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Barriers and Determinants of Antenatal Care Utilization among Marginalized Kumal Women in Rainas Municipality, Lamjung, Nepal

Tantrika Raj Khanal [1],
Govinda Prasad Devkota[2],
Sirina Sherpa[3]

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Corresponding Author:
Govinda Prasad Devkota
Mahendra Ratna Campus
Email:*devkotagovinda11@gmail.com*
ORCID: ORCID: 0000-0002-9133-7914

Publisher:
Research Management Cell
Drabya Shah Multiple Campus,
Gorkha, Nepal
Email: info@dsmc.edu.np
Website: www.dsmc.edu.np

Abstract

This study investigates the utilisation of antenatal care (ANC) services among women in Kumal, Rainas Municipality, Lamjung, Nepal, focusing on the frequency of ANC visits and associated socio-demographic factors. A cross-sectional quantitative survey was carried out in 2024 among 322 married Kumal women aged 15–49 years who had experienced a live birth or stillbirth within the past year. Despite national guidelines recommending at least four ANC visits, findings show that most (67%) of respondents reported attending only three visits, with only 29% meeting or exceeding th e recommended number. Chi-square analysis indicated that maternal age (p = 0.032), number of children (p = 0.032), husband's education (p = 0.000), food sufficiency (p = 0.028), and husband's foreign employment status (p = 0.034) were significantly associated with ANC visit frequency. In contrast, the mother's education, sex of the last child, and household headship did not have statistically significant associations. Women aged 34–49 years and those from food-secure households or with migrant husbands were more likely to complete four or more visits. These findings highlight ongoing disparities in ANC utilisation among marginalised groups, influenced by

economic, educational, and structural barriers. The study recommends targeted community-based interventions, increased male engagement in maternal health education, and enhanced outreach by health institutions to improve ANC uptake and reduce maternal and neonatal health risks in the Kumal community.

Keywords: Antenatal care, indigenous communities, Kumal women, maternal health, socio-demographic determinants

Introduction

ANC remains a crucial element of maternal and neonatal health worldwide, providing timely detection of complications, guidance on health behaviours, and essential interventions that support safe pregnancy and childbirth. In alignment with the global agenda, the World Health Organization (2016) recommends a minimum of eight ANC contacts during pregnancy to ensure a positive experience and lower maternal and neonatal risks. The Government of Nepal has incorporated these guidelines into its national health policies (MoHP, New ERA, & ICF, 2022). Despite notable progress in increasing ANC coverage across the country, disparities continue to exist, particularly among women from indigenous and marginalised communities in rural Nepal.

The Kumal community, recognised as one of Nepal's indigenous nationalities, is a socio-culturally distinct and economically marginalised group that continues to encounter systemic obstacles in accessing healthcare services. In Rainas Municipality of Lamjung District, an area mainly inhabited by the Kumal population, the utilisation of antenatal care remains alarmingly low. Although the Nepal Demographic and Health Survey (NDHS) 2022 reported that 84% of Nepali women received at least four ANC visits during their most recent pregnancy, initial observations in Rainas indicate that most Kumal women attend ANC only three times, which falls short of the recommended national and international standards (MoHP, New ERA, & ICF, 2022).

This underutilization of ANC services raises serious public health concerns, as inadequate ANC attendance is closely associated with missed opportunities for early detection of pregnancy complications, increased risk of maternal and neonatal mortality, and suboptimal pregnancy outcomes (Joshi et al., 2014; Paudel & Jha, 2018). Prior studies have underscored that socio-demographic determinants such as maternal age, parity, education levels, food security, migration status of the husband, and household decision-making dynamics critically influence maternal health-seeking behaviors in Nepal (Sharma et al., 2007; Thapa & Nieh of, 2013; Adhikari, 2016).

Despite this growing body of literature, there remains a dearth of empirical studies focusing on ANC utilization patterns among the Kumal women of Rainas Municipality. This gap in the literature impedes the development of context-specific health policies and interventions that address the unique needs and barriers faced by this indigenous group. Most national-level analyses and public health

initiatives overlook such marginalized subpopulations, thereby perpetuating cycles of health inequities (Karkee et al., 2013; Regmi et al., 2010). Moreover, cultural norms, low health literacy, and economic constraints further constrain Kumal women from accessing maternal health services in a timely and adequate manner (Shrestha & Shrestha, 2020).

