Research Article

Indian Journal of Extension Education
Vol. 57, No. 4 (October–December), 2021, (110-114)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Effectiveness of Educational Modules on Knowledge on Brucellosis among Dairy Farmers in Northern India

Arjun Prasad Verma[1]*, Hans Ram Meena[2], Diksha Patel[3] and B. S. Meena[4]

[1]Assistant Professor, Banda University of Agriculture and Technology, Banda-210001, Uttar Pradesh
[2,4]Dairy Extension Division, ICAR-National Dairy Research Institute, Karnal-132001, Haryana
[3]Krishi Vigyan Kendra, Banda-210001, Uttar Pradesh
*Corresponding author email: arjunverma45753@gmail.com

ARTICLE INFO

Keywords: Knowledge, Effectiveness, Educational module, Brucellosis, Dairy farmers

http://doi.org/10.48165/IJEE.2021.57424

ABSTRACT

The study was carried out to assess the effectiveness of an educational module on brucellosis among commercial dairy farmers. Experimental research design before and after was used to test the effectiveness of the Educational module. A total of 120 commercial dairy farmers were selected and interviewed using a well-structured interview schedule from six districts of Haryana and Punjab States during 2018. The results revealed that the majority of the respondents (55%) had not heard about brucellosis and didn't know causative agent of brucellosis (55%). The majority of the respondents mentioned that they did not know the symptoms of brucellosis, mode of transmission, method of prevention and vaccine used for brucellosis in dairy animals. Before exposure to the educational module, the percentage of knowledge was 12.03 per cent and after exposure 46.54 per cent. Mean knowledge gain was 34.51 per cent. Knowledge gain through educational module on brucellosis in dairy animals was positively and significantly correlated with education, landholding, income, herd size and experience in commercial dairy farming.

INTRODUCTION

Dairy sector in India is the world's fastest growing sector and it stands first in the world in terms of milk production and accounts for more than 19.5 per cent of the world's total milk production. Indian dairy industry despite being the leading milk producer, there is still a huge demand for milk and milk products. The development of the dairy sector depends on the numerous productive and reproductive performances of farm animals, which in turn depends on prevalent bovine diseases of the country. Brucellosis is the second most important zoonotic disease of the world after rabies and highly contagious reproductive disease prevalent in large scale among dairy animals of the country (Patel et al., 2014). It is estimated that brucellosis leading to an annual economic loses of US$ 58.8 million per year in India. Besides this, brucellosis causes an annual loss of approximately 30-million-man days. The available epidemiological evidence revealed that brucellosis is prevalent on all domestic animals in all states of India with wide variation from as low as 0.13 per cent to as high as 44per cent (Yadav et al., 2012). Brucellosis is a major zoonotic disease affecting public health as well as the economy of many nations throughout the world, particularly India, where insufficient disease control programmes have resulted in high endemicity. Human brucellosis is strongly associated while dealing with infected animals (Hegazy et al., 2011). Therefore, commercial dairy farmers are considered as being the highest occupational risk group (Al-Shamahy et al., 2000). To overcome brucellosis, Govt. of India launched a national animal disease control programme in 2019 to control the incidence of brucellosis in dairy animals. However, many factors have reduced the programme's effectiveness, such as lack of reliable information on brucellosis, lack of adequate communication between the public health authorities, veterinarians, and stakeholders, inadequate funding of surveillance and reporting systems, and free movement

Received 20-07-2021; Accepted 08-09-2021

of animals. The study aimed to assess the effectiveness of Educational Modules on brucellosis among commercial dairy farmers in Haryana and Punjab States.

METHODOLOGY

A cross-sectional study to investigate the effectiveness of educational module on brucellosis was conducted in six selected districts of Haryana and Punjab States.These districts were purposively selected from each state based on the highest cattle population. The inclusion criterion for commercial dairy farmers was designed to target those who were actively involved in dairying and at least having 25 milch animals. From each selected district 20 commercial dairy farmers were selected by snowball sampling method. Thus, 120 respondents were selected and out of it, 60 respondents were selected to test the effectiveness of the Educational module. A knowledge test was developed to measure the knowledge of commercial dairy farmers on Brucellosis. Data were collected by using a well-structured interview schedule. The interview schedule was pre-tested on a few selected farmers in one of the study areas, and the easiness of completion of the interview schedule and ambiguity of questions were noted and subsequently revised before a large-scale interview of the respondents. A standard structured interview schedule with multiple-choice was used. Data were analyzed by using frequency, percentage, cumulative squire root frequency methods, Z test and Pearson correlation coefficient.

