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Effectiveness of *Mastitis* management instructional video on knowledge of tribal farmers in northern hills zone of Chhattisgarh

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ABSTRACT

Mastitis is the inflammation of udder parenchyma and mostly occurs due to an invasion of bacteria through its teat canal from environment or during milking procedure. Mastitis is a multifactorial threshold trait resulting from interaction between genetic components of the host, infectious agents and environmental factors (Keviletsu and Yadav 2009).This disease can be identified by abnormalities in the milk, udder parenchyma with or without systemic illness. Mastitis is the most common and costly disease of dairy cattle today and remains one of the major problems for the dairy industry. Significant economic losses are mostly due to pathogen-mediated damage of milk secreting tissue of udder, lower milk yield and its degraded quality, early culling, loss of genetic potential, higher veterinary expenses, and increased labour cost for a farmer. Among the several barriers in achieving the milk production targets, mastitis continues to remain as a most challenging impediment, since the affected quarters show 30% less productivity and cow loses about 50% of production (NAAS 2013). In the affected animals, the milk yield is reduced considerably. Estimates of milk yield loss by different workers range from 100 to 500 kg/cow per lactation. When clinical mastitis occurs, additional costs result from discard of abnormal milk, cost of drugs and veterinary services. According to a study, the estimated loss following clinical mastitis in cows was almost 700 kg in first lactation and 1, 200 kg in the second or higher lactation.

Key words: Instructional video, Knowledge gain, Mastitis, Tribal farmer

In India, economic losses due to mastitis are estimated at US $ 526 million annually (Varshney and Naresh 2004). Singh and Singh (1992) estimated a loss of ₹1,607.20 crores due to bovine mastitis in India. Clinical mastitis in dairy cow for 100 days caused a loss of ₹780 crores (Venkatakrishnan 1997) for the treatment and losses due to reduction in milk yield. However in India, annual economic losses incurred by dairy industry on account of udder infections were estimated to be about ₹6,053.21 crore. Out of this, loss of ₹4,365.32 crore (70%–80% loss) was attributed to sub clinical version of udder infections (Dua 2001). Early detection of udder infections is very important for timely treatment and to avoid the significant economic loss. Non-availability of appropriate mastitis management information to all categories of dairy farmers is the major setback for achieving sustainable dairy production. It is very much important to ensure the information availability with farmers which will help them to detect the various clinical symptoms of mastitis, diagnosis, execution of preventive measures and treatment of affected animals. Access to information and improved communication is a crucial requirement for sustainable dairy farming. To address this issue, a Instructional Video on mastitis management was developed.

Instructional video production consist of three major steps namely Pre-production, Production and Post-production. Pre-production process consist of concept development or technology selection, script writing, finding a suitable location for film production and arranging a shooting objects/process/practices. Here, we had selected mastitis management as a subject matter which comprehends the economical importance of mastitis in dairy industry, causes, symptoms, diagnosis with the help of strip cup method, treatment like, intra-mammary antibiotic infusion, intra-muscular and intravenous antibiotic administration. Prevention and management measures like complete removal of the affected quarter, udder washing with mild antiseptics (Fig. 2–8). Further, appropriate script were written in Hindi and each practices documented under the supervision of experts from livestock production

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Fig. 1. Instructional video

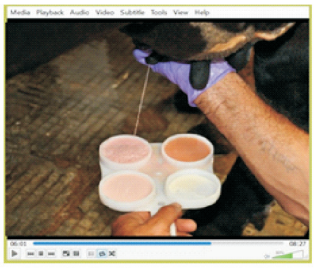
Fig. 2. California mastitis test

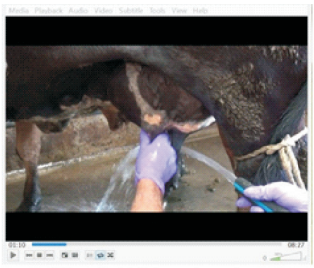
Fig. 3. Udder cleaning


Fig. 4. Removal of puss


Fig. 5. Milk man hygiene


Fig. 6. Pre stripping

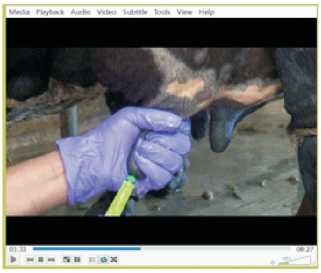
Fig. 7. Intra-mammary antibiotic infusion

