

DEVELOPMENT OF THE TEST TO MEASURE KNOWLEDGE OF DAIRY FARMERS REGARDING DEWORMING AND VACCINATION IN BUFFALO

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ABSTRACT

India has the world's highest livestock population. Livestock rearing is an integral part of agriculture in India as well as many developing countries since centuries. The Indian dairy industry has made remarkable progress in the last three decades with unprecedented growth in milk production. Cattle and buffalo producing milk which is the largest agricultural commodity play a significant role in the Indian economy. For understanding the knowledge of dairy farmers regarding deworming and vaccination in buffalo, knowledge test was developed. There were total 40 items in final knowledge test to measure the level of knowledge of dairy farmers regarding deworming and vaccination in buffalo after working out 'Index of item difficulty', 'Index of item discrimination' and 'Index of item validity'. The test was found to be reliable (0.88) and valid.

Keywords: buffalo, dairy farmers, deworming, knowledge, vaccination

INTRODUCTION

Livestock rearing is an integral part of agriculture in India as well as many developing countries since centuries (Christian *et al.*, 2019). The Indian dairy industry has made remarkable progress in the last three decades with unprecedented growth in milk production. Cattle and buffalo producing milk which is the largest agricultural commodity play a significant role in the Indian economy (Shafi *et al.*, 2021a & 2021b). Vaccination is the best method of preventing infectious diseases. Deworming and vaccination is one among the important practices to stay disease free. By doing this; the yield potential of animals are often boosted up ultimately leading to increasing the living standard of the rural people.

Knowledge is understood information possessed by dairy farmers regarding deworming and vaccination and it's a basic character which determines the particular adoption. Further, knowledge level and its determination also will be helpful in drawing out a technique to reinforce the education of deworming and vaccination among the farmers to suppress the animal diseases. So, it's highly essential to know existing knowledge level of dairy farmers regarding deworming and vaccination. However, there's no any test or tool to measure the level of knowledge of dairy farmers about deworming and vaccination. Keeping in sight these facts, present investigation entitled "Development of test to measure the knowledge of dairy farmers about deworming and vaccination in buffalo"

was undertaken.

OBJECTIVE

To develop the test to measure knowledge of dairy farmers regarding deworming and vaccination in buffalo

METHODOLOGY

Item Collection

The content of a knowledge test consists of questions called items. 68 items for the test were collected from different sources, like literature, field extension personnel, relevant specialists and the researcher's own experience. The items were collected in relation to major fields. Care was taken to make sure that no crucial practice should be left out. The collected items were discussed with research scientists of the concerned fields (staff of Department of Extension and Communication, Extension Education Institute, and Department of Livestock Production & Management as well as Directorate of Extension Education and other experts of Anand Agricultural University) for relevance of the statements and for addition and alteration of the items. Keeping the subsequent three criteria in view, the items were selected for the test:

- (a) The item should provide thinking instead of simply rote memorization.
- (b) The item should differentiate the well informed farmers

from the poorly informed farmers and should have certain difficulty value.

- (c) The items included should cover all the areas of knowledge about concerned field.

Item Analysis

The item analysis used by Jha and Singh (1970) was carried out so as to yield three kinds of information, viz., “Index of item difficulty”, “Index of item discrimination” and “Index of item validity”. Index of item difficulty refers to the extent to which an item was difficult, while the index of item discrimination was computed to find out whether an item really discriminates a well-informed person from a poorly informed one. The index of item validity indicates how well an item measures or discriminates in agreement with the rest of the test.

The items was checked and modified on the basis of pretesting and administered to 42 respondents for item analysis. The respondents for administering the items were randomly selected and were not included in the sample for final study. This was mainly done to avoid testing effect.

