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RESEARCH ARTICLE

Factors Affecting Antenatal Care Utilization Among the Disadvantaged Dalit Population of Nepal: A Cross- sectional Study

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Abstract:

Background:

Antenatal Care (ANC) visits are intended to prevent, identify and treat conditions that may threaten the health of the mother and newborn, and to increase the chance she has a smooth pregnancy and and safe childbirth. The most disadvantaged and underprivileged caste (Dalit) of Nepal has benefitted the least from maternal health service improvements in the recent years.

Objective:

This study was conducted to determine the rate and factors associated with the antenatal care service utilization among the most disadvantaged ethnic group (Dalit women) and recommend interventions to improve ANC utilisaiton, in the Mahottari district of Nepal.

Methods:

A cross-sectional study was conducted during July-December 2014 using a structured questionnaire. A total of 328 recently delivered mothers were interviewed covering the entire district. Descriptive statistics, binary and multivariable logistic regression analyses were computed. Statistical significance was considered at $p < 0.05$ and the strength of statistical association was assessed by odds ratios with 95% confidence intervals.

Results:

ANC utilization rate (≥ 4 ANC visit) was found to be 42%. Mother's education, husband's education, mother's occupation, perceived "good quality" ANC, hearing about incentive program, maternal health message, non-perception of health workers behaviours as discriminatory, and exposure to Female Community Health Volunteer were found to be significantly associated with ANC utilization.

Conclusion:

ANC service utilization is low. So, there is an urgent need to address the issue of ANC quality and discriminatory behaviour of health workers toward Dalit. A targeted & comprehensive maternal health program should be developed to raise awareness and motivate pregnant women for maximum utilisation of ANC services.

Keywords: Antenatal care, Disadvantaged dalit caste, Quality ANC, Discriminatory behaviour, Maternal health service, Nepal.

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1. INTRODUCTION

Developing countries account for 99 percent of the global maternal deaths, with the sub-Saharan Africa region alone accounting for 62% followed by Southern Asia 24% [1]. Antenatal care (ANC) can be defined as "the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and baby during pregnancy" [2]. Utilization of Antenatal care service promotes institutional delivery and decreases maternal morbidity and mortality both directly and indirectly [2 - 4]. ANC provides a mother the opportunity to familiarize and interact with the health system and with the health facility, thereby increasing the chance that she chooses to deliver in a health institution [5]. As recommended by

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World Health Organization (WHO), Nepal has required at least four ANC services scheduled in the following way: first visit at the 4th month, second at the 6th month, third at the 8th month and fourth at the 9th month of pregnancy [6]. In Nepal, ANC services are based on monitoring of mother's blood pressure, weight and fetal heart rate; providing information education and communication and behavior change communication for danger signs, care during pregnancy, timely referral to the appropriate health facilities; birth preparedness and complication readiness; early detection and management of complications; and provision of tetanus-toxoid immunization, iron and de-worming tablets to all pregnant women and malaria prophylaxis as needed [6]. Further, the government of Nepal provides financial incentives to women and health facilities to promote ANC and institutional delivery [6 - 8]. Despite these efforts, Nepal is still one of the countries in South and Southeast Asia where women are less likely to receive ANC from health professionals (doctors, nurse/midwife) and low proportion of births are delivered in a health facility [9].

Nepal has made impressive improvements in maternal health during the years between 1990 and 2015. Several statistics point to this progress, for example: the decrease in Maternal Mortality Ratio (MMR) from 850 per 100,000 Live Births (LB) in 1990 to 229 per 100,000 LB in 2010 [10, 11]; the increase in institutional delivery from 8% in 1996 to 57% in 2016; the increase in percentage of women receiving four or more ANC visits from 9% in 1996 to 69% in 2016 [7, 9, 12]. However, these gains are unevenly distributed, with the most disadvantaged group of caste (Dalit) benefitting the least. For example, the national MMR is 229/100,000 LB, *versus* 273/100,000 LB among Dalits and the percentage of women with four or more ANC visits is 64% among upper caste (Brahmin/Chhetri) and 40% among Dalits [11]. Dalit communities continue to suffer from caste-based discrimination and are considered "untouchable." As a result, Dalits are considered some of the most "backward" in social, economic, educational, political and religious dimensions and unsurprisingly have lower developmental indicator than other castes [13].

This study was conducted to understand the rate and factors associated with the antenatal care service utilization among the most disadvantaged ethnic group (Dalit women) and recommend interventions to improve ANC utilisaiton, in the Mahottari district of Nepal.

