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## Construction of a scale to measure attitude of veterinarians towards animal hygiene

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### Abstract

The veterinarians play an important role in the prevention of zoonotic diseases and their spread. However, their attitude towards risks associated with livestock production has been questioned earlier. So the assessment of their attitude towards such risk is of paramount importance. However, little work has been done measure their attitude towards animal hygiene. No scale was available to measure the attitude of such professionals towards animal hygiene. Therefore, a scale was constructed to measure their attitude. This article describes the steps involved in construction of a scale for measuring the attitude of veterinary professionals towards animal hygiene based on Likert's summated rating technique. The scale consisted of 22 items and attained a high degree of reliability. This scale can be used to measure veterinary professionals' attitude towards animal hygiene. Based on such findings reinforcement programmes to strengthen their motivation level can be designed and implemented with a higher degree of success.

**Keywords:** Animal hygiene, attitude, summated rating methods

### Introduction

There is an increasing intensification of the livestock production systems and mobility of both domestic animals and humans is on rise. The threat of zoonotic diseases being contracted and their spread is significantly higher now. In such a situation, the role of veterinarians in educating the farmers, detecting such diseases and responding quickly to such threats is vital. However, it has been argued that the attitude towards livestock-associated risks may differ between persons (including veterinary experts) working in livestock industry or elsewhere, for example in public health. Perhaps—according to contemporary demands - the attitude towards risks associated with livestock production is sometimes even somewhat too lax or too little among professionals working in the livestock industry (Kimman *et al.*, 2013) [3]. Zoonoses act as a double edged weapon, one by causing serious and fatal diseases in human beings and other by undermining animal health and productivity and thus producing great financial losses to the animal industries. The knowledge of the zoonoses is the fundamental for the veterinarians, as they are the first on the line of duty (Pal, 2013) [5]. Cripps (2000) [1] argued many of human health workers and veterinarians may not appreciate the relevance or importance of zoonoses even though they have theoretical understanding of the threat. But there is lack of empirical information about attitude of veterinarians towards the zoonotic diseases in India. In this backdrop a scale was developed to measure the attitude of veterinary professional towards animal hygiene scientifically and accurately.

### Materials and Methods

Attitude in the present study was conceptualized as the positive or negative disposition of an individual associated with the psychological object of Animal hygiene and was operationalized as an object which has to do with the prevention of zoonotic diseases and promotion of livestock health. The attitude was measured using Likert's technique of summated rating (1932) [4]. An appropriate device to measure attitude of Veterinary Professionals towards Animal Hygiene in India has not been reported. Therefore, it was decided to develop an attitude scale for this purpose.

In the present study, Likert's method of Summated Rating has been used for construction of attitude scale. Likert (1932) [4] claimed that the method of summated ratings is simpler and easier to apply in the development of an attitude scale than the method of equal appearing interval. The different steps and procedure adopted in the construction of scale are described below:

### 1. Collection of statements

An attempt was made to collect items representing the universe of content related to animal hygiene. After searching literature and discussions with experts, subject matter specialists and academicians who were directly or indirectly exposed to such knowledge system, a list of items was prepared.

### 2. Editing the statements

The items so collected were edited in the light of the informal criteria suggested by the Thurston and Chave (1929) <sup>[7]</sup> and Edward and Kilpatrick (1948) <sup>[2]</sup>. The items which were ambiguous, irrelevant and not conforming to the suggested criteria were deleted and 67 items were retained for scale construction (Table-1).

