


# Association of international remittance with satisfaction and utilization of maternal healthcare services in Nepal: A secondary analysis of two cohort studies

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## Abstract

This study aimed to explore the association of international remittance with satisfaction and utilization of maternal health services in Nepal. This is a secondary analysis based on two prospective cohort studies. Regression analyses were carried out to assess the association. Women from remittance-receiving households had 1.27 higher odds of receiving timely initiation of first ANC visit (aOR = 1.27; 95% CI: 1.19, 1.35). The association between remittance-receiving household income and overall satisfaction with maternal health services (aOR = 0.97; 95% CI: 0.91, 1.02) and receiving four or more ANC visits (aOR = 0.92; 95% CI: 0.85, 1.00) was not significant.

## KEYWORDS

antenatal care, client satisfaction and Nepal, international remittance, quality of care

## 1 | INTRODUCTION

International migration and remittance play an important role in improving primary and secondary school attainment, increasing life expectancy, and reducing infant mortality (Amega, 2018; Zhunio et al., 2012). Increase in remittance

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has shown association with almost one-third decline in under-five mortality (Terrelonge, 2014). Despite the estimated decline in international remittance in 2020 due to COVID-19 pandemic disruption, 23% of Nepal's gross domestic product was contributed by international remittance (World Bank, 2020). Nearly one in three married women in Nepal had husbands working abroad and has been a major income source for families (Ministry of Labor, 2020). Remittance increased the availability of money to spend on daily consumption and services (Acharya, 2018) and may be linked to improvement in girls' education and use of health services (Lokshin, 2009).

The magnitude of left-behind women (i.e., women who stay home when men move abroad) from starkly male dominated international labour migration reflected the cultural and social norms (Gartaula et al., 2012; Hassan 2020; Yabiku et al., 2010). Especially in cultures where males' and in-laws' decisions are prioritized over women's, access to material resources (e.g., remittances) for left-behind women can be hindered by in-laws' decision-making regarding services (Gartaula et al., 2012). Women with husbands working abroad have increased risk to reproductive morbidity and sexually transmitted diseases (Caballero et al., 2008; Dai et al., 2012; Shattuck et al., 2019).

Nepal has significantly improved maternal health utilization in the last two decades (Ministry of Health and Population et al., 2017; Thapa et al., 2020). The proportion of pregnant women who had four or more antenatal care (ANC) visits increased from 14% in 2001 to 69% in 2016 (Ministry of Health and Population et al., 2017; Thapa et al., 2020). Institutional deliveries increased from 9% in 2001 to 57% in 2016 (Thapa et al., 2020). Despite the implementation of maternal incentive program to improve access to poor families, significant socio-economic disparities exist in the use of maternal health services in Nepal (Paudel et al., 2017). The probability of having four or more ANC visits, timely first ANC, and receipt of good quality maternal services vary according to wealth, ethnic background, education, type of residence, parity, and age (Pandey & Karki, 2014; Paudel et al., 2017).

Furthermore, Comprehensive Emergency Obstetric, and Newborn Care (CEONC) services are not available in most hard-to-reach areas (KC et al., 2020). Albeit these areas have primary healthcare centers (also used for ANC), the quality of services are poor (KC et al., 2020). It has direct consequences for poorer women who often reside in rural and hard-to-reach areas, as they have no option than to give birth in these primary health centers (KC et al., 2020). Remittance has shown to increase maternal health access and utilization of care as women have autonomy to decide on their healthcare expenditure (Green et al., 2019; Joshi et al., 2014; Lama et al., 2020; Lei & Desai, 2021; Ministry of Labor Nepal, 2020). This study aimed to explore whether women from remittance-receiving households have better satisfied maternal health services than women from non-remittance-receiving households in Nepal. Further, this study also aimed to investigate whether women from remittance-receiving households utilize maternal healthcare services more than women from non-remittance-receiving households in Nepal.

## 2 | METHODS

### 2.1 | Study design and setting

This was secondary data analysis of two prospective cohort studies Rapid Feedback for quality Improvement in Neonatal rEsuscitation (REFINE) (Gurung et al., 2020) and a Scaling up Safer Birth Bundle Through Quality Improvement in Nepal (SUSTAIN) (Gurung et al., 2019). The REFINE was conducted between July 2017 to July 2021 in one hospital (Gurung et al., 2020). SUSTAIN was conducted between June 2018 to November 2021 in eight hospitals (Gurung et al., 2019). The current study utilized a 7-month period—from 16 May to 31 December 2019—of a baseline data collected through the REFINE and SUSTAIN studies.

The health institutions were located across all seven provinces of the country. The annual number of births in these hospitals constituted approximately 11.7% of the total annual births in Nepal in 2017. Intrapartum-related mortality (intrapartum-related stillbirth and first-day mortality) ranged from 11.0 to 36.5 per 1000 births. All the hospitals in the study had separate labour units and operating theaters and dedicated units for postnatal and sick

newborn care. All vaginal deliveries took place in labour units and cesarean sections in the operating theaters. In these public hospitals, childbirth services are subsidized; however, women and family pay for transport and additional laboratory services.

## 2.2 | Sample size and study population

No study power was calculated, and the sample size was determined by the existing data within the REFINE and SUSTAIN databases that met the study criteria. A total of 51 159 women were enrolled to REFINE and SUSTAIN in the nine hospitals around Nepal during the period 16 May to 31 December 2019 (Figure S1a,b). After screening on exclusion criterion and handling of missing values, the final sample size for this study was  $N = 31\,060$ .

