Assessment of knowledge towards zoonotic diseases among cattle owners

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Statement of Author

I, Arfanul Saif, certify unequivocally that I have performed all the tasks detailed in this report. The data was gathered from books, national and international periodicals, and other sources. All citations have been properly acknowledged. Consequently, I am solely responsible for collecting, manipulating, preserving, and publishing all data compiled in this report.

The Author

List of Acronyms Symbols Used

Abbreviation	Elaboration
%	Percentage
P	The P-value is known as the level of marginal significance
SD	Standard Deviation
OR	Odd ratio
CI	Confidence interval
No, N	Number
*	Expected Answer
>	Greater than
<	Less than
e.g.,	Example
etc.	Et cetera
et. al	And his associate
CVASU	Chattogram Veterinary and Animal Sciences University

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Abstract

Zoonotic diseases profoundly affect the health of both humans and animals, and their prevalence is notably high in less developed nations. Enhancing consciousness and advocating for preventative actions among individuals engaged in close animal interactions could potentially mitigate the challenges posed by zoonotic diseases. The goal of the study was to assess the level of knowledge and its possible risk factors among the cattle owners. Pre-structured questionnaire used to know the knowledge and other characteristics. Chi-square test was used to magnify the association between different characteristics and outcome variable. A logistic regression model was used to quantify the potential risk factors which triggering the outcome. 58% respondent had good knowledge regarding the animal zoonotic diseases. The average age of the respondents were 43 years old. The average experience of cattle rearing was 10 years. About 63% and 42.7% respondent heard and transmission of zoonotic disease. About 81% respondent think drinking raw milk can increase the risk of this disease. Age, family income, type of family, earning family member, cattle rearing and disease training, and yearly income from cow were the significant predictors for knowledge. The knowledge of respondents was found to be highly influenced by socio-demographic, and farm characteristics. Factors such as age, education, income, training, experience of farming were associated with knowledge towards zoonotic disease. Increasing awareness and training could reduce the risks of zoonotic diseases.

Keywords: Zoonotic diseases, awareness, cattle owners, Bangladesh

Chapter 1. Introduction

Zoonotic diseases, due to their outbreak potential in human and animals, still remain a global concern, particularly in developing nations ((Jones et al., 2008; Taylor et al., 2001). About 20% of human morbidity and mortality linked to zoonoses in developing areas (Grace et al., 2011; Grace et al., 2012; Rist et al., 2014). Besides, zoonotic diseases impair the economy due to trade barrier, and decrease the demand of consumer products (McDermottand and Arimi, 2002).

Many factors include human habitat and behavior, animal–human interaction, livestock farming, wild animal trade, climate change, destruction of wild animal habitat and mixing wild and domestic animals contributed the emergence of zoonotic diseases to human (Chowdhury et al.,2021). The nation's vulnerability to zoonotic diseases might be for its denser population and, close dependency and proximity of humans with animals, especially cattle. So, cattle owners had high chance to expose the zoonotic disease. Frequently natural calamities threatened Bangladeshi populations to be affected with zoonotic diseases due to increase chances of contamination of infected animal feces (Minar et al., 2013; Atwill, 1995).

Bangladesh considered as a global hotspot for the transmission of zoonotic diseases (Allen et al., 2017). But, the overall risk of zoonotic diseases on public health and disease emergence factors is not well summarized in Bangladesh. People of Bangladesh live very close to their domestic livestock and poultry. Slaughtering and selling sick animals are very common. Farmers are at high risk of frequent exposure to animals. Moreover, people are not well aware of the risk of zoonotic disease transmission (Chowdhury et al.,2021).

In order to effectively mitigate risks, it is crucial to possess a comprehensive understanding of public viewpoints and the underlying factors that contribute to the emergence and dissemination of these diseases (Barocas, 2020). This study deeply explores the intricate interplay between public perceptions and the multiple risk elements

associated with zoonotic diseases. Given the complexity of these diseases, a holistic strategy that combines societal and cultural aspects with scientific knowledge is imperative (Jones et al., 2020). Noteworthy among the study's findings is the pivotal role that public perceptions play in shaping the framework for the management of zoonotic diseases (Mburu et al., 2021). Consequently, it becomes vital to factor in how variables like age, gender, education, financial status, and even family configuration influence these perspectives when devising targeted public health measures. Barocas (2020) suggest that education can play a crucial role in shaping public perceptions and understanding of zoonotic diseases impacting cattle. The potential of education extends beyond merely increasing awareness; it can also enhance the public's comprehension of disease risks and preventive measures, as evidenced by the positive correlation between education levels and favorable outlook (Mburu et al., 2021). Demonstrating the effectiveness of targeted education initiatives, training programs focused on cattle rearing and disease prevention underscore the significance of specialized educational efforts in driving behavioral changes and fostering positive outlooks (Kustiningsih et al., 2023).

