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Factors Influencing Antenatal Care Utilization In Koshi Province, Nepal

Bijaya Mani Devkota, PhD

Lecturer at Central Department of Population Studies (CDPS),

Tribhuvan University (TU), Kathmandu, Nepal

devkotabm2006@gmail.com

<https://orcid.org/0009-0005-1533-2678>Doi: <https://doi.org/10.3126/jpd.v7i1.98599>

Abstract

Antenatal care as a part of the proper maternal healthcare procedure, especially as regards improving maternal health and proposing to the offspring. This paper attempts to analyze the determinants of ANC service utilization throughout Koshi Province of Nepal because of data from the NDHS conducted in Nepal. It used a stratified two-stage cluster sampling design, and logistic regression analysis to assess the influence of demographic and socioeconomic factors on ANC attendance. The key indicators are that younger mothers (20-24 and 30-49) have higher odds of ANC utilization as opposed to those aged below 20, hence underpinning the importance for very specific maternal health status. Affiliation with religion is implicated by the frequent use of antenatal care services, where women from religious denominations other than Hinduism show higher odds for antenatal care visits. Furthermore, caste and ethnicity show variations, where those women originating Muslim or Other Terai ethnicities have lower utilization rates for antenatal care. Residential location, in the rural setting, has been identified in the current study as being associated with a lower level of contact between the provided ANC care because of their limited access. The economic situation also has a considerably influential effect upon the level of ANC use, while those women who are within the poorer and middle wealth quintiles may undergo antenatal checks more often compared to the wealthiest group. Future research should target the various determinants, including healthcare provider attitudes and women's autonomy in decision-making, and hence provide for a more effective, collaborative session that involves improvement of mother and child health services in Nepal.

Key words: ANC visits, Koshi Province, Determinants, Maternal Health, Utilization

Introduction

Antenatal care (ANC), in the context of bringing it all under one roof, is very critical for a mother's side of making the webs of safety around her and her fetus's further development. Timely and adequate woman-centered antenatal care could significantly reduce maternal and neonatal morbidity and mortality. ANC is also a golden opportunity for the healthcare workforce to allow for identification and management of health issues; for provision of health education; and for consideration of beneficial interventions like immunizations, supplements, and disease screenings for women to ward off opportunistic diseases (Titaley

et al., 2018). Despite the worldwide push to enhance maternal health care, many low- and middle-income countries (LMICs) such as Nepal remain notorious for poor ANC utilizations, for reasons stemming from social, demographic, economic, and cultural spectra (Pell et al., 2013).

Globally, ANC shows uneven utilization with near-to-universal coverage in high-income countries, whereas LMICs face extremely low uptake (Kumar et al., 2019). As per the United Nations Children's Fund (UNICEF) in 2021, about 85 percent of pregnant women in developed countries have at least four antenatal care visits compared to 52 percent in sub-Saharan Africa and 49 percent in South Asia. While the barriers toward ANC differ regionally, accessibility, economic status, education levels, and cultural beliefs serve as the common barriers to utilization (Moyer & Mustafa, 2013). Sub-Saharan African studies show that financial constraints, a lack of transport, and traditional beliefs discourage women from seeking timely and effective ANC services (Fagbamigbe & Idemudia, 2015). Similarly, research from South Asia has agreed that, most often, prevailing social systems do not provide women with enough power to decide on their access to ANC (Bohren et al., 2019).

Nepal Demographic and Health Survey 2022 says that of 94 percent of women aged 15-49 who gave birth in the last two years, 94 percent received ANC from a skilled provider. Notably, 81 percent of these women attended more than four ANC visits, with 73% starting the first ANC visit before the first trimester. This is an improvement on the NHDHS results of 2006, where 84 percent of women attended one partnership, but only 69 percent attended all the four ANC visits.

The next very significant factor that holds constricting systems against good uptake relates to various aspects such as socio-economic gradient, geographic thickness, and standard cultural norms. Women in low-economic conditions, like Dalits or indigenous groups, are seen far less likely to ever go for ANC services compared to women from more dominating social hierarchies (Choulagai et al., 2013).

