The Pharma Innovation Journal 2020; 9(4): 138-141

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(4): 138-141

www.thepharmajournal.com
Received: 04-02-2020
Accepted: 06-03-2020

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Response analysis on knowledge of recommended dairy innovations among dairy farmers of Andhra Pradesh

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Abstract
Knowledge about modern dairy husbandry practices is pre-requisite for adoption of it, which ultimately improves the dairy production. To measure the farmers knowledge on dairy innovations a standardized knowledge test was developed in the present study. A total of 27 items were selected for the test and response analysis was done for each item. The sample size constituted 360 respondents from three districts i.e., Visakhapatnam, Krishna and Chittoor of the three regions of Andhra Pradesh respectively. The response analysis clearly indicated that, majority of farmers had knowledge on items like regular payments received through sale of milk (94%), drying of the pregnant animals 60 days before calving (91.4%), fixing of uniform and remunerative price for milk (88%), marketing of milk by an organized structure i.e., cooperatives (74.2%), feeding of area specific mineral mixture (74%) while large majority of dairy farmers possessed very poor (or) almost no knowledge on items like production of hydrophonic fodder (12%), composition of complete feed blocks (12.80%), utility of complete feed blocks (5.60%), Azolla as a supplement to concentrate feed (28%) etc. Results on overall level of knowledge revealed that, more than half (56.64%) of the respondents possessed medium followed by farmers with low (30.28%) and high (14.08%) level of knowledge respectively.

Keywords: Dairy innovations, knowledge test, response analysis

Introduction
Dairy as a subsidiary enterprise is an instrument of great importance for improving socio-economic status of rural population. The cattle and buffalo have remained as corner stone of Indian farming. Even though there is rapid advancement in the animal husbandry technologies, however the productivity of this sector still is very low in India. This may be due to various reasons like poor adoption and diffusion of new technologies (Rathod *et al*., 2014) [4]. Knowledge about modern dairy husbandry practices is pre-requisite for adoption of it, which ultimately improves the dairy production. Knowledge is referred to as "the body of understood information possessed by an individual or by a culture"- English & English (1961) [1]. A suitable device was not available to measure the farmers knowledge on dairy innovations in particular. Hence, a standardized knowledge test was developed based on the respondents memory either by recognition or recall of ideas, connected with dairy production technologies. A test is "an organized succession of stimuli designed to measure quantitatively or to evaluate qualitatively some material process, trait or characteristics". In the present study, Knowledge test was constructed, pre-tested, standardized and response analysis on each item was noted to evaluate the knowledge of dairy farmers on recommended dairy innovations in the areas of marketing, feeding, breeding, management, health and communication.

Methodology
A total of 360 dairy farmers, who were first to adopt innovations suggested by the State Animal Husbandry Department from three districts of Andhra Pradesh i.e., Visakhapatnam, Krishna and Chittoor districts were selected purposively for the study. knowledge in the present study was operationalized as the amount of information and understanding possessed by the respondents about recommended dairy innovations/ dairy production technologies at the time of investigation.

Construction and standardization of knowledge test
Since a suitable device was not available to measure the farmers knowledge on dairy innovations, a standardized knowledge test was developed based on the respondents memory

either by recognition or recall of ideas, practices or phenomena connected with dairy production technologies. The content of the test was composed of questions called items. A comprehensive list of questions on knowledge on recommended dairy innovations/scientific dairy farming practices was prepared by extensive study of relevant literature and by consulting experts. Sixty two items were selected from initial test batteries to carry out item analysis for developing separate standardized knowledge test. The items selected were framed in the objective form of questions namely multiple choice, fill in the blanks and Yes/No type.

Pretesting and item analysis

The preliminary test consisting of 62 items/questions was administered to 30 non-sample respondents of the study area. Their responses were then quantified by assigning a score of one to correct answer and zero to incorrect answer. After computing the individual total score for the 30 respondents, the respondents were arranged in descending order based on total score. The 30 respondents were then divided into six equal groups arranged in descending order of total score obtained by them. These groups were named as G_1, G_2, G_3, G_4, G_5 and G_6 with 5 respondents in each group. For item analysis, the middle two groups, G_3 and G_4 were eliminated keeping only four extreme groups, with high scores namely G_1 and G_2 and low scores namely G_5 and G_6. After getting the four extreme groups for item analysis, the respondents for each of the items were subjected to calculation of item difficulty index, item discrimination index and point biserial correlation.

Item difficulty and discrimination index

The index of difficulty was worked out as the percentage of the respondents answering an item correctly. The assumption in item statistics of difficulty was that difficulty is linearly related to the level of respondent's knowledge about scientific dairy farming Practices. The item with a value ranging from 20% to 80% was considered for final selection of knowledge test battery.

A measure of discrimination power was obtained on the basis of the high and low groups by using the following formula.

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

Where,

S_1, S_2, S_5 and S_6 are the frequencies of correct answers in the groups of G_1, G_2, G_5 and G_6 respectively.

