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Public Health Foundation of India

Practices that are Potential Risks to an increase in Zoonotic Tuberculosis – a cross-sectional study amongst cattle holders in peri-urban Sonepat

By

Dr.Sonam

PG/15/075

Under the guidance of

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Post Graduate Diploma in Hospital and Health Management

2015-17

International Institute of Health Management Research

PUBLIC HEALTH FOUNDATION OF INDIA

May 12, 2017

The certificate is awarded to

Dr. Sonam Barak

in recognition of having successfully completed her Internship in the department of

Roadmap to Combat Zoonoses in India (RCZI)

and has successfully completed her Project on

"Practices that are potential risks to increase in zoonotic tuberculosis – a cross-sectional study amongst cattle holders in peri-urban Sonipat"

(1 January 2017 - 10 May 2017)

Public Health Foundation of India

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning

We wish him/her all the best for future endeavors.

Dr. Manish Kakkar
Senior Public Health Specialist,
Public Health Foundation of India

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Sonam** student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at **Public Health Foundation of India** from **January 1st** to **may 10th ,2017.**

The Candidate has successfully carried out the study designated to him during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all his future endeavors.

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This is to certify that **Dr.Sonam**, a graduate student of the Post- Graduate Diploma in Health and Hospital Management has worked under our guidance and supervision. She is submitting this dissertation titled **"Practices that are potential risks to increase in zoonotic tuberculosis – a cross-sectional study amongst cattle holders in peri-urban Sonipat"** at **"Public Health Foundation of India"** in partial fulfillment of the requirements for the award of the Post- Graduate Diploma in Health and Hospital Management.

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Certificate of Approval

The following dissertation titled **"Practices that are Potential Risks to an increase in Zoonotic Tuberculosis – a cross-sectional study amongst cattle holders in peri-urban Sonepat"** at **"Public Health Foundation of India, Gurgaon"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of Post Graduate Diploma in Health and Hospital Management for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

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INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled ...Practices that are potential risks to an disease in Zoonotic Tuberculosis- a cross sectional study amongst cattle-holders in peri urban area of Sonepat district..... **and submitted by (Name)** ..Dr. Sonam..... **Enrollment No.** ...PG/15/075..... **under the supervision of** Dr. Sanjit kumar, Dr. Dhananjay Srivastava **for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from** January 1st **to** ..May 10th, 2017. **embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.**

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FEEDBACK FORM

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Dr. Sonam

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ABSTRACT

A cross-sectional study titled as **"Practices that are potential risks to an increase in zoonotic *tuberculosis* – a cross-sectional study amongst cattle holders in peri-urban Sonipat"**has been conducted in the peri-urban area of the Sonipat district, Haryana. A peri-urban area refers to a transition or interaction zone, where urban and rural activities are juxtaposed and landscape features are subject to rapid modifications including the human activities. From the ecosystem's point of view physical,chemical and bio-logical factors generally interact among themselves and are interrelated with socio-economic forces. These factors have their own functions which can be enhanced or reduced depending on the conditions of other factors in the same system. Human TB is caused principally by *M. tuberculosis*. The main causative agents of bovine TB are *M. bovis* and, to a lesser extent, *M. caprae*; however, zoonotic transmission of these pathogens is well described and occurs primarily through close contact with infected cattle or consumption of contaminated animal products such as unpasteurized milk.

Objectives

General Objective- To assess the association of practices potentially increasing risk of zoonotic TB among cattle holders in peri-urban area of Sonepat district.

Specific Objectives-

- To record animal handling practices of cattle holders and their family members.
- To enumerate practices that may lead to a greater risk of Zoonotic TB infections in cattle-holders.
- Risk scale development.

Methodology- The study was done on hundred cattle-holders; one from each selected household from the study area. Snow ball sampling method (Quota sampling) was opted for the selection of the study units out of the sampling frame. The criteria to include the study units was decided as those who are handling cattle at home for the maximum time. Face to face interviews were done to collect the data by using close ended questions and Modified

Kuppuswamy scale as well, so that the risk can be segregated in five categories on the basis of socio-economic scale.

Results- The data was analyzed by using different statistical tool cross-tabs, means and compare means etc. and the result was that the 4% (male) participants from age group of 30-39 years have heard about zTB who belongs to upper and middle upper middle class and achieved secondary-tertiary level of education as their highest. 6% of the population was attending animal fares. The dietary practices as consuming unpausterised milk and meat were also recorded. The consumption of boiled milk was 15% (40-49 years), mixed by 68% (20-29 years) and raw by 9% (30-39 years) of the population. The cooked form of the meat was consumed by 15% participants; out of which 12% were of 20-29 years and 3% were of 30-39 years whereas 3% (20-29 years) population was consuming mixed form of meat.

Conclusion- The male participants of age group 20-29, 30-39 years were exposed to maximum risk of zTB who belongs to upper middle and lower middle socio-economic class. The risky practices such as attending animal fares, treating cattle when they fall sick, contact with stray animal at grazing and watering points and in dietry practices consumption of milk and meat contributes in increasing the zTB risk.

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LIST OF SYMBOLS & ABBREVIATIONS

zTB : Zoonotic Tuberculosis

TB : Tuberculosis

M. : Mycobacterium

bTB : Bovine Tuberculosis

CIT : Comparative Intradermal Tuberculin

SCITT : Single Comparative Intradermal Tuberculin Test

PPD : Protein Purified Derivatives

HIV : Human immunodeficiency virus

AFB : Acid fast bacilli

NTM : Non tuberculous mycobacterium

MAC : Mycobacterium avium complex

OR : Odds ratio

C.I. : Confidence interval

HH : Household

VRH : Village resident herds

TH : Transhumance system

IFH : Interface system

Vet : Veterinary

IEC : Information Education Communication

HoH : Head of Household

LIST OF APPENDICES

CHAPTER 1 - BACKGROUND OF STUDY

INTRODUCTION

A peri-urban area refers to a transition or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, inducing by human activities (1). Tuberculosis (TB) is among the most devastating human infectious diseases worldwide. An estimated 8.8 million new cases, a global average incidence rate of 128/100,000 population/year, and 1.5 million deaths were attributed to TB in 2010 (2). Human TB is caused principally by *M. tuberculosis*. The main causative agents of bovine TB are *M. bovis* and, to a lesser extent, *M. caprae*; however, zoonotic transmission of these pathogens is well described and occurs primarily through close contact with infected cattle or consumption of contaminated animal products such as unpasteurized milk. TB cases caused by transmission of other mycobacteria from other animal reservoirs (e.g., wildlife) have been anecdotally reported (2). Globally, most cases of zoonotic TB are caused by *M. bovis*, and cattle are the major reservoir [2]. Therefore, for the purpose of this study and the remainder of this report, we refer to zoonotic TB as TB in humans caused by *M. bovis* or *M. capra* (2).The incidence of human Tuberculosis due to *Mycobacterium bovis* varies considerably among countries, depending on the prevalence of the disease in cattle, socio-economic conditions, consumer habits, and food hygiene practices (3). *Zoonotic Tuberculosis* (zTB) is a form of tuberculosis in people caused by *Mycobacterium bovis*, which belongs to the *M. tuberculosis complex*. *Mycobacterium Bovis* is a slow growing aerobic bacterium and the causative agent of tuberculosis in cattle known as Bovine Tuberculosis. It is related to *Mycobacterium Tuberculosis,* causes tuberculosis in humans and other mammals. Cattle are the most important animal reservoir for *M. bovis* in relation to zoonotic exposure of humans, but the disease can affect many other species and become established in wildlife reservoirs.It often affects sites other than the lungs (extrapulmonary), such as lymph nodes of the neck and gastrointestinal tract, but in many cases is clinically indistinguishable from TB caused by *M. tuberculosis*.Within livestock populations, *M. bovis* is the causative agent of bovine TB. *M. bovis* affects mainly bovine species and a wide range of wild animal species. It results in important economic losses and trade barriers with a major impact on the livelihoods of poor and marginalized communities (4). zTB often affects extrapulmonary sites such as lymph

nodes of the neck and gastrointestinal tract. In many cases it is clinically indistinguishable from human Tuberculosis (M. tuberculosis). Aerosol is considered to be the main route of infection in animals. (5), (6). Mycobacterium bovis is usually transmitted to human by consuming raw, infected cow-milk or via aerosol droplets. Pasteurization kills *M. bovis*bacteria in infected milk. In the developing world where pasteurization may not be routine, *M. bovis* is a relatively common cause of human Tuberculosis. zoonotic tuberculosis (zTB) is one of the most neglected endemic zoonosis disease presenting a complex epidemiological pattern and with the highest prevalence rates in cattle found in African countries, part of Asia and of Americas. It has been a cause for great economic loss in animal production (R). Zoonotic TB in animals is a rarity with occasional severe occurrences in small groups of herds. However, in developing countries, such as in African, Asian and South American and the Caribbean nations, 46%, 44% and 35% of sporadic occurrences and (particularly in Africa 11%) enzootic occurrences of zTB have been respectively reported (7) .Currently, the zTB in humans is becoming increasingly important in humans in the developing countries, as humans and animals are sharing the same microenvironment and dwelling premises, especially in rural areas. At present, due to the association of mycobacteria with the *HIV/AIDS* pandemic and in view of the high prevalence of *HIV/AIDS* in the developing world and susceptibility of *AIDS* patients to secondary infections like, tuberculosis in general, the situation needs to be immediately addressed (7). In 2015, there were an estimated 149,000 new human cases of zoonotic TB globally, and 13,400 deaths due to zoonotic TB (8). The burden of zoonotic TB is heaviest in African region followed by the South-East Asian region (R). Data on zoonotic TB is lacking mainly due to fewer routine surveillance in most of the countries. The aim of this study is to assess the association of zTB in cattle holders involved in animal handling practices with greater risk of infections. The study will be conducted in peri-urban area of Sonepat district in Haryana state.