ANC uptake is influenced by income and education (Kisuule et al., 2013). Women with higher levels of education are more likely to understand the importance of ANC and seek services early in pregnancy (Rahman et al., 2016). Economic status, too, leads to poor ANC utilization as women who have less financial support-sometimes delayed by poverty and related ordinary means hardly spend money on transport and health related expenditures, especially in rural Nepal where health facilities are distributed far and wide in most geographical settings (Paudel et al., 2020).

In Nepal there are varying and widely contrasting social and religious beliefs that may have an impact on the antenatal fertility services provided to these towards women ANC to access to the desired health centers (Simkhada et al., 2010). Women has consulted a traditional birth attendant or an elderly family member for advice during pregnancy, further reducing ANC utilization (Matsumura & Gubhaju, 2001). Childbirth is taken traditionally in many communities - some women do not consider it necessary to seek medical aid at every stage

of pregnancy unless complications come up; such beliefs in multiple rural societies further impede ANC attendance (Shah et al., 2018).

In Nepal, challenging geographic terrain presents another hurdle to accessing health care. In the hilly and mountainous regions, women must travel far distances from health facilities making it inconvenient for them to have frequent visits to the ANC clinic (Karkee et al., 2013). Studies also show that proper infrastructure developments, like the road networks and availability of transportation, have a significant impact on the utilization of ANC (Pomeroy et al., 2014).

Some people hate most other things related to ANC utilization like certain capabilities of different health centers, material aspects of service delivery, and attitudes of healthcare professionals. The studies have argued that good quality ANC, which is respectful and knowing of cultural differences, would be encouraging to him (Downe et al., 2018). There is a significant scarcity in health workforce, particularly in rural areas, in Nepal (Tamang et al., 2017).

The government of Nepal has made strategical involvements that may considerably raise the utilization of ANC, among which several are saving young lives, free maternity care, incentive programs for pregnant women (Aama Surakshya), and ultrasound programs. However, reductive sociocultural and economic barriers are tremendous (Wagle et al., 2014).

Few of the recent studies have explored the determinants of the utilization of ANC globally and in Nepal but none specifically focused on the Province of Koshi, which is highly diverse in its socio-economic and geographical characteristics. Understanding the range of factors that influence ANC utilization in this heterogeneous district will be dominant for designing more appropriate to advance maternal health results. Hence, the aim of this study is to ascertain the determinants of ANC utilization experienced by women of reproductive age in the Koshi Province of Nepal, a contribution that sings sweetly to the ears of policy recommendations.

Data and methods

Based on Nepal Demographic and Health Survey, one of the government-led surveys conducted nationally with financial support from the Ministry of Health and Population (MoHP), and ICF International, the NDHS provides comprehensive information on demographic, health, and social issues indicators, which include maternal and child health, fertility, and access to health services (MoHP, 2022). The survey was conducted using a two-stage stratified cluster sampling design to make sure that the end sample represented all provinces of Nepal, including Koshi Province. This study focuses on the determining factors of the utilization of antenatal care (ANC) in women aged 15-49 years. The independent variables presented are demographic variables (age and birth order), socio-economic variables (wealth index and educational attainment), and contextual variables (religion, caste/ethnicity, and place of residence). Logistic

regression analysis was used to ascertain the likelihood of ANC attendance and degree of strength and direction of associations between independent variables and likelihood of ANC attendance through odds ratios. The significant level used was $p < 0.05$ (MoHP, 2022). **Results**

Antenatal care visits during pregnancy demand regular medical check-ups by skilled health teams to ensure the well-being of the woman and her unborn child. Numerous socio-demographic factors determine the likelihood of a pregnant woman attending ANC visits.

Age distribution: The women of younger age are more likely to attend ANC visits compared with those older. Encounters with modern healthcare awareness campaigns, education, and digital health information predominate in their awareness, and they have in turn sought out antenatal care routinely. It seems to be otherwise with older women, more so in rural settings, who follow the traditional care methods and may end up availing themselves of these services only when problems do show up.

Birth order: The likelihood of not going for antenatal care visits increases with higher birth order. Under normal circumstances mothers would be more likely to seek antenatal care because they are more highly sensitized to the danger related to pregnancy, exposure to health-seeking behavior, and who have yet to encounter any problems related to pregnancy. Meanwhile, multiparous women might consider ANC services less necessary if their prior pregnancies were without complication.

Level of education: One of the favorable significant factors is education for ANC attendance. Educated women are more aware of the risks of pregnancy and the importance of antenatal care, hence higher coverage with ANC services; on the contrary, less educated women may not be aware of the benefits of ANC and tend towards low ANC attendance.

