



## **Correlation Analysis of Socio-cultural and Socio-economic Profile with Knowledge Level and Existing Small Ruminant Rearing Practices of *Bakarwal* Tribe in Jammu District of Jammu and Kashmir**

**Farzana Choudhary<sup>1</sup>, S. A. khandi<sup>1</sup>, Rayees Ahmed Bafanda<sup>1\*</sup> and Sheikh Umair Minhaj<sup>1</sup>**

<sup>1</sup>*Division of veterinary and animal husbandry extension education, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu (SKUAST-J), R.S.Pura, Jammu-181102, India.*

### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author FC designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SAK guided the author FC during whole research period and edited the manuscript. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/CJAST/2018/40192

#### Editor(s):

(1) Ahmed Mohamed El-Waziry, Professor, King Saud University, College of Food and Agriculture Sciences, Kingdom of Saudi Arabia.

(2) Ming-Chih Shih, Professor, Department of Health and Nutrition Science, Chinese Culture University, Taiwan.

#### Reviewers:

(1) Sandeep Kumar Singh, International Institute of Veterinary Education and Research, Rohtak, Haryana, India.

(2) Temple Grandin, Colorado State University, USA.

(3) Ioniță Lucian, Romania.

Complete Peer review History: <http://www.sciencedomain.org/review-history/25727>

**Original Research Article**

**Received 11<sup>th</sup> January 2018**

**Accepted 18<sup>th</sup> March 2018**

**Published 31<sup>st</sup> July 2018**

### **ABSTRACT**

The present study was conducted in Jammu district of Jammu and Kashmir with the objectives to access the correlation analysis of socio-cultural and socio-economic profile with knowledge and existing small ruminant rearing practices of *Bakarwal* tribe in Jammu district. The data were collected from 120 *Bakarwal* respondents belonging to Marh, Satwari, Bhalwal and Dansal blocks of Jammu district with the help of structured interview schedule containing selected dependent and independent variables, through personal interview technique. The findings revealed that age, herd size, total annual income and marketing pattern were positively but

\*Corresponding author: E-mail: [rayeesahmed372@gmail.com](mailto:rayeesahmed372@gmail.com);

insignificantly associated with the knowledge. On the other hand land holding, cultural attributes and relationship with other community and ownership were significantly positively associated with the knowledge. Insignificant negative association of work distribution among family members, source of information and indigenous knowledge was observed with knowledge level. Whereas ,insignificant positive association of age, herd size, wok distribution among family members, ownership pattern, total annual income and cultural attributes and their relationship with other communities was observed with existing practices. Education land holding and marketing pattern shows insignificant negative association of with existing practices. Negative significant association of source of information was observed with existing practices.

*Keywords: Bakarwal; correlation; socio-cultural; socio-economic; knowledge; existing practices.*

## 1. INTRODUCTION

Tribe can be defined as member of caste or ethnic group with a strong traditional association with livestock-rearing. These are animal rearers and may or may not have land to cultivate, but who migrate for a large part of the year and thus can be called nomadic pastoralists. The types of livestock kept by pastoralists vary according to the climate, environment, water and other natural resources and geographical areas. They may include sheep, goat, camels, yaks, horses, llamas, alpacas, reindeer and vicunas. Mobility is a key feature of pastoralism. Tribal constitute about 8.14 % of the total population of India numbering to 84.51 million and cover about 15 % of the country's area [1]. In India tribals are locally called as "adivasi". It is an umbrella term for a heterogeneous set of ethnic and tribal groups claimed to be the indigenous population of India. They comprise a substantial indigenous minority population of India. The same term "adivasi" is used for the ethnic minorities of Bangladesh and the native Veda people of Sri Lanka. *Adivasi* societies are particularly present in Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Jammu and Kashmir, Tamil Nadu, West Bengal and some North Eastern states and the Andaman and Nicobar Island.

