

Assessment of Factors Associated with Household Expenditure in Gajuri Rural Municipality, Dhading, Nepal

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Abstract

Background: Household expenditure is the total amount of money spent by a household for food, cloth, shelter, education, health, transportation, sanitation, entertainment, and so on. The objective of this study is to identify the significant factors affecting household expenditure in the rural area from the collected 897 primary data from the Gajuri Municipality in December, 2022.

Methods: Stratified random sampling method was used for the data collection and the secondary data was used from the *Sahabhagitamulak Gajuri Bikas Guru Yojana, 2074*. Ordinary least square regression method was used to analyze the data.

Results: The result of this study shows that the size of the household ($\beta = 0.023$, $p < 0.001$), gender of the household head ($\beta = 0.059$, $p=0.003$), income of the household ($\beta = 0.093$, $p < 0.001$), access to internet in the house ($\beta = -0.191$, $p < 0.001$), and the access to the television in the house ($\beta = -0.090$, $p < 0.001$) were found important in determining household expenditure in this municipality.

Conclusion: From this study, it can be found that the size of the household, gender of the household head, income of the household, access to the internet in the house and access to the television in the house are strongly associated with household expenditure instead of literacy status of household head, remittance receiving status of household, and age of the household head due to the contemporary development and advancement in the society. This study could help policy makers assess factors determining household expenditure and develop plans for Gajuri Rural Municipality.

Novelty: In underdeveloped countries, it is difficult to determine exactly what housing costs are especially in rural areas. This is because uneducated landowners do not account for the consumption of agricultural produce and the expenditure incurred in it.

Keywords: Access, expenditure, household, income, municipality, rural

Introduction

Expenditure is the amount of money that an individual spends on goods and services including clothing, shelter, food, schooling, sanitation and medical services, and recreation that are required for living. Household consumption expenditure is the total expenditure spent in a household ([Hone & Marisennayya, 2019](#)). It plays a pivotal role in socio-economic development. There are discrepancies in expenditures between towns and rural areas ([Acharya, 2021](#)). Expenditures are higher in urban areas than in rural areas ([Ahmad et al., 2021](#)). In rural areas, only two factors—the size of the household and the employment status of the family head—significantly influence household expenditure, whereas the level of education considerably raises urban consumption expenditures in urban areas ([Zin & Nabilah, 2015](#)).

There is also a disbalance between household expenditure and household income. This has had adverse impact on the fulfillment of their needs. This also plays a crucial role in having discrepancies on the determination of expenditure in the rural and urban areas. Urban households are encouraged to increase their expenditure to enhance their lifestyle which should be well reciprocated by the subsequent income ([Mustafa et.al, 2011](#)). On the other hand, the exact finding of the expenditure is precarious in rural municipalities because the goods produced by the people here don't have the pertinent valuation. In this case, only expenditures bought from the market that were unavailable in their possession or farm are regarded as the expenditure ([Acharya, 2021](#)). As a result, it is impossible to exactly measure the expenditure in the rural area as the people having their sustenance through their own landholdings and produce cannot exactly determine their total expenditure which has been prevalent in the rural areas ([Acharya, 2021](#)).

Gajuri is a rural municipality that is situated in Dhading district of Bagmati state of Nepal. This municipality was formed by merging 3 Village Development Councils (*Gajuri, Pida, and Kiraanchowk*) and is divided into 8 wards. There is a Galchhi in the east and Benighat Rorang Rural municipality in the west. Similarly, Sidhalek Rural Municipality is situated in the north and Makwanpur District is in the south. The total area of the municipality is 138.66 square km with total population 31304 living in 6241 households. This results in the population density as 225.76 per sq km. Despite having a small area, the diversity in the population composition in terms of caste ethnic groups of this municipality is evenly distributed. Altogether, there are 12 caste ethnic groups that are identified as: *Bahun, Chhetri, Chepang, Newar, Gurung, Magar, Tamang, Danuwar, Bhujel, Damai, Kaami, and Sharki*. Similarly, there are 16059 males and 15245 females in this municipality. In total, 18648 people (i.e., 72.8% of the population) in this municipality are literate and the rest (6969, i.e., 27.2%) are illiterate (*Sahabhagitamulak Gajuri Bikas Guru Yojana, 2074*).

The altitude of Gajuri Municipality varies from 300 to 1600 meters and is well-positioned for significant tourism potential. Moreover, the Prithivi Highway, one of the predominant highways of Nepal which passes through this municipality also provides endless opportunities for the holistic development of the region.