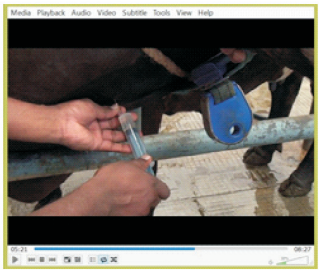
Fig. 8. Intravenous antibiotic administration

Fig. 9. Clinical symptoms

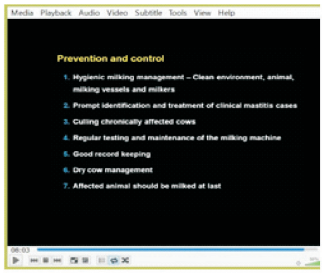

Fig. 10. Prevention and control


Fig. 11. Severely affected teat


Fig. 12. Mastitis affected udder

Figs 1–12. Contents of mastitis management instructional video

management, veterinary pathology, obstetrics and gynaecology, animal genetics and breeding field of specialization. Production is the second step in instructional video production. This phase consist of documentation of actual concept, based on the reviewed script. Appropriate pre-production and strategic planning is the basic requirement to proceed and successful completion of the targeted production work. Here, Livestock Research Centre of National Dairy Research Institute selected for documentation and the dairy animals, resources, infrastructures, scientific experts and working force used exhaustively to produce information rich instructional video on mastitis management.Post-production refers to the tasks that must be completed or executed after the filming or shooting ends. This includes tasks such as the importing raw footage from video camera, logging of video clips, timeline organisation, editing of raw footage to cut scenes, insertion transition effects, title, music, background voice dubbing, multimedia mix, reviewing and finally export. Post-production is the third and final step in instructional video production. Technical specification of developed instructional video on mastitis management is furnished in Table 1.

Instructional video on mastitis management produced for 8 minutes and 28 seconds. The High Definition (HD) quality used at the rate of 1280 pixels wide by 720 pixels tall in Windows Media Video (.wmv) file format to maximise the video clarity. It can be broadcasted through any television channel and the file format will support any video player codec. Windows Media Video file format is the basic video codec which will be recoganised by all type of video player.

Autorun is a feature of the Windows operating system that causes a certain file to open or a certain program to run automatically as soon as a compact disc (CD) or DVD (Digital Versatile Disc or Digital Video Disc) is inserted into the CD/DVD drive. The action taken is determined by a file called AUTORUN.INF. Instructional video on mastitis management provided with the auto run command. Autorunmaker used to create the auto run file. Details of autorun.inf are given in Fig. 13.

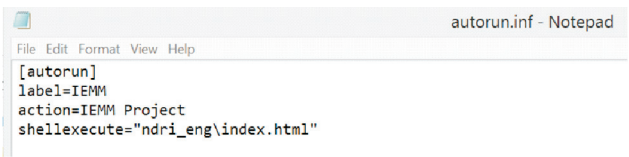

Fig. 13. Autorun coding script

Table 1. Technical specification of instructional video on mastitis management

Content	Technical specification	
	Video file	Audio file
Raw footage	• Type of File - M2TS File (.m2ts) • Frame width - 1440 • Frame Height - 1080 • Data rate - 9,342 kbps • Total bitrate - 9,790 kbps • Frame rate - 25 frame/second	• Bit rate - 448 kbps • Channel - 6 • Audio sample rate - 48 kHz
Instructional video	• Type of file - Windows Media Audio/Video file (.wmv) • Frame width - 1280 • Frame Height - 720 • Data rate - 6,000 kbps • Total bitrate - 6,320 kbps • Frame rate - 23 frame/second • Quality - High definition	• Bit rate - 320 kbps • Channel - 2 • Audio sample rate - 44 kHz
Background audio file	• Type of file - MP3	Bit rate - 320 kbps
Language	Hindi and English languages were used for voice recording	Subsequently, these audio files used as background voice to produce final film.