## 2.3 | Inclusion and exclusion criteria

Women who were at 22 weeks of gestation or more, admitted to the labor room with fetal heart sounds audible at the time of admission, and who consented to enroll in the study were eligible for inclusion in REFINE and SUSTAIN (Gurung et al., 2019, 2020). The exclusion criterion for this study was that there was missing data on the information on the type of household income. Additionally, the participants with missing data in any of the background characteristics were excluded if the total share of missing values in that particular variable was no more than 5% of the total sample.

## 2.4 | Data collection

Data used for this study were extracted from the existing data collection system for REFINE and SUSTAIN. Data collectors collected information on socio-demographic characteristics and perceptions of women towards care through face-to-face interviews at the time of hospital discharge. Data from clinical events were extracted from patient case notes and labour and delivery registers. Both studies used a tablet-based observation tool, and the observations were done in each hospital by independent researchers. The quality and completeness of the data collected with the tablet-based application were reviewed frequently by an independent data collection coordinator in each hospital. The data collection for both studies was led by the Golden Community, a Nepal-based research agency.

## 2.5 | Variables

### 2.5.1 | Outcome variables

*Overall satisfaction of the maternal healthcare services* was used to measure the quality of the maternal healthcare services from the experience of care perspective, as satisfaction is considered to be a value-based judgment of the quality and goodness of received health services (Biresaw et al., 2021; Persai et al., 2022). In REFINE and SUSTAIN, perception of the services was gathered through face-to-face interviews at the time of hospital discharge. The interviewer asked women to rate their satisfaction level on a scale from *very dissatisfied* to *very satisfied*. For this study, the original variable was transformed into a dichotomous variable, *dissatisfied* and *satisfied*. The variable was created by combining the three original categories *very dissatisfied*, *dissatisfied*, and *neither* and classify them as *dissatisfied* and combining the two original categories *satisfied* and *very satisfied* and classify them as *satisfied*. The quality of the

healthcare services was considered good if the participant was satisfied, and on the contrary, the quality was deemed not good if the participant was dissatisfied.

*The number of ANC visits* was a measure for utilization of maternal health services and the quality of the services from the provision of care aspect, as previous studies suggest that the quality of ANC services affects women's healthcare-seeking behavior (Ejigu Tafere et al., 2018; Phommachanh et al., 2019; Raru et al., 2022) and is an essential determinant if a pregnant woman is to complete the recommended number of ANC visits (Hussen & Worku, 2022; Mohammed et al., 2022; Negash et al., 2022; Nemomsa et al., 2022). The original numerical variable was transformed into a categorical variable with two categories, "three or fewer visits" and "four or more visits." The number refers to how many times a participant had received antenatal care by a doctor, nurse, or ANM during the pregnancy. Albeit the WHO's recommendations on antenatal care had recently changed from a minimum of four visits to eight visits, considering the feasibility of these new recommendations in a resource setting such as Nepal, four visits were perceived as an adequate for this study (World Health Organization, 2016). Additionally, the government of Nepal had still recommended four minimum number of ANC visits (Government of Nepal, 2018). The quality and utilization of maternal health services were considered good if the participant had four or more visits. On the contrary, the quality and the utilization were deemed not good if the participant had three or fewer visits.

*The timing of the first ANC visit* was a measure for utilization of maternal health services. It was categorized "first trimester (1–3 months pregnant)" and "second or third trimester (4–9 months pregnant)."

## 2.5.2 | Exposure variable

*The source of income in the household* was the exposure variable for the study. The original variable was re-categorized into two categories, "non-remittance-receiving household" and "remittance-receiving household." Moreover, as some remittance-receiving households had multiple types of incomes, these households were categorized as "remittance-receiving household." All the remittance-receiving households in this study received their remittances from abroad and had started receiving them prior to be enrolled to the study.

## 2.5.3 | Covariates

Different socio-demographic characteristics collected for the primary study were considered as covariates (Table 1).

**TABLE 1** Socio-demographic characteristics.

Characteristics	Category
Maternal age in completed years (years)	(i) ≤18 years, (ii) 19–24 years, (iii) 25–29 years, (iv) 30–34 years, and (v) ≥ 35 years
Ethnicity	(i) Relative disadvantaged group (Janajati, Madhesi, Dalit, and Muslim) (ii) Relatively advantaged groups (Brahmin and Chhetri)
Maternal education	(i) Illiterate, (ii) Able to read and write, (iii) Completed primary education, (iv) Completed secondary or higher
Wealth quintile <sup>a</sup>	(i) Poorest, (ii) Poorer, (iii) Middle, (iv) Richer, and (v) Richest
Parity (number of previous pregnancies)	(i) Nullipara (no previous births), (ii) Primipara (1 previous birth), and (iii) Multipara (two or more previous births)

<sup>a</sup>Calculated using the information on ownership of (i) durable assets (e.g., car, refrigerator), (ii) housing characteristics (e.g., number of rooms, dwelling floor, and roof materials), and (iii) access to services (e.g., electricity supply and drinking water source).

## 2.5.4 | Statistical analyses

The IBM SPSS Statistics Software Version 27.0.1.0 was used to conduct the analyses in this study. Both descriptive and inferential statistics were applied in exploring the quality and the utilization of maternal healthcare services and their connections with the type of household income. First, descriptive analyses were performed to see the distributions of socio-economic characteristics and the outcome variables by the type of household income.

In the second level of the analyses, Pearson's chi-squared test  $\chi^2$  was run to explore the bivariate relationship between the explanatory and outcome variables. The significance level was set to  $p < 0.05$ . The third step of the analysis used binary logistic regression to determine which of various categories of respondents were more or less likely to be satisfied with maternal health services, have recommended number of ANC visits during pregnancy, and have first ANC visit during the first trimester of the pregnancy. The crude odds ratio (cOR) and the 95% confidence interval (CI) were obtained.