*Bakarwal* is a nomadic tribe based in the Pir Panjal and Himalayan mountains of South Asia. They are an important and historic tribe and practice transhumance pastoralism, that involves cyclic movements from lowlands to highlands, to take advantage of seasonally available pastures at different elevations in Himalayas [2]. The lifestyle of *Bakarwal* tribe also throws some light on their culture and societal set up. *Bakarwal* are highly disorganized community which is socially, educationally, economically and politically backward. Choudhary [3], while discussing the *Gujjars* over

century's notes that past fifty three years, the country has made tremendous progress in every sphere of life, but nothing has changed for this community. Sheep and goat are considered as an important livestock species in India with their multifacet utility such as meat, wool, skin and manure, contributing to the agrarian economy especially in areas where crop and dairy farming are not economical [4]. They are main source of livelihood of *Bakarwals*. During the summer, they move from one meadow to the other over mountains in search of better pastures for their herd. *Bakarwal* tribes take near about sixty days to reach those remote meadows in the upper reaches of Himalayas from their place of settlement in winters. During the summer season, when the nature is in its full bloom, they can easily move from one meadow to the other. Smaller body size and easy adaptation to a wide range of agro-climatic condition makes sheep and goat suitable for economically weaker sections of the society. They have a cultural linked traditional knowledge about sheep and goat breeding, feeding, management and health aspects. They have an important role in agricultural production, as they provide manure for land [5]. There is a decline in the traditional way of pastoralism and it is possible to consider allowing it to die a natural death as a default option. There are several reasons that why there is an immediate need of reviving the traditional pastoral practices. In the first place, these nomadic pastoralists directly contribute significant economic value to the country in the form of wool, milk, meat and other animal products. They also contribute important manures to farm lands and common lands on which their flocks dwell. Sheep and goat manures are regarded very nutritive to the soil. Again, no precise economic value of the manures is clearly known but its value for maintaining the fertility of soil in meadows cannot be ignored. *Bakarwals* contribute significantly to the livestock economy of this state.

## 2. MATERIALS AND METHODS

The present study was conducted in Jammu district with the objectives to access the correlation analysis of socio-cultural and socio-economic profile with knowledge and existing small ruminant rearing practices of *Bakarwal* tribe in Jammu district. Jammu district comprises of twenty blocks. Out of these four blocks were selected purposefully having predominant *Bakarwal* population. The selected blocks were Marh, Dansal, Satwari and Bhalwal. A list of respondents involved in sheep and goat rearing were prepared from selected blocks. Thirty *Bakarwals* were selected randomly from each of the 4 selected blocks of Jammu district, making a sample size of 120 respondents. Data were collected from the study area with the help of a pre-structured interview schedule after proper pre-testing and modifications. The interview schedule was developed using the package of practices of neighbouring universities as “universe of content” after proper consultation with the members of Faculty of Veterinary Science and Animal Husbandry, SKUAST-Jammu. The final schedule was divided into four broad areas namely management, feeding, breeding and health care for evaluation of knowledge and existing small ruminants practices of Bakarwal tribe in their respective sections. Data were coded, classified, tabulated and analyzed using the software; Statistical Package for the Social Science (SPSS 16.0). The presentation of data was done to give pertinent, valid and reliable answer to the specific objectives. Frequencies, percentage, mean, standard deviation, mean percent score (MPS) and Pearson product moment correlation coefficient (r) were worked out for meaningful interpretation. Mean percent score (MPS) and Pearson product moment correlation coefficient (r) were calculated by using formula:

$$\text{Mean Percent Score (MPS)} = (\text{Observed score} / \text{Total score}) \times 100$$

### 2.1 Pearson product Moment Correlation Coefficient

Pearson product moment correlation coefficient was computed by the following formula.

$$r_{xy} = \frac{[N \sum XY - (\sum X)(\sum Y)]}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

Where, X and Y = original scores in variables X and Y

Where,

- N = Number of paired scores
- $\sum XY$  = Each X multiplied by its corresponding Y, then summed
- $\sum X$  = Sum of X scores
- $(\sum X)^2$  = Each X squared and then summed
- $\sum Y$  = Sum of Y scores
- $(\sum Y)^2$  = Each Y squared and then summed