Given this backdrop, the present study seeks to systematically assess the frequency of ANC utilization among Kumal women in Rainas Municipality and examine the socio-demographic factors influencing service uptake. The research is grounded in the recognition that improving maternal health outcomes in marginalized communities requires a nuanced understanding of local realities and determinants of health behavior. The primary objectives of the study are threefold: (i) to assess how often Kumal women utilize ANC services during pregnancy, (ii) to identify socio-demographic factors such as maternal age, parity, educational status, food sufficiency, and husband's migration that affect ANC attendance, and (iii) to propose evidence-based recommendations for enhancing ANC coverage in the community.

The rationale for this study is anchored in both academic and policy imperatives. From an academic standpoint, it contributes to filling the critical knowledge gap regarding maternal healthcare utilization among indigenous groups in Nepal. By employing a cross-sectional design and statistical analysis, the study provides data-driven insights that enrich the existing literature on health disparities in South Asia. From a policy perspective, the findings aim to inform the design of culturally sensitive and locally tailored maternal health interventions that can be integrated into Nepal's broader maternal and child health strategy.

This research is delimited to married Kumal women of reproductive age (15–49 years) residing in Rainas Municipality who experienced a live birth or stillbirth within one year preceding the survey. While the study offers detailed insights into the Kumal population of this specific municipality, its findings may not be generalizable to all indigenous communities across Nepal. Moreover, as a cross-sectional study, it captures associations rather than causality and is limited by self-reported data which may be subject to recall or social bias. Nonetheless, the focused scope and culturally grounded design of this study offer valuable implications for enhancing maternal health service delivery in similar rural and marginalized settings.

Finally, the persistent underutilization of antenatal care among Kumal women in Rainas Municipality reflects broader structural and socio-cultural barriers that must be addressed through targeted health programs, community awareness campaigns, and inclusive policy reforms. Strengthening ANC uptake in such underserved communities is not only essential for achieving national maternal health goals but also for fulfilling Nepal's commitments under the Sustainable Development Goals (SDG-3). This study offers an important step in that direction by elucidating the determinants of ANC use among Kumal women and proposing

actionable strategies to bridge the existing gaps in maternal healthcare access. Please prove the number of the sample as well. And write the sample using census method.

Methodology

Research Design

This study employed a quantitative cross-sectional research design to examine the frequency and determinants of ANC service utilisation among Kumal women living in Rainas Municipality. The cross-sectional approach was chosen for its ability to provide a snapshot of health-seeking behaviours and related socio-demographic factors at a specific point in time. This design allowed the researchers to identify statistically significant relationships between various independent variables (e.g., age, parity, education, household food sufficiency) and the dependent variable (ANC visit frequency) without modifying the study environment.

Study Population and Study Site

The study population comprised married Kumal women aged 15–49 years who had experienced at least one live birth or stillbirth within the 12 months preceding the survey. Inclusion criteria required participants to be permanent residents of the municipality and able to provide informed consent. Women with serious illness or cognitive impairment that impeded participation were excluded.

Sample Size and Sampling Procedure

The total sample size for this study was 322 respondents, determined through a census-based approach due to the relatively small and geographically concentrated target population. According to Rainas Municipality's local records and ward profiles (2023), there were approximately 350 married Kumal women aged 15–49 years who had experienced at least one live birth or stillbirth in the past year across the 11 wards of the municipality. Considering the manageable size of the target population and the study's aim to gather comprehensive and representative data, the researchers used a complete enumeration (census) method instead of relying on sampling formulas.

This method ensured maximum inclusion and reduced sampling bias, thereby enhancing the validity and generalisability of the findings within the Kumal community of Rainas Municipality. Out of the estimated 350 eligible women, 322 took part in the study, resulting in a 92% response rate. The small number of non-responses was due to temporary migration, illness, or refusal to participate. The decision to conduct a census also aligned with ethical and practical considerations, allowing the study to capture variation across all demographic subgroups (e.g., age, parity, education level, food sufficiency, and household characteristics).