In the final stage, multivariate logistic regression was used to adjust the analyses for the possible confounder for the chosen background characteristics. Three different analytical scenarios were created, and all scenarios were used for every outcome variable. Model I combined the source of income in the household with every statistically significant background characteristic, Model II excluded the source of income and included all significant background characteristics, and Model III included the source of income and excluded wealth quintile due to suspected high multicollinearity with the other background characteristics. The suspected multicollinearity was observed when the results from the bivariate analyses were compared to the results from the Model I analysis. This was further investigated by examining the associations between each background characteristic using binary logistic regression.

Participants with missing values on parity and age were excluded from analysis on the basis that the values were not many and the exclusion would not influence study power (0.3% of the sample size). In the final sample, only the variable "the timing of the first ANC visit" had a low amount (1.2% of the sample size) of missing values. These participants were included in the descriptive analyses but excluded while doing bivariate and multivariate analyses for the variable in question.

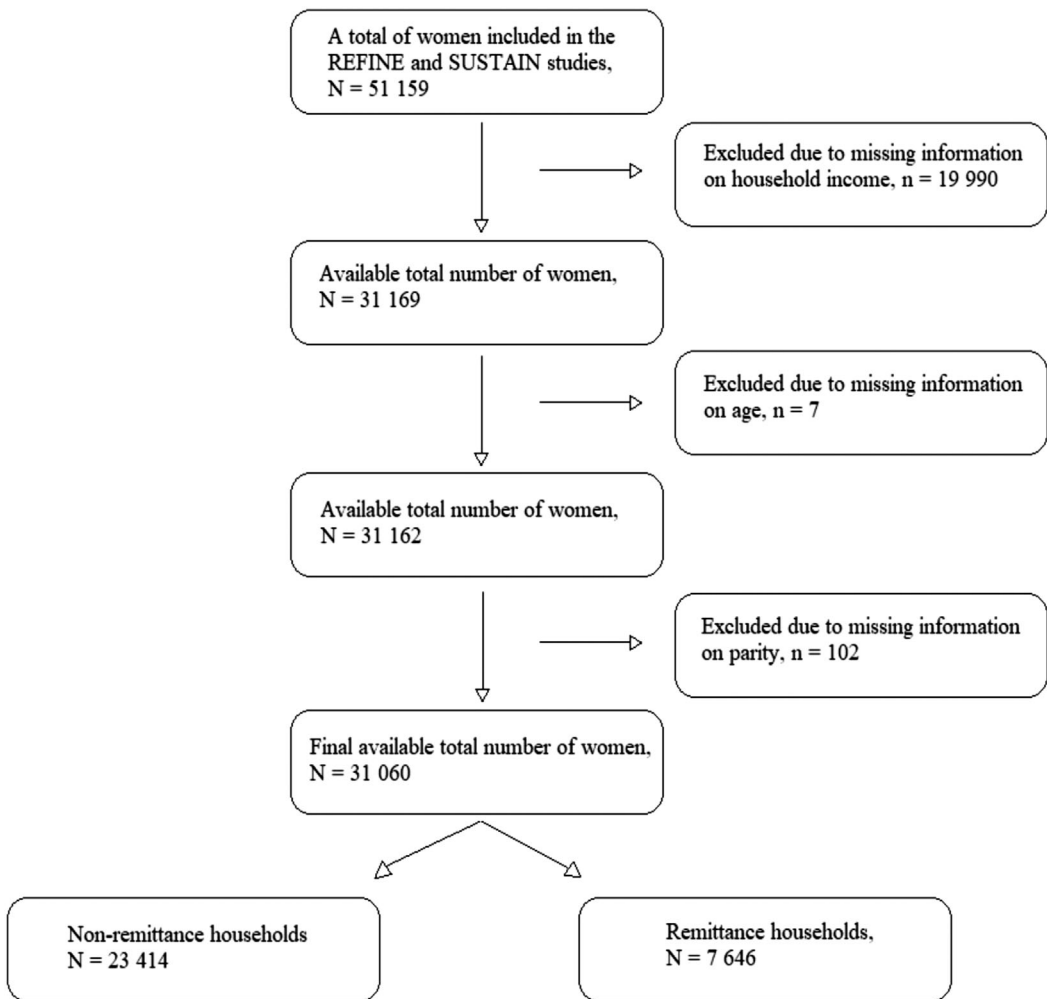
## 2.5.5 | Ethical considerations

For this study, permission to use the data from the REFINE and the SUSTAIN was obtained from the principal investigator in January 2021. Ethical approval for REFINE was obtained from the ethical review committee of Nepal Health Research Council in May 2018 and for SUSTAIN in February 2019.

## 3 | RESULTS

For the study, after excluding those participants who had missing data on the type of household income, age, and parity, a final sample size of 31 060 was available for the analyses (Figure 1).