## 3. RESULTS AND DISCUSSION

A brief account of the general with socio-cultural and social-economic profile of the respondents is presented in the Table 1. The variables studied were age, education, herd size, land holding, cultural attributes and relationship with other communities, work distribution among family members, type of pastoral system, ownership pattern, total annual income, source of information and marketing pattern. The correlation estimates between the dependent variables (i.e. knowledge and existing practice) and independent variables (i.e. socio-cultural and socio-economic profile of respondents) were presented in Table 2. Data of Table 1 shows that age, herd size, total annual income and marketing pattern were positively but insignificantly associated with the knowledge. On the other hand land holding, cultural attributes and relationship with other community and ownership were significantly positively associated with the knowledge. Insignificant negative association of work distribution among family members, source of information and indigenous knowledge was observed with knowledge level. Regarding correlation analysis of independent variables with existing practices Table 2 revealed that ,insignificant positive association of age, herd size, work distribution among family members, ownership pattern, total annual income and cultural attributes and their relationship with other communities was observed with existing practices. On the other hand insignificant negative association of education, land holding and marketing pattern with existing practices. Negative significant association of source of information was observed with existing practices. For proper analysis, the respondents were divided into categories based on the knowledge scores and existing practices score obtained as discussed below.

### 3.1 Age

In the present study it was found that the average age of the respondents was 50

(Table 1), indicating that in general the respondents were middle aged. For appropriate analysis the respondents were classified into three categories on the basis of mean and standard deviation i.e. young, middle and old. Insignificant positive association of age was observed with existing practices and knowledge, with correlation coefficient being 0.052 and 0.015; respectively (Table 2). Existing practices and knowledge scores of respondents classified on the basis of age are shown in the Table 3. As evident from the table, majority of the respondent (68.3%) were middle aged followed by old (19.2%) and young (12.5%). The respondents of old age group were following high existing practices (59.42%) and the knowledge level was higher amongst the young age group (58.99%) as compared to other two categories . Young age

category respondents were following low existing practices (57.18%) and the old age groups were having low knowledge about improved sheep and goat rearing practices (58.44%). The results were in agreement with the findings of Khandi et al. [6] and Jeelani [7] who reported that the majority of the respondents were middle aged. Similarly, Mahipal [8] reported that age was having positive but insignificant relationship with the overall adoption of dairy innovations by medium category farmers. The differences can be attributed to typical social system of the respondents and the degree of isolation found in the society in general. Similar findings were also reported by Soni et.al [9] that age was having positive but insignificant relationship with the overall adoption of improved dairy practices by farmers.

**Table 1. Socio-cultural and socio-economic profile of the respondents**

Independent variable	Possible range	Observed range	Mean $\pm$ standard error	Standard deviation
Age	-	34-69	50.10 $\pm$ 0.81	8.82
Education	0-4	0-3	1.51 $\pm$ 0.08	0.89
Herd size	-	47-155	113.04 $\pm$ 1.85	20.31
Land holding	0-4	0-1	0.46 $\pm$ 0.05	0.50
Cultural attributes and relationship with other community	0-11	8-11	9.03 $\pm$ 0.06	0.61
Work distribution among family members	0-40	20-27	23.46 $\pm$ 0.23	2.50
Type of pastoral system	1-3	3	3.00 $\pm$ 0	0
Ownership pattern	1-4	2-4	2.83 $\pm$ 0.10	0.99
Total annual income	-	50000-200000	120708.30 $\pm$ 3071.45	33646.06
Source of information	0-22	8-18	13.58 $\pm$ 0.22	2.38
Marketing pattern	0-30	14-23	18.87 $\pm$ 0.20	2.20
Indigenous knowledge	0-26	5-13	9.67 $\pm$ 0.20	2.23

**Table 2. Correlation estimate for dependent and independent variables**

Independent Variable	Correlation co-efficient 'r' value
Age	0.015
Education	0.159
Herd size	0.157
Land holding	0.188*
Cultural attributes and relationship with other community	0.244**
Work distribution among family members	-0.153
Ownership pattern	0.253**
Total annual income	0.078
Source of information	-0.034
Marketing pattern	0.131
Indigenous knowledge	-0.070

\*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed)

Anyhow, it is suggested that the emphasis should be given to the middle age group, to increase their knowledge level as they are likely to play a dominant role in decision making regarding small ruminant rearing practices by simplifying the information of complex sheep and goat husbandry practices and by conducting training programmes periodically to impart knowledge about improved techniques.

