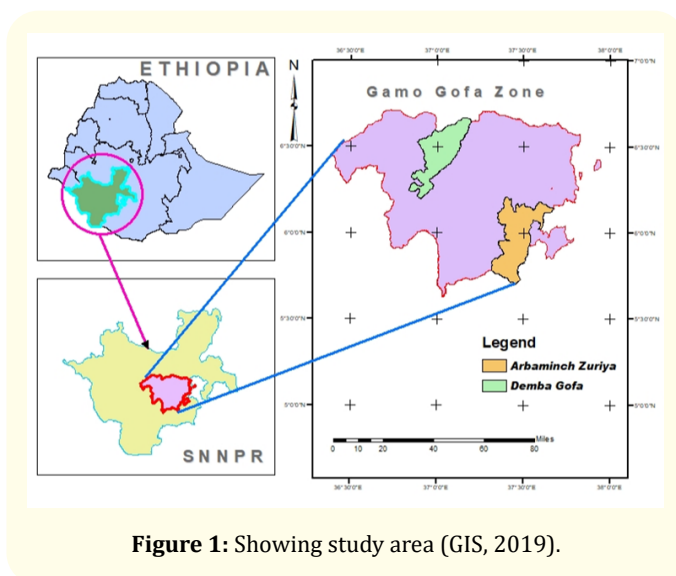


Figure 1: Showing study area (GIS, 2019).

Where, n is desired sample size according to cochran [6] when population household is > 10,000; z is the standard normal deviation (1.96 for 95% confidence interval); p is 0.1 (proportion of population to be included in sample i.e. 10%); q is 1 - p that is 0.9 (90%); d is the degree of accuracy desired (0.05) or 5% error term. A total of 138 house hold was determined but due to lack of required number of farmers in cooperatives as a member in both study areas only 102 farmers, collectors and retailers were participated. The households were purposively selected based on their milking, milk handling, collecting retailing as well as cheese making experience.

Observation of milk handling and milk processing condition

Milk handling, transportation, processing and selling at cooperative, farmer’s house and cooperatives processing plant were observed to know any hygienic problem through check list at the time of visiting to interview. Besides that, the milk handlers were assessed whether or not they took any training regarding hygienic milk handling and milk processing. The farmers who were members of the cooperative at Arba Minch Zuria and Demba Gofa were observed whether or not they were using refrigeration of milk.

Questionnaire survey

Questionnaires were compiled to the hygienic milk handling, milking and cheese making practice at farmers’ level. For these 102 milk handlers were interviewed. Interview and observations were conducted in the farmer’s house, and on cooperatives as well as retailers to know how the milk handler carries out milking practice and the processing method.

Data management and analysis

Data obtained from a questionnaire survey was stored in Microsoft Excel spreadsheet (Microsoft Corp.). These data was analyzed by descriptive statistics, using the Statistical package for social science (SPSS Version 19) statistical package [7]. Chi square test was used to determine significant variation between variables and ANOVA was also used to compare the mean difference among the independent variable at 95% confidence interval and 5% absolute precision.

Result and Discussion

Socio-demographic information of study Area

In both study area, all the respondents were female who take care of milking and handling of milk and milk products. This was due to the fact that men were mainly engaged in crop production, livestock management and tread beside that the members of the dairy cooperatives were women having lactating cows in both study areas. When we saw the age group who involved in milk handling practice the dominant one was > 36 years old with 27 (52.9%) and 32 (64.7%) respondents in Arba Minch Zuria and Demba Gofa, respectively. As far as the educational background of the respondents were concerned 21 (41.2%) were educated from 1 to 8 grade, followed by 15 (29.4%) literate, 9 (17.6%) from grade 9 to 12, 1 (2%) graduate and the remaining 5 (9.8%) were illiterate in Arba Minch Zuria district and an almost similar result was obtained from Demba Gofa district with 22 (43.1%) were grade 1 to 8 followed by 10 (19.6%) were from grade 9-12, 7 (13.7%) were literate, 4 (7.8%) were graduate and the remaining 8 (15.7%) were illiterates. There were no statistically significant differences in age and educational status of the participant in both study areas. This result was in line with the report by [8] who found the educational status of 39.7% attend primary school. This may have an impact on the hygienic practice of milking, handling, and processing of milk and milk product in general and also contribute to the quality deterioration of milk and milk products.

