Exploring Factors Associated with Community Perceptions towards Social Health Insurance

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https://doi.org/10.3126/pravaha.v31i1.89147

Abstract

Background: In developing countries like Nepal, payment from pocket for health facilities is a prime challenge. This leads to financial hardship and sometimes makes delay in treatment, particularly for poor people. To overcome these problems, the Government of Nepal introduced the Social Health Insurance program. The objective of this program is to provide financial protection and ensure equal access to quality health treatment.

Objectives: The study aimed to explore the factors associated with community perception towards social health insurance in Sundarharaicha Municipality, Morang, Nepal.

Material and Methods: The study used a cross-sectional study design. Using a structured questionnaire, primary data was gathered from 392 households of three wards randomly selected from Sundarharaicha Municipality, Morang. Descriptive analysis, chi-square tests, log normal regression were used to explore relationships among perception status, and socio-demographic variables. Cronbach's alpha was used to measure Internal consistency of the perception.

Results: The overall mean perception score towards SHI was 2.30 which was below the neutral midpoint of 3 on a five point Likert scale, indicating an unfavorable perception. Most respondents were disagreed that SHI was a worthwhile investment while only two respondents were strongly agreed. Cronbach's alpha (0.92) confirmed the internal consistency of the perception scale. Mann-Whiteny test showed significant differences in perception scores across awareness status, gender, marital status, family type, ethnicity, religion, education status, and history of chronic disease of the household head ($p < 0.10$). Perception status was found significantly associated with ward of residence, gender, marital status, family type, source of information, and awareness status from bivariate analysis. A log normal regression revealed that ward of residence, awareness status, and source of knowing SHI were significant determinants of perception. Respondents residing in Ward no. 4 and Ward no. 8 had higher perception compared to those from the Ward no. 9. In contrast, respondents with high awareness status and those informed from health personnel, media, and relatives/friends had lower perception compared to those who had not heard about the program.

Conclusion: This study assesses the perception of respondents towards SHI. The perception score was found to differ significantly across the categories of awareness, gender, marital status, family type, ethnicity, religion, education, and history of chronic disease of the household head. A log normal regression analysis identified ward of residence, awareness status, and source of information as the significant determinants of perception.

Keywords: *Mann-Whiteny test, Cook's distance, Shapiro-Wilk test, Breusch-Pagan test, log normal regression.*

Cite this paper
Yadav, A. K., & Paudel, K. (2025). Exploring Factors Associated with Community Perceptions towards Social Health Insurance. *Pravaha, 31*(1), 23-32.

Introduction

In developing countries where income is low or moderate, payment at the hospital or health care center is key problem. In such countries, people pay for health care directly from their pockets which cause not only financial hardship (Memirie et. al, 2017) but also delay in treatment. The delay in treatment worsens the patients' health problem (Russell, 2004; Gilson, 1998), particularly for marginalized groups (WHO, 2022; Nepal Government Health Insurance Board, 2022). To overcome these problems, Social Health Insurance (SHI) program was formally established by Nepal Government in 2015. The SHI program delivers protection against financial hardship and provides quality health services (Ghimire & Wagle, 2021).

The main principle of SHI is to share risk and provides equity. It provides an equal and fair access to defined healthcare for everyone regardless of their socioeconomic status. Every member has to contribute as premiums. The Nepal government offers subsidies to individuals who cannot afford the insurance premiums required for participation in the program.

SHI encounters challenges in enrollment in the program. Bharati et. al (2025) and Thapa et al. (2021) focused that awareness of households affects enrollment in SHI. Perception affects enrolment and retention decisions significantly (Appiah et al.,2012; Sharma & Banjara, 2020). Perception is defined as the combination of satisfaction, trust, and attitudes towards the program. Factors such as gender, age, education, ethnicity, chronic disease, family type etc. affect awareness and perception (Acharya et al., 2021; Dhungana et al., 2021).

To the best of our knowledge, only a limited number of studies have been conducted on community perception towards SHI, particularly in the eastern part of Nepal. Investigating the association between socio-demographic factors and community perception can provide valuable insights for policy makers to develop strategies about SHI. This study, therefore, seeks to assess the households' perception towards SHI and to identify major factors associated with perception.