BURDEN

- In 2015, there were an estimated 149,000 new human cases of zoonotic TB globally, and 13,400 deaths due to zoonotic TB.
- The African region carries the heaviest burden of disease and death due to zoonotic TB, followed by the South-East Asian region.
- The true burden of zoonotic TB is likely to be underestimated due to a lack of routine surveillance data from most countries.

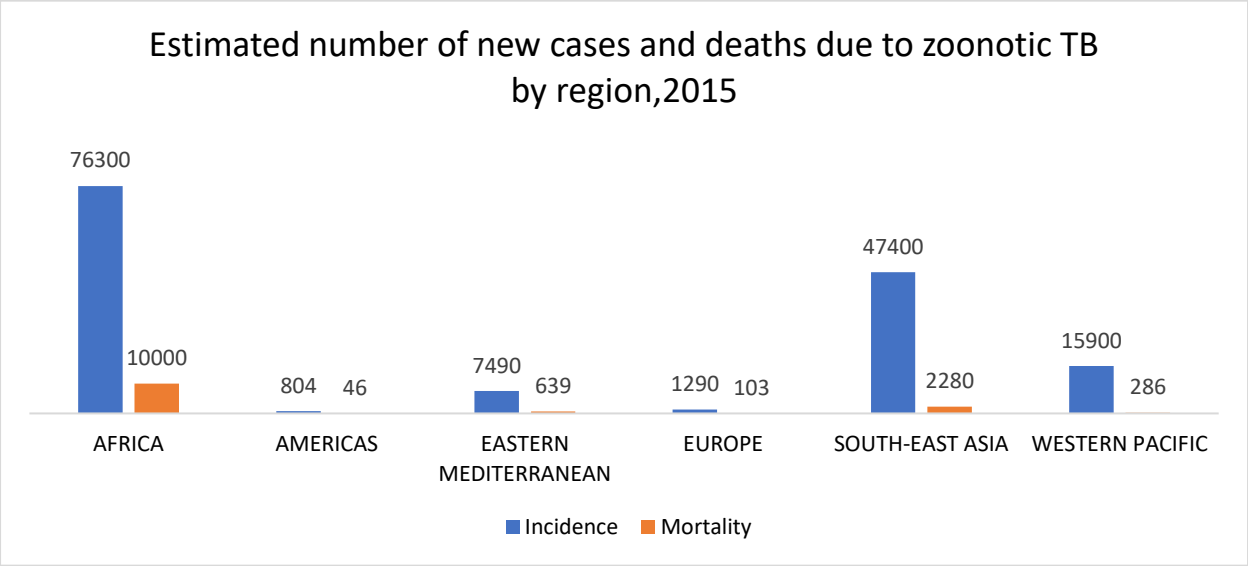

Fig. 1.1 Estimated number of new cases and deaths due to zTB by region, 2015

Source-WHO Global Tuberculosis Report 2016.

RISK FACTORS

While the most common route of transmission of *M. bovis* to humans is through food (unpasteurized milk and untreated animal products), airborne infections and direct contact with infected animals also pose an occupational risk to people with frequent direct contact with infected animals or contaminated animal products, including farmers, veterinarians, slaughterhouse workers and butchers.

OBJECTIVES

General Objective- To assess the association of practices potentially increasing risk of zoonotic TB among cattle holders in peri-urban area of Sonepat district.

Specific Objectives-

- To record animal handling practices of cattle holders and their family members.
- To enumerate practices that may lead to a greater risk of Zoonotic TB infections in cattle-holders.
- Risk scale development.

CHAPTER 2

LITERATURE REVIEW AND THEORITICAL FRAMEWORK

zTB IN DEVELOPING COUNTRIES

Zoonotic TB is present in animals in most developing countries where surveillance and control activitiesare often inadequateor unavailable; therefore, many epidemiologic and public health aspects of infection remain largely unknown. Most human cases occurs in young persons and result from drinking and handling contaminated milk resulting in cervical lymphadenopathy, intestinal lesions, chronic skin TB and other non pulmonary forms. Agricultural workers may acquire the disease by inhaling cough spray from infected cattle resulting into pulmonary TB. Wild animal TB represents a permanent reservoir of infection and poses a serious threat to control and elimination programs. (7)

EPIDEMIOLOGY OF zTB

Mycobacterium bovis, the cause of bovine-type tuberculosis, has an exceptionally wide host range. *M. bovis* infection was recognised as a major public health problem when this organism was transmitted to man via milk from infected cows resulted in the introduction of pasteurization Those occupational groups working with *M. bovis* infected cattle or deer, on the farm or in the slaughter house, are more likely to develop pulmonary disease than alimentary disease. Nowadays, the human immunodeficiency virus (HIV) is associated with a greatly increased risk of overt disease in humans infected with *Mycobacterium tuberculosis*. It is believed this increased risk also occurs in the case of *M. bovis* infections in humans. (9)

zTB INFECTION IN ANIMAL AND HUMAN POPULATION

Ethiopia is one of the African countries where tuberculosis is wide spread in both humans and cattle and the endemic nature of tuberculosis in humans and cattle has long been documented. The disease is considered as one of the major livestock diseases that results in high morbidity and mortality, although the current status on the actual prevalence rate of bovine tuberculosis (BTB) at a national level is yet unknown. Detection of BTB in Ethiopia is carried out most commonly on the basis of tuberculin skin testing, abattoir meat inspection

and very rarely on bacteriological techniques. Recently undertaken studies indicated the prevalence rate of BTB with a range of 3.4% (in small holder production system) to 50% (in intensive dairy productions) and a range of 3.5% to 5.2% in slaughterhouses in various places of the country. BTB in cattle remains to be a great concern due to the susceptibility in humans to the disease. The infections mainly take place by drinking raw milk and occur in the extra-pulmonary form, in the cervical lymphadenitis form in particular. (10)

PREVALENCE

An overall individual animal prevalence of 12.16% was recorded under traditional animal husbandry system in the study area. The higher percentage of positive results in tested animals was recorded in Arsi Zone (15.8%) and the lower percentage of positive results was found in the West Arsi Zone (8.9%). There was statistically significant difference (x^2=5.44; P-value=0.0196) in individual prevalence between the two Zones. Other epidemiological risk factors including age, sex, breed, and reproductive status of the animals were assessed for their contribution to the prevalence of the disease. (5)

Based on tests herd and individual animal prevalence of BTB were 42.6% and 7.9% respectively. Among the interviewed households, 24.5% had experienced at least one tuberculosis case in the family. Of these families, 43.5% had reactor cattle. Nevertheless, no statistically significant association (P>0.05) was observed between reactor cattle and human tuberculosis cases in households. The habit of milk and meat consumption was affected by occupation (P<0.0001) and location of household residence (P<0.001). Although the level of education influenced the habit of milk consumption (P<0.05), it did not impact the habit of meat consumption (P>0.05). Less than half (38.3%; 36 of 94) of the respondents knew about BTB, and only 30.8% (29/94) of the respondents were conscious of its transmission from cattle to humans. Secondary data analysis from Muka-Turri clinic indicated that 85.6% of the human tuberculosis cases were from rural parts of the district. Although the BTB prevalence seems low, its potential risk to public health was important based on food consumption, poor sanitary measures, and the lack of understanding about its zoonosis. (11)

RISK FACTORS

Bovine tuberculosis is widespread throughout Africa, very little is known about risk factors for *Mycobacterium bovis* infection in either human or cattle populations. Furthermore,

villages that experienced annual flooding had a higher prevalence of infection ($p=0.043$). (12)

Risk factors associated with bovine TB herd breakdowns, including the purchase of cattle, the occurrence of bovine TB in contiguous herds, and/or the surrounding area as well as herd size. Other factors identified in some studies include farm and herd management practices, such as, the spreading of slurry, the use of certain housing types, farms having multiple premises, and the use of silage clamps. In general, the most consistently identified risk factors are biologically plausible and consistent with known transmission routes involving cattle-cattle and wildlife-cattle pathways. (13)

zTB IN SMALL DAIRY HOLDERS

The study showed that from a total of 295 cattle tested, 24 (8.14%) were found to be positive for BTB. Out of the total examined animals, 60 (20.3%) were males. The effects of different risk factors (like sex, age, breed type, and body condition score) for the occurrence of BTB were investigated. The difference in reactivity to the CIDT test among the study participants in different age groups was statistically significant (P-value = 0.027) showing higher risk of BTB in older animals when compared to the younger ones (OR=4.03, 95% CI, 1.17-13.85). (14).