### 3.2 Education

It is a well known fact that education results in overall development of an individual. In the present study the average score for education was  $1.51 \pm 0.08$  (Table 1) with a standard deviation of 0.89, indicating that the respondents in general were having a poor formal education. Insignificant positive association of education with existing practice and knowledge level was observed with a correlation co-efficient value of -0.080 and 0.159; respectively (Table 2). For appropriate analysis, respondents were divided into three categories i.e. low, medium and high based on their education scores. As is evident from the Table 4 majority of the respondents (73.4%) were having medium education, (13.3%) each had low and high education. Respondents of low education group were following higher existing practices and those of high education category were having higher knowledge. Respondents of high education group were following low existing practices and those of low education group were having low knowledge. Similar findings were reported by Khandi *et al.* [6] and Jeelani [7] who found the poor formal education of *Gujjar* respondents in Jammu and Kashmir. Similar results were reported by Koli [10] who, carried a study of relationship between personal, situational, psychological and socio-economical characteristics with adoption of goat farming technology by the goat keepers. It could be attributed to the fact that *Bakarwals* mainly remain engaged in nomadic livestock rearing

which affects their formal education prospects besides other reasons. Right from the childhood they are taught to drive the flocks in pastures for grazing. Other reasons for poor education like cultural stereotyping and poverty cannot be ruled out. Anyhow, it is suggested that the extension programmes for *Bakarwals* should lay emphasis on demonstrations and a limited use of extension literature should be made given the level of literacy prevalent among such nomads.

### 3.3 Herd Size

In the present study, the average herd size was 113 (Table 1), indicating that the respondents in general were having medium herd size. Insignificant positive association of herd size was observed with existing practices and knowledge, with correlation co-efficient being 0.078 and 0.157, respectively (Table 2). For appropriate analysis respondents were classified into three categories on the basis of herd size i.e. small, medium and large. As evident from the Table 5 majority of the respondents (70.8%) were having medium herd size of 93-133 animals followed by large category (19.2%) having more than 133 animals. The small herd size category constituted (10%) of the respondents. The respondents with large herd size were having high scores in exiting practices and high knowledge as compared to the other two categories. The results were in consonance with the findings of Jeelani [7] and Khandi *et al.* [6] who reported that *Gujjars* were keeping large number of animals for their livelihood and sustenance. Non significant association between herd size and knowledge level has earlier been reported by Rao, [11] and Kherde [12]. Nataraju *et al.* (1986) opined that large sized possession of livestock by farmers necessitated them to participate more in extension activities to seek information about improved animal husbandry practices. This is in consonance with the findings of Chugh [13] who reported that the herd size

**Table 3. Classification of respondents based on age**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Age	Young (<41)	15 (12.5)	44.60±1.15 (57.18)	46.60±0.88 (58.99)
	Middle (41-59)	82 (68.3)	45.70±0.53 (58.59)	46.41±0.47 (58.75)
	Old (>59)	23 (19.2)	46.35±0.88 (59.42)	46.17±0.79 (58.44)

Values in parenthesis indicate percentage

**Table 4. Classification of respondents based on education**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Education	Low (<0.62)	16 (13.3)	46.69±1.37 (59.86)	45.69±0.92 (57.84)
	Medium (0.62-2.4)	88 (73.4)	45.58±0.47 (58.44)	46.42±0.41 (58.75)
	High (>2.4)	16 (13.3)	45.25±1.29 (58.01)	46.94±1.33 (59.42)

Values in parenthesis indicate percentage

**Table 5. Classification of respondents based on herd size**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Herd size	Small (<93)	12 (10.0)	45.42±1.67 (58.23)	45.0±1.15 (56.96)
	Medium(93-133)	85 (70.8)	45.06±0.48 (57.77)	46.29±0.43 (58.59)
	Large (>133)	23 (19.2)	48.13±0.91 (61.71)	47.48±0.89 (60.10)

Values in parenthesis indicate percentage

did not influence existing practices as well as awareness knowledge of dairy farmers. Kherde *et al.* [12] also reported knowledge to be insignificantly associated with herd size. It can be hypothesized that improved sheep and goat husbandry practices do not fit into their existing system of rearing and thus, they do not perceive these improved sheep and goat husbandry practices as beneficial. However, this needs to be substantiated by the empirical studies.