2. MATERIALS AND METHODS

2.1. Variables

Utilization of ANC was considered as the practice in which recently delivered women had visited health facility for four or more ANC checkups during her last pregnancy. The outcome variables ANC visit were four or more ANC visit coded '1' and less than four ANC visits coded as '0'. The independent variables were broadly categorized into four groups [5]: Socio-cultural factors, economic accessibility factors, physical accessibility factors, and perceived health need factors. Age of respondent as reported by individual was recorded and categorized into four groups: 15-19, 20-24, 25-29 and 30 years or above [14]. Educational status was recorded as no formal education, primary, secondary, and certificate and above [7]. Occupation of the mother was broadly categorized into a housewife, daily wage, agriculture and job. Similarly, occupation of husband was categorized into daily wage, agriculture, business and job. The family was considered as a nuclear family when husband, wife and their unmarried sons and daughters live together otherwise, they live in joint family. Wealth status and the autonomy of women were adapted from NDHS 2011, and categorized into three groups: poor to least poor corresponding from lowest to the highest status, and low autonomy to high autonomy from the lowest to the highest, respectively [7]. The Dalit caste included in the study was 'Terai Dalit'- Chamar, Mushahar, Dusadh/Paswan, Tatma, Khatabe, Banter, Dom, Chidimar, Dhobi, Halkhor and the 'Hill Dalit'-Kami, Damai, Sarki, Gaine, Badi [15]. Perceived "good quality" of ANC was considered when mother received iron supplementation, medical checkup, at least two tetanus toxoid injections, measurement of blood pressure, provision of intestinal parasitic drugs and health education, and counseling on danger signs. If a single component was missed, ANC was not regarded to have perceived" good quality" [16].

2.2. Study Setting

This study was carried out in the Mahottari district of Nepal, which lies about 253 kilometers to the Southeast of Kathmandu, the capital city of Nepal. According to the National Population and Housing Census 2011, the total population of the district was 627,580 (male 311,016 and female 316,564) [17].

2.3. Study Design and Participants

This was a cross-sectional study conducted in the Mahottari district during July-December, 2014. The mothers were included in the study if: (i) they had childbirth during the last one year (ii) were local residents of the districts, (iii) were not migrated to the district after childbirth, and (iv) belonged to Dalit ethnic group [18]. This district constitutes six electoral areas and each area constitutes 11 to 14 Village Development Committees (VDC) – the smallest administrative unit. Two VDCs were selected randomly from each electoral area to increase representations of the district. A list of all Dalit eligible mothers of total 12 VDCs (2 VDCs per electoral area) was prepared with the help of local public health facilities' community-based newborn program records, and Female Community Health Volunteers (FCHV). All 328 eligible Dalit mothers were interviewed and 15 mothers were not interviewed because they had migrated out of the district.

2.4. Instrument and Data Collection

The questionnaire was adapted from the Nepal Demographic and Health Survey (NDHS) 2011 [7]. An observation check-list was prepared to observe the assets and animals in- the house based on the NDHS 2011. A few minor words were changed in the original questionnaire to adapt to the local context and increase the readability of the questions. The face-to-face interviews were conducted in the local language of the respondent at her house by two female interviewers who were trained by the first author of this study and were also involved in the pretesting of questionnaires.

2.5. Statistical Analysis

Descriptive analysis was performed as per the study variable in the initial stage and results were reported using frequencies and percentage. Association of ANC utilization and other independent variables were first tested using Chi-square test and significant factors (p-value<0.05) were further entered for multivariate analysis at 95% confidence interval to ascertain the association of these factors with ANC utilization using backward logistic regression methods [18]. Data analysis was performed using Statistical Package for Social Sciences Version 20.

2.6. Ethical Consideration

Ethics approval was obtained from the Institutional Ethical Review Board, Institute of Medicine, Tribhuvan University Nepal (Approval Number 79 (6-11-E)^2 071/072). Informed written consent was also obtained from the district health office, Mahottari and from all participants of the study. Personal identifiers were removed before the analysis of data and data were only presented as aggregate.

3. RESULTS

3.1. Reasons for Low Utilization of ANC Service

The multiple response answers showed that there were numerous reasons for low ANC utilization. The most important reasons were lack of information, a long distance from health facility or unavailability of the transport, and lack of money. Full results are shown in Table **1**.

Table 1. Reasons for low utilization of ANC service.