There have been a few studies on determining factors influencing households' expenditure in many areas of Nepal (e.g., Acharya, 2021, Thapa & Acharya, 2017). However, factors affecting household expenditure in rural municipalities are unknown as no study has been conducted using the data collected only from rural areas. Therefore, the main objective of this study is to identify significant factors affecting the household expenditure in rural area using the data collected from Gajuri Municipality. The economic and socio-demographic indicators among per capita consumption quintile groups will be compared and significant factors affecting household expenditure will be identified using multivariate data analysis.

Data and Methodology

There are 6241 households in this rural municipalities across the wards, which was assumed as strata for the information collection under the stratified random sampling, and the sample size of 1025 was obtained. The determination of the sample size was based on the formula used by Hone and Marisennayya, (2019), where I considered the weightage of the household's number in each ward as the basis of determining sample size for each ward. The structured questionnaires of 1025, as per our sample size obtained, were distributed to the households. From those determined 1025 questionnaires, only 897 questionnaires could be collected due to unforeseen circumstances like the house locked up and absence of mature respondent in the household. Therefore, the remaining 228 questionnaires could not be collected. Population size, sample size and number of non-responses of each ward has been presented in Table 1. The framing of the items in the questionnaires were done on the basis of the review of the past literatures and by incorporating the opinions from the experts of household survey domain. The information was collected on December, 2022. For the analysis of the data collected, bivariate correlation and independent sample t-test was used in order to determine the association of independent variables with the dependent variables. From the use of these tools, the possible independent variables of the Ordinary Least Square (OLS) Model can be found out. OLS method has been used to estimate the parameter of this model. SPSS version 20 has been used for the fitting and analyzing of the model. The result of the estimated parameter from this model has been considered to be significance under the 5% significance level. R^2 has been used for determining the model's adequacy. For the finalizing of the estimation of the independent variable in the OLS model, step wise selection procedure has been used. The diagnostics of the model has been assessed using the standardized residual plot. For the residual normality test, Kolmogorov-Smirnov (K-S) test has been applied.

Table 1: Population and Sample Distribution of Each Wards

Stratum	Population distribution of households	% distribution of households in population	Sample distribution of households	% distribution of household in sample data	Number of non-responses
1	1120	17.9	104	11.6	71
2	836	13.4	116	12.9	34
3	459	7.4	75	8.4	25
4	561	9.0	78	8.7	22
5	899	14.4	150	16.7	25
6	970	15.5	128	14.3	22
7	554	8.9	87	9.7	13
8	842	13.5	159	17.7	16
Total	6241	100.00	897	100.00	228

To compare economic indicators among the per capita consumption quintile groups, five equal groups of individuals were ordered from the poorest to the richest depending on their level of per capita consumption.

Model Specification

Descriptive statistical measures, such as mean, median, standard deviation (σ) and range were used to analyze continuous variables. On the other hand, ratio and proportions were utilized to evaluate categorical variables. The relationship between intervalley scaled variables were assessed using Pearson's correlation coefficient. The normality of continuous variables was examined and continuous variables between two groups were compared using independent t-test.

In this study, 9 variables, such as age of household head, gender of household head, literacy status of household head, remittance recipient household, household size, annual household income, access to internet in a house, access to television in a house and number of cellphones in a house are independent variables. The annual per capita expenditure of a household is the dependent variable in this study which is continuous. Since the dependent variable is continuous and the independent variables are discrete, continuous, and categorical, an ordinary least square (OLS) regression was used to model the relationship between dependent and independent variables. Previous researchers (Acharya, 2021; Ahmad et al., 2021; Maniriho et al., 2021; Enbeyle et al., 2020; Sekhampu & Niyimbanira, 2013) have also used this method for this type of study. OLS regression model was also used to identify socio-economic and demographic factors affecting the household consumption expenditure. The regression model is written as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p + \varepsilon$$

where, $\beta_0, \beta_1, \beta_2, \dots, \beta_p$ are regression coefficients, $X_1, X_2, X_3, \dots, X_p$ are independent variables and ε is the error term.

Results

Table 2 illustrates the summary statistics of quantitative variables used in this study. The average household size (mean \pm s. d.) of the data was 5.28 ± 2.14 with an average age of household as 46.08 ± 13.79 . The number of cellphones in a household was 3.04 ± 1.61 . The natural log of total household annual income was NPR 5.25 ± 0.37 , while the natural log of total household annual expenditure was NPR 5.20 ± 0.22 .