**Table 1:** Agreement scores of judges on the items collected for attitude scale.

S. No.	Statements	Positive		Un-decided		Negative		Selected/Rejected
		Frequency	%	Frequency	%	Frequency	%	
1	I think quality of the environment where animals are due to live matters regarding animal health safeguard.	27	77.14	4	11.43	4	11.43	Rejected
2	I think there is no interaction between abiotic and biotic factors of environment and the domestic animal. (N)	9	25.71	3	8.57	23	65.71	Rejected
3	Farm structures play its role in preventing outbreaks of diseases	33	94.29	1	2.85	1	2.85	Selected
4	Veterinary services that maintain the well-being of both animal and man in a farm environment are worth consideration.	34	97.14	0	0	1	2.85	Selected
5	It is appropriate to say that there is relationship between an animal and its living environment on the farm.	34	97.14	0	0	1	2.85	Selected
6	The system for the identification and registration of animals should be improved for public health.	29	82.85	3	8.57	3	8.57	Selected
7	The Veterinary Information System needs to be improved.	33	94.28	2	5.71	1	2.85	Selected
8	Unprotected animals can also be used for experimental purposes. (N)	13	37.14	10	28.57	12	34.28	Rejected
9	Animal diseases cause social, economic and environmental damage.	33	94.29	2	5.71	1	2.86	Selected
10	Animal diseases threaten human health.	31	88.57	2	5.71	2	5.71	Selected
11	Increased globalisation of trade and animal product movements create new disease risks.	31	88.57	1	2.86	3	8.57	Selected
12	I think therapy of disease, in comparison to their prevention is economical. (N)	7	20.00	9	25.71	19	54.28	Rejected
13	Milk quality remains unaffected by housing conditions. (N)	4	11.43	4	11.43	27	77.14	Rejected
14	In my opinion bovine mastitis doesn't pose health risk for consumers. (N)	4	11.43	0	0	31	88.57	Selected
15	It is ridiculous to relate cooking utensils (used in the food industry) to animal hygiene. (N)	7	20.00	8	22.85	20	57.14	Rejected
16	I think only clean water should be provided to farm animals.	33	94.28	0	0	2	5.71	Selected
17	I don't find any need of keeping surroundings of water sources up and protected. (N)	2	5.71	2	5.71	31	88.57	Selected
18	I often discuss with other professionals about animal hygiene.	26	74.28	6	17.14	3	8.57	Rejected
19	I wish I could change other people to adopt good animal hygiene conditions.	33	94.28	2	5.71	0	0	Selected
20	I would like to adopt animal hygiene requisites, even if it costs profit loss to me.	24	68.57	6	17.14	5	14.28	Rejected
21	Improvement in the state of balance between animals and environment is important.	35	100	0	0	0	0	Selected
22	I consider animal hygiene just as a prophylaxis postulating prevention of diseases.	26	74.28	3	8.57	6	17.14	Rejected
23	I think that wholesome food of animal origin can be produced from healthy animals only.	34	97.15	1	2.85	0	0	Selected
24	For me, monitoring of latent food-borne pathogens is wastage of time. (N)	3	8.57	1	2.85	31	88.57	Selected
25	Prevention is better than cure.	35	100	0	0	0	0	Selected
26	Being veterinary professionals we should not be much concerned about ensuring human health protection. (N)	5	14.28	2	5.71	28	80.00	Selected
27	In my opinion boots and clothes for visitors should be available on every animal unit.	33	94.29	2	5.71	0	0	Selected
28	In my opinion airborne pathogens should not be considered as risks in the farm environment. (N)	3	8.57	2	5.71	30	85.71	Selected
29	It is ridiculous to consider heavy metals and organic pollutants from immissions as risks in the farm environment. (N)	6	17.14	4	11.43	25	71.42	Rejected
30	In my view, contaminations by improper processing, handling, storage and transport pose risks in the feeds.	31	88.57	2	5.71	2	5.71	Selected
31	Elimination of the antagonistic flora during treatment of animals is neglectable. (N)	6	17.14	12	34.28	17	48.57	Rejected
32	Application of drugs is more important than its being licensed or unlicensed. (N)	8	22.85	9	25.71	18	51.43	Rejected
33	In my opinion, hygienic safe treatment of effluents is necessary.	34	97.14	1	2.86	0	0	Selected