RESULTS AND DISCUSSION

Knowledge about brucellosis

The results revealed (Table 1) that majority of the respondents (55%) did not hear about brucellosis and didn't know about the causative agent of brucellosis (55%). The findings of the study are contrary to the Njuguna et al., (2017) who reported that majority respondents had heard about brucellosis and most of them had no idea on the causative agent. The majority of the respondents (66.67%) didn't know the type of animals affected by brucellosis whereas, 33.33 percent mentioned mostly cow/buffalo were affected by brucellosis. About 11.67 per cent mentioned male and 28.33 per cent mentioned female as most affected sex in animals and 21.67 per cent of respondents mentioned that they experienced abortion in their dairy animals. The study indicates that majority of the respondents (66.67%) did not know the symptoms occurring due to brucellosis in dairy animals. About one-third of respondents have knowledge of symptoms of brucellosis in dairy animals. Of these, 14.17 per cent mentioned retained placenta as symptoms of brucellosis followed by abortion in last trimester of pregnancy, swelling of the testicle in male and hygroma/swollen joints in dairy animals i.e. 10.00, 5.00 and 4.16 per cent, respectively. About 15.00 per cent of the respondents mentioned abortion in last trimester of pregnancy as most common sign of brucellosis. The vast majority of respondents did not hear about human brucellosis (86.67%) and 89.17 per cent of the respondents don't know symptoms of human brucellosis.

Results revealed (Table 2) that the majority of the respondents (59.17%) didn't know about the mode of transmission of brucellosis in dairy animals. About 40.83 per cent of respondents had knowledge about modes of transmission of brucellosis in dairy animals. Of these, 15.83 per cent mentioned transmission occurs through mating with infected animals followed by direct mixing of purchased animals, direct contact with infected animals, licking of infected placenta i.e. 11.67, 9.17 and 4.16 per cent, respectively. Less than one-third of the respondent (26.66%) mentioned that they had knowledge on modes of transmission of brucellosis in human beings. Of these, 10.83 per cent mentioned it spread through consumption of unpasteurised milk and milk product followed by consumption of contaminated meat, contact with the aborted fetus or fetal membranes and during assisting in the parturition of infected animals i.e. 7.50, 5.83 and 2.50 per cent, respectively. The findings of the study are contrary to Assenga et al., (2016) who mentioned that majority of the respondents acknowledged that consumption of unpasteurized milk as the main risk factor, whereas improper

Table 1. Knowledge of respondents on brucellosis and its sign and symptoms in Dairy animals

S. No.	A. Knowledge of respondents on brucellosis in Dairy animals	%
1.	Have you heard of a disease called Brucellosis?	
	a. Yes	45.00
	b. No	55.00
2.	What is the causative agent of brucellosis?	
	a. Bacteria	13.33
	b. Virus	9.17
	c. Fungi	22.50
	d. Don't know	55.00
3.	Do you know the type of animals mostly affected by brucellosis?	
	a. Cow	22.50
	b. Buffalo	10.83
	c. Don't know	66.67
4.	Do you know the most affected sex in dairy animal due to brucellosis?	
	a. Male	11.67
	b. Female	28.33
	c. Don't know	60.00
5.	Have you experienced abortion in your dairy animals?	
	a. Yes	21.67
	b. No	78.33
	B. Knowledge about sign and symptoms of brucellosis in Dairy animals	
1.	Symptoms occurring due to Brucellosis in dairy animals are?	
	a. Abortion in last trimester of pregnancy	10.00
	b. Retained placenta	14.17
	c. Hygroma/Swollen Joints	4.16
	d. Swelling of testicle in male	5.00
	e. Do not know	66.67
2.	When an animal foetus is delivered dead at 6-8 months of pregnancy indicates?	
	a. Brucellosis	15.00
	b. Don't know	85.00
3.	Do you heard about human brucellosis?	
	a. Yes	30.83
	b. No	86.67
4.	Do you know the symptoms of Brucellosis in human being?	
	a. Fever and arthritis	2.50
	b. Joint and Muscle pains/Night sweat	0.83
	c. Miscarriage in women/Nausea, Fatigue, Skin lesions	3.33
	d. Painful scrotum in men/Headache	4.17
	e. Don´t know	89.17
5.	Do you know stillborn or weak calves born due to brucellosis?	
	a. Yes	4.16
	b. No	95.83