### 3.4 Land Holding

The average score for land holding was  $0.46 \pm 0.05$  (Table 1) with standard deviation 0.50, indicating that the respondents in general were landless. Negative insignificant association of land holding with existing practices and positive significant association with knowledge were observed with a correlation coefficient value of -0.150 and 0.188\*\*, respectively (Table 2). Respondents were classified into two categories based on their land holdings (Table 6). As is evident from the Table that (54.2%) of the respondents were landless while, (45.8%) were having marginal land holding. Landless respondents had high scores in existing practices and those with marginal land holding had high knowledge as compared to the landless respondents, which is probably because of the nomadic lifestyle as stated earlier by Khandi *et al.* [6]. The results of knowledge and existing practices are in agreement with the findings of

number of workers. Kakoty [14] studied the differential influence of incentives and disincentives in determining existing practices of small dairy farmers of Dimoria tribal development block in Assam and revealed that the existing practices were insignificantly affected by land holding. It can be hypothesized that respondents having land are engaged in diversified agricultural activities which also influences the knowledge of the respondents regarding improved sheep and goat rearing practices.

### 3.5 Cultural Attributes and Relationship with Other Communities

The average score was  $9.03 \pm 0.06$  with standard deviation 0.61 (Table 1), indicating good cultural attributes and relationship with other communities. Significant positive association of cultural attributes and their relationship with other communities was observed with knowledge and insignificant association with existing practices, with correlation coefficient being 0.244\*\* and 0.051; respectively (Table 2). Respondents were classified into three categories based on scores of cultural attributes and relationship with other communities i.e. low, medium and high (Table 7). As is evident from the table that the majority of the respondents (78.3%) were having medium cultural attributes and relationship with other communities followed by high category (10%) and low category (11.7%). Hutchinson [15] reported that pastoral behavior is a logical

consequence of social-cultural systems that have evolved from centuries of adaptation to marginal environments. Saberwal (1999) stated that in social evolutionary thinking, the nomadic lifestyle has traditionally been treated as less civilized, less productive and more degrading than a settled lifestyle. Similarly, Kakar et al [16] observed that pastoralists in the Cholistan desert of Pakistan know the cultural events along their migratory routes and hence they participate in the fairs to sell their male animals and milk. He also reported that they stay near the peripheries in the fairs for trade purpose. They also stay near the peripheries of the cities to sell camel milk, which is usually mixed with buffalo milk by middlemen. Usually the pastoral women sell the camel milk and the earnings go to them. It can be hypothesized that the nomadic pastoral system influences the rearing of small ruminants on traditional lines that suites their socio-cultural and economic pattern.

### 3.6 Work Distribution among Family Members

The average score was  $23.46 \pm 0.23$  with standard deviation of 2.50 (Table 1), indicating that the respondents in general were having medium work distribution among family members. Insignificant association of work distribution among family members with existing practices and knowledge level was observed with a correlation coefficient value of 0.005 and -

0.153; respectively (Table 2). Respondents were classified into three categories i.e. low, medium and high. As is evident from the Table 8 majority of the respondents were having medium (54.2%) work distribution among family members followed by high (31.6%) and low (14.2%) work distribution. Those respondents having medium work distribution among family members had high scores in existing practices and those having low work distribution had high knowledge. The results were in consonance with the findings of Shahri [17], who reported that there is clear division of labour between men and women in the daily work among *Gujjars* Bakarwal families in Jammu and Kashmir. Men care for herd, take them to pastures and protect them from wild animals. They also direct plans for the family and keep trade going. Women on the other hand besides daily household chores, milk the buffaloes, goats and cows and help their men in trade. *Gujjar Bakarwal* trains their children from an early age to lead their herds and flocks to pastures. The only difference between the two tribes is that *Gujjars* rear cattle while *Bakarwal* breed sheep and goats but existence is centered towards animals, in both the groups. It can thus be hypothesized that the awareness may be increased among the *Bakarwals* towards scientific animal husbandry practices. So that they can rear livestock on scientific lines that results in increased productivity and production which will directly improve their socio- economic status.