Among women included in this study, a total of 23 414 (75.4%) had no remittances as the source of their household income, while 7646 (24.6%) did have. Overall, the women who had remittances as a household income were slightly older (age group 25 to 29 years comprised 32.1% and 30 to 34 years 11.9%) compared to women from non-remittance-receiving households (29.1% [ $p < 0.001$ ] and 10.8% [ $p < 0.001$ ], respectively). Regarding the variation between different ethnic groups, remittances were more common among households from Brahmin/Chhetri group (38.3% vs. 31.7% [ $p < 0.001$ ]) and Janajati group (31.6% vs. 29.9% [ $p < 0.001$ ]). Moreover, highest educational status (secondary or higher) was more coincidental with remittances (74.3% vs. 66.3% [ $p < 0.001$ ]). Regarding the wealth quintiles, the highest proportion of women from remittance-receiving households belonged to the richest quintile



**FIGURE 1** Inclusion and exclusion process of the study.

(32.2%), while the highest proportion of women from non-remittance-receiving households belonged to the poorest quintile (23.5%) (Table 2).

The proportion of women who had completed four ANC visits was 1.2% higher among women from remittance-receiving households than women from non-remittance-receiving households (87.7% vs. 86.5%,  $p = 0.005$ ). The significant difference was noted in the timing of the first ANC visit, as women from remittance-receiving households reported 6.2% more often to have timely initiation of first ANC than women from non-remittance-receiving households (74.7% vs. 68.5%,  $p < 0.001$ ) (Figure 2).

In the bivariate logistic regression analysis, no significant association was found between the type of household income and overall satisfaction of the services (cOR = 1.04; 95% CI: 0.98, 1.10). Women from remittance-receiving households had 35% higher odds to have first ANC visit during the first trimester of the pregnancy compared to women from non-remittance-receiving households (cOR = 1.35; 95% CI: 1.27, 1.43) (Table 3).

In the multivariate adjusted model, women from remittance-receiving households had no association on satisfaction to services compared to women from non-remittance-receiving households (Model I, 0.97; 95% CI: 0.91, 1.02). When the possible multicollinearity between wealth quintile and other socio-demographic factors was removed, still

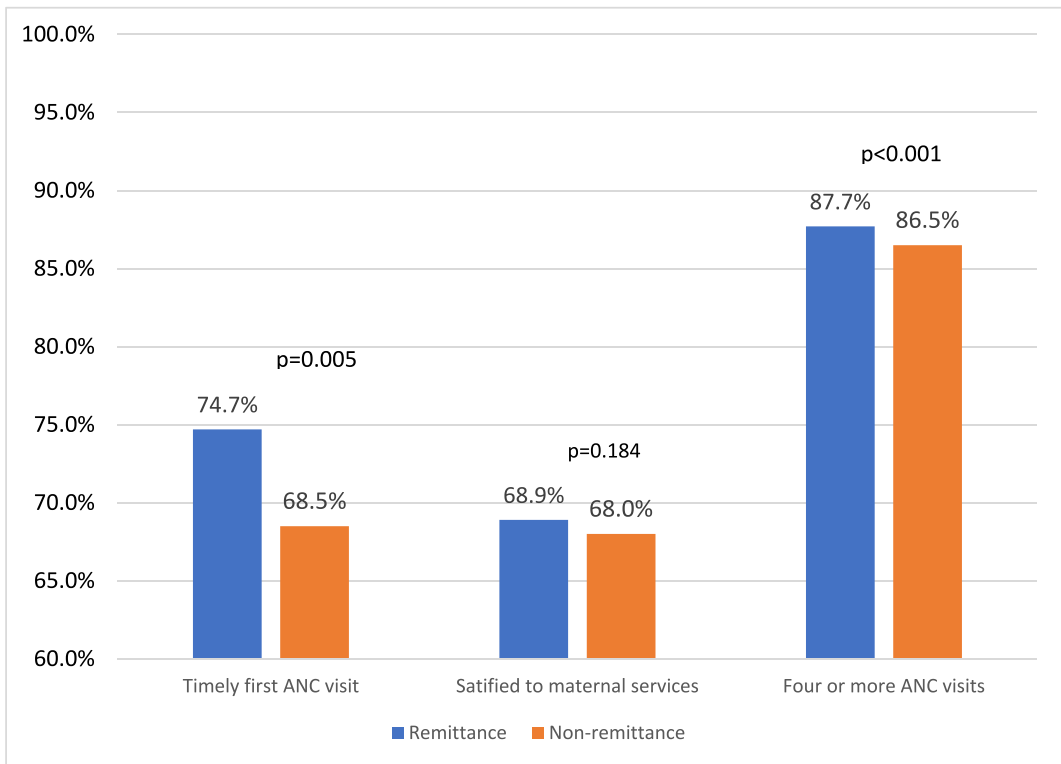
**TABLE 2** Distributions of socio-economic characteristics by the type of household income among Nepali women,  $N = 31\ 060$ .

Characteristics $n$ (%)	Non-remittance-receiving households	Remittance-receiving households	Overall sample
	$n = 23\ 414$ (75.4)	$n = 7646$ (24.6)	$n = 31\ 060$
<b>Age of mother**</b>			
18 or younger	1417 (6.1)	364 (4.8)	1781 (5.7)
19 to 24	11 952 (51.0)	3695 (48.3)	15 647 (50.4)
25 to 29	6822 (29.1)	2452 (32.1)	9274 (29.9)
30 to 34	2532 (10.8)	912 (11.9)	3444 (11.1)
35 or older	691 (3.0)	223 (2.9)	914 (2.9)
<b>Ethnicity**</b>			
Brahmin/Chhetri	7419 (31.7)	2928 (38.3)	10 347 (33.3)
Janajati	6997 (29.9)	2415 (31.6)	9412 (30.3)
Madhesi	4863 (20.8)	1213 (15.9)	6076 (19.6)
Dalit	3159 (13.5)	846 (11.1)	4005 (12.9)
Muslim	976 (4.2)	244 (3.2)	1220 (3.9)
<b>Educational level**</b>			
Illiterate	872 (3.7)	224 (2.9)	1096 (3.5)
Able to read and write	2551 (10.9)	780 (10.2)	3331 (10.7)
Primary	4460 (19.0)	958 (12.5)	5418 (17.4)
Secondary or higher	15 531 (66.3)	5684 (74.3)	21 215 (68.3)
<b>Wealth quintile**</b>			
Poorest	5504 (23.5)	688 (9.0)	6192 (19.9)
Poorer	5486 (23.4)	1159 (15.2)	6645 (21.4)
Middle	3843 (16.4)	1587 (20.8)	5430 (17.5)
Richer	3440 (14.7)	1748 (22.9)	5188 (16.7)
Richest	5141 (22.0)	2464 (32.2)	7605 (24.5)
<b>Parity</b>			
Nullipara	8939 (38.2)	2875 (37.6)	11 814 (38.0)
Primipara	9097 (38.9)	3014 (39.4)	12 111 (39.0)
Multipara	5378 (23.0)	1757 (23.0)	7135 (23.0)