Local health institutions, ward offices, and Female Community Health Volunteers (FCHVs) were instrumental in identifying and reaching eligible respondents. This participatory and exhaustive approach enhanced the reliability of the data and strengthened the community's ownership of the research process.

Data Collection Tools and Methods

Data were collected using a structured questionnaire, developed in consultation with public health experts and grounded in relevant literature on ANC utilization. The tool was first drafted in English and then translated into Nepali, with a back-translation process conducted to ensure consistency and accuracy. The questionnaire was pre-tested in a neighboring municipality (with similar socio-cultural features) on 10 women to refine question clarity, cultural appropriateness, and response accuracy.

The questionnaire consisted of five sections: demographic and socio-economic characteristics; obstetric history; ANC visit frequency and timing; knowledge and attitudes towards ANC; and barriers to utilization. Most questions were closed-ended, with categorical or ordinal responses, and a few open-ended items were included to allow additional context.

Data Collection Procedures

Data collection was carried out over four weeks in early 2024 by a team of trained enumerators fluent in the local language and culturally sensitive to the context. Enumerators underwent a two-day training on ethical research conduct, interview techniques, and data recording procedures. Each interview lasted approximately 30–45 minutes and was conducted face-to-face at the respondent's residence or a mutually agreed location, ensuring privacy and comfort.

Ethical clearance was obtained from the local health authority and municipal office. Verbal informed consent was sought from each participant after clearly explaining the study's objectives, procedures, voluntary nature, and confidentiality measures. No personal identifiers were collected, and participation did not involve any incentives or coercion.

Data Analysis and Interpretation

The data collected were entered into the Statistical Package for the Social Sciences (SPSS) version 25.0 for cleaning, coding, and statistical analysis. Descriptive statistics, such as frequencies and percentages, were used to summarise demographic variables and ANC visit patterns. Bivariate analysis using the Pearson chi-square test was conducted to assess the associations between selected socio-demographic factors and ANC visit frequency (categorised as: two, three, and four or more visits). A p-value of less than 0.05 was considered statistically significant. The interpretation of findings focused on identifying statistically meaningful trends, drawing inferences about disparities in maternal healthcare access, and

contextualising results within broader national and regional health policy frameworks.

Findings

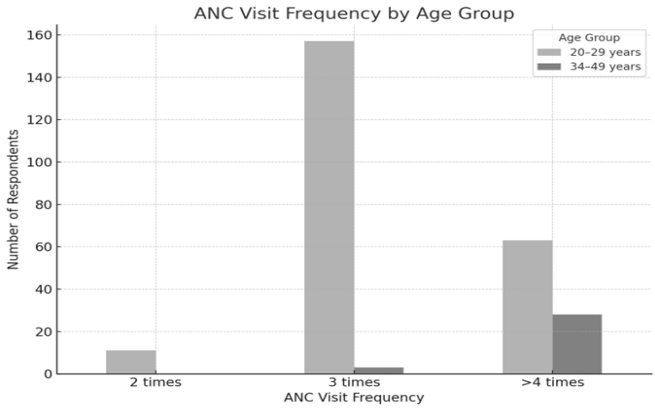
The demographic analysis of ANC utilization among 322 women in Rainas Municipality provides valuable insights into patterns of maternal healthcare behavior. The Government of Nepal's eight-contact ANC protocol serves as the benchmark, yet the data show that most Kumal women report attending only three ANC visits, falling short of the national standard.