Bovine tuberculosis in dairy cattle in Asmara, Eritrea was having an increased risk linked to large herds. A total of 72 randomly selected herds were included in the study. The comparative intradermal tuberculin test was used for diagnosis showed 14.5% reactors. Based upon individual animal specificity of 98.5% the calculated herd specificity was more than 99%. (15)

WILDLIFE – LIVESTOCK – HUMAN INTERFACE

Individual BTB prevalence in cattle was 0.8% (CI: 0.3%–2%) with the >4 mm cut-off and 3.4% (CI: 2.1%–5.4%) with the >2 mm cut-off. Herd prevalence was 33.3% and 83% when using the >4 and the >2 mm cut-off respectively. The prevalence of *M.avium*-complex (MAC) was 4.2% in wildlife, 2.5% in cattle and 0.5% in goats. (16)

PUBLIC HEALTH IMPLICATIONS OF zTB

To assess cattle owners awareness on its public health implication using a questionnaire survey. The individual animal and herd bovine tuberculin positivity prevalence were 54/480

(11.3%) (95% CI: 8.4 to 14.1%) and 24/120 (20%) (95% CI: 12.7 to 27.3%) at cut-off > 4 mm, respectively. Cattle kept in intensive type of production (odds ratio (OR) = 3.7), in larger herds with more than 10 cattle (OR = 11.3) and under poor management condition (OR = 4.3), were more likely to be infected with bovine tuberculosis. On the basis of animal characteristics, female (OR = 4.8), exotic (OR = 6.1) and cross bred (OR = 6.6), and cattle with poor body condition (OR = 2.7) were more reactive to tuberculin test than male, Zebu breed and good body conditioned animals, respectively. (17)

CONSEQUENCES OF zTB

Its possible consequences for human health in HIV/AIDS. A study on a total of 8190 cattle from 42 well- managed herds in the Lake Victoria of Tanzania and were tested for bovine tuberculosis by a single comparative intra-dermal test (SCITT) using avian and bovine purified protein derivatives (PPD) anttigens. The prevalence of bovine tuberculosis in this area was found to be 0.2%. there was significant variation ($p<0.001$) among the herds tested in the four regions in this zone (kagera, Mara, Mwanza and Shinyanga). The highest prevalence (2.12%) was in herd of 556 cattle in Kagera region. (18)

CHAPTER 3 - METHODOLOGY

RESEARCH QUESTION - To assess the association of practices potentially increasing risk of zoonotic TB among cattle holders in peri-urban area of Sonepat district.

STUDY AREA

Fig 3.1 Map of the study area.

Source: www.google.co.in

DESIGN - A descriptive cross-sectional.

A cross-sectional study examines the relationship between disease (or other health related state) and other variables of interest as they exist in a defined population at a single point in time or over a short period of time. Cross-sectional studies are used to assess the burden of disease or health needs of a population and are particularly useful in informing the planning and allocation of health resources.

PROCEDURE - The peri urban area of the Sonipat district study area was choosen as the study area. The cattle holders from the study area were considered as study population. Sample size of 100 households, one person from each household was interviewed. A total of 123 Households were approached out of which 23 denied of answering the questions. Snowball sampling method was used for finalizing the study units. The interviewer visited the area along with the questionnaire and a person from their community who was willing to participate.The study units were interviewed (within the household, person who spends the maximum time with the cattle).

SAMPLING-

Study population - Cattle holders in the peri-urban area

Sample frame - Head of Household/spouse/those who are handling cattle at home for the maximum time.

Sampling technique - Snow-ball sampling was used in this study for selection of the households from which the HoH will be interviewed.

Study units - 100 households at 99% confidence level and C.I. at ±10

INSTRUMENT- A structured questionnaire

INCLUSION AND EXCLUSION CRITERIA- only the HoH/spouse/member who are handling cattle at the home for the maximum time were included in the study from each house (1 person/HH) will be included into the study wherein the elderly members and children those are not involved in cattle practices were excluded from the study.

CATEGORIZATION

MODIFIED KUPPUSWAMY SCORE - The selected cattle holders were seggregated into five categories on the basis of modified kuppuswamy score for socio-economic status. The

segregation was done in five categories Upper (26 – 29), Middle Upper Middle (16 – 25), Lower Middle (11 – 15), Lower Upper Lower (5 – 10), Lower (< 5). This scale was consisting of three categories which were – Education level scoring, Occupation level scoring and Income level scoring. The scores from each category were added to calculate the total score for the categorization of the socio-economic status accordingly.

RISK SCALE

Risk scoring was done according to 0 and 1 score for the responses recorded in the yes/no coding. Such question was attending animal fares. 0 for no risk and 1 for practicing risky practices. From the questionnaire the other questions like highest level of education attained, socio-economic status, grazing and watering system, treatment when animal fall sick, consumption of raw milk, meat were also choosen for the risk scoring. Among them 0 was given to least risky practices and maximum were ascending according to the options in questionnaire. 5 was calculated as a score when no risky practices were practised and 20 was the maximum score for practising risky practices. After the calculation the scale was formulated as 5-20.

RISK SCALE CALCULATION

Potential risk factor	**Minimum score**	**Maximum score**
Highest level of education attained	0 (None)	3 (Tertiary)
Socio-economic status	1 (Upper class)	5 (Lower class)
Grazing system in practice	1 (VRH)	3 (IS)
Attending animal fares	0 (No)	1 (Yes)
Treatment given	1 (meeting vet.)	3 (self-administered)
Type of milk consumed	1 (Boiled)	3 (Raw)
Type of meat consumed	1 (Cooked)	2 (Mixed)
Total	5	20

Table 3.2 Risk scale calcuation

CHAPTER 4 - DATA ANALYSIS

The data was analysed under three sections on the basis of demographic information, knowledge and potential risk factors respectively. After this the mean score was calculated by refrencing risk scale and compare means were calculated.

DEMOGRAPHIC ANALYSIS

This includes the analysis on the basis of demographic details as agewise, socio-economic status etc. shown below-

Agewise distribution-

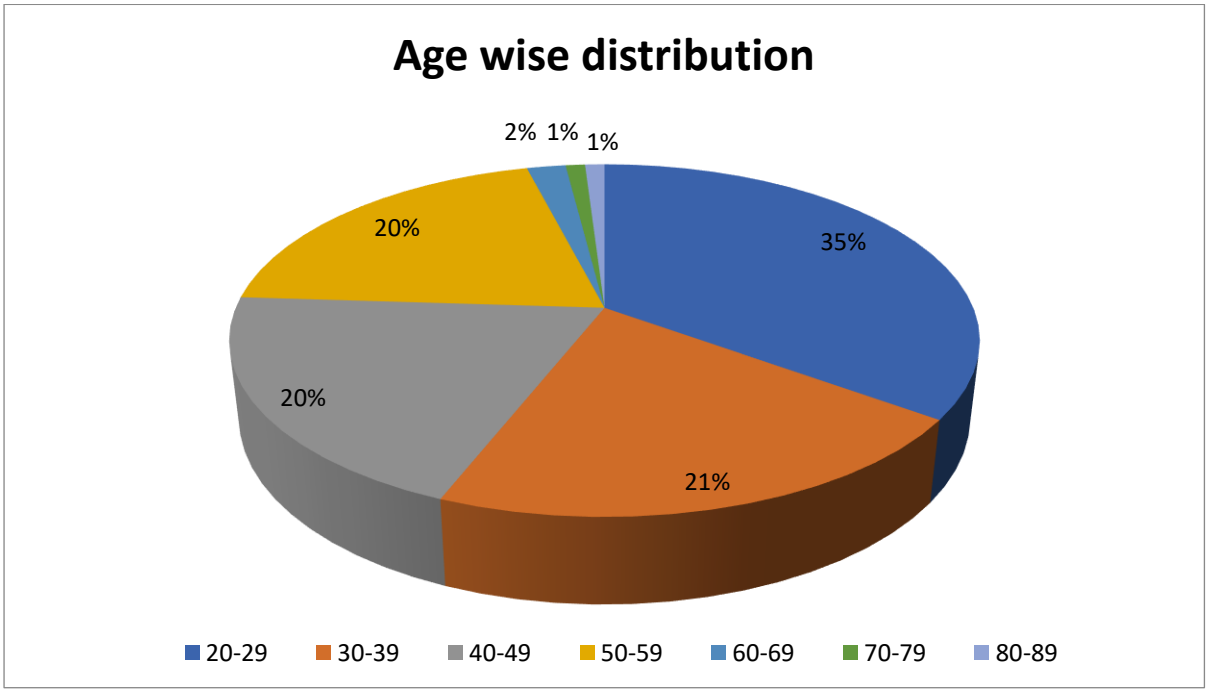

Fig. 4.1 Agewise percentage distribution of the participants

Interpretation- The above chart shows the percentile distribution of the sample in different age groups. A maximum of 35% study units were from the age group of 20-29 years, 21% from 30-39 yrs, 20% from 40-49 and 50-59 yrs each; whereas 60-69 yrs was 2% and 1% for 70-79 and 80-89 yrs of age group.