Despite the considerable importance of zoonotic diseases and their widespread implications, a significant gap exists in comprehensive research aimed at comprehending the scope of awareness among cattle owners regarding these diseases in Bangladesh. The current understanding of perception, knowledge, and risk associated with zoonotic illnesses among livestock farmers in the Chattogram region of Bangladesh is notably limited. Evaluating awareness levels and subsequent practices could offer a fundamental avenue for alleviating the burden of zoonotic diseases among rural farmers.

This study aims to fill this gap by conducting a comprehensive assessment of the knowledge possessed by cattle owners in specific areas of Bangladesh, including Chittagong and its neighboring regions. The primary goals of this research involve appraising the understanding of cattle owners regarding zoonotic diseases and their perspectives toward them.

1.1. Objectives of the study

The general objective of this study was to assess the depth of comprehension and potential risk factors of knowledge concerning zoonotic diseases of cattle. The specific objectives were as follows:

1.To assess the degree of familiarity with zoonotic diseases related to cattle among farmers in specific geographical areas.

2. To examine the associations between socio-demographic variables, as well as attributes linked to cattle and farming, and the levels of knowledge.

3. To pinpoint potential risk factors associated with socio-demographic elements, as well as cattle and farming attributes, that could impact the levels of knowledge.

Chapter 2. Materials and Methods

2.1 Study setting and design

The study was conducted between February 2023 and July 2023 in three upazilas in Bangladesh: Hathazari and Karnaphuli, situated in the Chattogram district, and Chakaria in the Cox's Bazar district of Bangladesh. Hathazari and Karnaphuli are part of the Chattogram Division. The coordinates of Hathazari are 22.5083°N 91.8083°E. The population is 431,748 in total. Its overall size is 251.28 km^2 and there are 52,594 houses there. Agriculture is the secondary source of revenue, with services as the primary one (BBS, 2011). In Hathazari, the average literacy rate is 57.9%, with 61.1% for males and 54.6% for females (Syed, S., 2012). Distance is 260 km from the capital, Dhaka. Karnaphuli is the 490^{th} Upazila in Bangladesh. It was established on 27 May 2000 with five unions. Chakaria is located at 21.7861°N 92.0778°E. It has 63671 households and a total area of 643.46 km^2. According to the 1991 Bangladesh census, Chakaria had a population of 409, 346. Males constituted 51.87% of the population, and females 48.13%. Average literacy 33.48%; Male 39.18%, Female 30.54%. Distance is 276 km from the capital, Dhaka. Numerous dairy farms surround the entire area, and the majority of farmers rely only on the income from these farms.

Farmers from the Hathazari, Karnaphuli, and Chakaria upazilas were included in the study's population, along with individuals who exhibited a range of sociodemographic characteristics. In addition, the target groups were questioned about their knowledge regarding a specific public health strategy for zoonotic disease control.

2.2 Study population

The study population in the chosen locations consisted of only cattle farmers. Farmers who rear cattle for commercial or subsistence purposes in the chosen locations of Hathazari, Karnaphuli and Chakaria are referred to as the study unit for the purposes of this study, which aims to evaluate their knowledge regarding cattle-related zoonotic illnesses. Farmers of cattle who are both male and female meet the inclusion criteria. Both

commercial and subsistence farmers who raise cattle are required. Must provide permission to take part in the study. Participants were excluded if they were unwilling to provide informed consent, regardless of whether they were cattle farmers or not.

2.3 Sampling design and ethics

A cross-sectional study was conducted from March 2023 to May 2023 to evaluate the community's knowledge of an integrated one-health strategy to reducing zoonosis disease. The respondents were questioned on their knowledge of zoonosis, the transmission of zoonosis from animals and their products and the availability of government and private sector extension services on zoonosis. The goals were achieved by using a convenience sampling design. From the three chosen upazilas, a total of 302 data were collected. Data collection for this study was done in accordance with the Helsinki ethical guidelines. During the interview, the respondent was asked for a written informed consent.