Statistical distribution of Respondents with ANC Visits

Age group of Mother	**2 times**	**3 times**	**>4 times**	Total	X2
<20 yrs	0 (0.0%)	0 (0.0%)	2 (100%)	2(100%)	
20-29 yrs	11 (4.76)	157(67.96)	63 (27.27)	231 (100%)	value=1
30-34 yrs	2 (2.5%)	56(70.0%)	22 (25.5%)	80 (100%)	2.004
34-49 yrs	0 (0.0%)	3 (33.3%)	6 (66.7%)	9 (100%)	p=.032
Total	13	216	93	322	
No. of Children					value=8.
1	4 (2.43%)	103 (62.8%)	56(34.8%)	163 (100%)	042
2	9(6.0%)	107 (69 %)	34(25%)	150 (100%)	p=.032
3 +	0(0.0%)	6(66.7%)	3(33.3%)	9 (100%)	
Total	13	216	93	322	
Sex of last child					X2
Male	6 (5 %)	88 (63 %)	45 (32%)	139 (100%)	value=8.
Female	7 (4 %)	128(70 %)	48 (26%)	183 (100%)	20
Total	13	216	93	322	p=.300
Mother' education					X2 value=1
No	0(0.0%)	12(80%)	3(20%)	15 (100%)	4.041
Basic	8 (4.5%)	107(60.45%)	62(35.05%)	177 (100%)	p=0.400
Secondary	3(2.60%)	86(74.78%)	26(22.62%)	115 (100%)	
Higher	2(13.33%)	11(73.33%)	2(13.34%)	15 (100%)	
Total	13	216	93	322	
Husband Education					X2
No	2 (14%)	10 (86 %)	0 (0.0%)	12(100%)	value=1
Basic	3(2 %)	57(46 %)	62 (52%)	122(100%)	8.37
Secondary	5 (4 %)	103 (78%)	24 (18%)	132(100%)	p=0.00
Higher	3(6 %)	46 (81%)	7 (13%)	56 (100%)	
Total	13	216	93	322	
Food Sufficiency					X2 value=4.
Yes	6(2%)	166(65%)	83(33%)	255(100%)	319
No	7(10%)	50 (75%)	10(15%)	67 (100%)	p=0.028
Total	13	216	93	322	

Husband Aboard					X2 value=5
Yes	3 (4%)	45(58%)	30(38%)	78(100%)	2.56
No	10 (4%)	166(70 %)	63(26%)	239 (100%)	p=0.034
Total	13	216	93	322	
Sex of HH Head					X2
Male	8(3.80%)	142(67.61%	60(28.59%)	210	value=1
Female	5(4.46%)	74(66.07%)	33(29.47%)	112	3.055
Total	13	211	93	317	p=0.307

Age of Mother and ANC Compliance A statistically significant association was identified between maternal age and the frequency of ANC visits ($\chi^2 = 12.004$, $p = 0.032$). The data reveal that women aged 20–29 years overwhelmingly reported attending three ANC visits during their most recent pregnancy (68%), falling short of the recommended minimum of four contacts. This pattern may reflect limited health awareness, competing domestic responsibilities, or underestimation of risks among younger mothers.



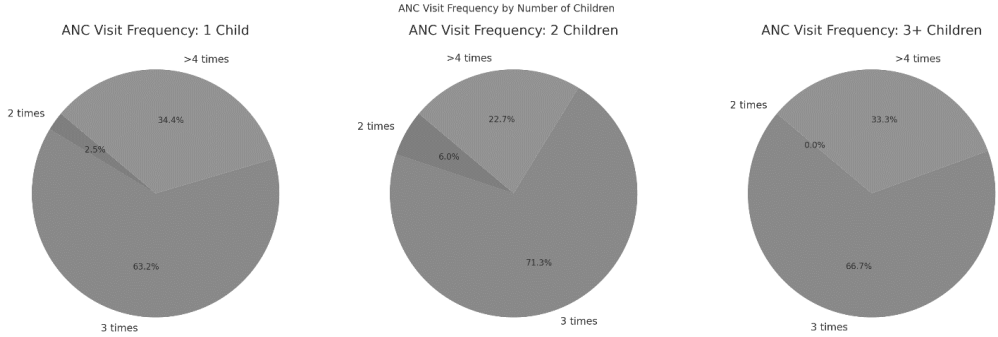
Conversely, women aged 34–49 years demonstrated greater adherence to the national ANC protocol, with 67% completing four or more ANC visits. This suggests that older women may possess higher health-seeking behavior, potentially informed by prior pregnancy experiences, greater perceived vulnerability, or stronger decision-making autonomy.