Distribution on the basis of socio-economic status-

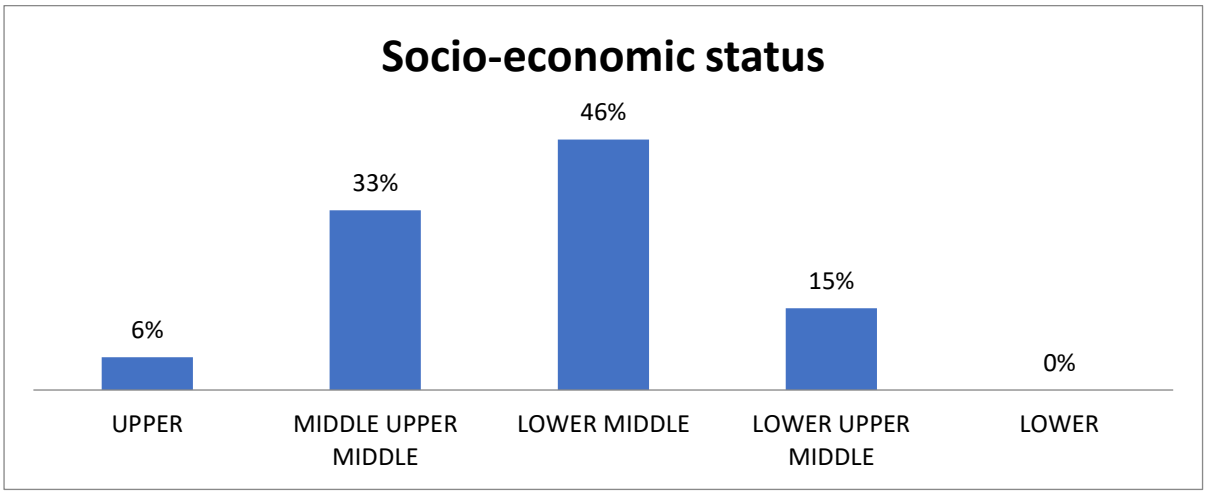

Fig. 4.2 Socio-economic status distribution

Interpretation- 6% of the participating population was from upper class of the socio-economic scale. Likewise 31% from middle upper middle, 46% from lower middle, 15% from lower upper middle and no participant was from low class.

KNOWLEDGE ANALYSIS

This section includes the awareness about TB and zTB overall and then its seggeation in different education level groups, age groups, genderwise and socio-economic categories.

Knowledge of TB and zTB

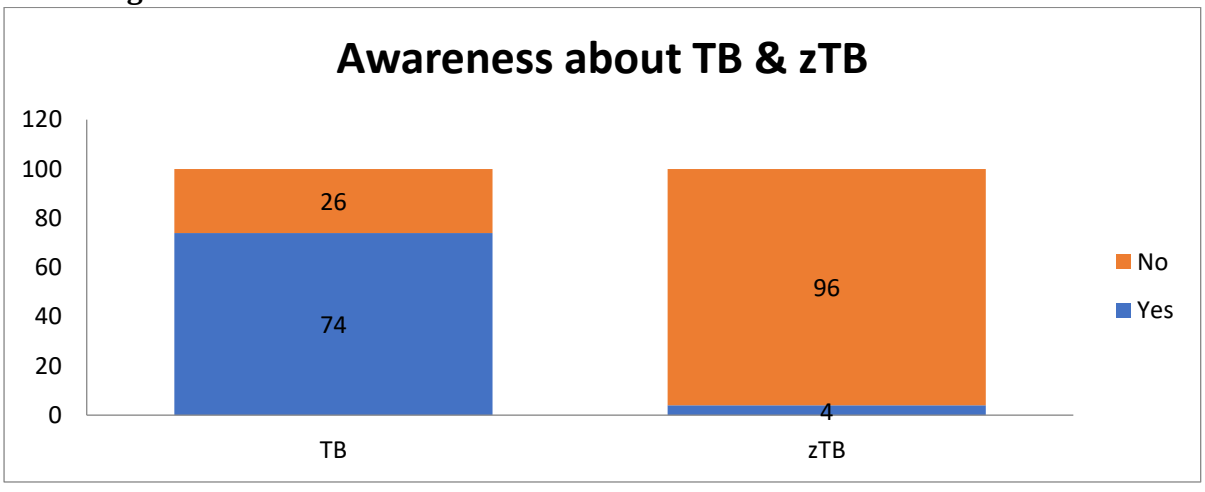

Fig. 4.3. Awareness about TB & zTB

Interpretation- The graph shows that out of 100 respondents 74 have heard about TB and only 4 have heard about zTB.

Awareness about zTB

Highest level of education attained	Have you heard about Zoonotic tuberculosis?	
	No	Yes
None	10	0
Primary	13	0
Secondary	49	3
Tertiary	23	1

Table 4.1 Knowledge of zTB according to education level

Knowledge in different age groups

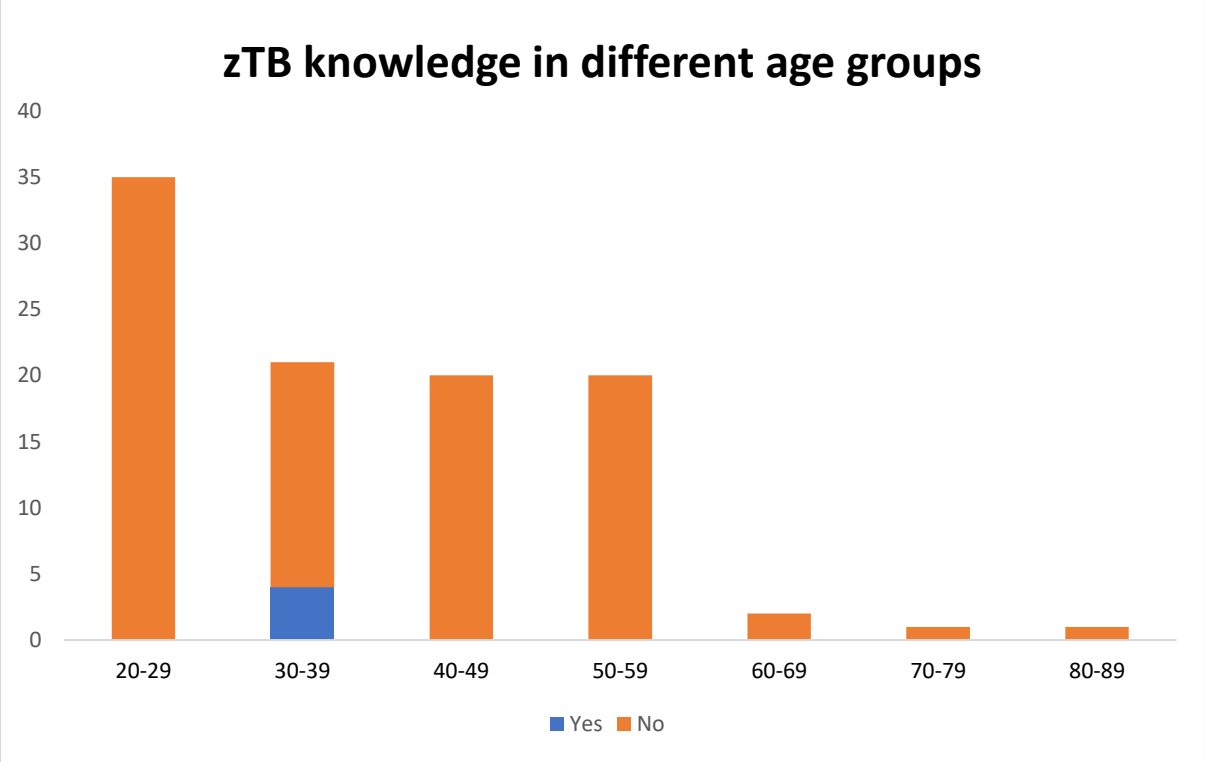

Fig 4.4 zTB knowledge in different age groups

Interpretation- In different age groups of the sample population only 4% have heard about zTB who belonged to the age group of 30-39 years.