2.4 Data collection procedure

To evaluate the knowledge of the farmers who live in the study areas, a systematic questionnaire was developed. During the interview, the questionnaire was appropriately translated into the Chittagonian language and given to the inhabitants that reside in the study areas. Additionally, before the interview began, they were informed of the survey's goal and asked for their permission. There are both closed- and open-ended questions on the survey. It is divided into three sections. First, socio-demographic data included details such as age, marital status, religion, education, occupation, family income, family structure, and number of wage earners. Second, characteristics pertaining to livestock and farms included the quantity of animals, yearly income from cows, training for disease and cattle husbandry, and so on. Thirdly, questions about zoonotic disease knowledge. There were nine knowledge-related questions. The inquiries on zoonotic disease transmission, outbreak, management, awareness, and training. Questions about knowledge, got yes or no answers. The score is 1 for a "yes" response and 0 for a "no" response. For analysis purpose, we categorized binary of knowledge score with the help of median.

The knowledge levels were assessed by scoring participants on a scale of 0- 9. This was dependent on the responses a participant gives concern knowledge questions on the questionnaire. A score of less than five (5) was regarded as poor knowledge and a score of six (5) or more was regarded as good knowledge. The scale expresses good reliability in the present study with a Cronbach's alfa of 0.84 for assessment of knowledge.

2.5 Statistical analysis

Mean, standard deviation and frequency, percentages were calculated for continuous variable and categorical variable The categorical variables were presented as a bar graph. An association was quantified for all categorical variables by chi-square test and fisher exact test. A logistic regression model was employed to find out the significant predictors on knowledge. Hosmer and Lemeshow test was applied for goodness of fit model. A likelihood ratio test was applied for significance of the model parameters. Odds ratio (OR) was used to interpret the parameters and confidence interval (CI) was used to make understand significance of the parameters. All analyses were done using SAS version 9.3 software, 5% significance level was considered with two tailed test.

Chapter 3. Data analysis and Presentation

3.1 Socio-demographic and socioeconomic characteristics of the respondent

n this survey study, we examined 302 respondents to provide an overview of their demographic characteristics. The majority, comprising 80.8%, were males, while females accounted for 19.2% of the sample. Regarding age groups, the largest proportion (60.3%) fell between 36 and 50 years, with 18.9% under 35 and 20.9% over 50. The average age was 43.35 years, with a variance of 9.41 years. Marital status predominantly indicated being married (97.4%), with a smaller percentage reporting as single (1.0%), divorced (1.0%), or widowed (0.7%).

In terms of education, 47.7% had completed primary education, 13.6% had attained secondary education or higher, and 5% were illiterate. Occupations varied widely, with the majority being farmers (76.4%), followed by businessmen (18.2%), housewives (3.0%), and various other professions (2.4%). In matters of religion, Islam was the most prevalent (97.7%), followed by Hinduism (2.3%).

The average household income was approximately 52,238 Bangladeshi taka. Family structures encompassed both nuclear (54.3%) and joint (45.7%) arrangements. Family sizes ranged from 2 to 10 members, with 6 to 10 members being the most common (58.3%), followed by 2 to 5 members (30.8%), and over 10 members (10.9%). Income distribution within families was diverse, with single earners being the most common (41.1%). On average, each family had 2.0298 wage earners, with a standard deviation of 1.24256. These findings provide a comprehensive breakdown of the demographic characteristics of the surveyed respondents.

Table 1: Socio-demographic information of the respondents of Hathazari, Karnaphuli and Chakaria upazilas (n=302)