The pattern underscores a critical age-related gap in ANC compliance, suggesting the need for targeted interventions aimed at younger mothers to raise awareness of the importance of completing all recommended ANC contacts to reduce maternal and neonatal health risks. In contrast, women aged 34–49 years were more likely to complete 4 or more ANC visits, suggesting greater adherence to ANC recommendations with increasing maternal age.

Number of Children and ANC Visit Patterns: Increasing Compliance with Higher Parity

A statistically significant relationship was observed between the number of children a woman has and her frequency of ANC visits ($\chi^2 = 8.042$, $p = 0.032$), revealing nuanced behavioral patterns. Mothers with one child predominantly reported attending three ANC visits (62.8%), while only 34.8% completed the

recommended four or more visits an outcome that may reflect first-time pregnancy uncertainty, limited familiarity with healthcare systems, or logistical challenges. Similarly, among mothers with two children, a high proportion (69%) reported three visits, whereas only 25% completed four or more, suggesting a slight decline in adherence possibly due to time constraints, caregiving responsibilities, or a sense of complacency based on previous uncomplicated pregnancies.



Notably, mothers with three or more children showed a more balanced distribution, with 33.3% reaching the four-visit mark. This change may be due to increased awareness of pregnancy-related risks from past experiences and greater familiarity with healthcare systems. These findings highlight the importance of targeted maternal health messaging for multiparous women to ensure continuity of ANC visits beyond the third check-up, as early visits alone may not sufficiently reduce maternal and neonatal risks.

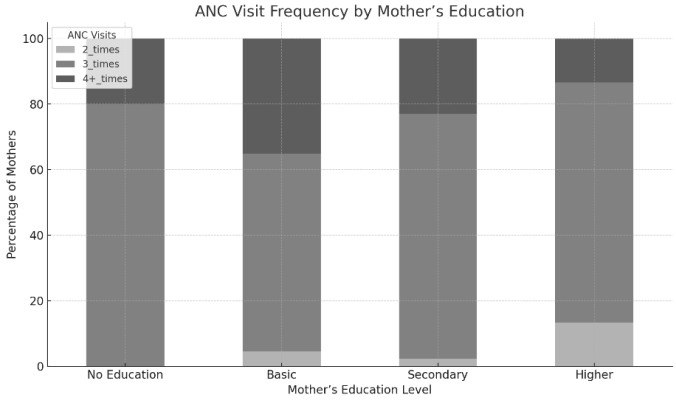
Sex of Last Child and Health-Seeking Behavior

The analysis showed that the sex of the last child was not statistically significantly linked to the frequency of ANC visits among Kumal women in Rainas Municipality ($\chi^2 = 8.20$, $p = 0.300$). The distribution of ANC visit frequencies was fairly similar for both male and female last-born children. Specifically, among mothers whose last child was male, 5% attended two visits, 63% attended three visits, and 32% attended four or more visits. For those whose last child was female, 4% attended two visits, 70% attended three visits, and 26% attended four or more visits.

These figures show no significant difference in ANC utilisation based on the child's sex. Therefore, within this study's population and timeframe, the sex of the last child did not significantly influence maternal health-seeking behaviour related to ANC service utilisation.

Mother's Education by ANC Visits. The data reveals distinct variations in ANC visit frequencies based on mothers' education levels. Among mothers with no education, 80% attended three ANC visits and only 20% completed the recommended four or more, indicating limited awareness or access to full ANC services. Those with basic education showed improved utilization, with 35% achieving four or more visits and 60.5% attending three. Mothers with secondary education had the highest proportion (74.7%) attending three visits, but only 23%

reached the recommended threshold. Interestingly, higher education did not correlate with better ANC coverage, as 73.3% still had three visits, only 13.3% completed four or more, and another 13.3% had just two visits the highest among all groups. This unexpected outcome among highly educated mothers may reflect factors such as small sample size or other underlying socio-economic or structural barriers, while basic education appears to be associated with the highest completion of recommended ANC visits.

