Knowledge Level of Dairy Farmers About Brucellosis in Punjab

Naman Khurana[1], Rajesh Kasrija[1*], Rajnish Sharma[2] and Rakesh Kumar Sharma[1]

[1]Department of Veterinary and Animal Husbandry Extension Education
[2]Assistant Professor, Centre for One Health
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana 141004, Punjab, India

ABSTRACT

Brucellosis is an important zoonotic disease across the world; it not only has impact on human and animal health but also on economy of the farm families in particular and of nation in general. Brucellosis has been reported in livestock in several states of our country including Punjab. The present study was conducted in all the agro-climatic zones of Punjab state. A total of 394 dairy farmers (holding minimum of 5 milch animals) were selected randomly and the information was gathered by personal interview schedule. Most of the respondents from all the six zones were above 30 years of age. In overall Punjab, only 3.0 percent dairy farmers were illiterate, while others have education level above high school. There was a statistically significant difference in knowledge score between different agro-climatic zones (H=11.687, df=5, p<0.05) and between education level (H=279.865, df=3, p<0.05). The knowledge level of dairy farmers from all the zones and from overall Punjab fall in to medium knowledge level category. There was no statistically significant difference in knowledge score between different age groups (H= 0.794, df=2, p>0.05), between family size (U=14775.000, Z= -1.010, p>0.05) and between farm size (H=0.670, df=2, p>0.05). From the present study, it is concluded that, there is dire need to organize suitable knowledge enrichment drive about brucellosis in the state.
Keywords: Brucellosis, Dairy, Knowledge, Punjab, Zoonoses

INTRODUCTION

Milk is an essential commodity in the food chain of human beings. There is continuous demand of milk and milk products among all the sections of society. As per Basic Animal Husbandry Statistics 2023, Government of India report, the milk production in India and in Punjab state was reported to be 230.58 million tones and 14.30 million tons respectively. Dairy farmers are toiling day and night with the aim to churn maximum profit. But, they are susceptible to some work place zoonotic diseases such as Brucellosis. According to World Health organization, any disease/ infection that is naturally transmissible from vertebrate animals to humans is known as Zoonosis, which comprise of major fraction of new and existing diseases in humans (Anonymous, 2021). Worldwide, brucellosis infects more than 500,000 humans every year (McDermott

*Corresponding author.

E-mail address: rajeshkasrija@gadvasu.in (Rajesh Kasrija)
Received ; 19.06.2024:Accepted 07.12.2024

et al 2013) and can affect all age group. Humans get the infection by coming in direct contact with infected animals or by eating or drinking contaminated milk/milk products (Moreno 2014) or by inhaling airborne agents. In Humans, brucellosis is also known as Bang's disease/Undulant fever/ Malta fever/Rock fever/ Mediterranean fever. This disease causes symptoms similar to flu such as loss of appetite, night sweating, weakness, fatigue, chills, wavering fever and joint/muscle pain. Brucellosis causes abortion in pregnant animals or birth of weak calves, decrease in milk production, and retained afterbirths with resulting uterine infections (Anonymous 2022). In nut shell, brucellosis causes production and economic losses to the dairy farmers and is also of public health concern. For prevention from this zoonotic disease, the dairy farmer must be aware about cause, symptoms, transmission and preventive measures about brucellosis. However, Brucellosis remains a neglected disease in the developing world (Franc et al 2018). So, the present study was planned with the objective of assessing the knowledge level of dairy farmers of Punjab state about brucellosis.