Parameters	Category	Frequency (%)	Mean ± SD
Age in years	≤ 35	57 (18.9)	43.35 ± 9.41
	36-50	182 (60.3)	
	> 50	63 (20.9)	
Gender	Female	58 (19.2)	
	Male	244 (80.8)	
Education	Illiterate	15 (5)	
	Primary	144 (47.7)	
	Secondary	102 (33.8)	
	Higher secondary & above	41 (13.6)	
Marital status	Married	294 (97.4)	
	Single	3 (1.0)	
	Divorce	3 (1.0)	
	Widow	2 (0.7)	
Profession	Business	55 (18.2)	
	Farmer	231 (76.4)	
	Housewife	9 (3.0)	
	Others	7 (2.4)	
Religion	Islam	295 (97.7)	
	Hindu	2.3 (2.3)	
Family income monthly	<=30000	47 (15.6)	52238.41 ± 28572.97
	31000-50000	156 (51.7)	
	>50000	99 (32.8)	
Family type	nuclear	164 (54.3)	
	joint	138 (45.7)	
Family member	2-5	93 (30.8)	7.12±2.60
	6-10	176 (58.3)	
	>10	33 (10.9)	
Earning family member	one member	124 (41.1)	2.03±1.24
	two members	101 (33.4)	
	more than 2	77 (25.5)	

Othres (banker, politician, lawyer, teacher)

3.2 Cattle and farm related characteristics of the respondent

Table 2 provides a comprehensive overview of several key aspects related to farming and cattle rearing, encompassing farm ownership, education, knowledge of cow diseases, living arrangements, experience, annual income, and cattle numbers across diverse farm types. Regarding training in cattle rearing, 58.3% of individuals had received such training, in contrast to 41.7% who had not. The average annual income was 519,933.7748 Taka, with a standard deviation of 488,829.36534 Taka. In terms of experience in cattle rearing, participants were primarily clustered within the 6–10 years' experience range, followed by those with 1–5 years and 11–15 years of expertise in cattle rearing. Furthermore, a majority of participants (74.2%) had family or medium-sized farms, with herd sizes spanning from 4 to 16.

Table 2: Frequency and percentages of cattle and farm related characteristics

Parameters	Category	Frequency (%)	Mean ± SD
Any training on rearing cattle	Yes	176 (58.3)	
	No	126 (41.7)	
Method of rearing cattle	intensive	252 (83.4)	
	extensive	5 (1.7)	
	semi-intensive	45 (14.9)	
Any training on cattle disease	yes	85 (28.1)	
	no	217 (71.9)	
Living beside cowshed	yes	217 (71.9)	
	no	85 (28.1)	
Year of experience of rearing cattle	1-5	78 (25.8)	10.63±6.42
	6-10	114 (37.7)	
	11-15	65 (21.5)	
	16-20	28 (9.3)	
	>20	17 (5.6)	
Yearly income form cattle (taka)	≤ 200000	56 (18.5)	519933.78±488829.37
	200001-400000	101 (33.4)	
	400001-600000	92 (30.5)	
	> 600000	53 (17.5)	
No. of cattle	Household farm (1 to 3)	24 (7.9)	12.5397±11.75568
	Family farm (4 to 16)	224 (74.2)	
	Business farm (>16)	54 (17.9)	

3.3 knowledge score level of livestock farmers relating to zoonotic disease

Out of the 302 study participants, 175 (58%) of the participants exhibited good knowledge, whereas 127 (42.1%) equally exhibited poor knowledge score on the basis of median score level.

The table gives an in-depth overview of the respondents' knowledge about zoonotic diseases in relation to farming in Bangladesh. 62.3 percent of respondents claimed they had heard of zoonotic diseases, compared to 37.7 percent who had not. 42.7% of respondents had understanding of how diseases are transmitted from cattle to people, whilst 57.3% did not. 33.8% of respondents did not share this belief, compared to 66.2% who thought they were susceptible to the same illness as their sick cow. 86.8% of respondents said they were aware of the dangers of eating raw meat and drinking raw milk, while 13.2% said they weren't. 88.7% of respondents said they were aware that animal bites can carry disease, while 11.3% said they were not. Only 23.5% of farmers said they had experienced zoonotic disease outbreaks on their properties; 76.5% had not. Only 14.6% of respondents reported having taken zoonotic disease training or instruction, whereas the majority (85.4%) did not.