Methodology

Data

The study was done in Sundarharaicha Municipality of Morang district, Nepal. A cross-sectional design was used in the study. To achieve the objective of the study, primary data were collected through personal interview method using a well-structured questionnaire. At 5% level of significance, the sample size was determined by the formula, Using the following formula

$$n = \frac{(Z_{\alpha/2})^2 \times p \times (1\text{-}p)}{E^2}(1+NR) = \frac{(1.96)^2 \times 0.5 \times (1\text{-}0.5)}{0.05^2}(1+0.05) = 403.37 \approx 403$$

Where, n = the sample size, Zα/2 = the Z-score, E = margin of error, and NR = non-response rate = 5%.

To obtain a representative sample, a two-stage sampling method was adopted. Three wards (4, 8 and 9) out of twelve wards were chosen randomly through simple random sampling in the first stage. In Sundarharaicha Municipality, there were 1449, 1209, 1782 households (4440 households in total) in ward no. 4, 8 and 9 respectively. From this households, 403 households were selected using proportional allocation from each ward: 131 from ward 4, 110 households from ward 8, and 162 households from ward 9 in the second stage. The households were selected through systematic sampling (Transect Walk). Approximately 2.7% non-response rate was found which resulted 392 households as an actual sample size.

The variables perception towards SHI were measured using multiple 5-point Likert items. Cronbach's alpha was used to assess the internal consistency. The median was used as the cutoff point to dichotomize the variables age, family size, and monthly family income into two groups.

Statistical Analysis

The perception of households towards SHI is the dependent variable. Ward of residence, gender, age, religion, marital status, ethnicity, occupation of household head, family type, household head's education status, family size, family monthly income, history of chronic disease in household head, history of chronic disease in family

member, source of knowing about SHI, and awareness are the independent variables included in the study. A condition lasting for one or more years was considered a chronic disease. The household's head was labeled as "High" if they correctly answered at least five out of ten SHI awareness questions; otherwise, they were classified as "Low" aware. The mean perception score was used as the cutoff point to divide perception into two categories: "High" and "Low".

The distribution of perception scores was initially found to be positively skewed (skewness = 0.95). A log transformation on the perception score reduced the skewness to 0.18. Therefore, the log of the perception scores followed approximately normal distribution. This justified the use of a lognormal regression model to identify the significant factors associated with respondents' perceptions of SHI. The lognormal regression equation is

$$\ln(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k + \varepsilon$$

where,

Y = Perception towards SHI

β_i = unknown parameters

X_i = Predictors

ϵ = Random error

Model's performance diagnosis

Overall significance of the model was evaluated by using F-test. Variance Inflation factors (VIF) was applied to check multicollinearity. R^2 and adjusted R^2 were used to quantify the explanatory power of the model. Shapiro-Wilk test was used for normality and the Breusch-Pagan test for homoscedasticity of the residuals. Influence diagnostic was carried out by Cook's distance, and a sensitivity analysis was performed after removing the influential cases.

Results

The surveyed households showed variation across demographic and socio-economic characteristics. Out of 392 respondents, the largest number was from Ward No. 9 (40.82%), followed by Ward No. 4 with 32.14% respondents and Ward No. 8 with 27.04% respondents. Among the respondents, two-thirds were male (66.07%), and one-third were female (33.93%).

Respondents aged above 45 years were 51.79%, which was slightly higher than 48.21% who were 45 years or younger. In terms of occupation, only 17.35% were engaged in government/foreign employment, whereas the majority (82.65%) reported other occupations. The majority were married (94.39%), Hindu (86.48%), and Brahmin/Chhetri (61.99%). Most respondents were literate (90.82%). Around two-thirds of respondents (64.80%) reported that their monthly family income was up to Rs. 20,000 (sample median). 61.7% respondents had joint families. Three out of four (74.5%) households reported they had a small family size. One in five (19.6%) households reported a chronic disease in the household head, while 21.7% had a family history of chronic illness. Health personnel (59.4%) were the main source of SHI information, followed by media (20.2%) and friends or relatives (10.71%). About 10% respondents had never heard about SHI. A majority (71.7%) of respondents had high awareness; in contrast, 65% respondents showed low perception.