N = Total number of respondents in the sample selected for item analysis

The items E 1/3 value ranging from 0.2 to 0.8 were considered for the final selection of the knowledge test.

Point biserial correlation (r-pbis)

The main aim of calculating point biserial correlation was to work out the internal consistency of the items that is the relationship of the total score to a dichotomized answer for any given item. In a way, the validity power of the item was computed by the correlation of the individual item of the whole test.

Reliability and Validity of the test

The reliability of test was tested by using "test-retest" reliability method. The test was administered to 30 non-sample farmers within an interval of 15 days. The scores obtained after testing were correlated. The correlation coefficient value calculated was 0.846, which was highly significant indicating a high degree of dependability of the instrument for measuring the knowledge of the farmers. The knowledge test developed on dairy innovations was subjected to content and construct validity. The test indicated the validity of the items in relation to knowledge test designed to measure the knowledge about the recommended dairy innovations.

All the 27 items in the knowledge test were read out to the respondents after establishing rapport with them. The respondents were asked to answer the items by themselves. A score of one and zero were given to correct and incorrect response for each item respectively and the total number of correct responses given by a respondent out of the 27 items was the knowledge score obtained by the respondent. Thus, the maximum and minimum possible score for a respondent were '27' and '0' respectively. Mean and standard deviations were computed and the respondents were categorized into low, medium and high knowledge levels.

Results

The knowledge levels of the farmers on the recommended dairy innovations were presented in Table 1 and illustrated in Fig 1. It was evident from the results that, more than half (56.64%) of the dairy farmers possessed medium level of knowledge followed by farmers with low (30.28%) and high (14.08%) level of knowledge respectively.

Table 1: Distribution of dairy farmers according to their knowledge levels on recommended dairy innovations.

S. No.	Category	Frequency	Percentage
1.	Low knowledge level	101	30.28
2.	Medium knowledge level	204	56.64
3.	High knowledge level	55	14.08
	Total	360	100

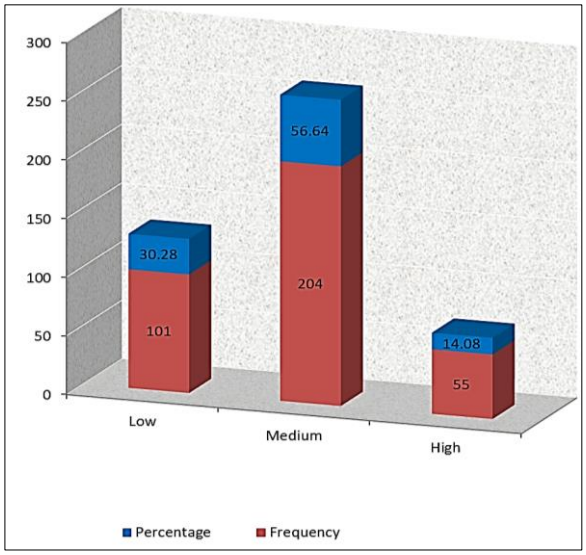

Fig 1: Distribution of dairy farmers according to their knowledge levels on recommended dairy innovations

Response analysis on knowledge of recommended dairy innovations

Response analysis was carried out to find out the knowledge of respondents on various dairy innovations identified for the study. The results obtained were presented in Table 2.

Table 2: Response analysis of statements in knowledge test

S. No.	Recommended Practice	Correct		Incorrect	
		N	%	N	%
1.	Concentrate feed requirement for heifer is 1.5-2.5 kg	210	58.33	150	41.67
2.	Minerals essential for milk production are Ca & P	230	64	130	36
3.	Minerals and Vitamins are very important for improving growth rate, milk production and reproductive performance of dairy animals	187	52	173	48
4.	Concentrate feed requirement for pregnant animal is 20% above maintenance	157	43.6	203	56.4
5.	Deficiency of iodine results in still births, abortions, weak and hairless calves	153	32.4	207	67.6
6.	Milch animals yielding > 5 kgs of milk must be fed with 1 kg of concentrate for every extra 2 kgs of milk	161	44.7	199	55.3
7.	Complete feed blocks are composed of roughaqes, concentrates and feed supplements	46	12.8	314	87.2
8.	Crude protein percentage in feed must be 18-20% to maintain milk protein in milk	42	16.54	318	88.46
9.	Mobile phones, radio, TV & Multimedia modules are the ICT's commonly used by farmers to obtain information on dairy innovations	281	78	79	22
10.	Heifers must attain an average weight of 300 kg at the time of insemination	220	61	140	39
11.	The minimum price per litre of milk should be Rs. 35/- to meet the cost of production	317	88	43	12
12.	The milk marketing should be done on co-operative basis	267	74.2	93	24.8
13.	Pregnant animal should be dried off 60 days before parturition	329	91.4	31	8.6
14.	Requirement of Ca & P per kg of milk production is 1.2g & 0.8g respectively	194	54	166	46
15.	Maximum intake of hydrophonic green fodder / animal is around 20 kgs	41	11.32	319	88.68
16.	The green fodder and paddy straw requirement for lactating animals is 30kgs	226	62.8	134	32.7
17.	Azolloa on a dry matter basic consists of 18%protein	124	34.4	236	65.6
18.	Azolla can be used as a supplement to replace the concentrate feed	101	28	259	72
19.	Fodder produced in nutrient rich solutions without soil is known as hydrophonic fodder	43	12	317	88
20.	Hydrophonic fodder contains quality Proteins, carbohydrates, vitamins and enzymes	38	9.64	322	90.36
21.	Milk production should be done hygienically at farm level	187	52	173	48
22.	Milking machine is easy to operate and faster than manual milking	119	33.33	241	66.67
23.	30gms of area specific mineral mixture must be fed invariably to pregnant and lactating animals	266	74	94	26
24.	Milk payments should be made at Weekly intervals	338	94	22	6
25.	Feeding by pass fats increase fat Content in milk	45	12.4	315	87.6
26.	Complete feed blocks provide balanced ration ruminants in lean Seasons	20	5.6	340	94.4
27.	Complete feed blocks reduce wastage of dry matter and roughages	50	14	310	86

