Research Article

Awareness about milk borne diseases and public health concerns in Rawalakot Azad Kashmir, Pakistan

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Abstract
Milk is a natural medium for microbial growth due to its specific nature. The milk-borne epidemics were recorded as 2-6% due to bacterial food-borne diseases. The microbial contamination can originate from different sources such as air, milking equipment and feed. Milk that has not undergone pasteurization can harbour bacteria such as Campylobacterium, Listeria, Brucella, Mycobacterium; and E.coli, can cause severe illness and even death. The current study was designed to evaluate the awareness of using boiled milk among women of Rawalakot, Azad Jammu, and Kashmir. A self-designed questionnaire was used to assess the awareness of women. Most people like milk (86.5%). Almost 100% of women were aware of using boiled milk for drinking, but it was quite surprising that 100% of women were using unboiled milk for making milk products. It was also noticed that about 87.5% of women experienced gastrointestinal problems after consumption of raw milk and it was interesting to find that almost 92.5% were not aware of the reason of illness. About 25% were suffering from lung tuberculosis whereas 12.5% had intestinal tuberculosis. Only 15% of women were aware of the aetiology of T.B and 85% were unaware of the cause of T.B transmission. This difference might be due to cultural practices that were used by people for many years without considering any hazard of using raw milk. They were unaware of milk-borne diseases due to the consumption of raw milk. This study will further help to aware of the people about the use of boiled milk.

Keywords: Awareness; Boiled milk; Illness; Microbial contamination; Tuberculosis

Introduction
Milk is a complete diet due to its high nutritive value. It is used by vast population of our land to fulfil its dietary requirements [1]. It is the natural best blend from its nutritional profile which is not only necessary for the growth and development of young ones but also favours the growth of microorganisms [2]. Milk and milk products are very much popular throughout the globe including Pakistan. Our country is fourth in milk production globally. Milk due to its high water content provide an excellent growth medium for organisms when a suitable temperature exists [3] and it is prone to all types of microbiological
contamination [4]. At the time of milking from healthy animal milk is almost sterile. It can get contaminated at various stages including within the udder, from its surrounding, milking utensils, and from storage area [5]. These contaminants are responsible for the growth of infectious agents which can compromise the quality of milk and such contaminated milk is not safe for human health. Milk-borne zoonotic diseases mostly occur due to poor handling and due to the fact that in some areas of the world people prefer raw milk over pasteurized milk [6]. Raw milk that has not undergone heat treatment can harbour many pathogenic organisms such as *Salmonella*, *Listeria*, *Mycobacterium tuberculosis*, etc. [7]. Milk borne illnesses are most frequent at present and in past, most of the outbreaks were due to contaminated milk usage [8]. Risks of milk-borne zoonosis paced greatly due to the usage of raw milk and cause public health concerns [9]. Due to the consumption of contaminated milk a person may suffer from nausea, water loss due to diarrhea vomits and sometimes severe complications as blood in urine or Guillian–Barré syndromes, if the cause remains untreated it can cause death of patient [10]. Un-boiled milk is always subjected to bacterial proliferation and it is not preferred over boiled or processed milk [11]. The usage of untreated milk is commonly observed in dairy herds mans those have direct contact with raw milk. Consumption of raw milk and raw dairy products always expose the public to many milk-borne diseases and unpasteurized dairy products such as yogurt and cheese are associated with foodborne illnesses [12]. Unpasteurized milk and dairy products such as yogurt, cheese, etc. are found to be contaminated with *Campylobacter* spp., *Salmonella* spp., *Shiga* toxin-producing *Escherichia coli* (STEC) and *Listeria monocytogenes* [13] and illness is noticed in hospitalized patients. The bacteria of *Mycobacterium tuberculosis* is also found in raw milk and is highly associated with tuberculosis in humans. These bacteria also have ability to survive in yoghurt made from un-boiled milk from 3-4 days [14]. In humans it is characterized by cough, fever, weight loss, chest infection leads to pleurisy. Raw milk can be contaminated with pathogens even when sourced from clinically healthy animals [15]. Even milk that appears to be of good quality (low total bacteria count) may contain pathogens [16]. Dairy products consumers who have limited knowledge about infectious agents in raw milk were more likely to consume raw milk than those who have awareness about presence of pathogenic organisms in un-boiled milk. Various studies showed that level of awareness is not up to satisfactory level. Only 20% to 65% participants were aware of diseases transmitted from milk [17]. This lack of knowledge may be one of the reasons for the consumption of raw milk. It is observed in various studies that dairy products prepared from raw milk can harbour various pathogenic bacteria that can cause *salmonellosis* and other foodborne illnesses of public health importance [18]. The study was conducted to elevate the awareness level among the women to use boiled milk before consumption. This obligation is not only for the milk used for drinking but also for the milk used for making milk products. Many pathogenic organisms can enter in milk from production to consumption and such pathogens can pose public health hazards. The present study will further help in providing awareness to the community about the benefits of boiled milk for drinking as well as preparation of milk products.