Significance codes: \*\* $p < 0.001$ , \* $p < 0.05$ .

women from remittance-receiving households had no significant association with satisfaction with services (Model III, 0.97; 95% CI: 0.92, 1.03). In terms of the covariates, especially ethnicity, women from the Janjati group, disadvantaged group, have 11% higher odds of satisfaction in reference to advantaged group (Model I, 1.11; 95% CI: 1.04, 1.18). Women from the Muslim group, disadvantaged group, have 59% of less odds of satisfaction in reference to advantaged group (Model I, 0.51; 95% CI: 0.45, 0.58) (Table 4).

After the multivariate adjustment, women from remittance-receiving households had 27% higher odds of having a timely initiation of first ANC visit in reference to women from non-remittance-receiving households (Model I, 1.27; 95% CI: 1.19, 1.35). When the possible multicollinearity between wealth quintile and other socio-demographic factors was removed, the timely initiation of first ANC for women from remittance-receiving households was 38% of higher odds compared to the non-remittance-receiving households (Model III, 1.38; 95% CI: 1.30, 1.47). In terms of



**FIGURE 2** Distribution of women in all the outcome categories by the type of household income.

the covariates, especially ethnicity, women from the Janjati group, disadvantaged group, have 30% higher odds of timely initiation of first ANC visit in reference to advantaged group (Model III, 1.30; 95% CI: 1.22, 1.39). Women from the Muslim group, disadvantaged group, have 44% of higher odds of timely initiation of first ANC visit in reference to advantaged group (Model III, 1.44; 95% CI: 1.26, 1.66) (Table 5).

After the multivariate adjustment, women from remittance-receiving households had no association with four or more ANC visit (Model I, 0.92; 95% CI: 0.85, 1.00 and Model III, 1.00; 95% CI: 0.92, 1.09). When the possible multicollinearity between wealth quintile and other socio-demographic factors was removed, there are no significant odds for four ANC visit for women from remittance-receiving households in reference to women with no income with remittance (Model III, 1.00; 95% CI: 0.92, 1.09). In terms of the covariates, especially ethnicity, women from the Janjati group, disadvantaged group, have 23% lesser odds of four ANC visit in reference to advantaged group (Model III, 0.77; 95% CI: 0.70, 0.86). Women from the Muslim group, disadvantaged group, have 54% of lesser odds of four ANC visit in reference to advantaged group (Model III, 0.46; 95% CI: 0.39, 0.54) (Table 6).

## 4 | DISCUSSION

Remittances were not found to have significant association with receipt and experience of maternal health services. However, women from remittance-receiving households were found to be more likely for early utilization of the ANC services. Further, this study found that the service quality and utilization were strongly associated with several socio-demographic factors. High educational status and wealth improved service quality and utilization. Women



**TABLE 3** Bivariate associations of satisfaction of the maternal healthcare services, having recommended number of ANC visits, and having timely initiated first ANC among Nepali women by socio-economic characters,  $N = 31\ 060$ .

Explanatory factors	Satisfied with the services		Four or more ANC visits		Timely initiated first ANC <sup>a</sup>	
	Crude OR	95% CI	Crude OR	95% CI	Crude OR	95% CI
<b>Household income</b>						
Non-remittance	Ref.		Ref.		Ref.	
Remittance	1.04	0.98–1.10	1.12*	1.03–1.21	1.35**	1.27–1.43
<b>Age</b>						
18 or younger	Ref.		Ref.		Ref.	
19 to 24	0.96	0.86–1.06	1.24*	1.08–1.42	1.13*	1.01–1.25
25 to 29	1.03	0.93–1.15	1.45**	1.26–1.67	1.04	0.93–1.16
30 to 34	1.16*	1.03–1.31	1.58**	1.34–1.86	0.99	0.87–1.12
35 or older	1.03	0.86–1.22	0.79*	0.64–0.97	0.91	0.77–1.09
<b>Ethnicity</b>						
Brahmin/Chhetri	Ref.		Ref.		Ref.	
Janajati	1.09*	1.02–1.16	0.68**	0.62–0.76	1.24**	1.17–1.32
Madhesi	0.35**	0.33–0.38	0.21**	0.19–0.23	1.74**	1.62–1.88
Dalit	0.88*	0.81–0.95	0.38**	0.34–0.43	0.93	0.86–1.00
Muslim	0.43**	0.39–0.49	0.22**	0.19–0.26	1.16*	1.02–1.32
<b>Educational level</b>						
Illiterate	Ref.		Ref.		Ref.	
Able to read and write	1.41**	1.23–1.61	1.88**	1.63–2.17	2.75**	2.38–3.18
Primary	1.80**	1.58–2.05	3.06**	2.67–3.51	2.46**	2.15–2.82
Secondary or higher	2.63**	2.33–2.97	8.49**	7.45–9.66	2.36**	2.08–2.68
<b>Wealth quintile</b>						
Poorest	Ref.		Ref.		Ref.	
Poorer	0.71**	0.66–0.76	1.20**	1.09–1.31	1.39**	1.29–1.49
Middle	0.78**	0.72–0.84	1.95**	1.75–2.16	1.66**	1.54–1.80
Richer	1.30**	1.20–1.41	2.50**	2.22–2.80	1.74**	1.61–1.89
Richest	1.12*	1.04–1.20	2.23**	2.02–2.46	1.73**	1.61–1.86
<b>Parity</b>						
Nullipara	Ref.		Ref.		Ref.	
Primipara	0.80**	0.76–0.85	0.73**	0.67–0.79	1.09*	1.03–1.15
Multipara	0.66**	0.62–0.70	0.43**	0.39–0.46	1.31**	1.23–1.40