MATERIALS AND METHODS

Sampling plan and locale of study

The present study was conducted in Punjab state, which is an agrarian economy (primarily agriculture based) state. Based on agro climatic conditions, Punjab state has been divided into six different agro-climatic zones (Mahi and Kingra 2013): Sub Mountain undulating zone (Zone-1), Undulating plain zone (Zone-2), Central plain zone (Zone-3), Western plain zone (Zone-4), Western Zone (Zone-5) and Flood prone zone (Zone-6). Assuming that 50 percent of the subjects in the population have the factor of interest, this study would require a sample size of 385 for estimating the expected proportion with 5% absolute precision and 95 percent confidence (Dhand and Khatkar, 2014). From each agro climatic zone, two districts were randomly selected and from each agro-climatic zone, dairy farmers (having minimum of 5 milch animals) were randomly selected. Fifty nine dairy farmers from Zone 1, Ninety two dairy farmers from Zone 2, Eighty two dairy farmers from Zone 3, Sixty four dairy farmers from Zone 4, Sixty five dairy farmers from Zone 5, Thirty two dairy farmers from Zone 6 were randomly selected, thereby making total sample size to be 394 dairy farmers from whole of Punjab. The dairy farmers selected for the present study were told that their participation in the study was absolutely voluntary and were ensured that the identification of the dairy farm/ herd/household would not be disclosed.

Ethics statement: The necessary permission for conduct of study was obtained from Institutional Ethics committee, Dayanand Medical College and Hospital, Ludhiana via. reference number DMCH/R&D/2021/6, dated 20.01.2021.

Designing interview schedule:

For quantification of data related with Brucellosis, appropriate weightage was given to items/questions as indicated in Table 1. After consulting subject matter specialists, progressive farmers and scrutinizing relevant literature, a total of 11 questions with maximum score of 21 were selected in final interview schedule. For more clarity of data, the score obtained by dairy farmer about brucellosis was calculated from a total score of 100. Depending upon total score, the dairy farmers having score of 0 - 33.33, 33.34 - 66.66 and 66.67 – 100 were categorized in to low, medium and high knowledge level category.

Administration of Interview schedule:

Data was gathered from interviewing the dairy farmers at their dairy farm by personal interview and observation technique. Only one dairy farmer was interviewed at a time to avoid influence of other farmers and to facilitate correct expression by the dairy farmer. After collection of data from dairy farmers (from each agro-climatic zone), the obtained data was tabulated, analyzed and subjected to appropriate statistical tools by using SPSS version 26.0.

RESULTS AND DISCUSSION

It is clear from Table 2, that most of respondents from agro-climatic zones 1, 2, 3, 4, 5, 6 and overall Punjab belong to age group above 30 years. This suggests that dairy farming in Punjab is practiced by farmers having age >30. Similar findings were observed by Patel et al (2013) in Narmada valley of Gujrat and by Chauhan *et al.* (2004) in Marathwada region. The education level of most of the respondents was above high school. Only 10.2 %, 14.1 %, 9.8 %, 15.6 %, 10.8 %, 18.8 % and 12.7 % dairy farmers were graduate and post graduate in agro-climatic zones 1, 2, 3, 4, 5, 6 and overall Punjab respectively. However, Ahirwar *et al.* (2016) reported that in Rewa district of Madhya Pradesh, most of the dairy farmers (38.33%) have passed high school, followed by higher secondary (31.67%), primary (15.00%), graduation (11.67%), post-graduation and above (1.66%) and illiterate (1.67%). Kankarne *et al.* (2017) reported that in Kolhapur District of Maharashtra, most of dairy farmers (45%) were educated up to second-

ary school level followed by higher secondary (25.75 %), primary (21.25 %), graduate (4.75 %) and illiterate (3.25 %) respectively. The family size of majority of dairy farmers (78 percent in Zone-1, 77.20 percent in Zone- 2, 64.6 percent in Zone-3, 75.00 percent in Zone-4, 66.20 percent in Zone-5, 65.60 percent in Zone-6 and 71.60 % in Overall Punjab was Small i.e. up to 4 members. However, Potdar *et al* (2020) observed that in Maharashtra, average family size was 8.74 members per household in Bihar, 6.76 members in Uttar Pradesh and 6.17 members in Maharashtra. Most of dairy farmers in Punjab had large farm size (41.40 %) followed by medium farm size (37.00 %) and small farm size (21.60 %). Patel *et al.* (2013) reported that in the Tribal Households of Narmada Valley of Gujarat, the herd size was medium (6-10) in majority (60.00%) of tribal households.