Table 1 shows the frequency of respondents' perceptions on ten statements related to SHI. Perception was measured on a five-point Likert scale - *"Strongly Disagree"*, *"Disagree"*, *"Neutral"*, *"Agree"*, and *"Strongly Agree"*. The majority of the respondents, among 392, selected Strongly Disagree (n = 155) and Disagree (n = 151), while only two respondents selected Strongly Agree for the statement *"A health insurance policy is a worth investment,"*. The mean score of 1.91 indicates the respondents' dissatisfaction with the perceived value of SHI. A similar pattern was observed in the response to the statement *"Health insurance could prevent financial hardship if you get sick"* and *"Health insurance can improve the healthcare delivery system in your family"*. Except for the statement *"There is an easy process for acquiring a health insurance policy,"* which received the highest response (n = 142) in *"Agree"*, most perception statements received their highest frequency of response in *"Disagree"* and *"Neutral"* categories.

Table 1: Distribution of respondents' perception across ten statements related to SHI

Perception Items	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean
Per_1: A health insurance policy is a worth investment.	155	151	56	28	2	1.91
Per_2: Health insurance could prevent financial hardship if you get sick.	134	165	66	26	1	1.97
Per_3: Health insurance can improve the healthcare delivery system in your family.	101	170	89	31	1	2.14
Per_4: Health insurance provides a sense of security regarding medical care for you and your family.	80	177	89	45	1	2.26
Per_5: It will be good to take a health insurance at a younger age.	80	173	97	40	2	2.26
Per_6: Taking health insurance is good for your family.	86	174	96	35	1	2.21
Per_7: Health insurance is essential for every family.	87	168	97	39	1	2.23
Per_8: A health insurance policy is a right instrument to mitigate health-related risk.	79	171	95	45	2	2.29
Per_9: There is an easy process for acquiring a health insurance policy.	52	95	98	142	4	2.87
Per_10: I am satisfied with the health insurance policy.	16	107	200	67	2	2.83
Overall Mean						2.30

The overall mean perception score of 2.30, which is below the neutral midpoint of 3.0 on a 5-point Likert scale, indicates that the majority of the respondents hold unfavorable perceptions towards SHI. In Figure 1, a grouped bar chart demonstrates the distribution of responses of respondents to each perception item.

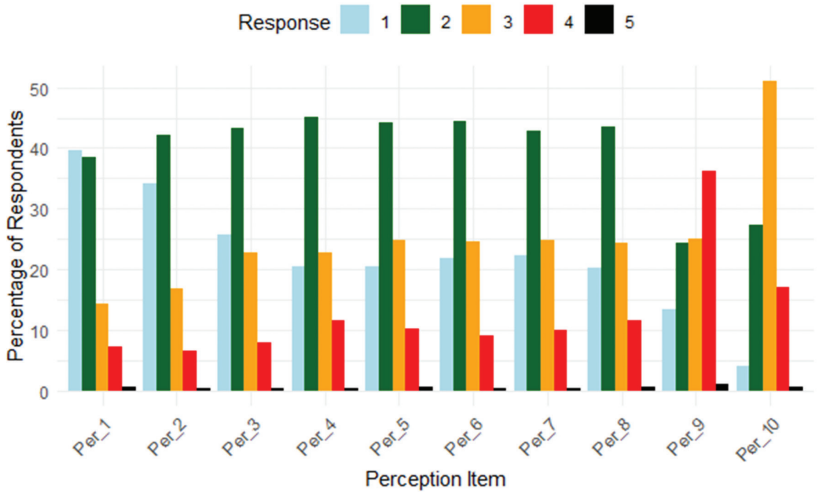

Fig 1: Percentage of responses across perception items.