Significance codes: \*\* $p < 0.001$ , \* $p < 0.05$ .<sup>a</sup>369 missing values.

from the Janjati, disadvantaged group, had higher odds of satisfaction to healthcare service and timely initiation of first ANC in reference to advantaged group. However, women from the Janjati, disadvantaged group had lesser odds of completing four ANC visit in reference to advantaged group. Women from the Muslim, disadvantaged group had lesser odds of satisfaction to healthcare service and completion of four ANC visit in reference to the advantaged group. However, women from the Muslim, disadvantaged group have higher odds of timely initiation to first ANC visit in reference to the advantaged group.

**TABLE 4** Multivariable logistic regression of the overall satisfaction of maternal healthcare services among Nepali women,  $N = 31\,060$ .

Explanatory factors	Satisfied with the services					
	Model I		Model II		Model III	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
<b>Household income</b>						
Non-remittance	Ref.				Ref.	
Remittance	0.97	0.91–1.02			0.97	0.92–1.03
<b>Age</b>						
18 or younger	Ref.		Ref.		Ref.	
19 to 24	1.03	0.92–1.15	1.03	0.92–1.15	1.04	0.93–1.16
25 to 29	1.09	0.97–1.22	1.09	0.97–1.22	1.11	0.99–1.25
30 to 34	1.21*	1.06–1.39	1.21*	1.06–1.39	1.25*	1.09–1.42
35 or older	1.15	0.96–1.39	1.15	0.96–1.39	1.19	1.00–1.43
<b>Ethnicity</b>						
Brahmin/Chhetri	Ref.		Ref.		Ref.	
Janajati	1.11*	1.04–1.18	1.11*	1.04–1.18	1.09*	1.02–1.16
Madhesi	0.41**	0.38–0.44	0.41**	0.38–0.44	0.40**	0.37–0.43
Dalit	0.95	0.87–1.03	0.95	0.87–1.03	0.93	0.85–1.01
Muslim	0.51**	0.45–0.58	0.51**	0.45–0.58	0.49**	0.43–0.56
<b>Educational level</b>						
Illiterate	Ref.		Ref.		Ref.	
Able to read and write	1.48**	1.28–1.70	1.48**	1.28–1.70	1.45**	1.26–1.67
Primary	1.56**	1.36–1.78	1.56**	1.36–1.79	1.53**	1.34–1.75
Secondary or higher	1.56**	1.36–1.78	1.56**	1.37–1.78	1.55**	1.36–1.77
<b>Wealth quintile</b>						
Poorest	Ref.		Ref.			
Poorer	0.74**	0.69–0.80	0.74**	0.69–0.80		
Middle	0.72**	0.67–0.78	0.72**	0.66–0.78		
Richer	1.10*	1.01–1.20	1.09*	1.00–1.19		
Richest	0.94	0.86–1.01	0.93	0.86–1.00		
<b>Parity</b>						
Nullipara	Ref.		Ref.		Ref.	
Primipara	0.86**	0.81–0.91	0.86**	0.81–0.91	0.84**	0.79–0.89
Multipara	0.79**	0.73–0.85	0.79**	0.73–0.85	0.77**	0.72–0.83

Significance codes: \*\* $p < 0.001$ , \* $p < 0.05$ .

From the service utilization aspect, contrary to previous finding from Nepal, remittances did not have a statistically significant association with the completion of four ANC visits (Gupta et al., 2014; Pandey & Karki, 2014), but the findings showed that the likelihood to have an early initiation of ANC among women from remittance-receiving households. Additionally, as a previous study from Tanzania has also observed, the findings in this study indicates that early ANC initiation predict the completion of all four ANC visits (Gupta et al., 2014). The likelihood was almost two-fold for having the recommended number of ANC visits among those women who had early ANC initiation in