Genderwise zTB knowledge distribution

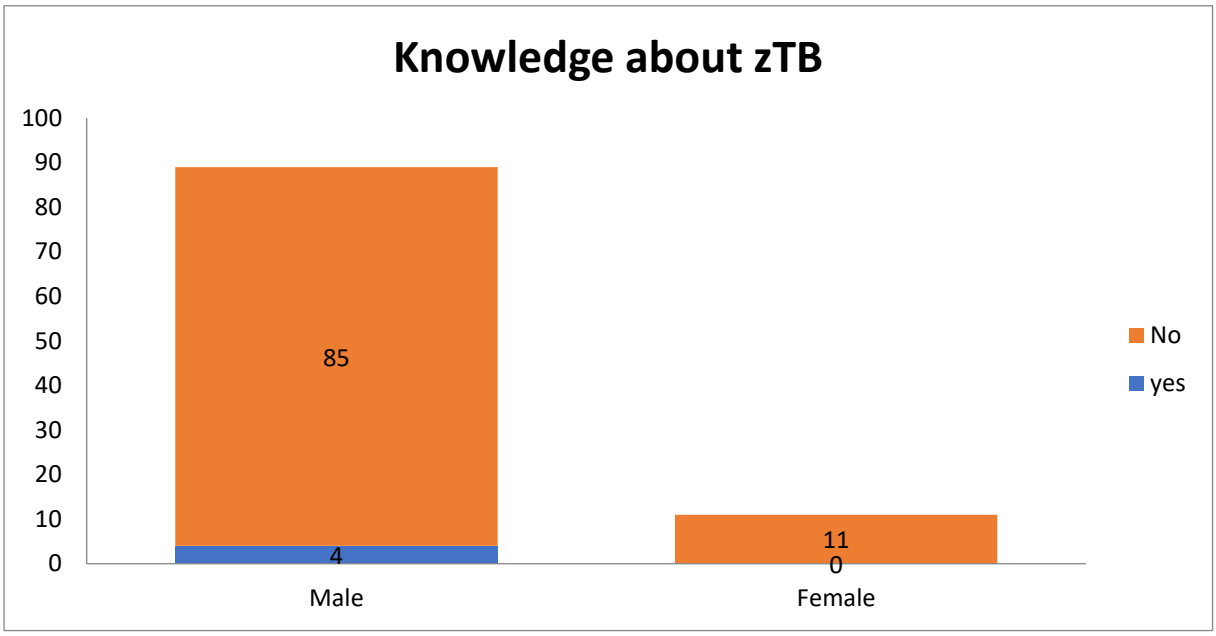

Fig. 4.5 Genderwise zTB knowledge

Interpretation- Out of 4% population who heard about zTB none were female. Only 4 males have heard about zTB.

In different Socio-economic groups

Socio-economic scale	**Have you heard about Zoonotic tuberculosis?**		
	Yes	No	Total
Upper	1	5	6
Middle upper middle	3	30	33
Lower middle	0	46	46
Lower upper lower	0	15	15

Table 4.2 zTB knowledge in different socio-economic class

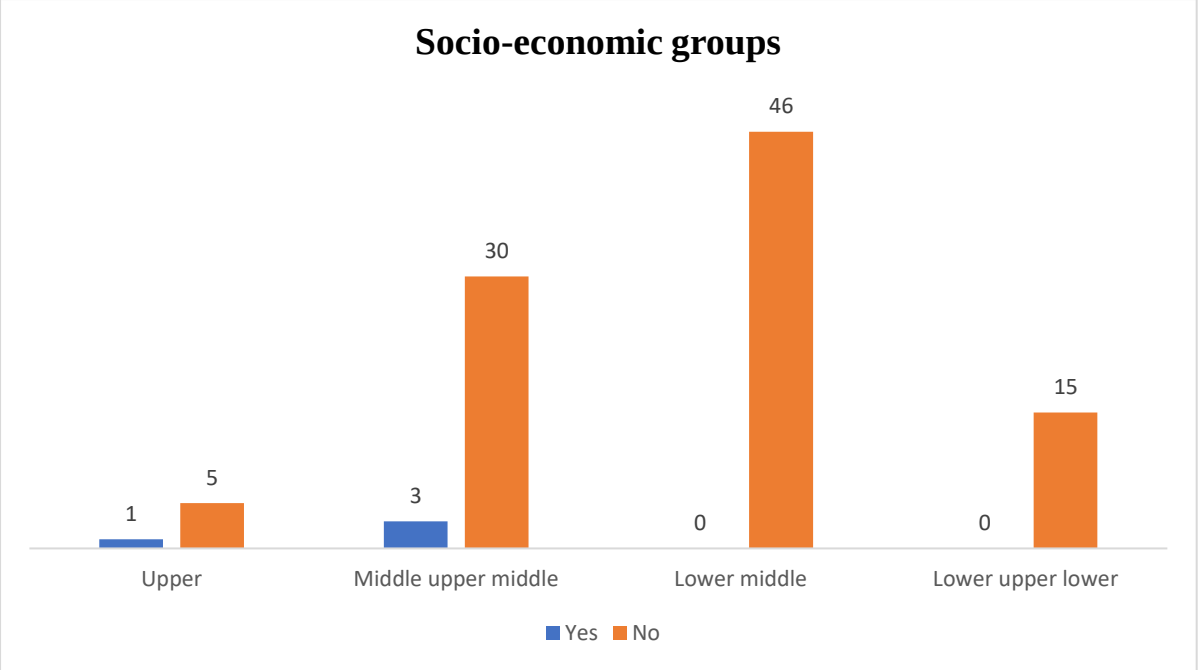

Fig. 4.6 zTB knowledge in different socio-economic class

Interpretation- This chart shows that 1 respondent from upper class and 3 from middle upper middle class were aware about the zTB.

POTENTIAL RISK FACTORS ANALYSIS

Frequency to attend animal fares-

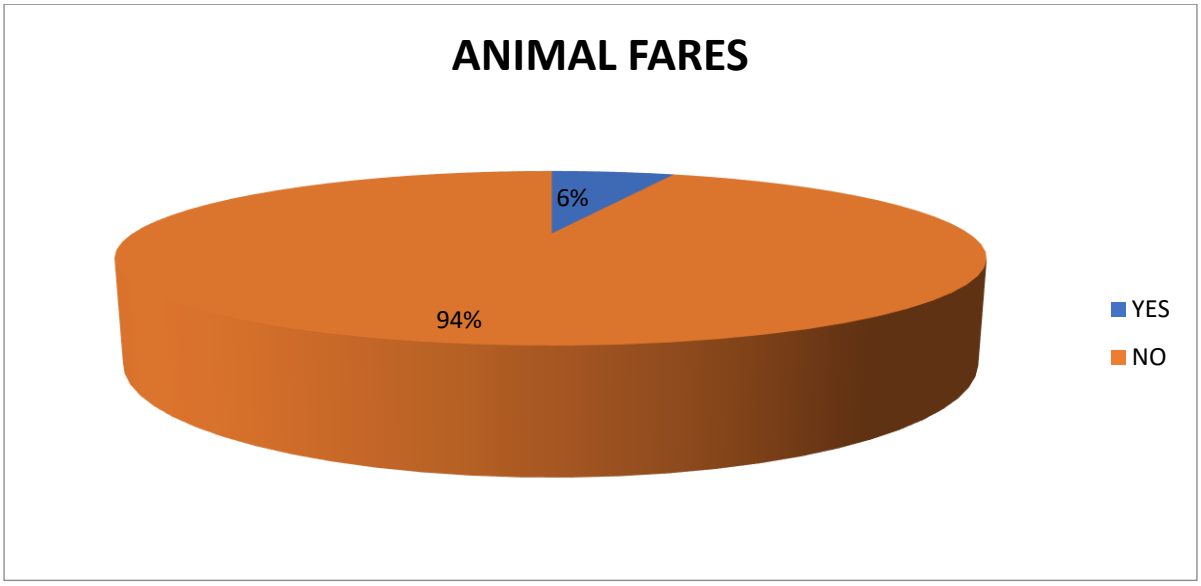

Fig 4.7 Frequency to attend animal fares

Mean score

Descriptive analysis	
Maximun score	12
Minimum score	5
Mean score	9.41
Standard deviation	1.43

Table 4.3 Mean score

Categorization of risk score-

For comparative analysis of scores in different groups the percentage score has been divided into majorly three categories i.e.