Table 3: Frequency table for knowledge score answers of livestock farmers relating to zoonotic diseases in Chattogram and Cox's Bazar District, Bangladesh

Variables	Response	Number (%)
1. Have you heard of zoonotic diseases before?	Yes	188 (62.3)
	No	114 (37.7)
2. Do you know how diseases are transferred from cattle to humans?	Yes	129 (42.7)
	No	173 (57.3)
3. When the cows in your herd are sick, do you think you can get the same illness?	Yes	200 (66.2)
	No	102 (33.8)
4. Drinking uncooked meat/raw milk can spread disease to you?	Yes	262 (86.8)
	No	40 (13.2)
5. Do you think animal bites can spread disease to you?	Yes	268 (88.7)
	No	34 (11.3)
6. Have you ever experienced an outbreak of any zoonotic disease on your farm?	Yes	71 (23.5)
	No	231 (76.5)

7. Have you received any training or education on zoonotic diseases?	Yes	44 (14.6)
	No	258 (85.4)
8. Do you think there is a need for more awareness and education about zoonotic diseases among farmers in Bangladesh?	Yes	296 (98.0)
	No	6 (2.0)
9. Have you or someone you know ever contracted a zoonotic disease?	Yes	52 (17.2)
	No	250 (82.8)

3.4 Bar graph of zoonotic disease known by participants and sources of information

According to the study's findings, the participants had differing degrees of knowledge about several zoonotic illnesses. Figure 1 displays the data. It is noteworthy that 50% of the participants said they were aware with the term "zoonotic diseases." In terms of specific illnesses, rabies and coronavirus were quite well known, with 78 (25.8%) and 37 (12.3%), respectively, participants showing familiarity. Other illnesses like anthrax, TB, FMD (Foot-and-Mouth Disease), and bird flu were relatively familiar to a portion of individuals. Only a very tiny percentage of participants, however, were aware of diseases including brucellosis, zika, and nipah.

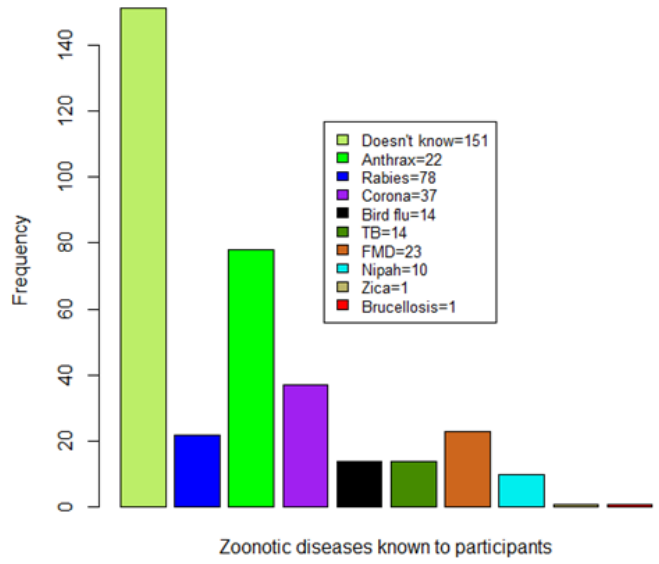

Figure 1: Frequency distribution of zoonotic diseases known to participants

The findings of our study provide insight into the many channels individuals use to acquire knowledge about zoonotic diseases. The information is displayed in Fig 2. Notably, 105 (32%) of participants indicated that they rely on veterinarians for knowledge on zoonotic diseases, making them the most popular primary source of information. 43 (13%) of participants cited their families as a key source of information, while 15% (49) cited society as a significant one. 33 (10%) of participants cited media as their main source, which included news sources, social media, and other platforms. Surprisingly, a sizable portion 94 (29%) stated that they weren't aware of the primary source of their knowledge about zoonotic diseases