Out of 27 districts of Chhattisgarh, Surajpur district was selected purposively for this study since the district had higher tribal population and intensive dairying activities as well. Subsequently, four villages selected from Surajpur district using purposive sampling method and from each village, 25 farmers were selected randomly. Totally, hundred tribal dairy farmers were selected for this experimental study. The respondents are selected based on the criteria of possession of a minimum one lactating cow or buffalo and considerable educational qualification because they have to undergo pre and post exposure knowledge test of instructional video on mastitis management. In this study, to measure the respondent's knowledge gain, a well structured "knowledge test" was developed following the teacher made test procedure (Annexure I). Questions with difficulty index of less than 0.25 and above 0.75 were rejected as they represented either two easy or two difficult responses. The use of discrimination index was the second step in the process of item/question selection for knowledge test. Discrimination index measured the distinguishing difference of a question between high and low groups. It expresses the extent to which an item discriminates among the subjects who differ sharply in their knowledge measured by the test as a whole. An item has greater power to discriminate more knowledgeable from less one if it is answered correctly by some only instead of whole. On the other hand, a statement which is either answered correctly by everyone or none in the sample has no power of discrimination. Individuals can be discriminated only when they obtain different scores instead of identical scores.

For this purpose, the total scores obtained by individuals were arranged in a descending order and one-fourth of each of high and low groups were identified as criterion groups. It was assumed here that their responses could discriminate the nature of questions. The discrimination index for each question were worked out by using standard formula. Questions having discrimination index of above 0.30 was selected to construct final knowledge test. The 'r' value calculated was 0.816 and found significant at 1% level of probability. It indicated that the test had high level of internal consistency. Twenty three items were selected with the help of difficulty and discrimination index values to construct final knowledge test. Each correct answer was given one score and wrong answers carried zero marks. This will indicate the farmer's knowledge on the subject matter before being exposed to instructional video on mastitis management. This test was called pre-exposure knowledge test. On the completion of pre-exposure knowledge test, the instructional video was demonstrated to the 100 tribal farmers of Chhattisgarh state for interactive learning. Adequate time was given to view all the mastitis management contents. In the exposure phase, the tribal dairy farmers were motivated to interact with experts for effective learning. LCD (Liquid Crystal Display) projector was used to project the instructional video on mastitis management (Figs 14, 15). After viewing the instructional video on mastitis management, farmers were exposed to the developed knowledge test which covered the all subject matter contents of mastitis management. After end of this test, the knowledge gain of the tribal dairy farmers was assessed. The difference in the knowledge levels of pre-exposure and post exposure was taken as knowledge gained by each respondent and subsequently presented in Table 2.

It could be seen from Table 2 that all the groups from Group 1 to Group 4 had effective in terms of knowledge

Figs 14–15. **14.** Screening of mastitis instructional video; **15.** Facilitating the learning process

Table 2. Mean knowledge gain due to the exposure of instructional video(n=100)

District name	Village/ Group name	Mean		Mean Knowledge gain	Percent	Paired 't' value
		Pre-score	Post-score			
Surajpur	Karwan (G1)	3.72	15.48	11.76	51.13	12.38 **
	Silphili (G2)	6.12	19.52	13.04	56.69	25.66 **
	Kalyanpur (G3)	3.61	13.48	9.87	42.91	6.45 **
	Rameshpur (G4)	2.40	15.36	12.96	53.34	14.07**

gain. From the result, in Surajpur district, the Group 2 (Silphili) had highest knowledge gain (56.69%) followed by Group 4 (Rameshpur) (53.34%), Group 1 (Karwan) (51.13%) and Group 3 (Kalyanpur) (42.91%). Among the four groups, six groups namely Group 1, 3 and 4 had significant different in knowledge gain even though farmers from these villages have scored low mean pre-knowledge score. It might be due to the fact that their close proximity with the district headquarter where the demand for fresh milk is high. This demand position would have created the interest among the farming community to learn mastitis management practices for their profitable dairy farming and earn more income through milk sale. This learning ultimately resulted in the significant knowledge gain. The overall knowledge gain ranged from 42.91 to 56.69% in the study area; this variation indicated that the farmers had different level of knowledge aspects in the dairy farming. Moreover, the highly significant *'t'* values once again confirm statistically, the considerable knowledge gain among the farmers due to the treatment. The findings of the study are in conformity with the results reported by Anandaraja (2002), Mooventhan (2006) and Vidya *et al.* (2010).