*Responses	Number	Percent of Cases
Lack of information	128	67
HF is far/Transport is not easy	61	32
Lack of money	30	16
Get good care at home	25	13
Family restriction	19	10
HW behavior not good	14	7
Service expensive	12	6
Male health worker in health facility	12	6
Not customary	5	3
No one in the family for accompanies	2	1
Health facility not open	2	1

*Multiple responses

3.2. Socio-cultural, Economic and Physical Accessibility Characteristics of Participants

Table **2** presents the description of socio-cultural, economic and physical accessibility factors. The mean age of mother was 22.52 years (standard deviation 3.72) and around half of the mothers were age group 20-24 year. More than three - quarters of mothers (78%) and half of the husbands (58%) had no formal education. The majority of mothers (79%) were housewives and 80% of husbands were engaged in daily wage work.

Table 2. Description of socio-culture, economic and physical accessibility factors.

Characteristics	Frequency (n = 328)	Percent
Caste		
Terai Dalit	296	90.2
Hill Dalit	32	9.8
Mother age (Year)		
15-19	68	20.7
20-24	159	48.5
25-29	79	24.1
≥30	22	6.7
Mean age 22.52 years, standard deviation3.72		
Family size		
9 or more members	104	31.7
5-8 members	178	54.3
3-4 family members	46	14
Type of Family		
Joint or extended family	226	68.9
Nuclear	102	31.1
Mother's education		
No formal education	257	78.4
Secondary	34	10.4
Primary	31	9.5
Certificate or above	6	1.8
Husband's education		
No formal education	192	58.5
Secondary	68	20.7

(Table 2) contd.....

Characteristics	Frequency (n = 328)	Percent
Primary	55	16.8
Certificate or above	13	4
Practice of traditional healers		
No	59	18.0
Yes	269	82.0
Women Autonomy		
Lowest	89	27.1
Middle	131	39.9
Highest	108	32.9
Women's occupation		
Housewife	259	79.3
Daily wage	62	18.9
Agriculture	3	0.9
Job	3	0.9
Husband's occupation		
Daily wage	263	80.2
Agriculture	21	6.4
Business	21	6.4
Mechanics	14	4.3
Job	9	2.7
Wealth status		
Lowest	109	33.2
Middle	109	33.2
Highest	110	33.5
Availability of motorized transport		
Yes	95	29
No	233	71

3.3. Health Related Characteristics of Participants

Among the participants shown in Table **3**, only 42% of mothers had completed four or more ANC visit. Majority of the mothers (82%) received ANC services from government health facilities and 80% of mothers did not perceive ANC as “good quality”. Furthermore, 47% of mothers were multiparous and 56% of mothers had not planned their last pregnancy. Of mothers with any ANC visit, only 50% of them were suggested for delivery in a health facility. Similarly, less than one third (28%) of mothers were exposed to maternal health messages through one or more media and 21% of mothers were not visited by FCHVs during their last pregnancy. In addition, 31% of mothers reported that health staff was not available when they visited health facility and 27% of mothers perceived health workers' behavior as discriminatory while providing health services.

Table 3. Description of health needs factors.

Characteristics	Frequency (n = 328)	Percent
ANC visit frequency		
<4 ANC	191	58.2
≥4 ANC	137	41.8
ANC Places (n=252)		
Government health facility	206	81.7
Non-government health facility	46	18.3
Perceived “good quality” of ANC		
No	264	80.5
Yes	64	19.5
Parity of mother		
3+	155	47.3
Second	93	28.4
First	80	24.4
Planning of last pregnancy		

(Table 3) contd.....

Characteristics	Frequency (n = 328)	Percent
No	185	56.4
Yes	143	43.6
Advised for health facility delivery (n=252)		
No	113	44.8
Yes	139	52.2
Birth preparedness and complication readiness		
No	190	57.9
Yes	138	42.1
Association in women group/network		
No	231	70.4
Yes	97	29.6
Heard about Safe Delivery Incentive Program		
No	153	46.6
Yes	175	53.4
Exposed to maternal health message		
No	236	72
Yes	92	28
Absence of health workers in health facility		
No	227	69.2
Yes	101	30.8
Perceived discriminatory behavior of health worker		
No	240	73.2
Yes	88	26.8
Visit with female community health volunteer		
No	70	21.3
Yes	258	78.7

3.4. Rates and Factors Associated with ANC Utilization

The ANC service utilization rate was found to be 42% with 95% CI (36.43 – 47.09). The bivariate analysis in Table **4** found that ANC utilization was significantly associated with the caste type, mother's education, husband's education, autonomy of women, mother's occupation, husband's occupation, wealth status, and availability of motorized transport. Some of the factors perceived for "good quality" ANC, were parity of mother, planning of last pregnancy, advice for HF delivery, mother's association with groups, knowledge about safe delivery incentive program(SDIP), exposure to maternal health message, availability of health worker, the positive and unbiased behavior of health exposure to FCHV, being significantly related to four or more ANC visits.