Each one of the 42 respondents, to whom the test was administered, was given a score 1 or 0 for each item, according to whether the answer was right or wrong and responses were also collected under multiple choice question system in which those respondents who gave correct answer was given score 1 and 0 for those who gave wrong answer. The total number of correct answers given by the respondent out of collected items was the knowledge score of the individual. After calculating the score obtained by 42 respondents, the scores were arranged from highest to lowest in order of magnitude.

These 42 respondents were divided into six equal groups, each groups having “7” respondents and were arranged in descending order of total scores secured by them. These groups were given names as G1, G2, G3, G4, G5 and G6, respectively. For item analysis, the middle two groups, i.e. G3 and G4 were removed. Only following four extreme groups with high and low scores were taken into account for the calculation of item difficulty and item discrimination indices as indicated in Table 1.

Calculation of Difficulty Index (P_i)

The difficulty index of an item is defined as the proportion of respondents giving correct answer to that particular item. This was calculated by the following formula:

$$P_i = \frac{n_i}{N_i} \times 100$$

Where,

P_i = Difficulty index in percentage of the ith item

n_i = Number of respondents giving correct answer to ith item

N_i = Total number of respondents

Calculation of Discrimination Index (E^{1/3})

The discrimination index can be obtained by computing the phi-coefficient as formulated by Perry and Michael (1951). Although, Mehta (1958) in using E^{1/3} method to find out item discrimination emphasized that this method was analogous to, and hence, a convenient substitute for the phi-coefficient. The (E^{1/3}) was used in the research study.

$$E^{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

Where,

S₁, S₂, S₅, and S₆ = the frequencies of correct answers in groups G₁, G₂, G₅ and G₆, respectively

N = total number of respondents in the sample of item analysis

Calculation of Biserial Correlation

It was used for the test item validation, when the criteria of validity are regarded as internal consistency that is, the relationship of total score to a dichotomized response to any given item. Keeping this in view, with the help of following formula proposed by Guilford (1965), the Biserial correlation for each of the item was computed as indicated in Table 1. The significance of the Biserial correlation coefficient was tested by using the formula given by Guilford (1965). The items which are found to be significant at 0.5 per cent level of significance was included in the final format of the knowledge test battery.

$$rbis = \frac{M_p - M_q}{6_t} \times \frac{pq}{y}$$

Where,

M_p = Mean of X values for higher group(Giving correct answer of particular item) in dichotomized variable

M_q = Mean of X values for lower group (Giving wrong answer of particular item) in dichotomized variable

p = Proportion of cases in higher group (Giving correct answer of particular item)

q = Proportion of cases in lower group (Giving wrong

answer of particular item)

segments containing p and q proportion of the cases.

y = Ordinance of the unit normal distribution curve with 6σ = Standard deviation
surface equal to 1.0 at the point of division between

Table 1: Difficulty index (P_i), discrimination index ($E_{1/3}$) and co-efficient of biserial correlation (r_{bis}) of all 68 items of knowledge test