Table 2. Knowledge about the mode of transmission, preventive, control measures and vaccination of brucellosis

S.No.	Knowledge about mode of transmission of brucellosis	Percentage
1.	Do you know the mode of transmission of brucellosis in dairy animals?	
	Mating with infected animals	15.83
	Direct mixing of purchased animal	11.67
	Direct contact with infected animals	9.17
	Licking of infected placenta	4.16
	Don't know	59.17
2.	Do you know the mode of transmission of brucellosis to human being?	
	Consumption of unpasteurised milk and milk product	10.83
	Consumption of contaminated meat	7.50
	During assisting in the parturition of infected animals	2.50
	Contact with aborted foetus or foetal membranes	5.83
	Don't know	73.34
3.	Do you know artificial insemination the main method of servicing the cows serve as a means of brucella transmission?	
	Yes	19.17
	Don't know	80.83
	Preventive and control measure and vaccination of brucellosis	
1.	The Methods of Prevention of brucellosis in dairy animals is?	
	Vaccination of mature female calf/heifer	17.50
	Isolation of infected animals	7.50
	Test infected animals before mating and AI	10.00
	Don't know	65.00
2.	What precautions should be taken against brucellosis in dairy animals?	
	Brucellosis testing on a regular basis	9.17
	Avoid buying or selling cattle from infected herds	7.50
	Bio-security measures	1.66
	Don't know	76.67
3.	Do you know that intensive dairy farming will affect the infection of brucellosis in farm animals?	
	Yes	21.67
	No	78.33
4.	Do you know about Methods of Prevention of brucellosis in humans being?	
	Eating cooked meat and milk product	11.67
	Wear gloves during handling the animal's birth	4.17
	Wear special work clothes in disposal of placenta	5.83
	Safety measures in high work place	3.33
	Don't know	75.00
5.	Do you know vaccine for brucellosis in dairy animals?	
	Yes	21.67
	No	78.33
6.	Which among following vaccine mostly used for brucellosis treatment in dairy animals?	
	Brucella abortus strain 19 (S19)/Brucella Strain RB 51)	5.00
	Don't know	95.00
7.	What is the right age of vaccination of farm animal against brucellosis?	
	4-6 month	8.33
	Don't know	91.67

disposal of foetal membrane was perceived to have low contribution in the transmission of brucellosis. Only 19.17 per cent of respondents mentioned that they knew AI is the main method of brucella transmission in farm animals. The findings revealed that majority of the respondents (65.00%) did not have knowledge of preventive and control measures of brucellosis in dairy animals. About one-sixth (17.50%) of the respondents mentioned vaccination of mature female calf/heifer as method of brucellosis prevention followed testing animals before mating and AI and isolation of infected animals i.e. 10.00 and 7.50 per cent, respectively. Only 18.33 respondents mentioned they knew about the precaution to be taken to avoid the risk of brucellosis in dairy animals. Of these, 9.17 per cent mentioned brucellosis testing on a regular basis, followed by avoiding buying or selling cattle from infected herds and bio-security measures i.e. 7.50 and 1.66 per cent, respectively. About 21.67 per cent respondents knew that intensive dairy farming will lead to the infection of brucellosis. Majority of respondents (75%) did not knew the method of brucellosis prevention in human being regarding knowledge of respondents on vaccination for brucellosis, results revealed that (Table 2) majority of the respondents (78.33%) did not knew the name of vaccine used for vaccinating dairy animals for prevention of brucellosis and 21.67 per cent of the respondents knew/heard about vaccine. The vast majority of the respondents (95%) did not know about vaccine and only 5.00 per cent of the respondents correctly mentioned the name of vaccine used for brucella vaccination in dairy animals. The majority of the respondents (91.67%) did not know the right age of vaccination of farm animals against brucellosis.