The job division of the study participants, about 43 (84.3%) were involved in milking, 7 (13.7%) in milk collection and only 1 (2%) respondent was engaged in-retailer activity in Arba Minch Zuria while 36 (70%) participant involved in milking practice whereas 11 (21.6%) and 4 (7.8%) participants were engaged in milk collection and retailer activity, respectively in Demba Gofa Woreda (Table 1). This difference was not statistically significant ($p < 0.05$). FAO, 2017 reported similar result which indicated women

are responsible for taking care of animals with the help of children; they gather fodder, milking and traditional processing and selling products. Abebe and Gelmesa [9] in Ambo also found similar result who reported 90% of respondents indicated that females are responsible for milking and again 79.3% of the cases in all production system milking is handled by women in Shashemene (Sintayehu., *et al.* 2008) but Milking is done mainly by men in West Gojam and it is contrary to the practice in other parts of the Country (Melku., *et al.* 2016); Also Kabirizi., *et al.* (2012) who reported dissimilar finding 32 - 34% of labour contribute on milking in Wote, Uganda. This difference might be due to variation in the gender division of labour in different parts of Ethiopia mainly in Oromia and Amhara region the involvement of men are very high [10].

Questionnaire for cooperatives and retailers

None of the cooperatives and retailers was used lactometer test and checked temperature of the milk before accepting it in both study sites. Also the cooperatives and retailers in both districts were used a combination of both aluminium and plastic containers and none of them reported that they had not access to hot water (Table 2). Personal observation during interview revealed that there was no hygienic handling of milk and milk product that come from members of cooperatives and also milk was sent to cooperatives by young and in open jar mainly in Arba Minch Zuria District. Beside this containers were not thoroughly washed with potable water and detergent this would increase the chance of contamination of milk and milk product with microorganism mainly environmental, coliform and potential pathogens. This result was in agreement with the report by [9] in Ezha district of the Gurage zone. Farther more in both study area all of the participants were used traditional storage material other than using refrigerator to store milk and cottage cheese. The result of this study is in close agreement with the report in central Ethiopia [11] and also similar report was found by Amanuel and Haftom, 2016 who reported 92% of participants were used traditional storage material in Ethiopia.

Farmer's questionnaire survey

All the respondents of cow owners were not used biosecurity measures (Table 2). None of the farmers in the present study used detergents or disinfectants during cleaning teat or cow's udder and this finding was in line with the report by Almost 43 (92.2%) of the farmers were always washed their hand before milking followed by 3 (5.9%) and 1 (2%) participants were sometimes and usually, respectively washed their hand and this result was not similar with

No	Variables		Study area				
			AMZ	DG		p- value	
			Percent (%)	Percent (%)	χ^2		Df
1	Age	10 - 15 years	1 (2%)	0 (0%)	2.89	3	0.409
		16 - 25 years	5 (9.8%)	6 (11.8%)			
		26 - 35	18 (35.3%)	12 (23.5%)			
		> 36	27 (52.9%)	32 (64.7%)			
		Total	51 (100%)	51 (100%)			
2	Education	Write and read	15 (29.4%)	7 (13.7%)	5.98	4	0.200
		1-8 grade	21 (41.2%)	22 (43.1%)			
		9-12 grade	9 (17.6%)	10 (19.6%)			
		Graduate	6 (11.8)	1 (2%)			
		Illiterate	0 (0%)	11 (21.6%)			
		Total	51 (100%)	51 (100%)			
3	Work division	Milker	43 (84.3%)	36 (70.6%)	3.309	2	0.191
		Collector	7 (13.7%)	11 (21.6%)			
		Retailers	1 (2%)	4 (7.8%)			
		Total	51 (100%)	51 (100%)			

Table 1: Socio-demographic characteristics of the study areas.