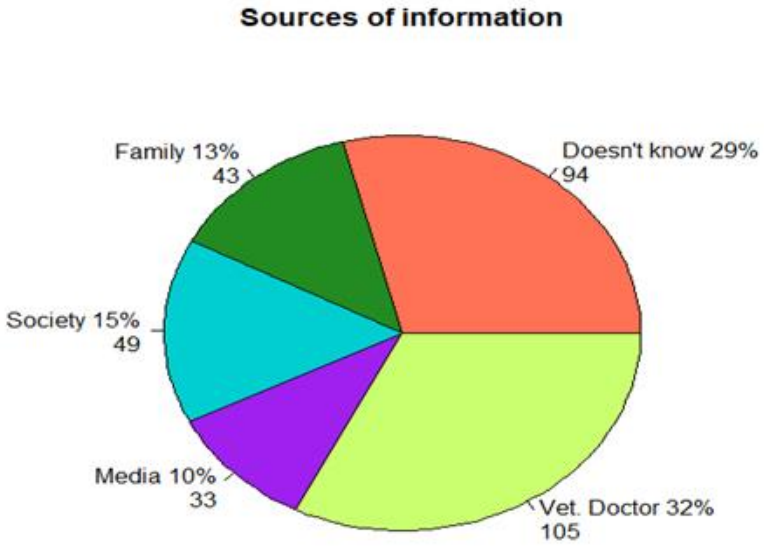

Figure 2 : Source of information to know zoonotic disease

3.4 Distribution of knowledge across socio-demographic characteristics

The association between socio-demographic characteristics and knowledge are presented in Table 4. The result revealed that there was significance in the age of the participants and their knowledge (p=.0001). Participants aged 35 and below have significantly better knowledge compared to those aged 35 to 50 and over 50 years old. Education significantly

affects knowledge. Participants with higher education levels (secondary and above) exhibit better knowledge (p=.001), compared to those with lower education levels. Family income is significantly associated with knowledge. Participants with higher family income levels tend to have better knowledge (p=0.001). Profession significantly impacts knowledge. Participants in the business and farming professions show better knowledge (p=0.001) compared to others.

Table 4: Relationship between socio-demographic characteristics, level of knowledge

Variables	Knowledge		Chi-square/FET	P value
	Good (n, %)	Poor (n, %)		
Age in years				
≤ 35	41 (71.9)	16 (28.1)	15.23	0.0001***
35-50	110 (60.4)	72 (39.6)		
> 50	24 (38.1)	39 (61.9)		
Gender				
Female	25 (43.1)	33 (56.9)	6.49	0.011*
Male	150 (61.5)	94 (38.5)		
Marital status				
Married	171 (58.2)	123 (41.8)	4.93	0.117
Single	3 (100.0)	0 (0.0)		
Divorce	1 (33.3)	2 (66.7)		
Widow	0 (0.0)	2 (100.0)		
Religion				
Islam	171 (58)	124 (42)	0.002	0.965
Hindu	4 (57.1)	3 (42.9)		
Education				
Illiterate	3 (20)	12 (80)	17.12	0.001**
Primary	75 (52.1)	69 (47.9)		
Secondary	67 (65.7)	35 (34.3)		
Higher secondary & above	30 (73.2)	11 (26.8)		
Family income				
≤30000	19 (40.4)	28 (59.6)	14.39	0.001**
31000-50000	85 (54.5)	71 (45.5)		
>50000	71 (71.7)	28 (28.3)		
Profession				
Business	44 (80)	11 (20)	15.11	0.001**
Farmer	121 (52.4)	110 (47.6)		
Housewife	5 (55.6)	4 (44.4)		
Others	5 (71.4)	2 (28.6)		
Family type				

Nuclear	100 (61)	64 (39)	1.35	0.245
Joint	75 (54.3)	63 (45.7)		
Earning family member				
One	61 (49.2)	63 (50.8)	7.67	0.022*
Two	68 (67.3)	33 (32.7)		
More than two	46 (59.7)	31 (40.3)		

Othres (banker, politician, lawyer, teacher); * Significant at P<0.05; ** Significant at P<0.01; ***Significant at P<0.001; FET=Fisher exact test

3.5 Distribution of knowledge across cattle and farm related characteristics

Table 5 provides a comprehensive analysis of participant knowledge across cattle and farm related characteristics. The result revealed that cattle rearing training significantly impacts knowledge. Participants who have received cattle rearing training exhibit better knowledge (p=.0001) compared to those who haven't received such training. Cattle disease training significantly influences knowledge. Participants who have received cattle disease training exhibit better knowledge (p=.0001) compared to those who haven't received such training. Cattle rearing experience significantly impacts knowledge. Participants with more years of cattle rearing experience tend to have better knowledge (p=.006). Knowledge was associated with living beside cowshed, No. of cattle. And yearly income from cowshed.