Table 1: Weightage of items/Questions related to Knowledge of Brucellosis

S. No.	Items/Questions	Expected Ideal Response (score for correct answer)
1	Have you ever heard about a disease known as brucellosis	Yes(1)
2	In your opinion which animal host (s) is susceptible to brucellosis?	Mentioned only one animal e.g. cow or goat (0.5) If more than one animal (1)
3	What is/are symptom(s) of brucellosis in animals?	Mentioned one symptom (1) Mentioned two symptoms (2) Mentioned three symptoms (3)
4	What is/are the route(s) of transmission of Brucellosis in animals?	Mentioned one route (1) Mentioned two routes (2) Mentioned three routes (3)
5	What are the measures to prevent and control brucellosis in animals?	Any correct measure e.g. Vaccination (1)
6	Do you think animal suffering from brucellosis can transmit disease to people (zoonotic importance)?	Yes (1)
7	What is/are the route(s) of transmission of animal brucellosis to man?	Mentioned one route (1) Mentioned two routes (2) Mentioned three routes (3)
8	What is/are symptom(s) of brucellosis in humans?	Mentioned one symptom (1) Mentioned two symptoms (2) Mentioned three symptoms (3) Mentioned four symptoms (4) Mentioned five symptoms (5)
9	What are the measures to prevent and control brucellosis in humans?	Any correct measure like Vaccination (1)
10	Do you know the age at which vaccination is given/administrated in cattle/buffaloes?	Correct age (1)
11	Do you know in which animals, vaccination is contradicted?	Correct answer i.e. male (1)
Total		Total score- 21

Table 3 showed that on Kruskal-Wallis H test, there was a statistically significant difference in knowledge score between different agro-climatic zones (H=11.687, df=5, p<0.05). This suggests that the knowledge about brucellosis varies from zone to zone. So, while planning any extension programme for a particular zone, the knowledge level of farmers belonging to that zone should be taken in to consideration. The knowledge score (Mean± S.D.) of Zone 1, 2, 3, 4, 5, 6 and overall Punjab falls in medium knowledge level category. So, the present extension machinery should be strengthened to increase the knowledge level of dairy farmers.

Table 2: Distribution of dairy farmers according to demographic profile in different agro-climatic zones of Punjab

Attributes	Parameters	Agro-climatic zones						Total
		1 (n=59)	2 (n=92)	3 (n=82)	4 (n=64)	5(n=65)	6(n=32)	(n=394)
Age (years)	**≤ 30**	8 (13.60)	11 (12.00)	14 (17.10)	8 (12.50)	13 (20.00)	6 (18.80)	60 (15.20)
	31-40	24 (40.70)	41 (44.60)	39 (47.60)	27 (42.20)	26 (40.00)	13 (40.60)	170 (43.10)
	Above 40	27 (45.80)	40 (43.50)	29 (35.40)	29 (45.30)	26 (40.0)	13 (40.60)	164 (41.60)
Education	**Illiterate**	4 (6.80)	0 (0.00)	4 (4.90)	3 (4.70)	0 (0.00)	1 (3.10)	12 (3.00)
	High school	24 (40.70)	44 (47.80)	39 (47.60)	19 (29.70)	34 (52.30)	13 (40.60)	173 (43.90)
	Higher secondary	25 (42.40)	35 (38.00)	31 (37.80)	32 (50.00)	24 (36.90)	12 (37.50)	159 (40.40)
	Graduation and post-graduation	6 (10.20)	13 (14.10)	8 (9.80)	10 (15.60)	7 (10.80)	6 (18.80)	50 (12.70)
Family size	**Small (up to 4 members)**	46 (78.00)	71 (77.20)	53 (64.60)	48 (75.00)	43 (66.20)	21 (65.60)	282 (71.60)
	Large (5 or more then 5)	13 (22.00)	21 (22.80)	29 (35.40)	16 (25.00)	22 (33.80)	11 (34.40)	112 (28.40)
Farm size	**Small**	10 (17.00)	25 (27.10)	19 (23.20)	9 (14.00)	16 (24.70)	6 (18.80)	85 (21.60)
	Medium	17 (28.80)	33 (35.90)	29 (35.30)	30 (46.90)	26 (40.00)	11 (34.40)	146 (37.00)
	Large	32 (54.20)	34 (37.00)	34 (41.50)	25 (39.10)	23 (35.30)	15 (46.80)	163 (41.40)