Table 4. Bivariate analysis of socio-cultural, economic, physical accessibility and health need factors of participants.

Characteristics	< 4 ANC (%) (n= 191)	≥ 4 ANC (%) (n=137)	p value	OR	(95% CI)	
					Lower	Upper
Caste type						
Terai Dalit	185 (96.9)	111 (81.0)		1		
Hill Dalit	6 (3.1)	26 (19.0)	<0.001	7.22	2.883	18.09
Mother's age in year						
≥20	157 (82.2)	103 (75.2)		1		
< 20	34 (17.8)	34 (24.8)	0.124	1.52	0.891	2.606
Family size						
≥6	136 (71.2)	96 (70.1)		1		
<6	55 (28.8)	41 (29.9)	0.824	1.06	0.653	1.709
Family type						
Joint or extended	135 (70.7)	91 (66.4)		1		
Nuclear	56 (29.3)	46 (33.6)	0.412	1.22	0.76	1.954
Mother's education						
No	173 (90.6)	84(61.3)		1		
Yes	18 (9.4)	53 (38.7)	<0.001	6.06	3.345	10.99

(Table 4) contd.....

Characteristics	< 4 ANC (%)	≥ 4 ANC (%)	p value	OR	(95% CI)	
	(n= 191)	(n=137)			Lower	Upper
Husband's education						
No	136 (71.2)	56 (40.9)		1		
Yes	55 (28.8)	81 (59.1)	<0.001	3.58	2.252	5.681
Women autonomy						
Lowest	54 (28.3)	35 (25.5)		1		
Middle	61 (31.9)	70 (51.1)	0.041	1.77	1.025	3.058
Highest	76 (39.8)	32 (23.4)	0.154	0.65	0.359	1.175
Practice from traditional healers						
Yes	161 (84.3)	108 (78.8)		1		
No	30 (15.7)	29 (21.2)	0.205	1.44	0.819	2.537
Mother's occupation						
Daily wage	57 (29.8)	5 (3.6)		1		
Non-daily wage	134 (70.2)	132 (96.4)	<0.001	11.2	4.364	28.9
Husband's occupation						
Daily wage	167 (87.4)	96 (70.1)		1		
Non-daily wage	24 (12.6)	41 (29.9)	<0.001	2.97	1.693	5.217
Wealth status						
1 Lowest)	80 (41.9)	29 (21.2)		1		
2 (middle)	71 (37.2)	38 (27.7)	0.187	1.48	0.827	2.635
3 (Highest)	40 (20.9)	70 (51.1)	<0.001	4.83	2.715	8.585
Time to reach nearest ANC site						
>30 Min	44 (23.0)	40(29.2)		1		
≤ 30 Min	147 (77.0)	97 (70.8)	0.208	0.726	0.441	1.196
Availability of motorized transport						
No	149 (78.0)	84 (61.3)		1		
Yes	42 (22.0)	53 (38.7)	0.001	2.238	1.378	3.636
Perceive of "good quality" ANC						
No	176 (92.1)	88 (64.2)		1		
Yes	15 (7.9)	49 (35.8)	<0.001	6.533	3.471	12.297
Parity of mother						
Multiparous	157 (82.2)	91 (66.4)		1		
Primiparous	34 (17.8)	46 (33.6)	0.001	2.334	1.397	3.899
Planning of last pregnancy						
No	129 (67.5)	56 (40.9)		1		
Yes	62 (32.5)	81 (59.1)	<0.001	3.01	1.908	4.747
Advised for HF delivery						
No	146 (76.4)	43 (31.4)		1		
Yes	45 (23.6)	94 (68.6)	<0.001	7.093	4.337	11.598
Association of mother in mother's group/ network						
No	153 (80.1)	78 (56.9)		1		
Yes	38 (19.9)	59 (43.1)	<0.001	3.046	1.865	4.974
Heard about SDIP						
No	117 (61.3)	36 (26.3)		1		
Yes	74(38.7)	101(73.7)	<0.001	4.436	2.747	7.162
Exposure to maternal health message						
No	167 (87.4)	69 (50.4)		1		
Yes	24 (12.6)	68 (49.6)	<0.001	6.857	3.983	11.807
Absence of HWs in health facilities						
Yes	69 (36.1)	32 (23.4)		1		
No	122 (63.9)	105 (76.6)	0.014	1.856	1.133	3.041
Perception of HW behavior as discriminatory						
Yes	91 (47.6)	29 (21.2)		1		
No	100 (52.4)	108 (78.8)	<0.001	3.389	2.058	5.58

(Table 4) contd.....