Category	Percentage range
Category I	0%-50%
Category II	50.01%-75%
Category III	75.01%- 100%

Table 4.4- categorization according to score

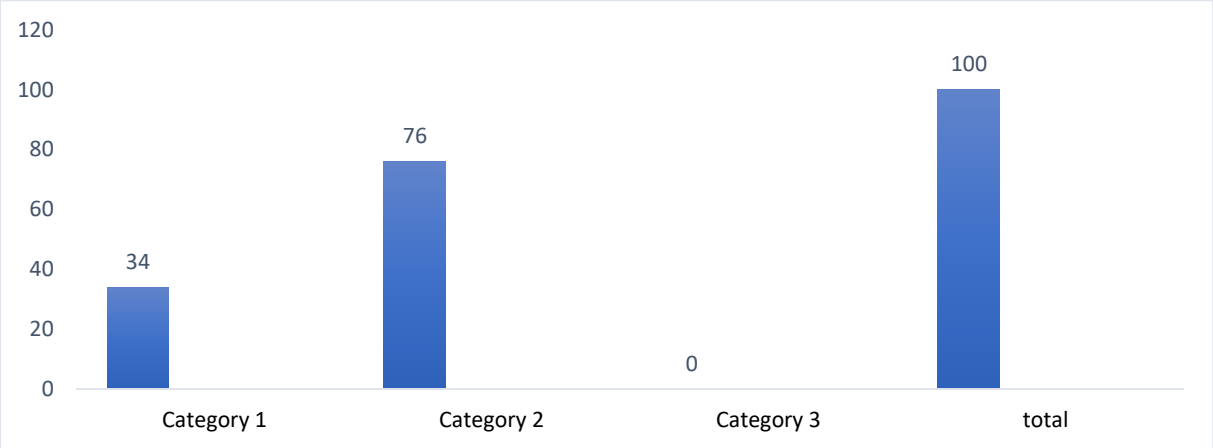

Fig. 4.8 Category wise distribution

Interpretation – 34 participants out of 100 were belonging to the category 1 and 76 in category 2 of the risk score categorization.

Compare means

Mean score were compared among the following variables such as, age, sex, occupation, education and socio-economic status. The graphical representation of compare means is shown below:

Gender compare mean

Gender	Mean	N
Male	9.50	89
Female	8.63	11
Total	9.41	100

Table 4.5 gender compare mean

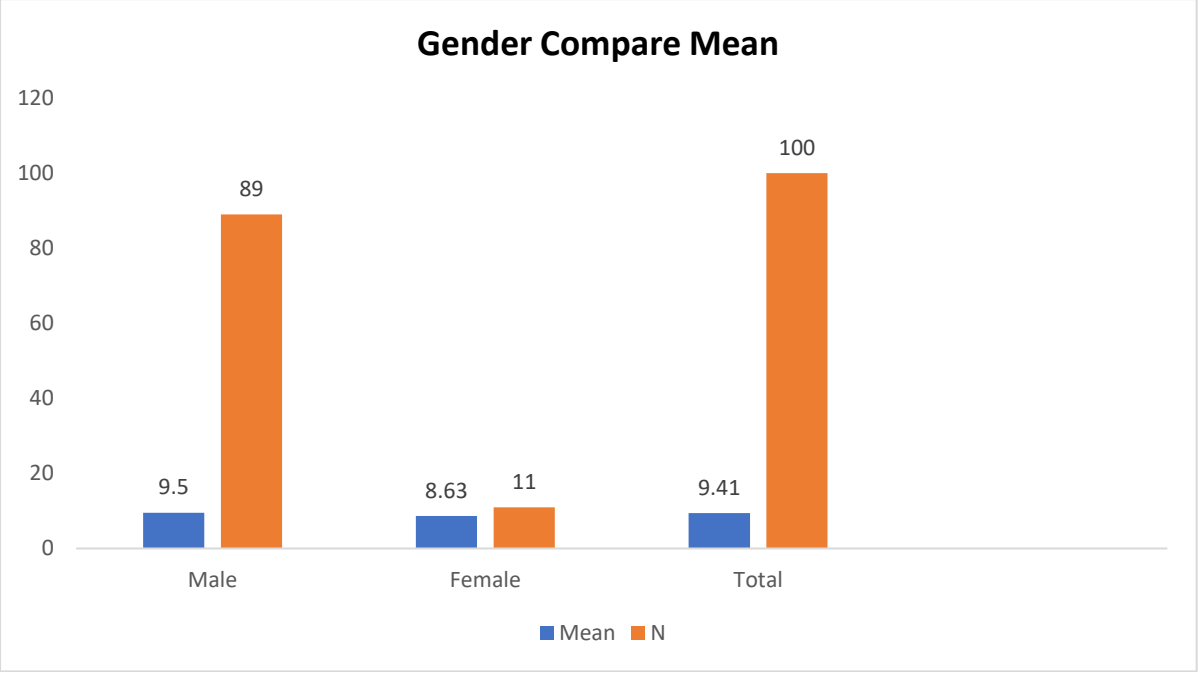

Fig. 4.8 Gender compare mean

Socio-economic status compare mean

Modified kuppuswami socio-economic scale	Mean	N
Upper	7.83	6
Middle upper middle	9	33
Lower middle	9.8	46

Lower upper lower	9.6	15
Total	9.41	100

Table 4.6 socio-economic status compare mean

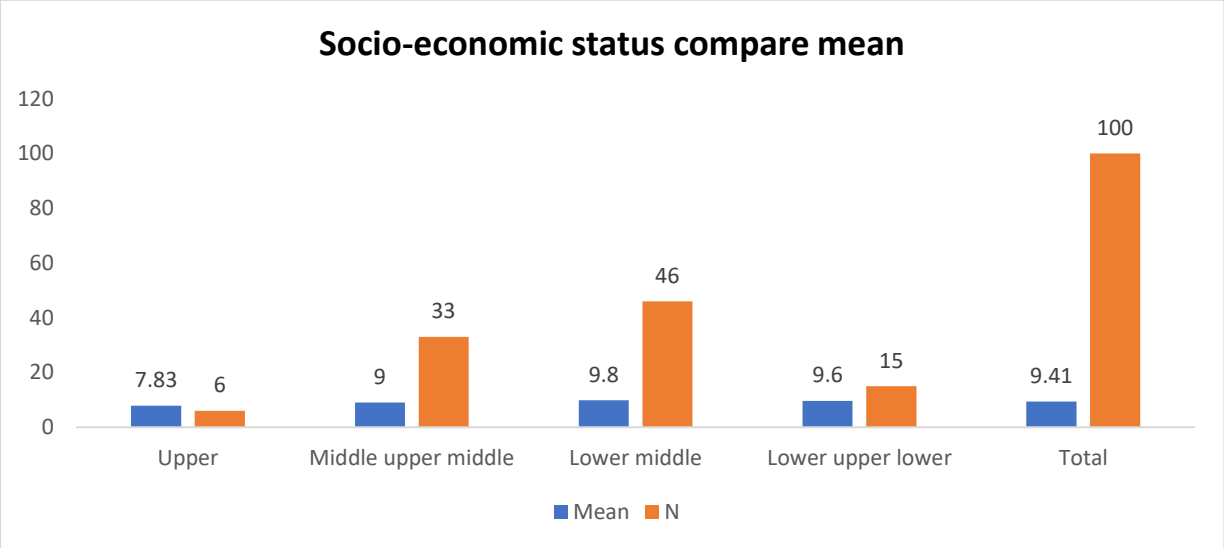

Fig. 4.9 socio-economic status compare mean

Education level compare mean

What is the highest level of education attained by the head of the respondent?	Mean	N
None	7.1	10
Primary	8.53	13
Secondary	9.61	52
Tertiary	10.45	24
Total	9.41	100

Table 4.7 Education level compare mean

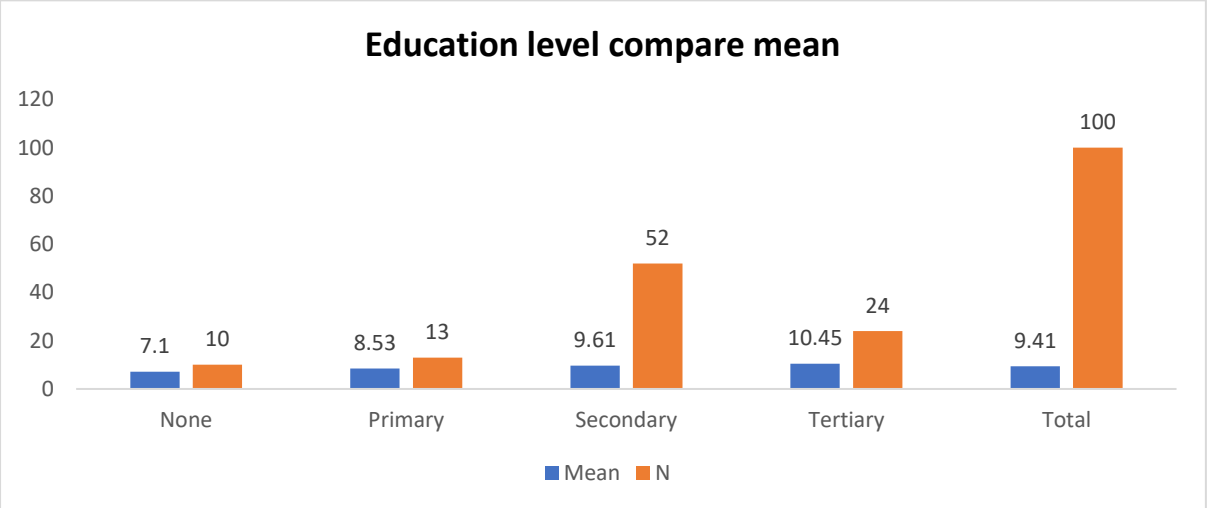

Fig. 4.10 Education level compare mean

Age compare mean

Age groups	Mean	N
20-29 years	10.22	35
30-39 years	9.53	21
40-49 years	8.60	20
50-59 years	9.05	20
60 and above	7.50	4
Total	9.41	100