Table 2: Summary Statistics of Quantitative Variables.

Variables	Mean \pm S. D.	Minimum	Maximum
Age of household head	46.08 ± 13.79	19.0	90.0
Household size	5.28 ± 2.14	1.0	16.0
Number of cellphones in a house	3.04 ± 1.61	0.0	10.0
Log of total household annual income	5.25 ± 0.37	3.78	7.08
Log of total household annual expenditure	5.20 ± 0.22	4.68	5.78

Total sample size (n) = 897, Source: sample survey 2022

Table 3 summarizes the demographic distribution of households of Gajuri Rural Municipality. The share of male population (86.9%), literate household head (70.0%), households not receiving remittances (84.6%), households with no access to Television (56.0%) and households with no access to internet (93.4%) were found to be higher in terms of frequency in comparison to their counterparts.

Table 3: Summary Statistics of Categorical Variables.

Variable	Frequency	Percentage (%)
Gender of household head:		
Male	780	86.9
Female	118	13.1
Literacy status of household head:		
Literate	629	70.0
Illiterate	269	30.0
Remittance recipient status		
Yes	138	15.4
No	760	84.6
Access to Television in house:		
Yes	395	44.0
No	503	56.0
Access to Internet in House		
Yes	59	6.6
No	839	93.4

Total sample size (n) = 897, Source: sample survey 2022

Out of nine important household independent variables shown in Table 2 and Table 3, four are quantitative. These are age of household head, household size, number of cellphones in a house

and log of total household annual income. The remaining (gender of the household head, literacy status of the household head, remittance recipient status, access to television in a house and access to internet in a house) are binary.

The Pearson's correlation coefficients between each quantitative independent variable and the response variable (annual household expenditure on a log scale) are listed in Table 4. Similarly, the independent t-test used to evaluate the relationship between each dichotomous variable and the response variable is illustrated in Table 4. As far as the multiple regression analysis is concerned, only factors that were significant ($\alpha = 0.05$) in explaining the variation in response variable were included. These results indicated that annual household income in log scale, number of cellphones in a house, household size and age of the household head were important variables that were correlated to household expenditure on an annual basis on a log scale.

Table 4: Correlation Matrix of Dependent and Independent Variables

	Annual household expenditure in log scale	Annual household income in log scale	Number of cellphones in a house	Household size	Age of household head
Annual household expenditure in log scale	1	0.271 (p < 0.001)	0.258 (p < 0.001)	0.210 (p < 0.001)	0.085 (p = 0.011)
Annual household income in log scale	0.271 (p < 0.001)	1	0.226 (p < 0.001)	0.123 (p < 0.001)	-0.010 (p = 0.760)
Number of cellphones in a house	0.258 (p < 0.001)	0.226 (p < 0.001)	1	0.560 (p < 0.001)	0.237 (p < 0.001)
Household size	0.210 (p < 0.001)	0.123 (p < 0.001)	0.560 (p < 0.001)	1	0.211 (p < 0.001)
Age of household head	0.085 (p = 0.011)	-0.010 (p = 0.760)	0.237 (p < 0.001)	0.211 (p < 0.001)	1

Table 5 shows the average household expenditure where male was the household head was 5.19 ± 0.221 while the same for its counterpart was 5.25 ± 0.22 . Similarly, the average household expenditure for those households which was headed by a literate member was 5.20 ± 0.22 , while the same headed by an illiterate member was 5.19 ± 0.22 . Likewise, the average

household expenditure in remittance recipient households and non-remittance recipient households were 5.24 ± 0.21 and 5.19 ± 0.22 , respectively.

The average household expenditure in households with access to television and internet were 5.27 ± 0.22 and 5.44 ± 0.19 , respectively. Similarly, the expenditure for households with no access to television and internet were 5.15 ± 0.21 and 5.18 ± 0.44 , respectively. It was also revealed that the gender of the household head, remittance receiving status, access to television in house and access to internet in house were all significantly correlated (in log scale) with household expenditure (Table 5).