34	I would prefer construction of animal houses with materials supporting hygienic measures.	35	100	0	0	0	0	Selected
35	Construction of animal houses should be done economically irrespective of hygiene considerations. (N)	5	14.28	3	85.71	27	77.14	Rejected
36	In my opinion, cleaning and disinfection practices in animal houses should be carried out as per convenience of time. (N)	10	28.57	4	11.43	21	60.00	Rejected
37	I advice to monitor hygienic status of the building regularly.	35	100	0	0	0	0	Selected
38	I think cleaning and disinfection of outdoor hard surfaces is not much important regarding animal hygiene. (N)	6	17.14	0	0	29	82.86	Selected
39	The consequences of not following strict hygienic rules are negligible. (N)	2	5.71	1	2.85	33	94.28	Selected
40	I think scope of animal hygiene is limited to animal disease prevention. (N)	7	20.00	2	5.71	26	74.28	Rejected
41	Pre-harvest food safety is a new challenge that the farming community is increasingly facing.	27	77.14	7	20.00	1	2.85	Rejected
42	In my opinion, environmental protection and waste management is also a challenge for the farming community.	32	91.43	2	5.71	1	2.85	Selected
43	The basic rules of biosecurity must be taught under animal hygiene.	34	97.14	1	2.86	0	0	Selected
44	Health and welfare of animals and humans are related to each other.	34	97.14	1	2.86	0	0	Selected
45	There is need of having good knowledge about safe manure removal, storage and land application.	34	97.14	1	2.86	0	0	Selected
46	Animal hygiene is a precondition for the sustainability of the animal husbandry systems.	32	91.43	3	8.57	0	0	Selected
47	Approach of animal hygiene should be limited to typical food delivering animals. (N)	11	31.43	3	8.57	21	60.00	Rejected
48	In my opinion, environmental problems are enhanced by high animal densities.	21	60.00	10	28.57	4	11.43	Rejected
49	It is convenient to keep farms and residential areas closer to each other. (N)	6	17.24	5	14.29	24	68.57	Rejected
50	Investigating the fate of the drugs in the environment is wastage of time. (N)	4	11.43	5	14.29	26	74.28	Rejected
51	Comparing different production systems regarding environmental risk is a very hectic and neglect table necessity. (N)	6	17.24	8	22.86	21	60.00	Rejected
52	Acceptance by the trade partners of products originating from vaccinated animals should be promoted.	26	74.28	5	14.29	4	11.43	Rejected
53	I believe that effect on performances remains minor by presence of sub-clinical disease within livestock systems. (N)	7	20.00	12	34.29	16	45.71	Rejected
54	It is rational to keep foot bath with disinfectant at the entry of the herd or a sanitary transition zone.	33	94.28	1	2.85	1	2.85	Selected
55	I would recommend provision of farm-specific clothing and shoes for visitors in farms.	32	91.43	3	8.57	0	0	Selected
56	Animals should be bought after knowing its health status.	35	100	0	0	0	0	Selected
57	In my opinion farmers should keep written records of all treatments of animals appropriately.	35	100	0	0	0	0	Selected
58	Chemicals and veterinary medicines should be stored securely and dispose of responsibly.	35	100	0	0	0	0	Selected
59	We should consider animal behaviour when developing farm infrastructure.	33	94.29	2	5.71	0	0	Selected
60	The code and conduct for following the proper animal hygiene in the farm is complicated. (N)	13	37.14	6	17.14	16	45.71	Rejected
61	I feel that the amount required to convert the farm to disease risk free is much higher. (N)	15	42.86	5	14.28	15	42.86	Rejected
62	I will have the problem in sourcing and purchasing inputs required to keep farm disease free. (N)	17	48.57	4	11.43	14	40.00	Rejected
63	I am not right kind of person to convince farmers of locality to adopt proper animal hygiene practices. (N)	6	17.14	5	14.29	24	68.57	Rejected
64	Strict adherence to proper animal hygiene practices will give less profit to dairy farm. (N)	6	17.14	4	11.43	25	71.43	Rejected
65	Profits are more important for the farmers than the environmental issues. (N)	13	37.14	3	8.57	19	54.29	Rejected
66	I will not recommend animal hygiene practices to the farmers. (N)	4	11.43	0	0	31	88.57	Selected
67	Nature of farming practices has no role in ecological problem/environmental pollution. (N)	6	17.14	2	5.71	27	77.14	Rejected

### 3. Judges rating of statements

Thereafter, the academicians, experts, scientists, subject matter specialists in the field of extension education, social sciences and veterinary sciences were approached for seeking their valued judgment and opinion in developing the attitude

scale. The 67 items were listed randomly and sent to 70 judges with well-defined instruction to carefully and critically evaluate the statement and requested to give their response as to whether the particular statement is showing favourable, unfavourable attitude towards animal hygiene or is

ambiguous. They were requested to add/delete or modify a statement which they deemed fit for inclusion or deletion. The purpose of administration of these items to the judges was to screen out items that were not clear and direct. Thirty-five judges returned the proforma. The score for each item was calculated. It was decided to select only those items on which more than 80 per cent of judges agreed. In this way, 37 items out of 67 were retained and rest were rejected at this stage.

#### 4. Selection of respondents and scoring procedure

These 37 items were administered to 30 veterinary professionals. The respondents were asked to respond to each one of these items on a five points continuum viz., strongly agreed, agreed, undecided, disagreed and strongly disagreed

with the weightage of 5, 4, 3, 2 and 1 for positive items and reverse scoring was done in case of negative statements. By summing up the scores obtained for each of the items included in the scale, the total score for each respondent was obtained. Out of these professionals falling in first quartile and last quartile were taken as high group and low group category, respectively. Mean score of each statement was calculated for both the category of farmers. Difference between the mean score of both categories (high and low group) was calculated (Table-2). It indicates the extent to which a given statement differentiates between the high and low group. The items having more than 0.8 differences were retained in the final attitude scale. In this way, only 22 items were finally retained.