Sr. No.	Frequencies of correct answers in each group				Total Frequencies of correct answers (frequencies out of 28)	P_i	$E_{1/3}$	r_{bis}	Selection
	S1	S2	S5	S6					
1	7	7	7	6	27	96.43	0.1072	N.C	-
2	6	6	6	5	23	82.14	0.1072	N.C	-
3	7	6	5	4	22	78.57	0.4287	0.4447	Selected
4	6	5	4	3	18	64.29	0.4287	0.5523	Selected
5	2	1	1	1	05	17.86	0.1072	N.C	-
6	7	7	6	5	25	89.29	0.3215	N.C	-
7	6	5	5	5	21	75.00	0.1072	N.C	-
8	7	7	6	4	24	85.71	0.4287	N.C	-
9	5	4	2	2	13	46.43	0.5359	0.3986	Selected
10	6	4	4	3	17	60.71	0.3215	0.2432	Selected
11	5	5	3	3	16	57.14	0.4287	0.4957	Selected
12	5	3	4	2	14	50.00	0.2144	0.4593	Selected
13	7	7	6	6	26	92.86	0.2144	N.C	-
14	5	4	2	2	13	46.43	0.5359	0.2197	Selected
15	3	3	3	2	11	39.29	0.1072	N.C	-
16	6	4	4	3	17	60.71	0.3215	0.3712	Selected
17	3	3	0	2	08	28.57	0.4287	0.4721	Selected
18	2	2	1	0	05	17.86	0.3215	N.C	-
19	7	6	4	4	21	75.00	0.5359	0.2280	Selected
20	6	5	4	3	18	64.29	0.4287	0.5083	Selected
21	5	4	4	3	16	57.14	0.2144	0.3285	Selected
22	5	5	3	2	15	53.57	0.5359	0.2345	Selected
23	5	4	3	2	14	50.00	0.4287	0.1577	-
24	3	2	0	0	05	17.86	0.5359	N.C	-
25	6	6	3	2	17	60.71	0.7503	0.3285	Selected
26	6	6	4	4	20	71.43	0.4287	0.2211	Selected
27	5	4	3	3	15	53.57	0.3215	0.5785	Selected
28	5	6	2	1	14	50.00	0.8574	0.3770	Selected
29	6	4	2	3	15	53.57	0.5359	0.2207	Selected
30	6	5	2	2	15	53.57	0.7503	0.3446	Selected
31	4	4	2	3	13	46.43	0.3215	0.2472	Selected
32	6	6	6	5	23	82.14	0.1072	N.C	-
33	5	4	2	1	12	42.86	0.6431	0.5216	Selected
34	7	6	5	3	21	75.00	0.5359	0.5378	Selected

Sr. No.	Frequencies of correct answers in each group				Total Frequencies of correct answers (frequencies out of 28)	P_i	$E^{1/3}$	r_{bis}	Selection
	S1	S2	S5	S6					
35	2	2	0	0	04	14.29	0.4287	N.C	-
36	2	1	1	1	05	17.86	0.1072	N.C	-
38	2	2	2	1	07	25.00	0.1072	N.C	-
39	2	2	1	0	05	17.86	0.3215	N.C	-
40	2	1	1	0	04	14.29	0.2144	N.C	-
41	2	1	1	1	05	17.86	0.1072	N.C	-
42	6	5	4	3	18	64.29	0.4287	0.5083	Selected
43	2	1	1	1	05	17.86	0.1072	N.C	-
44	7	6	4	4	21	75.00	0.5359	0.4690	Selected
45	5	5	3	3	16	57.14	0.4287	0.5096	Selected
46	6	5	3	3	17	60.71	0.5359	0.3996	Selected
47	5	5	2	2	14	50.00	0.6431	0.2399	Selected
48	5	4	2	2	13	46.43	0.5359	0.3023	Selected
49	3	3	1	1	08	28.57	0.4287	0.5043	Selected
50	5	4	1	1	11	39.29	0.7503	0.5529	Selected
51	5	5	3	2	15	53.57	0.5359	0.4822	Selected
52	2	1	1	1	05	17.86	0.1072	N.C	-
53	2	2	0	0	04	14.29	0.4287	N.C	-
54	6	4	2	2	14	50.00	0.6431	0.3770	Selected
55	2	2	1	0	05	17.86	0.3215	N.C	-
56	6	5	3	2	16	57.14	0.6431	0.3842	Selected
57	4	3	1	1	09	32.14	0.5359	0.2719	Selected
58	4	3	1	1	09	32.14	0.5359	0.2262	Selected
59	4	3	0	1	08	28.57	0.6431	0.4237	Selected
60	2	1	1	1	05	17.86	0.1072	N.C	-
61	2	1	0	0	03	10.71	0.3215	N.C	-
62	5	4	4	3	16	57.14	0.2144	0.3982	Selected
63	2	2	1	0	05	17.86	0.3215	N.C	-
64	2	1	1	0	04	14.29	0.2144	N.C	-
65	5	4	2	2	13	46.43	0.5359	0.3986	Selected
66	2	2	2	1	07	25.00	0.1072	N.C	-
67	4	3	2	0	09	32.14	0.5359	0.2262	Selected
68	2	1	1	1	05	17.86	0.1072	N.C	-

Note:

1. P values range for final selection: 20 to 80.
2. $E^{1/3}$ range for final selection: Above 0.20.
3. Selected items are significant at 0.5 level of probability.
4. N. C. = Not Calculated.