Table 5: Association of Dummy Independent Variables with Annual Household Expenditure in Log Scale

Independent variable	Annual household expenditure in log scale Mean \pm S. D.	t - value	p - value
Gender of household head: Male (0) Female (1)	5.19 ± 0.221 5.25 ± 0.22	-2.689	0.007
Literacy status of household head: Literate (0) Illiterate (1)	5.20 ± 0.22 5.19 ± 0.22	0.409	0.683
Remittance recipient status: Yes (0) No (1)	5.24 ± 0.21 5.19 ± 0.22	2.049	0.041
Accesses to television in house: Yes (0) No (1)	5.27 ± 0.22 5.15 ± 0.21	8.889	0.000
Accesses to internet in house: Yes (0) No (1)	5.44 ± 0.19 5.18 ± 0.44	8.776	0.000

From bivariate analysis, eight variables emerged as potential variables for multiple regression analysis (Tables 4 and 5).

We demonstrate how the values of indicators linked to income and expenditure vary throughout the CQGs. Table 6 shows the available information on each quintile group's two economic variables, per capita income and per capita expenditure.

Table 6: Mean Per Capita Quintile Groups

Quintile Groups	Mean real per capita expenditure	Mean real per capita income
First	13664.40	30423.59
Second	22060.66	44310.57
Third	29042.78	64619.91

Fourth	38801.65	45645.83
Fifth	71177.89	95909.05
Total	38494.09	59998.30

One of the poorest group’s main disadvantages was undoubtedly their low income and, as a result, their low level of expenditure in comparison to the richest group (Table 6).

Stepwise regression was used to select potential explanatory variables from the eight explanatory variables that emerged significant from bivariate analysis. Five variables: the gender of the household head, the household size, total household income in log scale, access to the internet in a house and access to television in a house were finalized by stepwise regression. The dependent variable was then expressed in terms of these variables and parameters were estimated by multiple linear regression (Table 7).

Table 7: Regression Estimates of OLS

Variable	β	S. E.	T	p-value	VIF
Gender of household head	0.059	0.020	3.021	0.003	1.001
Household size	0.023	0.003	7.149	< 0.001	1.027
Total household income in log scale	0.093	0.018	5.043	< 0.001	1.101
Access to internet in a house	-0.191	0.028	-6.931	< 0.001	1.087
Access to television in a house	-0.090	0.014	-6.446	< 0.001	1.123
Constant	4.818	0.103	46.725	< 0.001	
$R^2 = 0.215$, F-value = 48.71 ($p < 0.001$), sample size (n) = 898, Cook’s Distance (Maximum) = 0.025 < 1					

Annual household expenditure was significantly ($\alpha = 0.05$) impacted by the gender of the household head, the household size, total household income in log scale, access to the internet in a house and access to television in a house. The effect was positive for the first 3 variables and negative for the rest. Independent variables accounted for 21.5% of the variation in the outcome variable (log of annual household expenditure). The F-value of regression was 48.71 ($p < 0.001$).

The gender of the household head had a significant effect on average annual household expenditure ($\beta = 0.059$, $p = 0.003$). With all the other things remaining constant, the average annual expenditure of a household would increase by 5.9% if the household is headed by a female member. Similarly, the average annual household expenditure would increase by 2.3% if the household size increased by 1 unit ($\beta = 0.023$, $p < 0.001$). Likewise, the total household expenditure in log scale would increase by 9.3% with a unit increase in the total household income in log scale ($\beta = 0.093$, $p < 0.001$). On the other hand, the annual household expenditure for households not having access to internet in-house would be 19.1 % less than that of households having access to internet in house, assuming all other factors remain constant ($\beta =$

-0.191, $p < 0.001$). In the same way, the annual household expenditure for households without television access would be 9.0% less than that of households with television access ($\beta = -0.090$, $p < 0.001$).

Normal probability plot has been used to try the regression diagnostics. Since most of the dots are located across the straight line, the normal probability plot of residuals (Figure 1) shows that the residuals produced by the regression model do not violate the normality condition.