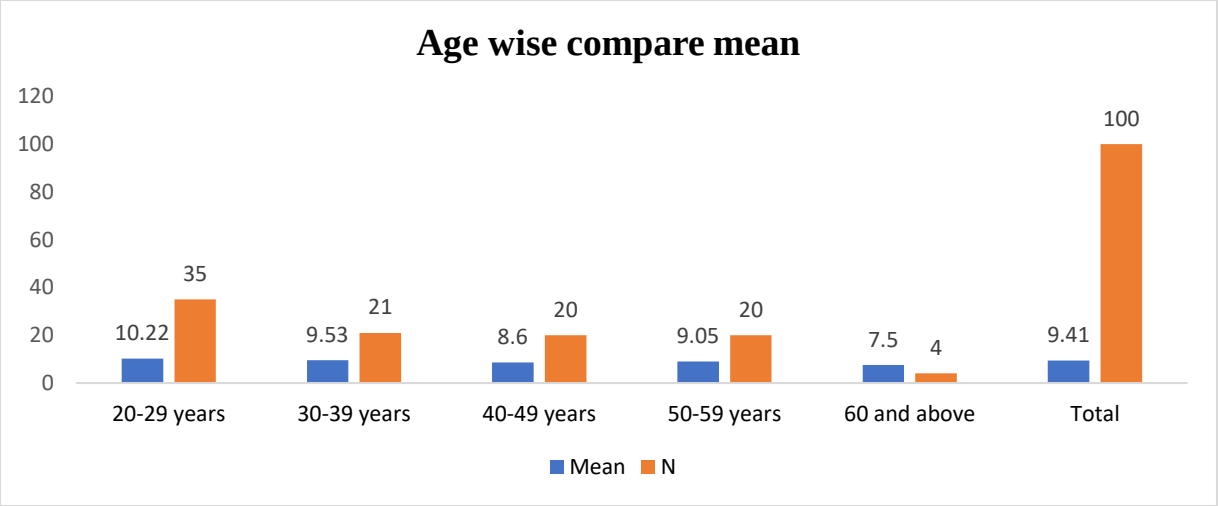

Fig. 4.11 Age wise compare mean

Milk and meat consumption distribution

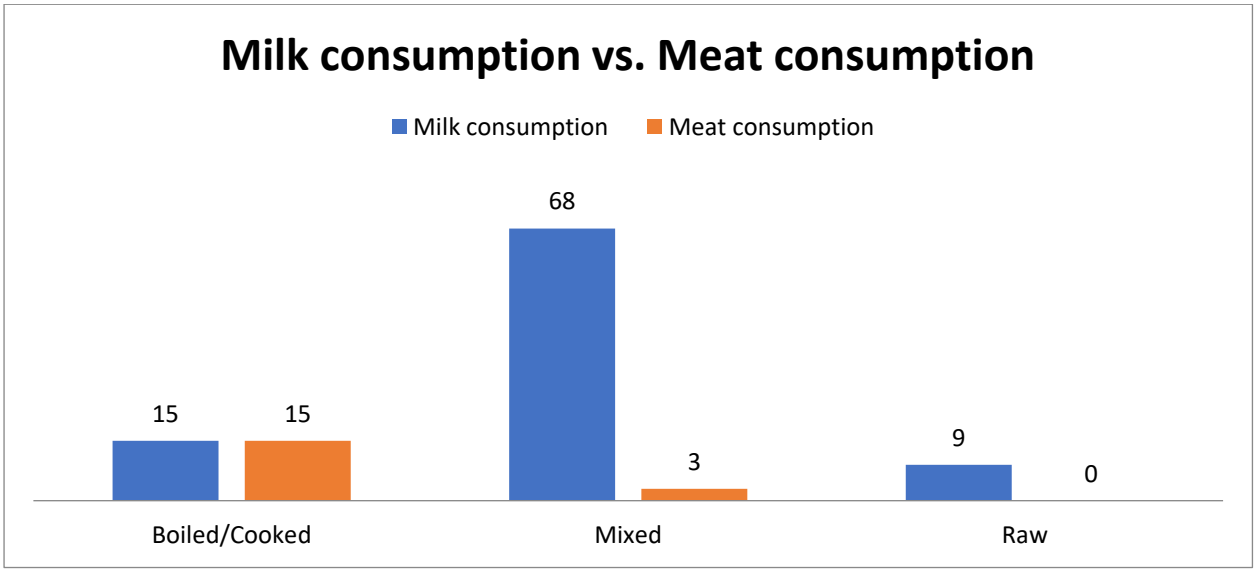

Fig. 4.12 Milk and meat consumption distribution

Interpretation- 15% of the population consumes boiled milk and cooked meat. Mixed type of milk was consumed by 68% and 3% were consuming mixed type of meat. 9% were consuming raw form of milk and there was no practise to consuming raw meat in the study area**.**

Milk consumption in different age groups

Milk consumption type	Boiled	Mixed	Raw
20-29	3	26	4
30-39	2	16	2
40-49	7	12	0
50-59	3	14	2
60-69	0	0	0
70-79	0	0	1
80-89	0	1	0
Total	**15**	**69**	**9**

Table 4.8 Milk consumption form in different age groups

Milk consumption genderwise

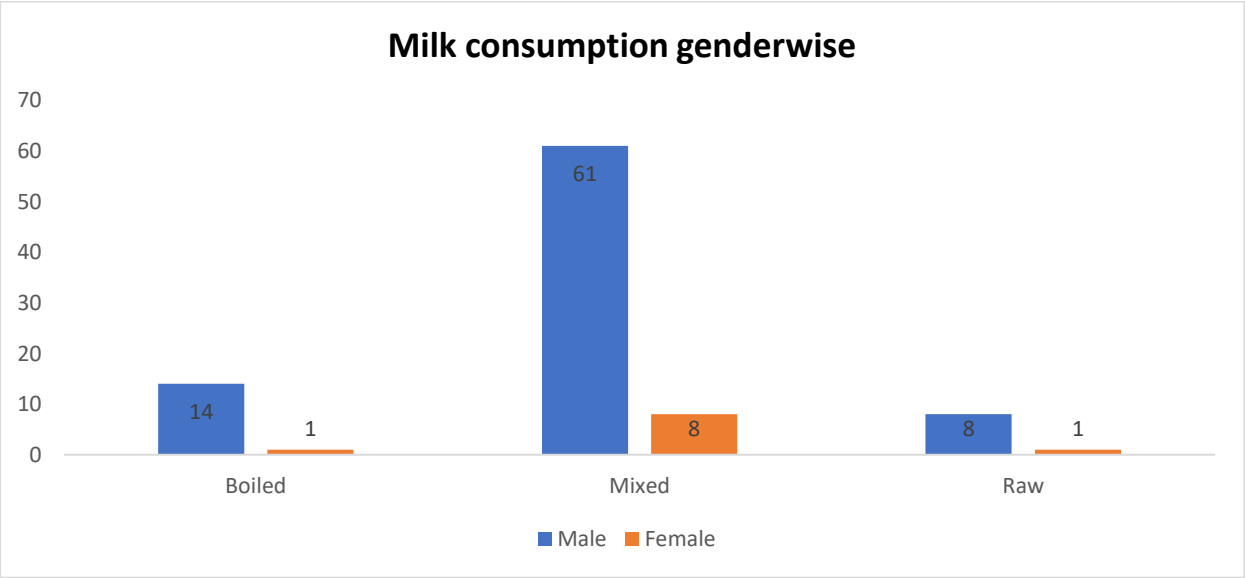

Fig. 4.13 Milk consumption genderwise

Interpretation- out of 15 respondents who consumed boiled milk 14 were males and 1 was female, 69 consumed mixed form of milk and out of them 61 were males and 8 were females. Out of 9 respondents who consumed raw milk 8 were males and 1 was female.