**Materials and Methods**

The current research study was conducted at Rawalakot, the centre of Poonch district Azad Kashmir during 2017. Self-designed questionnaire was used to assess the awareness of usage of boiled milk among women of Rawalakot in face to face interview and self-filled questionnaire by educated women. Informed written consent was taken from all individuals that their information was used in this study. In this
study, data of 200 women were collected. The aim of this research was to show that how un-boiled milk can be source of illness for general public. All data were related to females.

**Statistical analysis**

The statistical analysis was executed by using the SPS 20 software to assess the level of awareness among women of Rawalakot of Azad Kashmir.

**Results and Discussion**

The descriptive study was conducted in district Poonch at Rawalakot and its adjoining areas and it has been observed from the study that at community level there is seen high level of awareness regarding the usage of boiled milk for drinking purposes. Majority of the people were using boiled milk for drinking purpose, this awareness may be due to media campaigns active role of community health worker. The results of present study showed that more than (86.5%) respondents showed their likeness toward milk & milk products while a 9.5 % percentage do not like as shown in (Fig. 1).

There was seen high level of awareness among women regarding boiled milk for drinking, 100 % respondents were using heat treated milk for drinking as shown in (Fig. 2).

When respondents were asked about their preference of using tetra packed milk or common household milk which is obtained from locally domesticated animals, a large percentage of women showed their disliking toward tetra packed milk due to the “cooked taste” of pasteurized milk (Fig. 3). Similar findings regarding the taste of pasteurized milk may be due to the modern sophisticated type of pasteurization developed "cooked" flavour in milk that some find unpleasant [19].

In the present study, it was alarming to notice that (100%) participants were using raw milk for making yogurt and cheese which is considered an important factor in milk-borne illnesses. In Rawalakot and its adjoining areas, raw milk is used for making household yogurt and cheese for a long tradition and this cultural practice is considered as one of the most important predisposing factors in milk-borne diseases especially TB and Brucellosis. Such health concern was also cited in the study of [20]. Usage of un-boiled milk for making products like yogurt etc. is very ancient among women of Rawalakot and its adjoining areas and it was observed throughout the study that 100% community was using un-boiled milk for making milk products. When the respondents were asked about the main reason for using raw milk for making milk products like yogurt, cheese, butter, buttermilk, etc., the majority of the women responded that it was a traditional method of making yogurt from raw milk and due to preference of taste it is widely used. Another study was conducted by [21] in which people raw milk was used.
due to the preference of particular taste and convenience.