**Table 6. Classification of respondents based on land holding**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Land holding	Landless (0)	65 (54.2)	$46.32 \pm 0.55$ (59.38)	$45.69 \pm 0.45$ (57.84)
	With landholding (1)	55 (45.8)	$44.93 \pm 0.66$ (57.60)	$47.22 \pm 0.59$ (59.77)

Values in parenthesis indicate percentage

**Table 7. Classification of respondents based on cultural attributes and relationship with other communities**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Cultural attributes and relationship with other communities	Low (<8.43)	14 (11.7)	$45.64 \pm 1.17$ (58.51)	$44.28 \pm 0.99$ (56.05)
	Medium (8.43-9.64)	94 (78.3)	$45.68 \pm 0.47$ (58.56)	$46.37 \pm 0.40$ (58.70)
	High (>9.64)	12 (10.0)	$45.75 \pm 1.72$ (58.65)	$49.0 \pm 1.28$ (62.03)

Values in parenthesis indicate percentage

**Table 8. Classification of respondents based on work distribution among family members**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Work distribution among family members	Low (<20.96)	17 (14.2)	42.24±0.70 (54.15)	46.82±0.88 (59.27)
	Medium (20.96-25.96)	65 (54.2)	46.83±0.61 (60.04)	46.78±0.56 (59.22)
	High (>25.96)	38 (31.6)	45.26±0.67 (58.01)	45.53±0.54 (57.63)

Values in parenthesis indicate percentage

### 3.7 Ownership Pattern

The average score for ownership pattern was  $2.83 \pm 0.10$  with a standard deviation of 0.99 (Table 1), indicating that the property is inherited to the youngest son of the family. Significant positive association of ownership pattern was observed with knowledge and insignificant with existing practices with correlation coefficient being 0.253 and -0.019, respectively (Table 2). Respondents were classified into two categories based on their ownership pattern (Table 9). As is evident from the table that (58.4%) of the respondents inherited property to the youngest son and (41.6%) inherited property to family members uniformly. Existing practices were high for the respondents with uniform inheritance and knowledge was high for the respondents inheriting property to the youngest son. Sharma *et al.* (2003) reported that the pastoralists were usually poor in terms of cash and land ownership. Hogg [18] observed that many African pastoralists make decisions between livelihood patterns and resource allocation on a yearly basis, depending on the nature of the resources they possess.

### 3.8 Total Annual Income

The average total annual income was Rs. 120708 (Table 1), indicating that respondents in general were having medium annual income. Insignificant association of total annual income with existing practices and knowledge was observed with a correlation coefficient value of

0.178 and 0.078, respectively (table 2). Respondents were classified into three groups i.e.; low, medium and high income groups. Results presented in the Table 10 indicated that, 73.4% of the respondents were in medium annual income category (Rs. 87062 - 154354) followed by low (< Rs. 87062) and high (>Rs. 154354) income category comprising of 18.3% and 8.3% of the respondents, respectively. Those respondents having high annual income had high scores in existing practices and those with medium annual income had high knowledge as compared to other two categories. Singh (1993) reported that the life of *Gujjars* nomads of Jammu and Kashmir revolved around their buffaloes the main source of income was milk which they sold to private as well as government dairies. Similarly, Arya *et al.* [19] reported that *Gujjars* inhabiting Shiwalik foot hill villages were mainly shepherds and dependent on animal husbandry enterprise as their main source of income and livelihood. Similar results were reported by Samajadar [20]; Ara [2] and Sudan *et al.* [21].

### 3.9 Source of Information

The average score was  $13.58 \pm 0.22$  with a standard deviation of 2.38 (Table 1), indicating that, in general the respondents had medium source of information. Negative significant association of source of information was observed with existing practices and insignificant with knowledge, having correlation coefficient of -0.424 and -0.034; respectively (Table 2). For

**Table 9. Classification of respondents based on ownership pattern**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Ownership pattern	Youngest son inheritance (2)	70 (58.4)	45.58±0.66 (58.44)	47.60±0.53 (60.25)
	Uniform inheritance (4)	50 (41.6)	45.76±0.56 (58.67)	45.53±0.48 (57.63)

Values in parenthesis indicate percentage



**Table 10. Classification of respondents based on total annual income**

Independent variable	Category (Rs.)	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Total annual income	Low (Rs. <87062)	22 (18.3)	44.27±0.72 (56.76)	44.36±0.75 (56.15)
	Medium (Rs. 87062-154354)	88 (73.4)	45.59±0.50 (58.45)	47.0±0.44 (59.49)
	High (Rs. >154354)	10 (8.3)	49.60±1.50 (63.58)	45.50±1.01 (57.59)