Table 2: Internal consistency of the perception scale

Perception Items	1	2	3	4	5	6	7	8	9	10
Corrected item - Total correlation (r. drop)	0.78	0.80	0.75	0.77	0.75	0.76	0.77	0.72	0.49	0.49
Alpha if Item Dropped (std. alpha)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.93
Average Inter-Item Correlation	0.53	0.53	0.54	0.53	0.54	0.54	0.53	0.54	0.58	0.58
Signal-to-Noise Ratio (S/N)	10	10	10	10	10	10	10	11	13	13
Item Mean	1.9	2.0	2.1	2.3	2.3	2.2	2.2	2.3	2.9	2.8
Item SD	0.93	0.89	0.90	0.92	0.92	0.90	0.92	0.93	1.08	0.77
Overall Cronbach's alpha = 0.92 [95% CI: 0.91-0.93]										

In Table 2, Cronbach's alpha coefficient was calculated to evaluate the internal consistency of the perception scale. The Cronbach's alpha was 0.92 [95% CI: 0.91-0.93], which exceeds the widely accepted threshold of 0.70 for acceptable reliability (Nunnally & Bernstein, 1994). Therefore, the items in the scale are highly consistent in measuring the perception construct towards SHI.

Corrected item–total correlation values ranged from 0.49 to 0.80. The first eight items exceeded the commonly recommended threshold of 0.50 (Field, 2018). This result indicates that most items were strongly correlated with the overall scale. With correlations of 0.49, items 9 and 10 showed a lower association with the total score.

The value of "alpha if item deleted" remained stable at 0.91 when any one of the first eight items was removed. This indicates that these eight items had an equal contribution to the internal consistency. In contrast, the reliability coefficient slightly increased from 0.92 to 0.93 if items 9 or 10 were removed from the scale. However, this increment in alpha was negligible; the dropping of items 9 and 10 was not statistically meaningful because Cronbach's alpha value above 0.90 was already considered excellent.

The average inter-item correlation values ranged from 0.53 to 0.58, close to the recommended range of 0.15 to 0.50 (Clark & Watson, 1995) for the first eight items, with slightly higher values observed for items 9 and 10.

The consistently high signal-to-noise ratios (10 to 13) across all items suggest that most of the variance in the item responses displays true score variance rather than error, providing robustness of the scale.

The item means ranged from 1.9 to 2.9, with standard deviations between 0.77 and 1.08, indicating adequate participant response variability.

Overall, the perception scale displays excellent internal consistency.

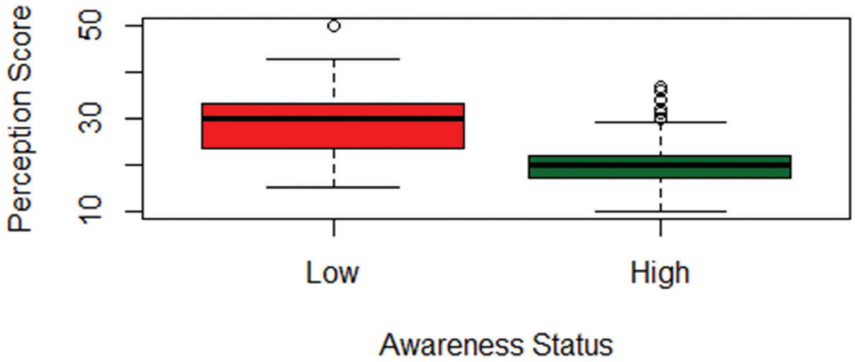

Fig. 2: Whisker-Box plot of perception scores against awareness status.

The difference between scores of perceptions against independent variables was tested using the Mann-Whitney test. This test shows that the perception score was significantly different with the awareness status ($p = 0.000$), with the low awareness status demonstrating a higher perception score shown in the Whisker-Box plot, figure 2.

The perception score was found to differ significantly across the categories of gender, marital status, family type, ethnicity, religion, education, and history of chronic disease of the household head at the 5% level of significance. Respondents who were illiterate, female, married, from nuclear families, belonging to ethnic groups other than Brahmin/Chhetri, and practicing religions other than Hinduism exhibited a higher median perception score. In

contrast, age, occupation, family history of chronic disease, and monthly family income did not have significantly different score perception scores.