**TABLE 5** Multivariate logistic regression of the timing of the first ANC visit among Nepali women,  $N = 30\,691$ .

Explanatory factors	Timely initiated first ANC <sup>a</sup>					
	Model I		Model II		Model III	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
<b>Household income</b>						
Non-remittance	Ref.				Ref.	
Remittance	1.27**	1.19–1.35			1.38**	1.30–1.47
<b>Age</b>						
18 or younger	Ref.		Ref.		Ref.	
19 to 24	1.02	0.92–1.14	1.03	0.92–1.14	1.04	0.93–1.16
25 to 29	0.86*	0.77–0.97	0.87*	0.77–0.98	0.91	0.81–1.02
30 to 34	0.81*	0.71–0.92	0.81*	0.71–0.92	0.86*	0.75–0.98
35 or older	0.77*	0.64–0.93	0.77*	0.64–0.93	0.82*	0.68–0.98
<b>Ethnicity</b>						
Brahmin/Chhetri	Ref.		Ref.		Ref.	
Janajati	1.32**	1.24–1.41	1.32**	1.24–1.40	1.30**	1.22–1.39
Madhesi	2.09**	1.92–2.28	2.06**	1.89–2.25	2.05**	1.89–2.24
Dalit	1.07	0.99–1.16	1.07	0.98–1.16	0.99	0.92–1.08
Muslim	1.45**	1.26–1.67	1.43**	1.24–1.64	1.44**	1.26–1.66
<b>Educational level</b>						
Illiterate	Ref.		Ref.		Ref.	
Able to read and write	2.57**	2.21–2.99	2.57**	2.21–2.98	2.73**	2.35–3.17
Primary	2.63**	2.29–3.04	2.61**	2.26–3.00	2.80**	2.43–3.22
Secondary or higher	2.83**	2.46–3.25	2.81**	2.45–3.23	3.35**	2.92–3.84
<b>Wealth quintile</b>						
Poorest	Ref.		Ref.			
Poorer	1.29**	1.19–1.39	1.31**	1.21–1.41		
Middle	1.56**	1.43–1.69	1.62**	1.49–1.75		
Richer	1.72**	1.58–1.88	1.81**	1.66–1.97		
Richest	1.76**	1.63–1.90	1.84**	1.70–1.99		
<b>Parity</b>						
Nullipara	Ref.		Ref.		Ref.	
Primipara	1.18**	1.11–1.25	1.18**	1.12–1.26	1.15**	1.08–1.22
Multipara	1.55**	1.43–1.67	1.56**	1.44–1.68	1.48**	1.37–1.60

Significance codes: \*\* $p < 0.001$ , \* $p < 0.05$ .<sup>a</sup>369 missing values.

reference to their counterparts who did not have. However, a study from sub-Saharan Africa have observed that timely initiated ANC might not translate into completing the recommended number of visits (Magadi et al., 2007).

Patient experience expressed as satisfaction is an important outcome measure for health services (Williams, 1994; Williams et al., 1998) and is an integral part of the WHO quality of care framework (World Health Organization, 2018a, 2018b). Experience of care does not correlate with provision of care and a women's demographic factor influence experience of care. In this study, based on the WHO quality of care framework, we assessed

**TABLE 6** Multivariate logistic regression of the number of ANC visits during pregnancy among Nepali women,  $N = 31\,060$ .

Explanatory factors	Four or more ANC visits					
	Model I		Model II		Model III	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
<b>Household income</b>						
Non-remittance	Ref.				Ref.	
Remittance	0.92	0.85–1.00			1.00	0.92–1.09
<b>Age</b>						
18 or younger	Ref.		Ref.		Ref.	
19 to 24	1.31**	1.14–1.51	1.31**	1.14–1.51	1.31**	1.13–1.50
25 to 29	1.57**	1.35–1.83	1.57**	1.35–1.83	1.57**	1.35–1.83
30 to 34	1.83**	1.53–2.19	1.83**	1.53–2.20	1.83**	1.53–2.19
35 or older	1.21	0.96–1.52	1.21	0.97–1.52	1.20	0.96–1.51
<b>Ethnicity</b>						
Brahmin/Chhetri	Ref.		Ref.		Ref.	
Janajati	0.77**	0.69–0.86	0.77**	0.70–0.86	0.77**	0.70–0.86
Madhesi	0.40**	0.36–0.44	0.40**	0.36–0.45	0.40**	0.36–0.45
Dalit	0.59**	0.52–0.66	0.59**	0.52–0.66	0.56**	0.50–0.63
Muslim	0.45**	0.38–0.53	0.45**	0.38–0.53	0.46**	0.39–0.54
<b>Educational level</b>						
Illiterate	Ref.		Ref.		Ref.	
Able to read and write	1.78**	1.53–2.05	1.78**	1.54–2.06	1.89**	1.64–2.19
Primary	2.56**	2.22–2.96	2.57**	2.23–2.97	2.73**	2.37–3.14
Secondary or higher	4.36**	3.77–5.04	4.37**	3.79–5.06	4.98**	4.32–5.74
<b>Wealth quintile</b>						
Poorest	Ref.		Ref.			
Poorer	1.24**	1.13–1.37	1.24**	1.12–1.36		
Middle	1.62**	1.44–1.81	1.59**	1.42–1.78		
Richer	1.64**	1.45–1.86	1.61**	1.43–1.82		
Richest	1.37**	1.23–1.53	1.34**	1.21–1.49		
<b>Parity</b>						
Nullipara	Ref.		Ref.		Ref.	
Primipara	0.84**	0.77–0.92	0.84**	0.77–0.92	0.85**	0.78–0.93
Multipara	0.60**	0.55–0.67	0.60**	0.54–0.67	0.61**	0.55–0.68

Significance codes: \*\* $p < 0.001$ , \* $p < 0.05$ .

both provision and experience of care. We built a conceptual framework to holistically interpret the factors influencing the decision to seek and use maternal healthcare services in Nepal using the three-delay care model (Thaddeus & Maine, 1994). The framework also visualizes how the perceived quality of health services and the decision to seek healthcare are connected. Further, the whole care utilization process contributes to the patient outcome and the mother's judgment (i.e., overall satisfaction) of the received health services.