AMZ: Arba Minch Zuria; DG: Demba Gofa.

[12] who studied 76% washed their hands with water only and 24% of them used water and soap for washing their hands while in the manner of washing, 46 (90.2%) were used tap water and soap followed by 5 (9.8%) of respondents were used only tap water and none of respondents were access to hot water in Arba Minch Zuria while 28 (54.9%) respondents were replied they always washed their hand before handling milk and milk product with 13 (25.5%) usually, 6 (11.6%) rarely and 4 (7.8%) respondents sometimes were practiced hand washing before handling milk and milk products and when we look at the manner of washing in contrast 37 (72.2%) Milk handlers were used only tap water whereas 14 (27.5%) respondents were used taps water and soap for washing purpose in Demba Gofa District (Table 2) and this report was in agreement with [12] who studied 76% washed their hands with water only and 24% of them used water and soap . When comparing the hand washing practice of milk and cheese handlers in both study sites, respondents in Arba Minch Zuria district had higher experience of washing hand before handling milk and milk product ($P < 0.01$). This could be due to knowledge difference in the hygienic handling practice among the farmers in both study area because members of the cooperatives in the former study area had training on hygienic handling practice of milk and milk products and this finding is in line with the report by [11,13].

Status of hygienic handling practice of milk and cheese

The majority of participants 50 (98%) in Arba Minch Zuria were hygienically handled milk and cottage cheese with only 2 (2%) participants were improperly handled milk while 31 (60.8%) and 20 (39.2%) respondents were handled in hygienic and unhygienic manner, respectively in Demba Gofa district. There was statistically significant difference between milk and cheese handlers among the two districts ($P < 0.01$). The result from Arba Minch Zuria was inconsistent with studies done in Dangila (52.5%) and in Assosa (67.8%) [14]. This difference might be due to increased awareness of the farmers through frequent hygienic training by different NGO's, personal observations also support the questionnaire survey result. But the result from Demba Gofa was in agreement with studies done in Addis Ababa (47.7%) [15] and in Gondar which is 30.3% [16].

As per the study result, majority 43 (84.3%) of milk and cheese handlers were reported as they received training on hygienic handling of milk and cheese and the remaining 8 (15.7%) participants were not taken any kind of training in Arba Minch Zuria, in contrast the majority 37 (72.5%) of study participants were not taken any kind of training on hygienic handling of milk and cheese whereas only 14 (27.5%) participants were took training in Demba Gofa

district. The difference among study participant in both districts was statistically significant ($p < 0.01$). This difference may be due to the presence of more NGOs, distance from zone that makes Arba Minch Zuria preferable to be chosen for training as well as the presence of strong female cooperatives. This report was disagreed with the finding [12] who studied 50% of the participants obtained training only on hygienic milking in Bishoftu. This difference could be due to difference in access to training providing different NGO's in the areas.

Towards cheese making practice; the majority 44 (86.3%) of respondents were replied they never processed cheese at home; In addition, 41 (80.4%) of participants were responded they never consume cheese with only 6 (11.7%) participants had experienced raw cheese consumption in Arba Minch Zuria. In contrast most 50 (98%) participants were processed cheese at home and All 51 (100%) respondents had experience of consuming cheese in their home with higher 26 (51%) participants were enjoyed under cooked cheese in Demba Gofa. This difference in cottage cheese processing and consumption habit among the study participants were statistically significant ($p < 0.01$) (Table 2). This could be due to less milk production in Arba Minch Zuria which forced them to sell fresh milk to the cooperatives. The finding the current study was in agreement with the report by (Ayantu, 2006) who found the majority of household's cheese making and consuming in Dalbo, Wolaita Zone.