Table 3: Bivariate analysis of socio-economic and demographic variables with perception

Variables	Perception			Chi-Square	P- value
	High (137)	Low (255)	Total		
Ward No.				53.987	<0.000
8	59 (56%)	47 (44%)	106		
4	55 (44%)	71 (56%)	126		
9	23 (14%)	137 (86%)	160		
Gender				4.071	0.044
Female	56 (42%)	77 (58%)	133		
Male	81 (31%)	178 (69%)	259		
Age Group				1.930	0.165
Up to 45 years	59 (31%)	130 (69%)	189		
Above 45 years	78 (38%)	125 (62%)	203		
Marital Status				5.703	0.017
Unmarried	2 (9%)	20 (91%)	22		
Married	135 (36%)	235 (64%)	370		
Family Type				37.444	<0.000
Nuclear	81 (54%)	69 (46%)	150		
Joint	56 (23%)	186 (77%)	242		
Occupation				0.236	0.628
Others	111(34%)	213 (66%)	324		
Government/ Foreign employment	26 (38%)	42 (62%)	68		
Ethnicity				3.381	0.066
Others	61 (41%)	88 (59%)	149		
Brahmin/Chhetri	76 (31%)	167 (69%)	243		
Religion				3.428	0.064
Others	25 (47%)	28 (53%)	53		
Hinduism	112 (33%)	227 (67%)	339		
Education status				3.255	0.071
Illiterate	18 (50%)	18 (50%)	36		
Literate	119 (33%)	237 (67%)	356		
History of chronic disease in the household				0.076	0.783
No	113 (35%)	206 (65%)	319		
Yes	24 (33%)	49 (67%)	73		
Family history of chronic disease in the household				1.169	0.280
No	112 (36%)	195 (64%)	307		
Yes	25 (29%)	60 (71%)	85		
Family Monthly Income				0.004	0.952
Low	88 (35%)	166 (65%)	254		
High	49 (36%)	89 (64%)	138		
Family Size				0	1
Small	102 (35%)	190 (65%)	292		
Large	35 (35%)	65 (65%)	100		
Source of knowing about SHI				79.213	<0.000
Not heard	36 (95%)	2 (5%)	38		
Health Personnel	53 (23%)	180 (77%)	233		
Media	27 (34%)	52 (66%)	79		

Variables	Perception			Chi-Square	P- value
	High (137)	Low (255)	Total		
Relatives/Friends	21 (50%)	21 (50%)	42		
Awareness status				105.6	<0.000
Low	83 (75%)	28 (25%)	111		
High	54 (19%)	227 (81%)	281		

The chi-square test was applied to assess the relationship between perception status and independent variables (Table 3). Ward of residence, gender, marital status, family type, source of knowing about SHI, and awareness were significantly associated with perception status at 5% significance level. However, ethnicity, religion, and the education status of households had p-values marginally above 0.05; they were also included as predictors in the model fitting.

Regression model

The total score for the perception was calculated by summing the responses on ten perception related statements/ items, each measured in a five-point Likert scale. The descriptive statistics of the aggregated perception score are presented in Table 4. To assess the distribution of data, a histogram was plotted (Figure 3). Both the histogram and skewness value indicated the positive skewness in the distribution. Therefore, logarithmic transformation was applied to the normality.

Table 4: Descriptive statistics of total perception score before and after log transformation

Descriptive Statistics	Min.	Q1	Median	Mean	Q3	Max.	Skewness	Kurtosis
Before log transformation	10	18.75	21.50	22.95	27.25	50	0.94	3.77
After log transformation	2.30	2.93	3.07	3.09	3.30	3.91	0.05	3.25

After transformation, both the skewness value (0.05) and histogram plot suggested that the data was approximately normally distributed.