Representative of the test

Though the aforesaid criteria were the main consideration for the ultimate selection of the knowledge items, the care was taken not to eliminate the important aspects if any.

Reliability of the test

A test is reliable when it consistently produces the same results when applied to the same sample. In the present study due to limited time and resources available to the

researcher, split-half method of testing reliability was used. The forty statements were divided into two halves with 20 odd numbered in one-half and 20 even-numbered statements in the other. These were administered to 30 respondents. Each of the two sets of statements was treated as a separate test and then these two sub-tests were correlated. Each of the two sets of statements was treated as a separate test and then co-efficient of reliability was calculated by the Rulon's formula (Guilford, 1954), which came to 0.88. Thus, the test developed was found highly reliable.

Table 2: Final statements of knowledge test to study the level of knowledge of dairy farmers regarding deworming and vaccination in buffalo

Sr. No	Statements
1	Are you doing vaccination and deworming in your farm animal? (a) Only vaccination (b) Only deworming (c) Deworming and vaccination (d) No
2	Which diseases can be vaccinated? (a) FMD (b) Brucellosis (c) Anthrax (d) All of the above
3	FMD is _____ disease. (a) Viral (b) Bacterial (c) Fungal (d) None
4	Which factors are responsible for the spreading of FMD? (a) Only contact (b) Contact and air (c) Contact, water, feed and air (d) Not spread to other
5	What are the symptoms of foot and mouth disease? (a) Fever (b) Excessive salivation (c) Ulcers in mouth and hoof (d) All of the above
6	In which month vaccine is given for FMD? (a) November-December (b) January-February (c) April-May (d) August-September
7	How many times the vaccination for foot and mouth disease is done in a year? (a) One time (b) Two times (c) Three times (d) Four times
8	Which are the symptoms of brucellosis disease? (a) Abortion (b) Joint swelling (c) Retention of the placenta (d) All of the above
9	At which month of pregnancy abortion occurs in brucellosis disease? (a) After 5 th month (b) After 3 rd month (c) After 7 th month (d) At time of birth
10	Brucellosis vaccine is given to _____. (a) Female calves (b) Male calves (c) Both male and female (d) Not required
11	How many times vaccination should be done to protect animals from brucellosis? (a) Before every calving (b) Only one time (c) Two times (d) Three times
12	At what age brucellosis vaccination is done? (a) 2 to 4 month (b) 8 to 12 month (c) 4 to 8 month (d) At any age
13	Brucellosis disease is _____. (a) Zoonotic (b) Contagious (c) Both A and B (d) None
14	Which period HS disease occurred? (a) Before monsoon (b) During monsoon (c) After monsoon (d) Any season