Remittances might have impacted the early utilization of ANC services by enabling women to become self-dependent to decide for health services (Kapri & Jha, 2020; Thapa & Acharya, 2017). The idea of explicit monetary connection with increased early utilization of the maternal health services is consistent with the findings on wealth status. More affluent women were more likely to have their first ANC visit early in the pregnancy. A systematic review of studies from several LMICs identified that possible loss of wage and external costs (such as transportation and medication) might act as a barrier for care among poorer women (Simkhada et al., 2008). Studies from Nepal and Ethiopia observed that early initiation of ANC was almost fourfold more likely among women from wealthiest quintile (Paudel et al., 2017; Tarekegn et al., 2014). Moreover, a study using Demographic and Health Survey data from 45 different LMICs found that utilization of ANC services among the most affluent quintile was consistently 80% or higher (Houweling et al., 2007). As in this study, the use of services decreased progressively with decreased wealth (Houweling et al., 2007).

Besides the increased purchasing power, women's "left-behind" status can provide more significant decision-making role, especially if women residing in nuclear families (Agasty, 2014; Lenoël, 2017). Thus, the findings in this study could indicate that women from remittance-receiving households may have had increased decision-making autonomy over their healthcare service utilization. In addition, women from wealthier households were found to have higher educational attainments, which have been previously observed to further increase the decision-making autonomy (Bloom et al., 2001; Lenoël, 2017). In this study, the likelihood to have the first ANC visit in first trimester among women with highest education level was much higher than among women with lower educational attainments. This commensurate with previous findings from LMICs, which have consistently found a significant relationship between the education and early initiation of ANC (Ministry of Health and Population et al., 2017; Paudel et al., 2017; Simkhada et al., 2008).

Women from the relatively disadvantaged group were likely to have their first ANC visit in first trimester of their pregnancies, however, due to poor satisfaction for care, they lower odds to complete all four ANC visits. The results in terms of association between ethnicity and utilization was similar to the previous findings from Nepal (Deo et al., 2015; Paudel et al., 2017). Furthermore, studies have shown that Nepal's society is highly unequal, and especially ethnic background can strongly affect individuals' general opportunities in life and access to essential services (OECD, 2008; KC et al., 2020). This implies that relatively disadvantageous background is inversely associated with lower education and poor wealth status, which have been shown to have a negative impact on maternal healthcare services (Devkota et al., 2018; Paudel et al., 2017).

## 4.1 | Methodological consideration

This study has some strengths. The study used secondary analyses as the data have already been collected in the initial studies, the breadth of data available was extensive, and typically the initial studies were conducted rigorously using standard protocols and trained data collectors. The data were collected from nine different hospitals across all the provinces in Nepal, resulting in a significant sample size and a broad geographical composition of population.

This study also has several limitations. First, the use of secondary data means that the original data were collected to answer different research questions. As a result, the data do not necessarily include all the desired variables or information, and some variables may have been defined differently, such as women's self-perceived decision-making level in the household and possible service fees. Second, the interviews took place in hospitals, which may have introduced bias in reporting due to the lack of neutrality in the interview setting (Srivastava et al., 2015). These might have led to misreporting and loss of information. Third, as many remittance-receiving households had multiple sources for their household income, there might have been overestimation of impact of remittances on the service quality and the service utilization as the share of remittances of the overall household income may have been insignificant. Fourth, this study did not consider the possible differences in the quality and accessibility between the

study hospitals and lower level birthing centres (BCs) or private service providers. Fifth, the study sample was limited to only those women who gave birth in health facilities and therefore significant proportion who delivered at home were not included. Finally, the study, information was collected from two cohort studies: the REFINE cohort, which included only one hospital, and the SUSTAIN cohort, which included eight hospitals and might have a heterogeneity introduced due to large dataset from SUSTAIN. We conducted a supplementary analysis using the SUSTAIN dataset and the results were similar (Table S1).

## 4.2 | Policy and programmatic implication

In comparison with women who did not receive remittance-based income, there is increased odds of timely initiation of first ANC visit with no increased odds of satisfaction to care and no increased odds of completing four or more ANC visit for women who receive remittance has several programmatic implications. Women who receive remittance are more resourced to take go to health facility for first ANC visit; however, they are not satisfied with the care from public health facility; as a result, the completion of all four ANC visit is similar to those women who did not receive remittance. Further, the result show a drop in healthcare utilization, specifically in the completion of four or more ANC visits, among disadvantaged groups, particularly the Janjati and Muslim groups. This indicates that the experience of care among women from disadvantaged groups during the first ANC visit was poor, leading to discontinuation of care. The health system now needs to improve its service readiness and experience of care for women who visit health facilities for pregnancy care. Interventions such as providing respectful care by healthcare providers can enhance the experience during the first ANC visit, which may improve continuity of care for women from disadvantaged groups as well as those who receive remittances.

## 5 | CONCLUSION

Women from remittance-receiving households were more likely to initiate ANC early yet there was no statistically significant relation found with the completion of all four ANC visits and remittances. The findings indicate that maternal health programmes need to address the health system barrier to make quality maternal healthcare services accessible.

### DATA AVAILABILITY STATEMENT

The dataset generated and analysed is not publicly available as it is part of larger quality improvement projects but can be made available on reasonable request with a data-sharing agreement.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Kilpi, K., Puthoopparambil, S., Gurung, R., Malla, H., Basnet, O., & KC, A. (2025). Association of international remittance with satisfaction and utilization of maternal healthcare services in Nepal: A secondary analysis of two cohort studies. *Journal of International Development*, 37(1), 51–67. <https://doi.org/10.1002/jid.3950>