**Table 2:** Mean scores and differences of high and low groups of respondents.

S. No.	Statements	High Group Mean	Low Group Mean	Difference
1	Farm structures play its role in preventing outbreaks of diseases	4.82	4.24	0.59
2	Veterinary services that maintain the well-being of both animal and man in a farm environment are worth consideration.	4.82	4.00	0.82
3	It is appropriate to say that there is relationship between an animal and its living environment on the farm.	5.00	4.59	0.41
4	The system for the identification and registration of animals should be improved for public health.	4.88	4.18	0.71
5	The Veterinary Information System needs to be improved.	4.71	4.35	0.35
6	Animal diseases cause social, economic and environmental damage.	5.00	4.35	0.65
7	Animal diseases threaten human health.	4.88	4.00	0.88
8	Increased globalisation of trade and animal product movements create new disease risks.	4.88	4.06	0.82
9	In my opinion bovine mastitis doesn't pose health risk for consumers. (N)	4.82	3.35	1.47
10	I think only clean water should be provided to farm animals.	4.82	4.00	0.82
11	I don't find any need of keeping surroundings of water sources up and protected. (N)	4.24	2.53	1.71
12	I wish I could change other people to adopt good animal hygiene conditions.	4.47	4.24	0.24
13	Improvement in the state of balance between animals and environment is important.	4.65	3.82	0.82
14	I think that wholesome food of animal origin can be produced from healthy animals only.	4.88	3.88	1.00
15	For me, monitoring of latent food-borne pathogens is wastage of time. (N)	4.88	2.41	2.47
16	Prevention is better than cure.	4.94	4.71	0.24
17	Being veterinary professionals we should not be much concerned about ensuring human health protection. (N)	4.82	2.76	2.06
18	In my opinion boots and clothes for visitors should be available on every animal unit.	4.53	3.59	0.94
19	In my opinion airborne pathogens should not be considered as risks in the farm environment. (N)	4.59	3.18	1.41
20	In my view, contaminations by improper processing, handling, storage and transport pose risks in the feeds.	4.88	4.12	0.76
21	In my opinion, hygienic safe treatment of effluents is necessary.	4.88	4.12	0.76
22	I would prefer construction of animal houses with materials supporting hygienic measures.	5.00	4.18	0.82
23	I advise to monitor hygienic status of the building regularly.	4.94	3.59	1.35
24	I think cleaning and disinfection of outdoor hard surfaces is not much important regarding animal hygiene. (N)	4.71	2.41	2.29
25	The consequences of not following strict hygienic rules are negligible. (N)	4.94	3.18	1.76
26	In my opinion, environmental protection and waste management is also a challenge for the farming community.	4.88	4.18	0.71
27	The basic rules of biosecurity must be taught under animal hygiene.	4.82	3.94	0.88
28	Health and welfare of animals and humans are related to each other.	4.88	3.82	1.06
29	There is need of having good knowledge about safe manure removal, storage and land application.	4.76	4.06	0.71
30	Animal hygiene is a precondition for the sustainability of the animal husbandry systems.	4.94	4.06	0.88
31	It is rational to keep foot bath with disinfectant at the entry of the herd or a sanitary transition zone.	4.94	4.00	0.94
32	I would recommend provision of farm-specific clothing and shoes for visitors in farms.	4.76	3.94	0.82
33	Animals should be bought after knowing its health status.	5.00	4.29	0.71
34	In my opinion farmers should keep written records of all treatments of animals appropriately.	4.88	4.41	0.47
35	Chemicals and veterinary medicines should be stored securely and dispose of responsibly.	5.00	4.24	0.76
36	We should consider animal behaviour when developing farm infrastructure.	4.35	4.00	0.35
37	I will not recommend animal hygiene practices to the farmers. (N)	4.53	2.76	1.76