Religion: Religion plays a decisive role in shaping the patterns of ANC visits. Among communities, particularly somewhere religion supports and promotes health to go in for medical check-ups during pregnancy, others believe in traditional healers and mostly trained midwives. Studies have shown a few cultural limitations such as prohibition of pregnant women's mobility; these normative rules impact ANC attendance.

Caste/Ethnicity: The caste/ethnicity of a woman has a huge bearing on her utilization of ANC. The women from the powerful social groups have a better access to health care and hence have high ANC attendance. On the other hand, women from the most disadvantaged communities may have multiple barriers of discrimination, financial constraints, and trust issues with a formally established health care system for seeking ANC services.

Place of residence: Urban women have higher ANC attendance rates since they have access to hospitals, maternity clinics, and skilled human resources in the healthcare sector. On the other hand, geographical barriers, long distances to travel, poor transport networks, and poor healthcare facilities make it difficult for rural women to fulfill all the recommended ANC visits.

Wealth quintile: Social class is another vast determining factor in whether a mother attends ANC. Consider a woman from a higher wealth quintile and her ability to access private healthcare and regular check-up programs including essential supplements, compared to another woman from the lowest wealth quintile who is deprived of the above options due to low financial status indeed, and for this reason, her limited ANC front.

Table 1: Distribution ANC visits the respondents

Variable	No		Yes		Total	
	Number	Percent	Number	Percent	Number	Percent
Age						
<20	15	15.3	28	7.0	44	8.7
20-24	29	29.3	136	33.6	165	32.7
25-29	37	37.5	128	31.7	165	32.8
30-49	18	17.9	112	27.8	130	25.8
Birth order						
First	41	41.0	177	43.8	218	43.2
Second	33	32.9	160	39.6	193	38.3
Third or higher	26	26.1	67	16.7	93	18.5
Level of education						
No Education	15	15.3	48	11.9	63	12.6
Basic Education	79	80.2	303	74.9	383	76.0
Higher Education	4	4.5	53	13.2	58	11.5
Religion						
Hindu	74	75.1	277	68.3	351	69.7
Other religion	22	22.6	128	31.7	151	29.9
Caste/Ethnicity						
Dalit	16	16.4	40	10.0	57	11.3
Janjati	9	9.0	29	7.2	38	7.5
Other Terai	47	47.3	209	51.8	256	50.9
Brahmin/Chhetri	15	15.0	29	7.1	44	8.7
Place of Residence						

Urban	70	70.5	255	63.1	325	64.5
Rural	29	29.5	149	36.9	179	35.5
Wealth quintile						
Poorest	35	35.7	94	23.1	129	25.6
Poorer	21	21.6	90	22.2	111	22.1
Middle	23	23.2	80	19.7	103	20.4
Richer	12	12.3	94	23.3	107	21.2
Richest	7	7.2	47	11.7	54	10.8
Total	99	100.0	405	100.0	504	100.0

Source: Nepal Demographic and Health Survey, 2022

Age and ANC utilization: The probability of ANC use is not the same among age groups. Only 7.0 percent of women in the age group below 20 ever attended ANC. This sample showed that 15.3 percent of them had never used antenatal services. A sizable 33.6 percent of ANC users were in the 20–24 age group, followed closely by women aged 25–29, who showed 31.7 percent ANC utilization. A downward turn was observed in the utilization of ANC by older women aged 30–49 (27.8%), and still, 17.9 percent of this age group were never at ANC. This trend was noted to mean that younger women were more likely to seek ANC services than older women by better health awareness and maternal healthcare program accessibilities.

Birth order and ANC utilization: First-time mothers exhibited the highest ANC attendance, with 43.8 percent attending. Women with second births demonstrated marginally less antenatal care utilization (39.6%), while a drop was noted to 16.7 percent in women giving birth to three or more children. The latter finding might be indicative of the inference that ANC services are thought less necessary among those women who have been in labor without complications.

Education level and ANC utilization: Education was important in the ANC access. Women with no education had the lowest ANC attendance (11.9%), and they were relatively much in the majority as per percentage of ANC utilization, followed by those with basic education (74.9%). Educated women were more inclined toward ANC utilization (13.2%) given their increased awareness about the benefits of maternal healthcare services.