Table 5: Relationship between cattle and farm related characteristics, level of knowledge

Variables	**Knowledge**		**Chi-square/FET**	**P value**
	Good (n, %)	**Poor (n, %)**		
Cattle rearing				
Intensive	139 (55.2)	113 (44.8)	5.32	0.061
Extensive	3 (60)	2 (40)		
Semi-intensive	33 (73.3)	12 (26.7)		
Cattle rearing training				
Yes	124 (70.5)	52 (29.5)	27.08	0.0001***
No	51 (40.5)	75 (59.5)		
Cattle disease training				
Yes	70 (82.4)	15 (17.6)	28.92	0.0001***
No	105 (48.4)	112 (51.6)		
Living beside cowshed				
Yes	112 (51.6)	105 (48.4)	12.69	0.0001***
No	63 (74.1)	22 (25.9)		

No. of cattle				
Household farm (1-3)	8 (33.3)	16 (66.7)	6.5	0.039*
Family farm (4-16)	135 (60.3)	89 (39.7)		
Business farm (> 16)	32 (59.3)	22 (40.7)		
Cattle rearing experience				
1-5	55 (70.5)	23 (29.5)	14.51	0.006**
6-10	69 (60.5)	45 (39.5)		
11-15	34 (52.3)	31 (47.7)		
16-20	12 (42.9)	16 (57.1)		
>20	5 (29.4)	12 (70.6)		
Yearly income from cow				
≤200000	29 (51.8)	27 (48.2)	33.38	0.0001***
200001-400000	46 (45.5)	55 (54.5)		
400001-600000	51 (55.4)	41 (44.6)		
>60000	49 (92.5)	4 (7.5)		

*** Significant at P<0.05; ** Significant at P<0.01; ***Significant at P<0.001; FET=Fisher exact test**

3.6 Effects of socio-demographic characteristics on Knowledge

Table 6 presents the association between socio-demographic variables on knowledge. It was observed that age, family income, family type and earning family member were associated with knowledge. The knowledge was 4.59 times higher for less than or equal to 35 years old as compared to greater than 50 years old. Lower family income person had lower knowledge towards zoonotic disease. Joint family was less knowledge towards zoonotic disease. Two earning members knowledge higher as compared to greater than two earning members towards zoonotic disease.

Table 6: Multiple logistic regression analysis of sociodemographic variables on knowledge

Parameters	Odds ratio (OR), 95% CI
Age	
≤35	4.59 (2.03 - 10.38)**
36-50	2.46 (0.31 - 4.60)
>50	1
Family income	
≤30000	0.17 (0.07 - 0.42)***
31000-50000	0.37 (0.20 - 1.71)
>50000	
Family type	
Nuclear	1
Joint	0.50 (0.29 - 0.86)*

Earning family member	
One	1.04 (0.50 - 2.14)
Two	2.17 (1.09 - 4.45)**
More than two	1

*** Significant at P<0.05; ** Significant at P<0.01; ***Significant at P<0.001; CI=Confidence interval**

3.7 Effects of cattle and farm related characteristics on Knowledge.

Table 7 presents the cattle and farm related variables on knowledge towards zoonotic disease. Participants who didn't have cattle rearing and disease training were less likely to possess knowledge (OR: 0.47, CI: 0.26-0.83; OR: 0.22, CI: 0.11 - 0.45). Yearly income from cow ownership also had a significant impact on knowledge. Lower level of yearly income had poor knowledge than higher level of yearly income towards zoonotic disease.

Table 7: Multiple logistic regression analysis of cattle and farm related variables on knowledge

Parameters	Odds ratio (OR), 95% CI
Cattle rearing training	
No	0.47 (0.26 - 0.83)*
Yes	
Cattle disease training	
No	0.22 (0.11 - 0.45)**
Yes	
Yearly income from cow	
≤200000	0.08 (0.03 - 0.26)
200001-400000	0.06 (0.02 - 0.19)***
400001-600000	0.07 (0.02 - 0.21)**
>60000	1

*** Significant at P<0.05; ** Significant at P<0.01; ***Significant at P<0.001; CI=Confidence interval**

Chapter 4. Discussion

The study focused on socio-demographic, socioeconomic, and cattle-related factors as well as respondents' levels of zoonotic disease knowledge. Both a healthy herd and healthy livestock farmers are crucial. The study objectives were to assess the level of knowledge and related factors. Our study emphasizes the need to increase the understanding of Bangladeshi livestock farmers about zoonoses and to continue promoting current and new strategies to lower the risk of zoonotic disease transmission.

The study provides an in-depth assessment of the respondents' knowledge of zoonotic illnesses as they relate to Bangladeshi cattle husbandry. Out of the 302 study participants, 175 (58%) of the participants exhibited good knowledge, whereas 127 (42.1%) equally exhibited poor knowledge. This may be because fewer people are aware of these illnesses even when infections are present. Other possible causes include a lack of health facilities, awareness camps, training programs for handling animals, and poor literacy rates. A similar research result was found (Hundal et al., 2016; Munyeme et al., 2010). Another research found that the overall knowledge towards cattle related zoonotic diseases good scores was 52% (Adam, 2021).