Regarding hygienic preparation of cottage cheese at home 29 (56.8%) participants were replied hand washing were not practiced during cheese making with 22 (43.2%) participants had good hand washing practice during work in Demba Gofa. This was due to lack of awareness of farmers towards hygienic handling and also the majority of farmers participated were illiterate as compared with Arba Minch Zuria. This report was in line with the finding by [17] who reported 73.4% household in peri-urban areas of produced cottage cheese.

Milking and hygienic practices

Women were the main actors in milking of cow in both study areas. Cows were usually milked twice a day (Table 3) and this result was in line with the result 96.3% of households milked twice in Shashmene (Sintayehu, *et al.* 2008) and plastic containers (buckets) were used during milking. Higher number of study participants 47 (92.2%) were practiced washing of their hand and milk utensils daily with 4 (7.8%) participants were not regularly clean hand and milk vessels in Arba Minch Zuria; this result was Consistent with [18] reported that majority (96.3%) of the farmers

No	Variables		Study Area	
			AMZ	DG
			Percent (%)	Percent (%)
1	Hygienic handling	Yes	50 (98%)	31 (60.8%)
		No	1 (2%)	20 (39.2%)
		Total	51 (100%)	51 (100%)
		χ^2	21.647	
		Df	1	
		p- value	0.000	
2	Training obtained	Yes	43 (84.3%)	14 (27.5%)
		No	8 (15.7%)	37 (72.5%)
		Total	51 (100%)	51 (100%)
		χ^2	33.443	
		df	1	
		p- value	0.000	
3	Cheese making practice	Yes	7 (13.7%)	50 (98%)
		No	44 (86.3%)	1 (2%)
		Total	51 (100%)	51 (100%)
		χ^2	32.527	
		df	1	
		p- value	0.000	
4	Hand washing during work	Yes	47 (92.2%)	22 (43.1%)
		No	4 (7.8%)	29 (56.9%)
		Total	51 (100%)	51 (100%)
		χ^2	5.702	
		df	1	
		p- value	0.017	

Table 2: Status of hygienic handling Practice of Milk and cheese among participants.

in Jimma practiced hygienic milking, such as washing of hand, milk containers and udder before milking whereas 28 (54.9%) milkers were regularly cleaned hand and utensils with the remaining 23 (45.1%) were failed to wash hand and vessels daily in Demba Gofa and the present study found in agreement with the study by Up on observation cleaning was not efficient and utensils were not properly dried. This contributes the contamination of milk and cottage cheese with opportunistic and potentially pathogenic foodborne microorganisms. This finding in Demba Gofa was similar with the report by [12] who reported 61% of participants properly washed.

It was observed that milkers dip their fingers in the milking vessel to moisten teats of the cows with the intention of facilitating milking. Cleaning the udder of cows before milking is important

since it could have direct contact with the ground, urine, dung and feed refusals while resting. Lack of washing udder before milking can impart possible contaminants into the milk [19]. Among interviewees, about 66 (65%) did not washed udder before milking while the remaining 36 (35%) did wash, this study is in agreement with other reports [19,20]. But Haile., *et al.* [21] reported that 82.5% of the small size farms owning households in Hawassa city are practicing pre milking udder washing. Unless properly handled, milk can be contaminated by microorganisms at any point from production to consumption. Therefore producers should be practiced a regular washing of udder in order to minimize contamination and produce good quality milk at acceptable level.

Wet teats allow skin and environmental bacteria to have easy access into mammary gland [21]. Not practicing sufficient drying of teat and udder by the dairy cow owners, increased contamination level of the milk [19]. Similarly, none (0%) participants were not used towel to dry udder after washing and rather they massaged the udder with bare hands 40 (78.4%) and 37 (72.5%) in Arba Minch and Demba Gofa, respectively. Generally, it was observed that the person involved in milking was not clean, and the milking environments and utensils were also unhygienic indicating the possibilities for microbial contaminations of milk. This result is in line with the report by [19,23].