Values in parenthesis indicate percentage

appropriate analysis the respondent were classified into three categories viz; low, medium and high. As is evident from the Table 11 that 53.4% of the respondents were having medium source of information followed by high and low with 25.8% and 20.8% of the respondents, respectively. Respondents with low source of information had high scores in existing practices and knowledge as compared to other two categories. The results were in consonance with the findings of Khandi et al. [6] who reported that majority of the respondents (46%) were having low mass media exposure and extension contact (89%). It can be attributed to conservative nature and migratory lifestyle of the respondents. They further reveal that the respondents with high mass media exposure and extension contacts have significantly high knowledge. Similarly, Jeelani [7] reported that the majority of the respondents (64.2%) and (49.2%) were having medium mass media exposure and extension contact. Here it can be hypothesized that

appropriate steps should be taken to enhance the overall mass media exposure and extension contacts that will increase the source of required information to the respondents.

### 3.10 Marketing Pattern

The average score of marketing pattern was 18.87±0.20 with standard deviation of 2.20 (Table1), indicating that they fared well in terms of their marketing pattern. Insignificant association of marketing pattern was observed with existing practices and knowledge, with correlation coefficient being -0.110 and 0.131; respectively (Table 2). For appropriate analysis respondents were divided into three categories i.e., limited, fair and diverse. As is evident from the Table 12 that 70% of the respondents were having fair marketing pattern followed by limited and diverse with 18.3% and 11.7% of the respondents, respectively. Respondents with limited marketing pattern have high scores in

**Table 11. Classification of respondents based on source of information**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Source of information	Low (<11.20)	25 (20.8)	48.92±0.80 (62.72)	47.12±1.01 (59.64)
	Medium (11.20-15.95)	64 (53.4)	45.28±0.61 (58.05)	46.58±0.48 (59.96)
	High (>15.95)	31 (25.8)	43.90±0.59 (56.28)	45.42±0.63 (57.49)

Values in parenthesis indicate percentage

**Table 12. Classification of respondents based on marketing pattern**

Independent variable	Category	Frequency (%)	Existing practices score (%)	Knowledge score (%)
Marketing pattern	Limited (<16.67)	22 (18.3)	47.23±1.25 (60.55)	45.41±0.84 (57.48)
	Fair (16.67-21.06)	84 (70.0)	45.11±0.49 (57.83)	46.39±0.45 (58.72)
	Diverse (>21.06)	14 (11.7)	46.71±0.063 (59.88)	47.93±0.96 (60.67)

Values in parenthesis indicate percentage

existing practices and those with diverse marketing pattern have high knowledge as compared to other two categories. Kakar et al. [11] reported that the pastoralists in the Cholistan desert of Pakistan participate in the fairs to sell their male animals and milk. He further reveals that they stay near the peripheries in the fairs for trade purpose. Usually the pastoral women sell the camel milk and the earnings go to them. Similarly Arya et al. [19] reported that *Gujjars* were dependent on animal husbandry enterprise and 54% of their income comes from the sales of milk and livestock.

#### 4. CONCLUSION

From the findings of study it can be concluded that age, herd size, total annual income and marketing pattern were positively but insignificantly associated with the knowledge. On the other hand land holding, cultural attributes and relationship with other community and ownership were significantly positively associated with the knowledge. Insignificant negative association of work distribution among family members, source of information and indigenous knowledge was observed with knowledge level. Whereas, insignificant positive association of age, herd size, work distribution among family members, ownership pattern, total annual income and cultural attributes and their relationship with other communities was observed with existing practices. Education land holding and marketing pattern shows insignificant negative association of with existing practices. Negative significant association of source of information was observed with existing practices.

#### 5. SUGGESTIONS

- As knowledge level was higher amongst the young age group, therefore emphasis should be given to the middle age group as they are likely to play a dominant role in decision making regarding small ruminant rearing practices by simplifying the information of complex sheep and goat husbandry practices and by conducting training programmes periodically to impart knowledge about improved techniques.
- Respondents with large herd size were having high scores in existing practices and high knowledge and thus effort should be made to make more participate of these respondents in extension activities to seek information about improved sheep and goat husbandry practices.