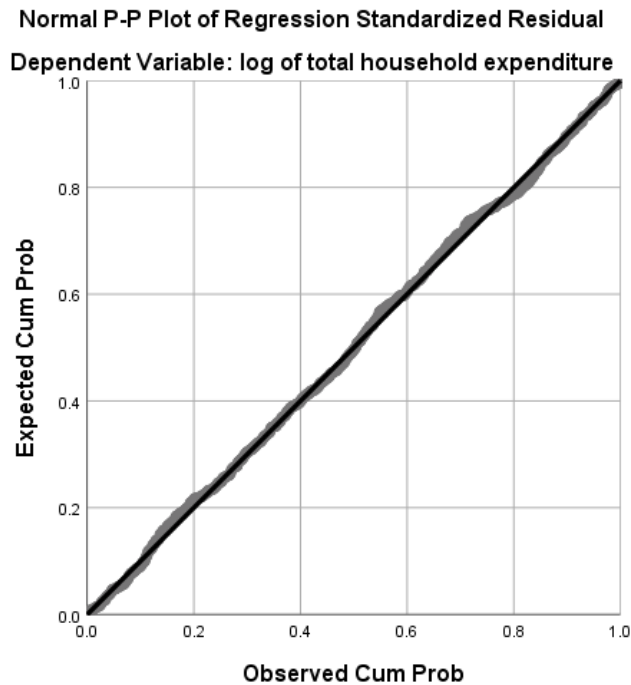


Figure 1: Normal P-P Plot of Regression Standardized Residual

Likewise, Kolmogorov-Smirnov test was used to verify that the residuals, as displayed in Table 8, were normal. The p-value was more than 0.05 and the Kolmogorov-Smirnov test result was 0.20. The residuals are not in violation of the normality assumption, as indicated by the test's statistical insignificance.

Table 8: One-Sample Kolmogorov-Smirnov Test

Standardized Residual		
N (Sample size)		897
Normal Parameters	Mean	0
	Std. Deviation	0.997
Most Extreme Differences	Absolute	0.025
	Positive	0.017
	Negative	-0.025
Test Statistic		0.025
Asymp. Sig. (2-tailed)		0.2

Discussion

The multicollinearity among independent variables was negligible as the variance inflation factor (VIF) ranged between 1.001 and 1.123. Variables with VIF less than 10 are considered to be not seriously correlated. The model fit was reasonably good as the coefficient of variation (R^2) was 0.215 and the overall F-value was 48.71. There were also no outliers that could impact the regression line as the maximum Cook's distance was 0.025. The data with this distance less than 1 is considered without a serious outlier. The results of the Kolmogorov-Smirnov (K-S) test was statistically insignificant, suggesting that the residual was distributed normally.

The result that the male headed household had higher expenditures compared to female headed household is consistent with the findings by Acharya, (2021). The expenditure of the household which had access to internet is high compared to the ones that did not have access to the internet. This implies that the internet use is a major factor increasing household expenditure. This corroborates with the results found by Wang and Liu (2023); Chunfang et al., (2023); Gurning and Khaliqi (2021).

Similarly, the household that did not have a television had relatively less expenditure. This implies that the access to television in a house makes people more likely to borrow money for home items and being in debt. Television does not correlate with overall non-mortgage debt, but it does correlate with greater levels of debt for durable items (Baker & George, 2010).

In the case of the size of household, the ones with bigger size had higher household expenditure compared to the ones with smaller size. Lee Siew Heng & Tan Khee Guan, (2007), Khan and Ahmad, (2014), Mignouna et al., (2015), Ahmad et al., (2021), Hone and Marisennayya (2019), Zin et al., (2015) also reported similar results. As Khan and Ahmad, (2014) and Begum et al. (2010) reported the income was positively related to expenditure. This is because households with good income may buy products like wholesome food, spend on transportation, medical care, and other necessities. Due to its dependency on household expenses, income is a major determinant of changes in family spending. Household expenses will climb as income rises steadily. This corroborated with the result of Bakri et al., (2017). The findings of this study cannot be generalized other than study area as the data used in this study were collected only from one rural municipality of Dhading district, Nepal.

Conclusion

This study demonstrated that the size of the family, yearly income, gender of the household head, availability of television and internet in a house had a substantial impact on annual household expenditure of Gajuri Rural Municipality situated in Dhading district. In the previous studies, the literacy status, remittance receiving household, and the age of the household were considered as the significant variables but in this study, it has been found that in the new context of development and advancements in the rural areas, the dimensions of the household expenditure has been shifted to the dependence on the new variables, such as: access to the internet in the house and access to the television in the house. The results of this study have not been compared with the data of NLSS IV, so it presents a new scope for the future

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researchers to delve into the domain of comparing and contrasting of ones result with the data of the NLSS IV in order to validate results. The standard of living of the household living in this rural municipality is found to be mediocre with no substantial progress, hence posing opportunities for improvements. Thus, the government should take initiatives to develop rural municipalities in order to improve the standard of living.

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