Figure in parenthesis indicate percentage

Table 3: Mean knowledge score (Mean± S.D.) of dairy farmers about brucellosis in different agro-climatic zones of Punjab

Sr. No	Particulates	Mean± S.D.	Range	
	Agro-climatic zone		Minimum	Maximum
1.	Zone-1	57.79 ±35.11	4.76	100
2.	Zone-2	62.01 ±32.47	4.76	100
3.	Zone-3	50.06 ±34.49	0.00	100
4.	Zone-4	65.18 ±34.26	4.76	100
5.	Zone-5	58.31±32.68	4.76	100
6.	Zone-6	66.52 ±30.99	4.76	100
	Overall Punjab	59.16±33.75	0.00	100

Kruskal-Wallis H =11.687, df=5, p<0.05

Table 4 show that on Kruskal-Wallis H test, there was no statistically significant difference in knowledge score between different age groups (H= 0.794, df=2, p>0.05). Deka *et al.,* 2020 also reported that in Assam and Bihar, there is no significant association between farmers' knowledge about brucellosis and family size, education, age or gender of the farmers.

Table 4. Mean knowledge score (Mean ± S.D.) of dairy farmers about brucellosis with respect to age in Punjab

Sr. No	Particulars	Mean± S.D.	Range	
	Age		Minimum	Maximum
1.	Young	62.94 ±29.71	4.76	100
2.	Middle	59.58 ±34.67	0.00	100
3.	Old	57.35 ±34.23	4.76	100

Kruskal-Wallis H= 0.794, df=2, p>0.05

Table 5 shows that on Kruskal-Wallis H test, there was a significant difference in knowledge score between educa-

tion level (H=279.865, df=3, p<0.05). The highest knowledge was possessed by the dairy farmers having more educational level. Çakmur *et al.* (2015) also observed that in Turkey, there is a statistically significant positive difference between high education level and knowledge about zoonotic diseases. Lindahl *et al.* (2015) also observed that in Tajikistan, low educational level was found to be associated with low awareness of brucellosis (P = < 0.001).

Table 5. Mean knowledge score (Mean ± S.D.) of dairy farmers about brucellosis with respect to education in Punjab

Sr. No	Particulars	Mean± S.D.	Range	
	Education		Minimum	Maximum
1.	Illiterate	4.76±0.00	4.76	4.76
2.	High school	32.20 ±22.01	4.76	61.90
3.	Higher secondary	82.33±15.30	0.00	90.48
4.	Graduation and Post-graduation	91.81±23.68	4.76	100

*p<0.05, Kruskal-Wallis H=279.865, df=3

Table 6 show that on Kruskal-Wallis H test, there was no statistically significant difference in knowledge score between farm size (H=0.670, df=2, p>0.05). However, Deka *et al.* (2020) observed that in Assam and Bihar, knowledge about brucellosis was higher for farmers with a larger herd size (p < 0.001) and fully using a stall-fed system (p < 0.001).

Table 6. Mean knowledge score (Mean ± S.D.) of dairy farmers about brucellosis with respect to farm size in Punjab

Sr. No.	Particulates	Mean± S.D.	Range	
	Farm size		Minimum	Maximum
	Small	60.28±35.70	4.76	100
	Medium	58.54±32.75	4.76	100
	Large	59.13 ±33.79	0.00	100

*p>0.05, Kruskal-Wallis H= 0.670, df=2

CONCLUSIONS

Assessment of knowledge level of dairy farmers about Brucellosis in Punjab indicated that there was there was no significant difference in knowledge score between different age groups, family size and farm size. However, there was a significant difference in knowledge score between different agro-climatic zones and education level. Moreover, the knowledge level of dairy farmers of Punjab has been reported to be in medium knowledge level category. So, more extensive knowledge enrichment programme should be organised after keeping various socio-economic parameters.