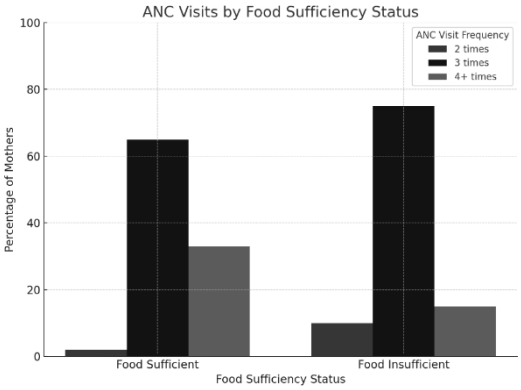


Contrary to expectations, maternal education was not significantly associated with ANC visit frequency (χ^2 = 14.041, p = 0.400). However, descriptively, women with secondary education mostly reported 3 ANC visits (75%), while fewer completed 4 or more visits, possibly due to gaps in health literacy or time constraints.

Analysis of Husband's Education by Frequency of ANC Visits. The association between husband's education and the frequency of ANC visits among mothers was found to be statistically significant (χ^2 = 18.37, p = 0.00), suggesting a strong relationship between paternal education levels and maternal healthcare utilization.

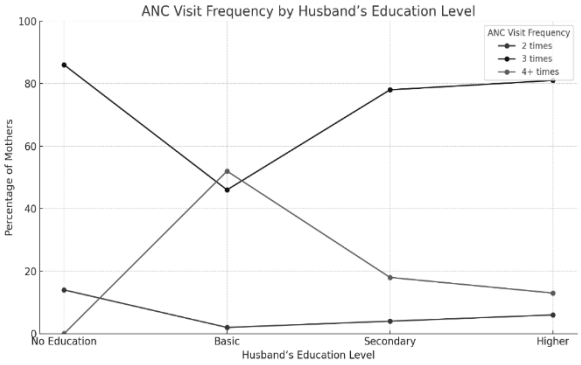
Mothers whose husbands had no formal education overwhelmingly received suboptimal ANC services, with 86% attending only three ANC visits and none completing the recommended four or more. This stark underutilization may reflect the influence of limited spousal health literacy on maternal health-seeking behavior. In contrast, women whose husbands had attained basic education demonstrated the highest completion rate of four or more ANC visits (52%), suggesting that even minimal education can significantly enhance awareness and support for maternal care. However, a considerable proportion (46%) still attended only three visits, reflecting a partial adherence to ANC protocols.

Notably, husbands with secondary education were associated with the highest proportion (78%) of mothers attending three visits, while only 18% completed four or more, indicating a tendency toward moderate ANC compliance but potential constraints in reaching optimal care. Similarly, among women with highly educated husbands, the majority (81%) received three ANC checkups, but only 13% completed the recommended four or more, showing a decline in full-service utilization despite higher paternal education. This paradoxical trend in higher education groups might be attributed to sociocultural preferences, work-related absences, or access issues rather than a lack of awareness.



Food Sufficiency

Food sufficiency emerged as a statistically significant determinant of antenatal care (ANC) utilization ($\chi^2 = 4.319$, $p = 0.028$), underscoring the critical role of household food security in influencing maternal health-seeking behavior. Women residing in food-secure households demonstrated markedly higher adherence to the recommended ANC protocol, with 33% completing four or more visits, in contrast to only 15% among their food-insecure counterparts. Conversely, food-insecure women exhibited a disproportionately higher reliance on suboptimal ANC engagement, with 10% attending merely two visits. This disparity suggests that economic hardship and nutritional vulnerability may act as structural barriers, limiting consistent access to maternal health services. The findings thus reinforce the interdependence of food security and maternal healthcare utilization, highlighting the need for integrated interventions that address both nutritional and health service access to improve maternal outcomes in resource-constrained settings.

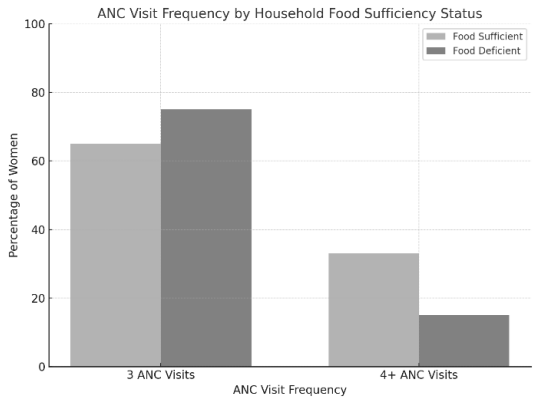


Husband's Migration Status by ANC Visits

Migration status of the husband showed a strong statistical association ($\chi^2 = 52.56$, $p = 0.034$). Women whose husbands were abroad were more likely to have ≥4 visits (38%), likely due to better economic support.