Figure 2. Awareness of heat treated milk for drinking

Figure 3. Usage of raw milk for making products

It was also noticed that about (87.50%) women developed G.I.T (gastrointestinal) problems due to usage of un-boiled milk products while (12.5%) remained healthy and had no complaints about gastric problems as shown in (Fig. 4). For those women who ingested yogurt made from raw milk, most of them said that they suffered from G.I.T (gastrointestinal tract) disorders e.g. gas and dyspepsia. These types of disorders associated with the bacteria that are present in the raw milk and on consumption produce gas, indigestion, etc. The participant told that they faced gastrointestinal problems on the consumption of raw milk. This showed that there is a direct correlation between raw or un-boiled milk ingestion and gastrointestinal problems. It has been observed that the highest (92.50%) of women were completely unaware of the development of G.I.T problems after consumption of raw milk products while the lowest (7.5 %) of women were aware of the actual cause of the enteric disturbance (Fig. 5).
In the present study, it was noticed that among the different forms of tuberculosis, the percentage of pulmonary TB was high and recorded as 25.0 %, whereas the percentage of enteric TB was (12.50%) among people. It was observed that local community having a low level of awareness regarding un-boiled milk usage and milk-borne diseases. It is scientifically proved that bacterium of tuberculosis and brucellosis can survive for a few days even at low acidic pH of yogurt and can transmit disease of TB. This shows that raw milk played a principal role in the spread of milk-borne diseases and seems positively correlated to the lack of awareness of usage of boiled milk for any purpose of consumption i.e. for drinking as well as for making milk products, similar findings were also reported by [22], that pasteurization is the only way to limit disease-producing bacteria or usage of boiled milk also play a critical role in restriction of milk-borne diseases which is beneficial for poor communities having a low income.

Most of the house wives have limited knowledge about milk-borne diseases and have no idea that raw milk is a potential source of illness. [23], reported a similar low level of awareness regarding the usage of raw or un-boiled milk for daily consumption at the household level (Fig. 6).
Highest (85.00%) people had no idea about aetiology and route of transmission. While lowest (15.00%) women knew about the causative agent of tuberculosis (Fig. 7). The result showed that most of the women had no information about the transfer of zoonotic diseases and other bacteria that can be ingested by humans by taking raw milk directly. Only about 15 % of the women were aware of the transfer of diseases that arise in the human body due to the ingestion of raw milk indicated by the data of the present study. Studies were done in the past also showed that about 20 % to 70 % of contestants were aware of the fact that raw milk could transfer milk borne diseases [24] whereas it was observed, that knowledge about the route of transmission of milk-borne diseases was almost negligible. The majority of the participants were completely unaware of the fact that un-boiled milk is a natural habitat for many pathogenic organisms that have a potential source of causing zoonotic diseases.

One of the major limiting factors of TB transmission was that most of the women residing in the small cities and rural areas were unaware of the etiologic of TB and its route of transmission. Most of the women did not know that un-boiled can harbour tuberculosis bacteria and can act as a vehicle for transmission of TB to a human being. The spread of TB among family members was seen as common in these areas and this was most significantly due to lack of awareness of TB transmission and its control. In many families, disease spread easily as people did not follow preventive measures related to spreading and control of TB. Tuberculosis is 100% curable and preventable disease but due to lack of awareness and the limited knowledge death rate is quite high among TB patients in these areas. This invites more research and opens new corridors for community workers to increase the level of awareness in the community about the daily used food items to take preventive measures in their consumption.
Conclusion and Recommendations

Untreated milk is a direct source of milk-borne diseases in the community and due to a lack of public awareness. It was concluded that the traditional practice of using raw milk for making yogurt and cheese at Rawalakot and its adjoining areas in the local community is the common and a direct source of milk-borne diseases like *tuberculosis*, *brucellosis*, and fungal intoxication. A large number of women were completely unaware of the cause and route of disease transmission and had no idea about milk-borne diseases. Most of the community women have shown their concerns about hygiene and quality of tetra packed milk and have many doubts. It was also observed throughout the study that most of the women disliked the taste of processed milk. It is strongly recommended that raw milk is inherently hazardous and should not be consumed by anyone at any time for any purpose as raw milk contain many pathogens. Community level awareness regarding boiled milk usage must be encouraged. Traditional practice of making milk products from un-boiled milk at Rawalakot and its adjoining areas must be discouraged through public awareness campaigns by community workers. Community guidance about milk borne illnesses can provide excellent result. At community level, women must be communicated that un-boiled milk can harbour many diseases causing bacteria and viruses that can compromise public health.

Authors’ contributions
Conceived and designed the experiments: N Khan & A Shamim, Performed the experiments: N Bashir, Analyzed the data: N Khan & I Hayat, Contributed materials/analysis/tools: N Bashir & A Shamim, Wrote the paper: N Bashir.

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