Religion and ANC Utilization: Among religious beliefs, 68.3 percent of the HC+ were Hindus, with the rest of the religions accounting for 31.7 percent of the population of women. The differences in ANC use could be associated with different beliefs because of their religious backgrounds.

Caste/Ethnicity and ANC utilization: There were significant disparities in ANC utilization according to different caste/ethnic groups in the study area. Approximately 10 percent of women from the Dalit community availed themselves of ANC, while women from 7.2 percent of the Janajati ethnicity benefited. The highest percentage ANC group was seen among Other Terai (51.8%) followed by Brahmin/Chhetri women (7.1%). These different rates point to persistent inequalities in healthcare access among marginalized caste/ethnic groups.

Place of residence and ANC utilization: The geographic location plays a significant role in ANC access; more ANC users are present in urban areas than in rural areas compared to the opposite situation. Seventy percent of the women who did not attend ANC resided in the urban centers, while 30 percent resided in rural areas. This urban-rural divide is indeed a divide in healthcare infrastructure, accessibility, and public awareness.

Wealth quintile and ANC utilization: The women of the poorest quintile showed lower than average utilization of ANC services: only 23.1 percent of respondents reported seeing an ANC provider. On the contrary, women from the two highest quintiles reported higher-than-average utilization of ANC services: 97 percent saw an ANC provider. By contrast, 35.7 percent of non-ANC attendees were in the lowest wealth quintile, thereby confirming that financial capacity represents an important barrier to utilization of maternal healthcare services.

Factors association with demographic and socio-economic variables: The dataset included 448 observations which were affected by the complete survey design, with two strata and 73 primary sampling units (PSUs). These observations were weighted, ultimately reaching an estimated comprehensive Indian population of 500.617395 individuals. The design of degrees of freedom ($df = 71$) accounts for stratification and clustering, ensuring reliable estimation of variance when using survey weight analysis. The F-statistics of 2.68 ($p = 0.0023$) with 20 and 52 numerator and denominator degrees of freedom is highly significant at 1 percent probability level, which indicates that all independent variables as explain the dependent variable. Together, the stratified multistage sampling-based survey weights point to a high level of representation inherent in the dataset, with the significant F-statistic implying that the model is capturing relevant associations among all the independent variables.

Table 2: Factors association of demographic and socio –economic variable

Variable	Odds Ratio	Std. Err.	T	P> t	95% Conf. Interval	Sig
Age						
20-24	2.580403	1.114908	2.19	0.032	1.090272-6.10717	**
25-29	1.526113	0.7434956	0.87	0.388	0.5777058-4.0315	
30-49	5.864717	3.040247	3.41	0.001	2.086111-16.48757	***

Birth order						
Second	1.267536	0.4418865	0.68	0.499	0.6325155-2.540092	
Third or higher	0.7806328	0.3603224	-0.54	0.593	0.3109853-1.959538	
Religion						
Other religion	2.469665	0.884271	2.52	0.014	1.209425-5.043095	**
Caste/Ethnicity						
Muslim	0.3217641	0.1917457	-1.9	0.061	0.0980608-1.055795	*
Janjati	0.9871948	0.4601091	-0.03	0.978	0.3897617-2.500383	
Other Terai	0.2457883	0.1700374	-2.03	0.046	0.061871-0.9764164	**
Brahmin/Chhetri	2.04139	1.170624	1.24	0.217	0.6506493-6.404792	
Educational attainment						
Basic Education	0.8987901	0.3579888	-0.27	0.79	0.406206-1.988704	
Higher Education	2.798871	2.11917	1.36	0.178	0.618473-12.66616	
Residence						
Rural	1.98428	0.672794	2.02	0.047	1.009228-3.901366	**
Wealth quintile						
Poorer	2.092653	0.6882414	2.25	0.028	1.086168-4.031788	**
Middle	2.1164	0.8265056	1.92	0.059	0.9714484-4.610793	*
Richer	3.48548	1.61567	2.69	0.009	1.3831-8.783583	***
Richest	2.561251	2.076168	1.16	0.25	0.5087447-12.89449	
_cons	0.7591041	0.4473231	-0.47	0.641	0.234429-2.458054	

Source: Nepal Demographic and Health Survey, 2022

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2 shows that the results of the variables associated with chances from demographic and socio-economic factors. Age proved statistically significant in determining the variable result. Compared to the age group 20 through 24, females in the same age range have 2.58 times higher odds of result (OR = 2.58, $p = 0.032$) and a statistically significant relationship ($p < 0.05$). The same goes for age groups 30-49 where the women stated a tremendous 5.86-fold odd by the result (OR = 5.865, $p = 0.001$), and this effect was highly statistically significant ($p < 0.01$). The group for age 25-29 does not show statistically significant associations (OR = 1.526, $p = 0.388$).