The Government of Nepal has adopted the eight ANC contact protocol, with the first visit occurring up to 12 weeks, the second up to 16 weeks, the third from 20–24 weeks, the fourth within 28 weeks, the fifth in 32 weeks, the sixth in 34 weeks, the seventh in 36 weeks, and the eighth from 38–40 weeks (Ministry of Health and Population 2019). NDHS (2022) shows that some 84 percent of mothers attended at least four ANC visits during their most recent pregnancy. The survey revealed a strong link between regular ANC visits and improved maternal and neonatal health outcomes, including fewer complications and lower mortality rates.

Food sufficiency



A statistically significant association was observed between household food sufficiency and the frequency of ANC visits among women ($\chi^2 = 4.319$, $p = 0.028$). Women residing in food-sufficient households demonstrated a relatively higher tendency to complete four or more ANC visits (33%) compared to their counterparts in food-deficient households (15%). Conversely, a higher proportion of women from both food-sufficient (65%) and food-deficient (75%) households reported receiving only three ANC checkups. This pattern suggests that food insecurity may serve as a barrier to accessing comprehensive maternal healthcare, underscoring the need for integrated nutritional and health interventions targeting vulnerable households.

Discussion

The current study highlights a significant link between household food security and ANC utilisation among Kumal women in Rainas Municipality, Nepal. Women from food-secure households were more likely to complete four or more ANC visits (33%) compared to those from food-insecure households (15%), emphasising the important role of food security in maternal healthcare participation. This evidence reinforces a growing body of research both within Nepal and worldwide that recognises food insecurity as a key factor influencing maternal health-seeking behaviour.

In Nepal, existing literature consistently highlights the influence of economic and nutritional conditions on ANC attendance. For instance, Adhikari

(2016) reported that women with greater autonomy in household decisions, often linked to better food and financial circumstances, were significantly more likely to utilise maternal health services, including ANC, compared to those with less autonomy and fewer resources. Similarly, Joshi et al. (2014), analysing NDHS data, found that socioeconomic status, including food sufficiency, directly affected not only the utilisation of ANC but also its quality. They emphasised that poorer women from rural areas were more inclined to underutilise ANC services, often due to competing household priorities and nutritional insecurity.

Additional national-level analysis by Paudel and Jha (2018) supports this pattern. Their study, which utilised DHS data from 2006 to 2016, revealed that women from the lowest wealth quintile consistently had lower odds of completing the recommended ANC visits compared to women from wealthier households. Their conclusion highlighted the intersection of food insecurity, poverty, and low maternal health service utilisation.

Globally, similar trends have been observed across various contexts. In Bangladesh, a study by Huda et al. (2017) found that food insecurity significantly decreased the likelihood of women attending four or more ANC visits, especially in flood-prone and rural areas. Women from food-insecure households were 1.5 times more likely to underutilise ANC services compared to those from food-secure households (https://doi.org/10.1186/s12884-017-1432-4). In Pakistan, Bhutta et al. (2014) documented how maternal undernutrition and household food insecurity created a cascading effect on ANC non-compliance and adverse pregnancy outcomes.

Beyond South Asia, findings from sub-Saharan Africa support this relationship. Titaley et al. (2010), in a study conducted in Indonesia, showed that household food insecurity contributed to delayed or missed ANC appointments because women prioritised food acquisition and caregiving over personal health (https://doi.org/10.1186/1471-2393-10-61). A multi-country study by Ahmed et al. (2010), analysing DHS data from 31 countries, concluded that maternal healthcare utilisation was positively linked to both household wealth and food security. Women from the poorest and food-insecure households were less likely to have skilled attendance and ANC services (https://doi.org/10.1186/1471-2393-10-32).