N – Frequency % - Percentage

The response analysis of Table 2 clearly indicated that, majority of farmers had knowledge on items like regular payments received through sale of milk (94%), drying of the pregnant animals 60 days before calving (91.4%), fixing of uniform and remunerative price for milk (88%), marketing of milk by an organized structure i.e., cooperatives (74.2%), feeding of area specific mineral mixture (74%), requirement of green fodder and paddy straw for pregnant and lactating animals (62.8%), minerals essential for milk production (64%), concentrate feed requirement for heifers (58.33%), role of vitamins and minerals in production (52%), utilization of communication channels like Radio, TV, Multimedia (78%), requirements of Ca and P for production of 1 liter of milk (54%), concentrate feed requirements for pregnant animals (43.6%), concentrate feed requirement for heavy yielders (44.7%).

However, a large majority of dairy farmers in the study area possessed very poor (or) almost no knowledge on items like production of hydrophonic fodder (12%), intake of hydrophonic fodder (11.32%), percentage of crude protein in feed (11.54%), composition of complete feed blocks (12.80%), utility of complete feed blocks (5.60%), dry matter and roughage ratio of complete feed blocks (14%), feeding of by-pass proteins (12.40%), Azolla as a supplement to concentrate feed (28%) and protein percent in Azolla (34.40%).

Discussion

The results of Table 1 revealed that, majority (56.64%) of the dairy farmers possessed medium level of knowledge. The knowledge is an important component, which significantly influences the adoption of new technology. Medium experience in dairy farming, medium to high information seeking behaviour, economic orientation, medium to high attitude towards adoption of new technologies are the factors that might have contributed to medium knowledge on dairy innovations. But the major concern was about one third of the respondents in the study area possessed low level of knowledge. Extension agencies and non-governmental agencies need to focus on improvement of knowledge level in this category. The findings are in congruence with the observations of Kumawat R *et al*., (2012) [2], Sabapara G.P *et al*., (2014b) [5], Vijay kumar and Singh B.P (2015) [7].

Response analysis on knowledge of recommended dairy innovations

Response analysis of the items on knowledge level of the respondents clearly indicated that majority of the dairy farmers had medium to high knowledge on marketing aspects like regular payments received through sale of milk, fixation of uniform and remunerative price for milk and marketing of milk through organized sectors; followed by feeding aspects like requirements of green fodder and paddy straw, feeding of area specific mineral mixture, concentrate feed requirement, minerals and vitamins essential for milk production. Medium levels of knowledge were recorded from the respondents in managemental and communicational aspects also. Dairying is viewed as an enterprise in the present scenario and hence knowledge is essential in marketing, feeding, managemental and communicational aspects for enhancing profitability and sustainability, which might be a contributing factor for the above response from the dairy farmers. The results gained the support of Shekhawat *et al.*, (2013) [6] and Njeri M *et al.*, (2013) [3].

Response analysis on knowledge items pertaining to recent scientific advances like cultivation of hydroponic fodder, crude protein percent in feed, utility of complete feed blocks, feeding of by-pass proteins, supplementation of azolla etc., depicted very low knowledge level of the respondents on these aspects. This analysis calls the attention of the extension

agencies, state veterinary university, state animal husbandry department, NDDB etc., to promote the recent scientific innovations to the door step of the dairy farmers by continuous updates through print, electronic media; mass campaigns, kisan melas, rural forums etc.

Conclusion

The knowledge is an important component, which significantly influences the adoption of new technology. The findings of the study revealed that one-third of the respondents had low knowledge level followed by half of the respondents with medium knowledge levels. It can be interpreted from the results that, dairying is viewed as an alternate source of livelihood but not as a commercial enterprise and hence knowledge is essential in marketing, feeding, managemental and communicational aspects for enhancing profitability and sustainability. This analysis calls the attention of the extension agencies, state veterinary university, state animal husbandry department, NDDB etc., to promote the recent scientific innovations through on farm trails, front line demonstrations, trainings and rural forums.

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