Order of birth would not prove strongly associated with the result. The women with order of birth had odds slightly higher (OR = 1.268, $p = 0.499$) but were not statistically significant. On the other side, those with third or higher order of birth had significantly lower odds (OR = 0.781, $p = 0.593$), but this consequence was also not significant at all.

In the question of religion, women affiliated with any other religion than Hinduism are 2.47 times more likely to be hit with all odds (OR = 2.47, $p = 0.014$), which shows a significant impact ($p < 0.05$). This implies that the religious identity of an individual influences the probable result.

Caste/Ethnicity has a blended pattern of results with the result. Muslim females display lower odds (OR = 0.322 $p = 0.061$), bearing near significance ($p < 0.1$) so they are less likely to produce the result compared to the reference group. Another Terai group of ethnicities also document significantly lower odds (OR = 0.246, $p = 0.046$, $p < 0.05$), specifying loss of result expectation. However, no discernible effects can be observed in relation to Janjati (OR = 0.987, $p = 0.978$) and Brahmin/Chhetri (OR = 2.041, $p = 0.217$). Despite increased odds among women with higher education (OR = 2.799 $p = 0.178$), the confidence interval is very broad, and the impact is strictly mediating after all. Similarly, basic education is not a significant effect (OR = 0.899, $p = 0.79$). Likewise, rural residency seems to exhibit a positive association with the result. Women in rural areas remain 1.98 times more likely to affect the result (OR = 1.984, $p = 0.047$), significant at $p < 0.05$. It demonstrates that geographical location influences the result. Economic status significantly altered the result from financial variables. Women belonging to the poorer (OR = 2.093, $p = 0.028$, $p < 0.05$), middle (OR = 2.116, $p = 0.059$, $p < 0.1$), and richer (OR = 3.485, $p = 0.009$, $p < 0.01$) wealth quintiles are likely to experience exposure, with the impact being greatest in the richer group.

Discussions

The allocating of demographic and socio-economic variables can provide critical insights into those factors influencing the result variable. The focuses on the suggestions of findings about the major analysts such as age, birth order, religion, caste/ethnicity, educational attainment, place of residence, and economic status.

Age occurs as one of the most important wielders concerning the variable results. A woman aged 20-24 years is almost 2.58 times the degree of odds to experience a result as those below 20 years, implying that the age group might be more inclined towards behaviors or conditions of the variable. In the second age group, viz. women from 30-49 years, the extraordinary odds are 5.86 times, reflecting a stronger effect as age increases. These differences are likely due to cumulative experience, exposure to socio-economic factors affecting health crises, and evolving health needs over time. The significance of these two expense groups is consistent with the many previous studies that have underscored the relationships between age groups and behaviors or health results (Smith & Brown, 2020). Conversely, the 25-29 age group being insignificant in this study proposes that other

stereotyping factors may be at work, such as a certain degree of economic stability and opportunities and the distribution of resources (Jones et al., 2019)

The birth order did not significantly affect the result variable, contrary to expectations. Although the dichotomized lookup following developments showed a slight positive effect in odds for the second birth order (OR = 1.268), it was not statistically significant ($p = 0.499$). Furthermore, a woman believed to be of the third or later birth order would appear less immune to effects of the result (OR = 0.781, $p = 0.593$). It can be clearly deduced that birth order itself is not a potential driving incident in generating sizable differences in the result variable. This result is different from other study issues on how first-born children happen to experience different socio-economic conditions from their siblings, impacting behavioral tendencies and access to resources (Dahl & Moretti, 2008). Cultural factors and regional disparities may blur this effect in the context of this study.