Additionally, a recent systematic review by Musa et al. (2022) confirmed that across low- and middle-income countries, food insecurity correlates with reduced ANC attendance, lower maternal dietary diversity, and increased risk of maternal complications. Their meta-analysis emphasised the need for cross-sectoral interventions linking food assistance to ANC service delivery.

While the Government of Nepal has adopted WHO's eight-contact ANC protocol (MoHP, 2019), the implementation remains uneven, particularly among food-insecure and indigenous households. Efforts such as the Aama Program (maternity incentive scheme) have improved national ANC coverage but have not adequately addressed structural barriers like food insecurity. As noted by Karkee,

Lee, and Binns (2013), culturally marginalized groups, including the Kumal, face persistent challenges that go beyond service availability such as mistrust in health institutions, transportation limitations, and food insecurity all of which impede regular ANC attendance.

Furthermore, studies like Regmi et al. (2010) highlighted that interventions to enhance ANC utilisation must not only increase awareness but also address material deprivation, such as food insufficiency, which limits women's mobility and capacity to seek care.

In light of both national and global evidence, the findings of the present study suggest an urgent need for multisectoral strategies. These should include nutrition-sensitive health policies, integrated food aid with ANC outreach, and localised incentive programmes to increase ANC attendance among food-insecure and marginalised groups. Effective community engagement and collaboration between the health and agriculture sectors could amplify results, particularly in rural and indigenous regions like Rainas Municipality.

Conclusion

The study finds that ANC service utilisation among Kumal women in Rainas Municipality remains below the national recommendation of four or more visits, with most reporting only three ANC checkups during their most recent pregnancy. Socio-demographic factors such as maternal age, number of children, husband's education, food sufficiency, and husband's foreign employment status were significantly linked to ANC frequency. Women from food-secure households, with better-educated husbands, and whose husbands worked abroad were more likely to attend four or more ANC visits. However, mother's own education, sex of the last child, and household headship did not show a statistically significant link with ANC utilisation. These findings underscore the need for targeted awareness and support programmes within the Kumal community to enhance ANC coverage, especially among women from food-insecure and low-education households. Strengthening local health outreach can lead to improved maternal and neonatal outcomes in Rainas Municipality.

To improve ANC utilisation among Kumal women in Rainas Municipality, targeted community-based awareness programmes should be implemented, emphasising the importance of completing four or more ANC visits. Health institutions should strengthen outreach services, particularly for women from food-insecure households and those with lower education levels. Engaging male family members, especially husbands, in maternal health education could further enhance support. Additionally, the local government should allocate resources to improve access and quality of ANC services in remote areas.

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Authors' Contribution

TRK, and SS contributed to the study's conception and design, including the data collection, and analysis. TRK, and SS interpreted and drafted the manuscript and GD critically revised the manuscript. All authors are agreed to submit the article in this form.

Conflict of Interest

The authors declare no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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Author Bio

Govinda Prasad Devkota, PhD, is a researcher and faculty member at Mahendra Ratna Campus, Tribhuvan University. His expertise includes public health, WASH policy, ecological sanitation, gender empowerment, and social inclusion. He completed his PhD in 2023 and has led projects funded by USAID, UNESCO, and

UN-Habitat. His work promotes social justice, transformative education, and sustainable community development in Nepal.

Tantrika Raj Khanal is a Lecturer in Geography and Population Education at Mahendra Ratna Campus, Tribhuvan University. He specializes in migration, maternal health, population dynamics, and socio-economic development. With over two decades of teaching and research experience, he has authored textbooks and journal articles and actively contributes to evidence-based policy and population education initiatives in Nepal. ORCID: 0000-0002-9133-7914

Sirina Sherpa is an experienced educator and academic coordinator with a strong background in early childhood and primary education. Holding an M.Phil. from Tribhuvan University, she has over a decade of teaching and leadership experience in research-based organization in Nepal. Currently serving as Coordinator at Quest Centre Nepal (QCN), Pvt. Ltd., she is committed to nurturing young learners and promoting quality education. ORCID:0009-0009-0475-7143