Effectiveness of educational module

The result revealed (Table 3) that before exposure to educational modules, the mean knowledge scores was 4.93. The mean knowledge scores after fifteen days of exposure were 19.08. The mean gain in knowledge scores was 14.15. Overall knowledge

Table 3. Distribution of respondents on the basis of knowledge gain due to exposure to Educational module

Treatment	Mean				Mean		Z value	Standard
	Pre-exposure	%	Post-exposure	%	Knowledge gain	%		error mean
Educational module	4.93	12.03	19.08	46.54	14.15	34.51	17.69	0.727

**Significant at 0.01 level of significance

gain of commercial dairy farmers in terms of percentage was 34.51 per cent. This shows that the educational module played a vital role in giving the knowledge and it is also confirmed that module helped in gaining knowledge among the commercial dairy farmers. The difference in means of pre and post-test is highly significant in term of knowledge on brucellosis. Similar findings were reported by Vidya et al., (2010), and Sasikala et al., (2012) after studying the effect of the multimedia module. Meena et al., (2014) and Kumar et al., (2015) also confirmed that the majority of the respondents were benefited from educational DVD on improved dairy farming practices (IDFPs) as the overall mean knowledge gain with regards to IDFPs through developed educational DVD was 14.21 per cent. The study conducted by Patel et al., (2020) and Nain et al., (2019) showed that the WhatsApp was able to increase the knowledge of the respondents on soybean production technology. The outcome of the study are in line with the study of Hadiya (2019) who revealed the effectiveness of Kisan Mobile advisory services which was highly understandable needful, timely and fully applicable at field level. Singh et al., (2018) revealed that respondents knowledge before exposure were 5.63 per cent which enhanced to 23.63 per cent after exposure of different extension methods. The findings of this study were also in conformity with the findings of Patel and Patel (2006); Gouri et al., (2014) and Verma et al., (2019).

Pearson's correlation analysis

The results revealed (Table 4) that knowledge gain through educational module on brucellosis in dairy animals was positively and significantly correlated with education, landholding, income, herd size and experience in commercial dairy farming at 5% level of significance. It was not significantly correlated with variables like age, family size, occupation, milk production and ICT tools possession. Here, the result depict that the different variables had different effect in knowledge gain of the respondents about brucellosis in dairy animals. From the findings we can infer that education is a major factor which determines the use of module, the respondents who were more educated tends to use Educational module more on brucellosis prevention in dairy animals. This is also illustrated in the studies conducted by Lindahl et al., (2015) and Arif et al., (2017). Size of the landholding and knowledge gain on brucellosis had positive effect due to the fact that households with bigger farm size are able to provide better educational opportunities to their children, have greater access to media and outside world and financial resources which contribute towards exploring knowledge on brucellosis. Improvements in farm income would significantly increase the extent of use of different technologies; Dairy farmers with large herd size are more likely to obtain information from a variety of sources. This might be the reason behind this study also. With increase in experience in commercial dairy farming, dairy farmers got more chance to know about different disease in their animals and it might be the reason behind the knowledge gain of the respondents.

Table 4. Correlation analysis between various factors and Knowledge gain through Education Module

S.No.	Independent variables	'r' value
1.	Age	0.101^{NS}
2.	Education	0.291*
3.	Family Size	-0.098^{NS}
4.	Land holding	0.282*
5.	Occupation	0.048
6.	Income	0.248*
7.	Herd size	0.249*
8.	Milk production	0.119
9.	Experience in commercial dairy farming	0.297*
10.	ICT tool possession	-0.096^{NS}

*Significant at 0.05 level of significance

CONCLUSION

The significant difference between pre and post-knowledge indicates the effectiveness of the educational module therefore efforts should be made to improve the knowledge of dairy farmers through such module about brucellosis by different development agencies. The variables such as dairy farmer's education, landholding, annual income, herd size and experience in dairying were found to be important variables which can effectively influence the implementation of educational intervention. So these variables should be taken into consideration before preparing any educational campaigns to increase awareness of brucellosis among dairy farmers.

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