- Landless respondents had high scores in existing practices and knowledge as respondents having land are engaged in diversified agricultural activities which also influences the knowledge of the respondents regarding improved sheep and goat rearing practices. Therefore exposure visit, demonstration as well as providing on campus training programmes on improved animal husbandry practices to landless farmers to aware and motivate them to adopt improved sheep and goat husbandry practices.
- Individual extension methods should be the focus on any future extension effort and emphasis should be laid on motivation as an inherent component. Information communication awareness on use of various ICT tools such as mobile internet, whatsapp, social media, web portals etc for easy access to good sheep and goat husbandry rearing practices.
- Organizing of more kisan mela, exhibitions.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Census of India. Ministry of Home Affairs, Government of India; 2001.
2. Ara J. A sociological study of Gujjars and Bakarwals of district Anantnag. Ph.D. Thesis, Aligarh Muslim University, Aligarh; 2005.
3. Choudhary M. The gujjars over centuries in K warikoo and sujit som (eds.), Gujjars of Jammu and Kashmir. Himalayan research and cultural foundation, New Delhi. 1999; 84-91.
4. Arora CL, Garg RC. Sheep production and Breeding. International Book distributing company, New Delhi; 1998.
5. Anonymous. Encyclopedia Britannica; 2010.  
Available:<http://www.britannica.com>
6. Khandi SA, Gautam, Mandal MK, Hamdani SA. Knowledge level of gujjars about modern animal husbandry practices. Environment and Ecology. 2010;28(2B): 1257-1260.
7. Jeelani R. Adoption of improved animal husbandry practices by Gujjars in Jammu district of Jammu and Kashmir. M.V.Sc

- thesis. Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu; 2014.
8. Mahipal. A study of socio-economic and psychological correlates in adoption of dairy innovations in the ORP area of NDRI, Karnal. Ph.D. Thesis. NDRI, Karnal, Haryana; 1983.
  9. Soni RL, Rajeev Berathi, Rathore RS. Socio-economic impact of the improved goat farming practices on tribal. Rajasthan Journal of Extension Education. 2011;19: 62-65.
  10. Koli RT, Koli ST. Study of relationship between personal, situational, psychological and socio-economical characteristics with adoption of goat farming technology by the goat keepers. Research Journal of Animal Husbandry and Dairy Science. 2016;7(1):11-15.
  11. Rao S, Kherde VN, Sohal TS. Adoption of dairy innovations – A review. Indian Journal of Dairy Science. 1993;46(9):393-400.
  12. Kherde KL. Dairy farming and training for human resource development. Indian Journal of Extension Education. 1978; 22(381):54.
  13. Chugh DS. Suitability of dairy farming technology and factors affecting knowledge and Adoption. M.Sc. thesis. G. B. Pant University, Pantnagar, Utrakhand; 1986.
  14. Kakoty HN. Differential influence of incentive and disincentives in determining the adoption behaviour of small dairy farmers of Dimoria tribal development block (Assam). Ph.D. thesis, NDRI, Karnal; 1980.
  15. Hutchinson SE, Nuer Dilemmas. Coping with money, ware and the state. Berkeley: University of California Press; 1996.
  16. Kakar AR, Verdier K, Younas M. Rapid changes of strategy is necessary for development of dromedary camel pastoralism in the Cholistan desert of Pakistan pastoralism: Research. Policy and Practice; 2011.
  17. Shahri GM. Transhumance of Jammu and Kashmir. Shiraza Quarterly. 1987;62-69.
  18. Hogg R. Should pastoralism continue as a way of life disasters. 1992;16(2):131- 137.
  19. Arya SL, Agnihotri Y, Sharma JS. Impact of cattle migration on economy Shivalik foot village in relation to water-shed management. Indian Journal of Agricultural Economics. 1992;47(3):432.
  20. Samajadar T. Forest based dairy husbandry practices of van Gujjars: A case study in Nanital district. M.V.Sc. thesis. IVRI, Izatnagar, UP; 2000.
  21. Sudan NA, Mandal MK, Gautam. Livestock rearing practices of pastoralists of Jammu and Kashmir. Journal of Environment and Ecology. 2007;25(4):1227-1231.

© 2018 Choudhary et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:  
<http://www.sciencedomain.org/review-history/25727>*