Sr. No	Statements
15	Which are the symptoms of Haemorrhagic Septicaemia? (a) High temperature (b) Difficulty in breathing (c) Both A and B (d) No specific symptoms
16	In which month HS vaccination given regularly to the dairy animal? (a) May – June (b) January – February (c) August – September (d) November – December
17	Which reasons are responsible for the death of animals in HS? (a) Respiratory failure (b) Swelling on neck region (c) Both A & B (d) None of the above
18	Which are the symptoms of Black Quarter (BQ)? (a) Sudden high fever (b) Eye swelling (c) Swelling on legs (d) Both A and C
19	At which age vaccination should be given for Black Quarter disease? (a) Above 6 months (b) Above 4 months (c) Above 5 months (d) Any age
20	From which animal can rabies be spread? (a) Dog (b) Weasel (c) Both A and B (d) Mouse
21	Is rabies spread by eating the flesh of infected animals or by drinking milk? (a) Only when eating the flesh (b) Only when drinking milk (c) Both by eating the flesh and drinking milk (d) No
22	For which disease, vaccinations should be done after occurrence of disease? (a) FMD (b) Rabies (c) Anthrax (d) None of the above
23	Which are the symptoms of Anthrax? (a) High fever (b) Respiratory distress (c) Bleeding from orifices (d) All of the above
24	Which animals are not to be vaccinated? (a) Calves below two months of age (b) Sick animals (c) Pregnant buffaloes in last 2-months of pregnancy (d) All of the above
25	What are the benefits of vaccination? (a) Good animal health (b) Increased milk production (c) Economical to farmers (d) All of the above
26	Worms are _____. (a) Predator (b) Parasites (c) Parasitoid (d) None of the above
27	Worms are usually found in which part of the animal? (a) Lungs, Nasal passage, Eye, etc (b) Inside the digestive tract (c) Both A and B (d) Outside of the body
28	Roundworms are generally found in which part of the animal? (a) Digestive tract (b) Rumen and liver (c) Inside blood vessels (d) All of the above
29	Tapeworms are generally found in which part of the animal? (a) Digestive tract (b) Rumen and liver (c) Inside blood vessels (d) All of the above
30	Flukeworms are generally found in which part of the animal? (a) Digestive tract (b) Rumen and liver (c) Inside blood vessels (d) All of the above
31	Liver fluke worms are responsible for which disease? (a) Bottle jaw (b) Snoring disease (c) Theileriosis (d) None of the above
32	Which are the symptoms of Bottle jaw disease? (a) Pitting swelling under the neck (b) Pitting swelling under the jaw (c) Pitting swelling under the ear (d) All of the above
33	Which are the symptoms of Snoring disease? (a) Granuloma in the nasal cavity (b) Snoring sound (c) Both A and B (d) Pitting swelling under the neck

Sr. No	Statements
34	Which are the symptoms of worm infestation? (a) Diarrhea and Anaemia (b) Lower disease resistance (c) Reduction milk production (d) All of the above
35	First dewormer dose is given at which age of animal? (a) 4-5 days (b) 7-10 days (c) 1 month (d) 6 month
36	How many times Pregnant animals should be dewormed? (a) Once (b) Twice (c) Thrice (d) Not require
37	For mainly which disease deworming should be done? (a) Ascariasis (b) Strongyloidosis (c) Ectoparasites (d) All of the above
38	Which is the symptom of Ectoparasites? (a) Excitement (b) Itching (c) Irritation (d) All of the above
39	Which treatment given for Ectoparasites? (a) Levamisole (b) Cypermethrin (c) Methanol (d) Oxi tetracycline
40	For flat and tapeworm treatment should be given at _____ months interval? (a) 1-3 months (b) 4-6 months (c) 8-10 months (d) 10-12 months

Note: Please put (√) marks for correct answer from below given options.

CONCLUSION

The developed knowledge test with 40 items was found to be highly reliable and was found valid to study the level of knowledge of dairy farmers regarding deworming and vaccination in buffalo.

IMPLICATIONS

- (1) The test developed to measure the knowledge of dairy farmers regarding deworming and vaccination is found to be reliable and valid, hence, it may be used in future studies.
- (2) This will help the policy makers and planners to make further steps in improving the knowledge level of dairy farmers regarding deworming and vaccination.
- (3) This test can be used to study the knowledge of dairy farmers in other areas of the country regarding deworming and vaccination in buffalo. Thus the improved knowledge level enable the dairy farmers in concentrating more on the health of the buffaloes and thereby accelerating the milk production and attaining a remunerative income from dairy farming.

CONFLICT OF INTEREST

This is to declare that there is “No conflict of interest” among researcher.

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