Meat consumption genderwise

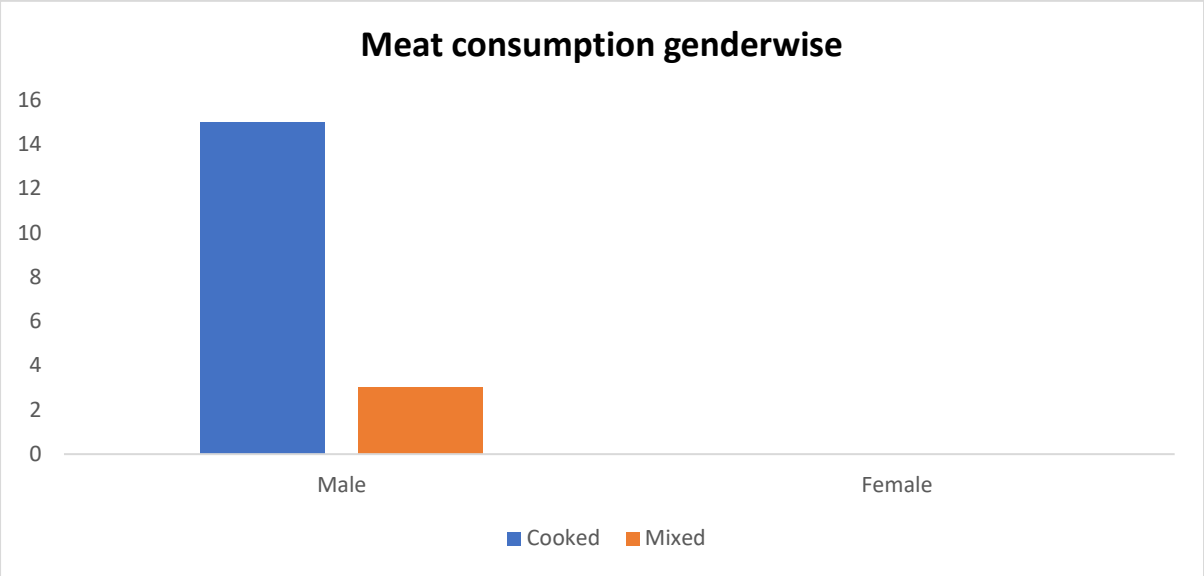

Fig 4.14 Meat consumption genderwise

Interpretation- 15 respondents consumed boiled or cooked form of meat and 3 0f them consumes mixed form.

Meat consumption in different age groups

Meat consumption type	Cooked	Mixed
20-29	12	3
30-39	3	0
40-49	0	0
50-59	0	0
60-69	0	0
70-79	0	0
80-89	0	0
Total	**15**	**3**

Table 4.9 Meat consumption in different age groups

CHAPTER 5 – RESULTS

The study has been done to show the assosciation of different factors such as demographic, knowledge/awareness and potential factors like attending animal fares, grazing system, milk and meat consumption habits, watering points for the cattles which are associated with increased risk of zTB.

1. Among the participants only 4% of the participants have heard about zTB, those have attained secondary and tertiary level of education and were belonging to upper, middle upper middle class.
2. Only males belonging to the age group between 30-39 years had heard of zTB.
3. 6% of the population attended animal fair and most of them were buying and selling the cattle to the local buyers from the community.
4. The other potential factor to increase the risk of zTB was form of milk and meat consumption. 15% of the population was consuming boiled milk (14% males and 1% females). Mixed type of milk was consumed by 68% (out of which 61% were males and 8% were females) and 9% were consuming raw form of milk (8 % males and 1% females). 15% of the population was consuming cooked meat (only by males). 3% were consuming mixed type of meat (males only) and there was no practise to consuming raw meat in the study area**.**
5. The tendency to consume boiled milk was maximum in age group of 40-49 yrs (7%) weather the mixed form was more consumed by the people from age group of 20-29 years (26%) and 30-39 years (16%) were consuming raw milk. Cooked meat was consumed by 12% of population from age group of 20-29 years and 3% were from age group 30-39 years. In habit to consume mixed form of meat 3% were from age group of 20-29 years.
6. A risk scale ranging from 5-20 was formulated by scoring method.
7. The maximum risk score was calculated as 12, minimum was 5, mean score was 9.41 and standard deviation was 1.43.

8. According to the risk score; three categories were formulated and 34 participants were falling in category 1, 76 were in category 2 , none were from category 3.
9. When the mean was compared with age, gender, education and socio-economic status; the results suggested that age group 20-29 years, 30-39 years, males, lower middle and middle upper middle, participants who achieved tertiary and secondary level of education as their highest were at maximum risk.

CHAPTER 6 – CONCLUSION

- The risky practices in animal handling those significantly being practiced were treating animals by mixed method when they fall sick and som least considerable were contact at grazing system and watering points; as they weer least practiced comparatively.
- Dietary practices such as consumption of raw milk and meat are also leading to the greater risk of zTB among the community. The males from community of age group 20-29 years and 30-39 years are majorly exposed risk because of their dietary habits.
- Risk scale range was from 5 to 20. As the score was increasing there was an increase in risk of zTB. The minimum score for the study was 5 and maximum was 12 on the basis of potential risk factors.

CHAPTER 7 – RECOMMENDATIONS

- Awarness among community about the zTB and its severity through IEC material.
- Awarness campaigns to increase the awareness about the potential risk factors of zTB
- Targeting particular age group and gender for awareness.

CHAPTER 8 – LIMITATIONS

- This study was conducted on the selected cattle holders residing in the villages in peri-urban area of Sonipat district which is a Hindu community hence the results cannot be generalized on Muslim community.
- Language barrier.

APPENDIX

APPENDIX I – QUESTIONNAIRE

Background information-

1. Respondent no. ……
2. Name of the head of family…… Mobile no……..
3. Age…… Sex ……
4. Address

   ……..
5. What is the highest level of education attained by the head of the respondent?
   - None
   - Primary
   - Secondary
   - Tertiary
6. Main Occupation……..
7. Modified Kuppuswamy score for socioeconomic status.....

i)Education	**score**
Professional or Honours	7
Graduate or Post-Graduate	6
Intermediate or Post-High-School Diploma	5
High School Certificate	4
Middle School Certificate	3
Primary School or Literate	2
Illiterate	1

ii)Occupation

Profession	10
Semi-Profession	6
Clerical, Shop-owner, Farmer	5
Skilled worker	4
Semi-skilled worker	3
Unskilled worker	2
Unemployed	1

iii)Family Income Per Month (in Rs)*

>39020	12
19510-39019	10
14633-19509	6
9755-14632	4
5853-9754	3
1971-5852	2
<1970	1

Total Score Socioeconomic Class

26 – 29 Upper (I)

16 – 25 Middle Upper Middle (II)

11 – 15 Lower Middle (III)

5 – 10 Lower Upper Lower (IV)

< 5 Lower (V)

8. Number of cattle in the household……

- <3
- 3-5
- >5

9. Owner/care-taker of cattle
10. Do you know about Tuberculosis?

    Yes/No

11. Have you heard about zoonotic tuberculosis?

    Yes/No

12. If YES, do you know how its spread?

    Yes/ No

13. Type of grazing system practiced

    Village Resident Herds (VRH)

    Transhumance System (TH)

    Interface System (IFH)

14. Have your cattle been in contact with in forests?

    Yes/ No

15. Where the watering point is located for your cattle?
    - Home
    - Outside
16. If outside, have you seen your cattle share watering points with stray animals simultaneously?

    Yes/ No

17. Do you attend the animal fares?

    Yes/ No

18. Have you sold/purchased an animal in the previous 12 months?

    Yes/ No

19. Where did the buyers come from?
    - Local buyers from town
    - Within the province
    - From animal fares
    - Can't recall
20. How do you give treatment to your cattle when they fall sick?
    - Self-administration of medicines
    - Meeting a Vet.
    - Mixed

21. Do you consume the milk of cattle or sells?

    Yes/ No

22. If Yes then which form of milk do you consume?

    - Raw
    - Boiled
    - Mixed

23. Are you a non-vegetarian?

    Yes/ No

24. If Yes which form of meat do you consumes?

    - Cooked
    - Mixed

25. Do you know milk is a vehicle for Mycobacterium *bovis?*

    Yes/ No

26. Do you know meat is a vehicle for Mycobacterium *bovis?*

    Yes/ No

ANNEXURE II – CONSENT FORM

ID No._____

Informed Consent

I am Dr. Sonam, a student of International Institute of Health Management Research, Dwarka, New Delhi. I am conducting research on Practices that are potential risks to an increase in zoonotic tuberculosis – a cross sectional study amongst cattle holders in peri-urban Sonepat. This questionnaire is intended to get information from you regarding your practices of cattle handling, awareness about zoonotic tuberculosis and its transmission. The information you provide would be kept confidential. Participation is voluntary. You can withdraw your participation if you do not feel comfortable at any point of the time. The contact number of the Institute would be provided to you in case you have any query. The results of the study would be communicated to you once the study is completed.

If you accept to participate in this study

Sign here_____ Date_____

Please mention-

Consent accepted_____ Consent rejected_____

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