**Table 3:** Final attitude scale: Strongly disagree-SD, disagree-D, undecided-U, agree-A, strongly agree-SA

S. No.	Statements	SA	A	U	D	SD
1.	Veterinary services that maintain the well-being of both animal and man in a farm environment are worth consideration.	5	4	3	2	1
2.	Animal diseases threaten human health.	5	4	3	2	1
3.	Increased globalisation of trade and animal product movements create new disease risks.	5	4	3	2	1
4.	In my opinion bovine mastitis doesn't pose health risk for consumers. (N)	1	2	3	4	5
5.	I think only clean water should be provided to farm animals.	5	4	3	2	1
6.	I don't find any need of keeping surroundings of water sources up and protected. (N)	1	2	3	4	5
7.	Improvement in the state of balance between animals and environment is important.	5	4	3	2	1
8.	I think that wholesome food of animal origin can be produced from healthy animals only.	5	4	3	2	1
9.	For me, monitoring of latent food-borne pathogens is wastage of time. (N)	1	2	3	4	5
10.	Being veterinary professionals we should not be much concerned about ensuring human health protection. (N)	1	2	3	4	5
11.	In my opinion boots and clothes for visitors should be available on every animal unit.	5	4	3	2	1
12.	In my opinion airborne pathogens should not be considered as risks in the farm environment. (N)	1	2	3	4	5
13.	I would prefer construction of animal houses with materials supporting hygienic measures.	5	4	3	2	1
14.	I advise to monitor hygienic status of the building regularly.	5	4	3	2	1
15.	I think cleaning and disinfection of outdoor hard surfaces is not much important regarding animal hygiene. (N)	1	2	3	4	5
16.	The consequences of not following strict hygienic rules are negligible. (N)	1	2	3	4	5
17.	The basic rules of biosecurity must be taught under animal hygiene.	5	4	3	2	1
18.	Health and welfare of animals and humans are related to each other.	5	4	3	2	1
19.	Animal hygiene is a precondition for the sustainability of the animal husbandry systems.	5	4	3	2	1
20.	It is rational to keep foot bath with disinfectant at the entry of the herd or a sanitary transition zone.	5	4	3	2	1
21.	I would recommend provision of farm-specific clothing and shoes for visitors in farms.	5	4	3	2	1
22.	I will not recommend animal hygiene practices to the farmers. (N)	1	2	3	4	5

(N) = Negative statement

**5. Reliability of the scale**

Reliability depends upon the population measure as well as upon the measurement instruments. One should speak of the reliability of certain instrument applied to certain population under certain conditions. According to Anasthasi (1976), reliability refer to the consistency of scores obtained by the same individual when examined with test on different occasion or with different sex of equivalent items or under other variable examining conditions. The reliability coefficient is a mathematical estimate of the degree to which an instrument is free from measurement error (Talmage and Rasher, 1981) [6]. Kerlinger (1995) has defined reliability as the accuracy or precision of measuring instrument. Scale is said to be reliable when it consistently produce the same result when applied to measure the same phenomenon from time to time. In this study, to test the reliability of the scale, split half method was applied. The odd even method was favoured because it assured parallelism, ensured that approximately the same amount of time was devoted to each half. Also it tends to keep testing condition more nearly constant for the two halves and avoided informant fatigue or cumulative items effect might have raised or lowered the true correlation.

Data obtained from 30 veterinary professionals was used to calculate Pearson product moment co-efficient of correlation. It was computed between the two sets of scores of the scale with the following formula:

$$t = \frac{NXY - (X)(Y)}{[(NX^2 - X^2)]. [(NY^2 - Y^2)]}$$

Where,

- N = Number of respondents
- X = Value of odd numbered items scores
- Y = Value of even numbered items scores

The 'r' value obtained was 0.69 indicating an acceptable level of reliability.

**6. Validity of the scale**

The validity of the scale refers to degree to which the scale is capable of achieving the aims or purposes. When attitudes are measured, using either Likert scaling or any other type of attitude measurement, the investigator must establish the validity of the instruments (Sims, 1981). An instrument ought to take into account four aspects of validity namely content validity, predictive validity, concurrent validity and construct validity. In the present study, keeping in view the resource limitations, only content validity of scale was worked out. The scale was examined for the content validity of determining how well the content of the scale represented the subject matter under study. In collection and selection of items for the construction of the present scale sufficient care was taken. It covered important items related to attitude of veterinary professionals towards animal hygiene. As all the possible items covering the universe of content were selected by discussing the same with experts, subject matter specialists and reviewing the available literature on the subject as well as by working out agreement scores. Thus, the scale satisfied the content validity.

**7. Final format of Attitude scale**

Final format of Attitude scale was consisted of 22 statements. Out of these 22 statements, 14 items were positive and rests were negative. These items were arranged randomly against a five-point continuum. The five-point continuum was strongly agreed, agreed, undecided, disagreed and strongly disagreed with respective weightage of 5, 4, 3, 2 and 1 for positive items and reverse order for negative items (Table-3).

**Conclusion**

Nearly 80 percent of infections are shared between man and animals. This poses a potentially serious threat to the human population. The scale developed by following the steps described has an acceptable level of reliability and validity. It can be used to measure the attitude of veterinary professionals towards animal hygiene. Such a measurement will pave way for attitudinal reinforcement programmes for such

professional who play vital role in preventing and managing public health threats from zoonotic diseases.

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