No	Variables		Study Area				p- value
			AMZ	DG		df	
			Percent (%)	Percent (%)	χ^2		
1	Hand washing and utensil	Always	47 (92.2%)	28 (54.9%)	21.242	3	0.000
		Usually	1 (2%)	13 (25.5%)			
		Sometimes	3 (5.8%)	4 (7.8%)			
		Rarely	0 (0%)	6 (11.8%)			
		Total	51 (100%)	51 (100%)			
2	Manner of washing	Soap and water	46 (90.2%)	14 (27.5%)	41.448	1	0.000
		Cold water only	5 (9.8%)	37 (72.5%)			
		Hot water only	0 (0%)	0 (0%)			
		Total	51 (100%)	51 (100%)			
3	Washing of udder and teat	Yes	19 (37.3%)	17 (33.3%)	3.309	1	0.191
		No	32 (62.7%)	34 (66.7%)			
		Total	51 (100%)	51 (100%)			
	Drying practice of udder and teat	Using clean towel	0 (0%)	0 (0%)	2.321	1	0.250
		Bare hand	40 (78.4%)	37 (72.5%)			
		other practice	11 (21.6%)	14 (27.5%)			
		Total	51 (100%)	51 (100%)			

Table 3: Hygienic practice of milking and cleaning utensil.

AMZ: Arba Minch Zuria; DG: Demba Gofa.

Cattle housing and cleaning practices

The majority of cattle owners who were members of the dairy cooperatives responded that they kept their animal outdoor in a fence 47 (92.2%). While the floor of about 50 (98%) was earthen and covered with manure since they do not remove the manure completely during cleaning and found in poor hygienic state. Teats and udders of cows inevitably become soiled while they are lying in such stalls. In the study about 35 (68.6%) of the respondents cleaned the barn once in a week while 15 (29.4%) participants were cleaned daily and only 1 (2%) participant was responded ev-

ery month in Arba Minch Zuria District while the majority of cattle owners were kept their animal in door in Demba Gofa District. This difference was statistically significant ($p < 0.01$) (Table 4). This result was not consistent with the finding of [12] who reported all the respondents (100%) use separate house for keeping the animals and most of the cows (93%) were housed in concrete type floor barn in Bishoftu; Bruktawit [24] also reported that in Addis Ababa, majority of the respondents used barn floor made of concrete. This difference may be due to the difference in the living condition of the dairy cow owners.

No	Variables		Study Area				
			AMZ	DG			
			Percent (%)	Percent (%)	χ^2	df	p- value
1	Floor	Concrete	0 (0%)	6 (11.8%)	25.467	4	0.000
		Stone	0 (0%)	24 (47.1%)			
		Soil	50 (98%)	10 (19.6%)			
		Sloppy	1 (2%)	4 (7.8%)			
		Levelled	0 (0%)	7 (13.7%)			
		Total	51 (100%)	51 (100%)			
2	Wall	Concrete	0 (0%)	1 (2%)	26.835	2	0.000
		Mud	1 (2%)	37 (72.5%)			
		Only Fence	50 (98%)	13 (25.5%)			
		Total	51 (100%)	51 (100%)			
3	Roof	Metal	0 (0%)	40 (78.4%)	80.053	2	0.000
		Grass	4 (7.8%)	8 (15.7%)			
		No roof	47 (92.2%)	3 (5.9%)			
		Total	51 (100%)	51 (100%)			
4	Manure cleaning Practice	Daily	35 (68.6%)	23 (45.1%)	9.353	2	0.009
		Weekly	15 (29.4%)	19 (37.3%)			
		Monthly	1 (2%)	9 (17.6%)			
		Total	51 (100%)	51 (100%)			

Table 4: Cattle housing and cleaning practice among the study site.

The housing practice of study area concerned 24 (47.1%) participants were used stone floor followed by 10 (19.6%) soil, 7 (13.7%) leveled, 6 (11.8%) concrete, and 4 (7.8%) sloppy were responded in Demba Gofa while 50 (98%) respondents were used soil floor and only 1 (2%) participant replied the floor was sloppy in Arba Minch Zuria and this difference was statistically significant ($P < 0.01$). up on observation and personal interview revealed that housing practice in Arba Minch Zuria mainly the low land part used only fence 50 (98%), in contrast respondents in Demba Gofa district were used 37 (72.5%) mud, 13 (25.5%) fence, and 1 (2%) concrete wall for cattle housing. The variation was statistically significant among the two districts ($P < 0.01$) (Table 4).