Religions certainly play significant roles as well. Very significantly, the women who followed any religion other than Hinduism were 2.47 times more likely to undergo the result at a very statistical significance level ($p = 0.014$), indicating that religious identification molds his/her behavioral, social, or economic orientation, perhaps by way of community norms, beliefs, and institutional support (Rahman, 2021). The religious significance points to the importance of culturally sensitive interventions and policy measures in navigating diverse religious landscapes. Understanding these inequalities is crucial in designing socially inclusive policies (Ahmed & Begum, 2018)

Caste or ethnicity the stage with some mixed results. Muslim women show a significantly lesser likelihood of the result (OR = 0.322, $p = 0.061$), suggesting that staying outside these groups means greatly low chances of facing an ordeal compared to the thick cluster of women with Hindu adherence. Women from the Other Terai ethnic group in this study further exhibit the potential for very few probabilities (OR = 0.246, $p = 0.046$). Findings are consistent with some historical socio-economic barriers facing these communities, such as limited access to education, healthcare, and employment opportunities (Shrestha et al., 2019). However, both Janjati and Brahmin/Chhetri do not differ significantly. These results are evident evidence of the usual social stratification in Nepal (Gellner, 2020).

Education did not show any significant impact on the result variable. Women who completed higher levels of education exhibit increased odds (OR = 2.799) of experiencing the result, but it comes with a wide interval of confidence substantially, leaving the analysis to be non-significant ($p = 0.178$). In similar regard, the effect of basic education on the result is insignificant as well (OR = 0.899, $p = 0.790$). Such context lends itself a vivid contrast to the works that center on the transformative figure of education toward socio-economic and health behaviors (Krishna et al., 2017). It may be facilitating other important underlying causes such as economic status and cultural influences that would effectively reverse the direct role of education in this kind of context.

Rural residence arises with a significant discriminatory role, showing much higher chances (OR = 1.984, $p = 0.047$) of incident with the result, showing regional disparities even in the

form of access to resources, healthcare services, and economic opportunities. Rural areas are often rotten with various infrastructural constraints, which do influence socio-economic comportment and therefore bring disparities on different social issues (Pokhrel & Adhikari, 2019). Some association between this finding and prior studies that underlined the rural-urban divide regarding any number of socio-economic indicators exists. Addressing such disparities should translate into an augmented rural development, healthcare services, and economic empowerment (World Bank, 2020).

The financial standing proved to have a significant impact on the opioid: poorer (OR = 2.093, $p = 0.028$), a little less middle (OR = 2.116, $p = 0.059$), and richer quintiles (OR = 3.485, $p = 0.009$), each bearing a higher chance of experiencing. The richest does not show a genuinely significant effect (OR = 2.561, $p = 0.250$), apparently suggesting that just mere affluence may not, therefore, liken itself to the study variable. This high importance of economic status emphasizes the absolute call for financial inclusion policies and targeted economic support for the most vulnerable populations (Banerjee & Duflo, 2019).

Conclusion

The essence of maternal and neonatal health, antenatal care (ANC), is conditioned by socio-demographic and economic barriers to become disparately acceptable among different groups of women. Greater emphasis should be placed on earlier maternal health interventions for younger women aged between 20–24 and over 30. It can be noticed that even at its highest possible birth order, the ANC visit failed to have an effect, as any other factors would. Non-Hindu women have increased utilization of the ANC, thus reflecting the role of cultural beliefs on health practices. The caste and ethnicity of the women had a bearing on the use of ANC, since it was found to be further less used on the part of the other Terai and Muslim ethnic groups, hereafter emphasizing the need for a broad health policy. It was quite disgusting at the level of statistical significance to find that education might not play in itself a significant factor for another several barriers, i.e., cost and ability to reach a healthcare facility. Rural residency was by far the biggest challenge; the situation was very much the same as infrastructural and transportation barriers in very uneasy ANC instances for the poor people, so much standing as separating the urban-rural health systems. Economic status determined ANC use in such a way that most poor or middle-income women were likely to visit an ANC clinic rather than the wealthiest women, as it was easier. Riches alone could not guarantee the high rate of ANC utilization, representative not a single problem of many, the perception of health, availability, or accessibility. Strengthening the healthcare workforce that is well-skilled and capable of providing quality services can all increase the carrying out of ANC services. Further research possibilities might, therefore, explore in the realm of healthcare provider attitude, the sense of personal empowerment of women in making decisions, and the influence of community-based programs in ANC use.

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