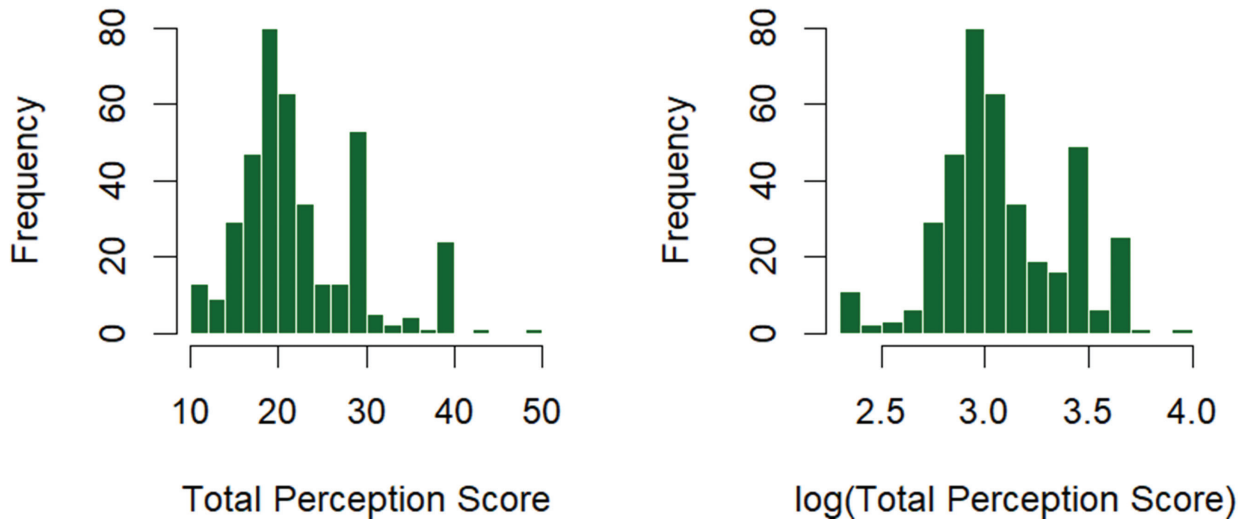

Fig. 3: Histogram of Total Perception Score Vs. Log (Total Perception Score)

A log normal regression model was used to identify the significant predictors of the perception suggested from the bivariate analysis. The multivariable regression analysis demonstrated that ward of residence, awareness, source of knowing were significant predictors of perception of households towards SHI. Respondents residing in Ward no. 4 (Exp $\beta = 1.161$, 95% CI: 1.059-1.273, p-value = 0.002) and Ward no. 8 (Exp $\beta = 1.204$, 95% CI: 1.109-1.308, p-value < 0.001) had approximately 16% and 20% higher perception compared to those from the Ward no. 9.

Table 5: Coefficients of log normal regression model

Coefficients		Beta (β)	SE (Beta)	Exp (β)	95% CI		P-Value
					Lower	Upper	
Constant	3.237	0.086	25.449	21.48	30.152	<0.001	
Ward No.	4	0.149	0.047	1.161	1.059	1.273	0.002
	8	0.186	0.042	1.204	1.109	1.308	<0.001
	9®	-	-	-	-	-	-
Gender	Female	0.017	0.025	1.017	0.969	1.068	0.481
	Male®	-	-	-	-	-	-
Education	Literate	-0.002	0.043	0.998	0.918	1.085	0.961
	Illiterate®	-	-	-	-	-	-
Marital Status	Married	0.051	0.05	1.052	0.954	1.16	0.311
	Unmarried®	-	-	-	-	-	-
Family Type	Nuclear	0.05	0.031	1.051	0.988	1.118	0.112
	Joint®	-	-	-	-	-	-
Ethnicity	Brahmin/Chhetri	-0.006	0.028	0.994	0.941	1.051	0.841
	Others®	-	-	-	-	-	-
Religion	Hinduism	0.004	0.041	1.004	0.926	1.087	0.931
	Others®	-	-	-	-	-	-
Awareness status	High	-0.259	0.031	0.772	0.727	0.82	<0.001
	Low®	-	-	-	-	-	-
Source of Knowing	Personnel	-0.146	0.049	0.864	0.784	0.952	0.003
	Media	-0.122	0.052	0.885	0.799	0.980	0.019
	Relatives/Friends	-0.152	0.056	0.859	0.768	0.959	0.007
	Not heard®	-	-	-	-	-	-

In contrast, respondents with high awareness showed 23% low perception score compared to those with low awareness, which infers that more informed respondents tended to evaluate the SHI program more critically. Similarly, respondents who got the information from health personnel (Exp β = 0.864, 95% CI: 0.784-0.952, p-value = 0.003), media (Exp β = 0.885, 95% CI: 0.799-0.980, p-value = 0.019), and relatives/friends (Exp β = 0.859, 95% CI: 0.768-0.959, p-value = 0.007) had approximately 14%, 12%, and 14% lower perception compared to those who had not heard about the program. Others socio-demographic factors including gender, marital status, ethnicity, religion, family type, education were insignificant predictors of perception.