Manure removal practice of both district indicted that 23 (45.1%) of participants were cleaned manure daily with 19 (37.3%) once in a week, and 9 (17.6%) monthly manner in Demba Gofa whereas 35 (68.6%) respondents were removed manure daily and 15 (29.5%) weekly with only 1 (2%) respondents were clean manure once in month at Arba Minch Zuria district ($P < 0.01$). This result is in agreement with the report in Tanga; Tanzania and Ethiopia [19,25,26] respectively.

Veterinary antibiotic usage practice

One of the factors for development of drug resistance is irrational use of veterinary drug through illegal veterinary practitioners and farmers themselves treat their animal. In both study areas the experience of veterinary drug usage the most 45 (88.2%) were used antibiotic for treating any animal disease with 6 (11.8%) respondents were replied they don't know in Demba Gofa while the majority 48 (94.1%) of participants in the Arba Minch Zuria were used antibiotics for treatment of various animal disease with only 3 (5.9%) respondents were responded they don't had experience. The difference in the usage of antibiotics in both study area was not statistically significant ($p > 0.05$). This result was similar with the finding by [27] who reported around 90% farmers commonly use antimicrobials in Low/midland pastoralist but Caudel, *et al.* 2017, who reported 74% of farmers were used antibiotics in Maasai, Tanzania and this result was dissimilar with the finding of the current study. And also Biruk, *et al.* 2019 again reported 25% farmers in lowland crop-livestock and highland crop-livestock used antimicrobials.

Regarding veterinary service, 39 (76.5%) and 34 (66.7%) participants were used veterinary clinic for treating their sick animal in in Arba Minch Zuria and Demba Gofa district, respectively. This result was in line with (Mulugeta., *et al.* 2017) who studied 63.9% of participants in Bishoftu visited veterinary clinic. Whereas the remaining 12 (23.5%) 17 (33.3%) respondents were treat their animal at home by themselves in Arba Minch Zuria and Demba Gofa district and this report was in line the study done by [28] (36%) treat their animals themselves in Maasai, Tanzania. There was no statistically significant difference among the respondents in both study area ($p > 0.05$). This might be due to farmers in both study area used both clinic and treat their animal at home or was used local illegal veterinary practitioner which increased the risk of veterinary drug resistant in the study areas.

Public health aspect

the current study revealed about 50 (98%) interviewed producers were consume raw milk with the remaining 1 (2%) pasteurized milk before consumption in Arba Minch Zuria this finding was in agreement with study done by Desissa and Grace (2012) who reported 94% of farmers in peri-urban had a habit of consuming raw milk while 28 (54.9%) respondents in Demba Gofa responded drinking of raw milk and the remaining 5 (15.2%) are not and again this study was in agreement with the report by 68.3 and 47% of the respondents in the Dega and Woina Dega areas, respectively, used whole milk for consumption. Contrary to this finding, consumption of raw milk in the Wolayta zone is not a usual practice rather in most cases the small amount of milk produced daily is accumulated over a few days to manufacture the butter (Ayantu, 2006). The difference in drinking habit of raw milk among the two district is statistically significant ($P < 0.01$). This difference may be due to preference in drinking of raw milk and high cheese making and eating habit in Demba Gofa district.