CONFLICT OF INTEREST

Authors don't have any conflict of interest.

ACKNOWLEDGEMENTS

REFERENCES

Ahirwar, M. K., Singh, H. S., Patel, R. K., and Mondal, M. K. (2016). Socio-Personal and Economic Profile of Peri-Urban and Rural Dairy Farmers in Rewa District of Madhya Pradesh. *Int. J. Agric. Sci.*, **8**(63): 3548-3551.

Anonymous. (2021). Zoonoses, World Health organization retrieved from https://www.who.int/news-room/fact-sheets/detail/zoonoses

Anonymous. (2022). Facts about brucellosis, United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service, retrieved from https://www.aphis.usda.gov/animal_health/animal_diseases/brucellosis/downloads/bruc-facts.pdf

Çakmur, H., Akoğlu, L., Kahraman, E., and Atasever, M. (2015). Evaluation of farmers' knowledge-attitude-practice about zoonotic diseases in Kars, Turkey. *Kafkas J. Med. Sci.*, **5**(3): 87–93.

Chauhan, D. S., Kamble, V. J., Padghan, P. V., Sawant, R. C. and Kamble, R. R. (2004). Impact of farmers' status on milk production in tribal area of Kinwat Tahasil (Marathwada Region). *Indian J. Anim. Res.,* **38**(2): 137-140.

Deka, R. P., Magnusson, U., Grace, D., Shome R. and Lindahl J.F. (2020) Knowledge and practices of dairy farmers relating to brucellosis in urban, periurban and rural areas of Assam and Bihar, India, *Infection Ecology and Epidemiology*, **10**(1): 1769531. DOI: 10.1080/20008686.2020.1769531.

Dhand, N.K. and Khatkar, M.S. (2014). Statulator: An online statistical calculator. Sample Size Calculator for Estimating a Single Proportion. Accessed 24 December 2021 at http://statulator.com/SampleSize/ss1P.html

Franc, K. A., Krecek, R. C., Häsler, B. N. and Arenas-Gamboa, A. M. (2018) Brucellosis remains a neglected disease in the

developing world: a call for interdisciplinary action *BMC Public Health*, **18**: 125 DOI 10.1186/s12889-017-5016-y

Lindahl, E., Sattorov, N., Boqvist, S. and Magnusson, U. (2015). A study of knowledge, attitudes and practices relating to brucellosis among small-scale dairy farmers in an urban and peri-urban area of Tajikistan. *PLoS ONE*, **10**(2): 1-10.

Kankarne, Y., Siddiqui, F. and Kochewad, S. (2017). Effect of Socioeconomic traits on the level of knowledge of dairy farmers. *International J. Agri. Sci. Res.*, **7**(1): 287-292.

Mahi, G.S. and Kingra, P.K. (2013). *Fundamentals of Agrometerology.* Kalyani Publishers, Ludhiana pp 236-40.

McDermott, J., Grace, D. and Zinsstag, J. (2013) Economics of brucellosis impact and control in low-income countries. *Rev. Sci. ech.* **32**(1): 249–261.

Moreno, E. (2014). Retrospective and prospective perspectives on zoonotic brucellosis. *Front. Microbiol.*, **5**: 213.

Patel, N. B., Singh, R. R., Saiyed, L. H., Sabapara, G. P., Rao, T. K. S. and Modi, R. J. (2013). Status and constraints of dairying in the tribal households of Narmada Valley of Gujarat - India *Animal Science Reporter*, **7**(3): 83-89.

Potdar, V. V., Gaundare, Y. S., Khadse, J. R., Joshi. S. and Marimuthu Swaminathan, (2020). Socio-economic survey of Uttar Pradesh, Bihar and Maharashtra states of Indian continent. *Asian J. Agric. Ext. Econ. Soc.*, **38**(4): 75-81.