Diagnostics of the fitted model

A linear regression on the log-transformed perception score was statistically significant ($F(12,379) = 28.45$, $p < 0.001$). This indicated that set of predictors in the model explained the variation in perception rating. The model explained 47.4 % of the variation in log-transformed perception score ($R^2 = 0.474$) with adjusted $R^2 = 0.457$. The variance inflation factors (VIF) were between 1.04 and 1.59, indicating that there was no serious multicollinearity. The histogram and Q-Q plot both showed that residuals were approximately normally distributed, but the Shapiro-Wilk test that it was not normal ($W = 0.972$, $p < 0.001$). The Breusch-Pegan test showed that residuals were not homoscedastic ($BP = 22.40$, $p = 0.033$). Influence diagnostic revealed that multiple observations with heightened Cook's distance, requiring additional scrutiny. After removing 20 important cases with Cook's distance flagged, a sensitivity model was used to see how strong the results were. The results were mostly the same with the sizes of the coefficients and confidence intervals. But the assumption checks got improved in normality. The residuals were found normal by Shapiro-Wilk test ($W = 0.995$, $p = 0.287$), and the Breusch-Pegan test showed no serious homoscedasticity ($BP = 19.4$, $p = 0.111$). This means the abnormality and heteroscedasticity were caused by few influence observations instead of an incorrect pattern specification.

The assumption checks got better: the residuals were normal (Shapiro-Wilk W = 0.995, p = 0.287), and the Breusch–Pagan test showed no signs of heteroscedasticity (BP = 19.4, p = 0.111). This means that the differences in the original model were likely caused by a few important observations instead of a pattern of incorrect specification.

Discussion

The average perception score was below the neutral point 3 on five point Likert scale. This suggests that most of the households did not show agreed view towards the program which is consistent with the previous studies (Paneru et al., 2022; Ghimire et at., 2024)

A remarkable finding was the paradoxical association between perception and awareness. This study found that higher awareness demonstrated more critical evaluations of SHI. This pattern is consistent with the previous study (Acharya et al., 2024), discussing that while awareness improves knowledge of the program, it may also expose problems such as bureaucratic delays and week service delivery. This suggests that awareness alone will not improve perception without real improvements in service quality and program design.

Households' perceptions also differed significantly by some socio-demographic factors such as ward of residence, family type, and ethnicity. Respondents from nuclear families and minority ethnic group expressed more positive perceptions, indicating varying expectations among different social groups. These findings align with community based health insurance studies conducted in South Asia and Africa, where social and cultural contexts strongly influenced participation and satisfaction (Dror et al., 2016; Eze et al., 2023).

The source of information also played a critical role. Respondents who learned about SHI through health personnel, media, or relatives/friends showed low perception than those who had never heard of the program. This suggests that current communication strategies may not convey the information in proper way or fail to develop confidence. Communication should be transparent, citizen centered, and emphasize concrete benefits and reforms (Ghimire et al., 2024).

Limitations

The study was conducted on randomly selected three wards of the Sundarharaicha Municipality of Morang. Therefore, the study may not be representative for the whole district or Nepal. Thus, the generalization of the results/findings is limited. Perception towards SHI was measured using Likert-scale. However, Cronbach's alpha showed that the scale was internally consistent; it might not capture the complete depth of respondents' perception.

Conclusion

This study assesses the perception of respondents towards SHI. The perception score was examined against socio-economic and demographic factors. Mann Whitney test showed that the perception score was found to differ significantly across the categories of awareness, gender, marital status, family type, ethnicity, religion, education, and history of chronic disease of the household head. Respondents who were illiterate, female, married, from nuclear families, belonging to ethnic groups other than Brahmin/Chhetri, and practicing religions other than Hinduism exhibited a higher median perception score. Bivariate analysis showed that perception status was significantly associated with ward of residence, gender, marital status, family type, source of knowing about SHI, and awareness at 5% significance level. The log normal regression analysis demonstrated that ward of residence, awareness, source of knowing were significant predictors of perception of households towards SHI.

Conflict of Interest

The authors declare that they have no conflict of interest.

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