Participants under the age of 35 showed more knowledge about zoonotic illnesses than participants between the ages of 35 and 50 and over 50. Age was significantly associated with knowledge. 35 years and younger people were 4.59 and 2.5 times more likely to have a favorable knowledge compared to those over 50 years old. This shows that in this situation, younger people would be more open to health-related information and interventions. This may be explained by the fact that younger people are exposed to more information via the internet and social media, raising awareness of the dangers of zoonotic diseases that spread from animals to humans. Drinking raw milk, consumption of raw meat are not common practices in the study regions which is common among people in African region (Ngoshe et al., 2022).

Education level significantly influenced knowledge, with illiterate individuals and those with only an elementary education being less likely to possess adequate knowledge about zoonotic diseases. Higher education was linked to a better understanding of zoonoses, as indicated by a recent study on dairy cattle farmers in Malaysia (Sadiq et al., 2021). This underscores the importance of education in raising awareness and understanding of zoonotic diseases associated with cattle. The lower awareness among respondents with lower educational levels may be attributed to a reluctance to move beyond traditional farming practices.

Furthermore, household dynamics played a role, with nuclear families more likely to have a positive outlook, potentially due to differences in decision-making and information-sharing processes. Knowledge was also influenced by the number of employed family members, with households having more than two wage earners displaying higher levels of positive outlook and knowledge, possibly due to increased access to education and health information. Cattle rearing and disease training significantly correlated with higher knowledge levels. Individuals with such training were more likely to possess positive outlook and knowledge, emphasizing the importance of specialized training programs in enhancing awareness of zoonotic diseases. This aligns with previous research, where education and awareness were key determinants of health-protective behaviors.

Additionally, factors such as proximity to cattle had a notable impact on knowledge, potentially through exposure to various situations or the accumulation of knowledge over time. These findings resonate with earlier studies conducted in Southern Ghana, Ethiopia, and India (Mandefero & Yeshibelay, 2018; Rajkumar et al., 2016; Amissah-Reynolds, 2020). The quantity of cattle in a household had limited influence on opinions.

Knowledge was also significantly associated with annual income from cow ownership, with those having higher incomes more likely to possess positive outlook and knowledge. This aligns with prior research in this domain (Islam et al., 2021). The findings of this study hold substantial implications for public health interventions and policy development.

Strength and Limitations

The strength of this approach is that the study provides an in-depth assessment of cattle owners' knowledge concerning zoonotic diseases in the context of Bangladeshi cattle husbandry, offering a nuanced understanding of the issue. The study employs quantitative methods to analyze the data, allowing for statistical assessment and identification of significant associations, providing a robust foundation for drawing conclusions.

The limitation of this approach is that the study focuses on specific regions in Bangladesh, the findings might not fully capture the diverse knowledge and outlook across the entire country. Also, the study may not fully account for the diverse socio-cultural backgrounds and traditions that could impact cattle owners' knowledge and outlook towards zoonotic diseases.

Chapter 5. Conclusion and Recommendations

Conclusion

The knowledge of the respondents was greatly shaped by factors such as education, income, and occupation. Higher levels of education, participation in cattle rearing training, and experience in managing diseases and cattle were associated with better knowledge. These findings underscore the importance of targeted education and training initiatives to enhance knowledge and promote positive outlook. Logistic regression analysis further clarified the links between sociodemographic and cattle-related variables with knowledge, supporting the idea that education, training, and experience significantly impact respondents' behavior.

In summary, the study provides valuable insights into the zoonotic disease knowledge of Bangladeshi cattle owners. It emphasizes the necessity for focused interventions to bridge information gaps, foster positive outlook and encourage practical preventive measures. Policymakers and public health professionals can develop more effective strategies to reduce the risks related to zoonotic diseases, enhance livestock health, and protect public health within agricultural communities by understanding the factors that influence cattle owners' actions.

Recommendations

Identified risk factors and demographic patterns provide valuable insights for targeted interventions. To bridge knowledge gaps among various demographics, awareness campaigns should utilize diverse communication channels, including digital platforms.

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