The study concluded that the instructional video on mastitis management succeeded in the dissemination of mastitis management practices among tribal community of Chhattisgarh state. The significant knowledge gain of the respondents and high 't' values support the instructional video is very effective. Instructional video reduced the time gap and increased the availability of information at farmers door step. It provided the learning at an individual pace and respondents can avail the process of learning whenever they want through multiple delivery possibilities. Instructional video have the advantage of easy storing and retrieval with minimum cost. It can be used to facilitated the group learning and possible to address the mass in minimal time. Further, we have observed the increased motivation, enhanced learning experience, higher knowledge gain, improved team work and communication skills and retention of learned information through instructional video on mastitis management among tribal farmers of Chhattisgarh state.

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ANNEXURE - I
Knowledge test
(In-build knowledge questionnaire)

S.No	Items	Score
1.	Which one of the following is the best milch breed of buffalo in India? (a) Niliravi (b) Murrah (c) Jaffarabadi (d) Surti	Correct answer = 1; Wrong answer = 0
2.	Which one of the following is the high milk producing cattle breed in India? (a) Sahiwal (b) Red Sindhi (c) Tharparkar (d) Gir	
3.	Which organisms cause mastitis disease? (a) Virus (b) Bacteria (c) Fungus (d) Insects	
4.	Which one of the following disease cause huge economic loss to the dairy farmers in India? (a) Mastitis (b) Rinderpest (c) Rabies (d) Influenza	
5.	Which solution should be used for dipping of teats before and after milking? (a) Salt water solution (b) Soap solution (c) Mild antiseptic solution (d) Detergents solution	
6.	Which method of milking should be followed to avoid teat injuries and milking the udder completely? (a) Full hand milking (b) Stripping (c) Half hand (d) Knuckling	
7.	Which one of the following act is not advisable after milking the animal to avoid teat infection? (a) Walk (b) Lie down (c) Eat (d) Run	
8.	Mastitis is the inflammation of? (a) Udder (b) Ear (c) Eyes (d) Legs	
9.	What is the range of somatic cell count in the normal milk? (a) Less than 2 lakhs (b) More than 2 lakhs (c) 2 lakh (d) 1 lakh	
10.	What is the taste of mastitis infected milk? (a) Normal (b) Acidic (c) Alkaline (d) Bitter	
11.	Which test should be used to screen the sub-clinical mastitis of cows and buffaloes? (a) Strip cup test (b) California mastitis test (c) Urine test (d) Somatic cell count	
12.	Which one of the following test can be used to screen the clinical Mastitis? (a) Strip cup test (b) California mastitis test (c) Blood test (d) Urine test	
13.	Which one of the following practice is essential to prevent mastitis? (a) Green feeding (b) Watering (c) Clean udders/teats before milking (d) Wallowing	
14.	What is the normal milking duration of cows/buffaloes? (a) 5-7 mins (b) 2-3 mins (c) 1-2 mins (d) 30 mins	
15.	Which one of the following disease caused by contaminated milking utensils, dirty floor, and unhygienic milker? (a) Brucellosis (b) Food and Mouth Disease (c) Small pox (d) Mastitis	
16.	What are the major symptoms of Mastitis? (a) Blood or pus in milk (b) Lameness (c) Hyperactive (d) Over feeding	
17.	When the mastitis affected animal should be milked? (a) First (b) Second (c) Anytime (d) Last	
18.	Which one of the following material should be used to wash the milking utensils? (a) Mud (b) Ash (c) Suitable detergent with warm water (d) Bathing soap	
19.	Which one of the following material can be used to clean dry teats? (a) By bare hands (b) Polythene sheets (c) Paper towels or reusable cloth towels (d) Milker dress material	
20.	Which one of the following act helps to increase the milk letdown and reduce the microbial count in the milk? (a) Pre-stripping (b) Grooming the animal (c) Cooling the animal (d) Milker dress material	
21.	Which one of the following practice helps to reduce the incidence of mastitis? (a) Providing sugarcane bagasse (b) Providing neem cake (c) Providing adequate energy intake at calving time (d) Providing mustard oil	
22.	Which one of the following method of drying-off is best? (a) Abrupt (b) Incomplete (c) Intermittent (d) Continuous	
23.	What is the normal length of dry period in cows? (a) 1 Month (b) 2 Months (c) 3 Months (d) 4 Months	