Almost all of the respondents 102 (100%) were not aware about the risk of public health hazards associated with consumption of raw cow milk in both study areas, most of the participants were not boil milk for consumption and some of the respondents were suffered from food borne infections of unknown origin. All cow owners were not used milking machine and storing of milk by refrigerator were not practiced in both study areas. It was common practice that fresh milk were mixed with milk left over from previous milking and milk from different source were mixed together during collection. During personal observation most of the members of the cooperatives sent the produced milk by children and in open plastic jar in Arba Minch Zuria District this might contribute to contamination of milk by different hazards. The majority of re-

spondents 44 (86.3%) replied that they sold milk to cooperatives followed by 5 (9.8%) individuals and 2 (3.9%) cafeteria while in Demba Gofa 23 (45.1%) participant sold raw milk to cooperatives followed by 19 (37.3%) to individuals and the remaining 9 (17.6%) to cafeteria. This difference was statistically significant ($p < 0.01$) (Table 5). This difference could be due to the difference in milk processing experience in among study areas.

As far as concerning the exposure of milk and cheese handlers to skin infection 44 (86.3%) were not experienced skin infection while 7 (13.7%) were acquired skin infection in Arba Minch Zuria in contrary 35 (68.6%) participants were not exposed to skin infection with reasonable number of respondents 16 (31.4%) experienced skin infection and this difference was statistically significant ($p < 0.05$). But all the respondents 102 (100%) were fail to undertake regular medical examination in both study areas. This is may be due to lack of awareness of farmers regarding the personal hygiene of milk and cheese handlers which had a negative impact on the quality of milk and cheese and also predispose consumer to foodborne infections in the study areas [29-34].

No	Variables		Study Area	
			AMZ	DG
			Percent (%)	Percent (%)
1	Antibiotic usage	Yes	48 (94.1%)	45 (88.2%)
		No	3 (5.9%)	6 (11.8%)
		Total	51 (100%)	51 (100%)
	χ^2		1.097	
	Df		1	
	p- value		0.295	
2	Practice of treating sick animal	Clinic	39 (76.5%)	34 (66.7%)
		Inject at home	12 (23.5%)	17 (33.3%)
		Total	51 (100%)	51 (100%)
	χ^2		1.205	
	df		1	
	p- value		0.272	
3	Prognosis	Effective	8 (15.7%)	18 (35.3%)
		Non effective	43 (84.3%)	33 (64.7%)
		Total	51 (100%)	51 (100%)
	χ^2		25.490	
	df		1	
	p- value		0.000	

4	Level of skin infection	Yes	7 (13.7%)	16 (31.4%)
		No	44 (86.3%)	35 (68.6%)
		Total	51 (100%)	51 (100%)
		χ^2	4.547	
		df	1	
		p- value	0.033	
5	Selling practice	Cooperatives	44 (86.3%)	23 (45.1%)
		Cafeteria	2 (3.9%)	9 (17.6%)
		Individual	5 (9.8%)	19 (37.3%)
		Total	51 (100%)	51 (100%)
		χ^2	19.203	
		df	2	
		p- value	0.000	

Table 5: Knowledge of veterinary drug usage and public health aspect in the study area.

Conclusion and Recommendations

This current study revealed that there were unhygienic handling of milk and cheese in both study areas, milking and cleaning practices were also the potential risk factor for milk contamination by different microorganisms. The risk of occurrence of foodborne infection and intoxications were very high due to poor hygienic handling and milking practice, improper washing of hand, utensils and udder; knowledge gap, lack of training on hygienic handling practice of milk and cheese in both study area. Farmers in the study areas had the practice of poor housing, cleaning practice, and irrational veterinary drug usage which predispose milk and milk products to microbial contaminations and development of veterinary drug resistance in general. Above all this study concluded that the cheapest possible solutions for reduction of the risk of occurrences of foodborne infection and intoxication in both study areas. Based on the above conclusion the following recommendations are forwarded:

- Good handling and manufacturing practice should be implemented mainly to cooperatives who handled milk and milk products in both study areas.
- Training should be given to farmers on hygienic milking, handling practice and personal hygiene mainly to woman who had direct contact with milk and milk product in both study areas.
- Awareness creation should be done regarding foodborne disease and zoonosis through extension service in both study areas.

- Education should be given on boiling of milk and thorough cooking of cottage cheese to farmers, students at school and public institutions.
- Further investigation should be done on milk and cheese safety and quality through microbial identification and isolation together with antibiotic susceptibility test.

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