Characteristics	< 4 ANC (%)	≥ 4 ANC (%)	p value	OR	(95% CI)	
	(n= 191)	(n=137)			Lower	Upper
Exposure to FCHV						
No	60 (31.4)	10 (7.3)		1		
Yes	131 (68.6)	127 (92.7)	<0.001	5.817	2.852	11.862

Table 5. Multivariate analysis of factors associated with ANC utilization.

Characteristics	Crude OR	(95% CI)		Adjusted OR	(95% CI)		p value
		Lower	Upper		Lower	Upper	
Mother's education							
No				1			
Yes	6.06	3.35	10.99	2.63	1.25	5.52	0.011
Husband's education							
No				1			
Yes	3.58	2.25	5.68	1.81	1.01	3.24	0.047
Mother's occupation							
Daily wage				1			
Non-daily wage	11.23	4.36	28.90	3.44	1.21	9.74	0.02
Perceive "good quality" of ANC							
No				1			
Yes	6.53	3.47	12.30	3.02	1.44	6.34	0.003
Heard about SDIP							
No				1			
Yes	4.44	2.75	7.16	2.33	1.30	4.18	0.005
Exposure to maternal health message							
No				1			
Yes	6.86	3.98	11.81	3.34	1.73	6.46	<0.001
Perceived discriminatory behavior of HW							
Yes				1			
No	3.39	2.06	5.58	2.55	1.38	4.69	0.003
Exposure to FCHV							
No				1			
Yes	5.82	2.85	11.86	2.48	1.07	5.75	0.035

After adjusting for potential confounding variables, the multivariate analysis (Table **5**) showed that mother's education (AOR: 2.63, CI: 1.25 – 5.52), husband's education (AOR: 1.81, CI: 1.01 -3.24), mother's non-daily wage occupation (AOR: 3.44, CI: 1.21-9.74), perception of "good quality" ANC service (AOR: 3.02, CI: 1.44 -6.34), knowledge about SDIP (AOR: 2.33, CI: 1.30 -4.18), exposure to maternal health message (AOR: 3.34, CI: 1.73 -6.46), positive and unbiased behaviour of health workers (AOR: 2.55, CI: 1.38 - 4.69), and exposure to FCHV (AOR: 2.48, CI: 1.07 -5.75) were significantly associated with utilization of four or more ANC visits. However, caste, autonomy of women, husband's occupation, wealth status, parity of mother, planning of last pregnancy, advice for health facility delivery, association in women group/network were not found to be significantly associated with ANC utilization in multivariate analysis.

4. DISCUSSION

From the methodological point of view, this study was based on the literatures review of cross-sectional studies with a large sample size in Nepal and other countries; and the respondents were the mothers who had delivered their child within past one year [14, 19, 20] and within last two year [21]. In this study, mothers with formal education were found to be three times more likely to have four or more ANC visits than mothers who did not have formal education. This is in keeping with other literature, the NDHS 2016 showed that non-educated mother constituted a higher proportion (12%) of those who had no ANC at all, while School Leaving Certificate (SLC) or the above-educated mothers constituted only 1% of women with no ANC [12]. Similarly, a number of studies showed that by increasing education levels of women, the probability of receiving four or more ANC visits also increased [16, 19, 20, 22 - 27]. The increased education may have also brought increased knowledge and awareness of health services, higher receptivity to new health-related information, better communication with the husband, more decision making power, increased self-worth, negotiating skills, and ability to demand adequate services. Higher education of husband level has shown similar effect, wife receiving twice ANC utilization than their counterparts. This is similar to the result of systematic review carried out in low-income countries [28].

Studies conducted in Nepal [16], Ethiopia and Shanghai [25, 29] support the similar findings. This could be explained on the basis that educated husbands may be aware of ANC's benefits, put fewer constraints on their wives' mobility and decision-making and able to communicate with health workers to demand appropriate service. Another finding from our study was that non-daily waged mothers had utilized three times ANC services than their counterparts. This is consistent with another study conducted in the mid and far western region of Nepal found that women having occupation-service, business, wage labor and housewife had more ANC visit than women having occupation- agriculture [19] while another study of Sindhupalchok district of Nepal showed that the mother's occupation whether agriculture/labor or business/service was not significantly associated with ANC utilization [14]. This dissimilarity may be due to the different basis of categorizing the occupation. Our study showed that Perceived "good quality" of ANC was significantly associated with the ANC utilization. Other studies have shown that women reported better quality of care in private facilities but the cost prevented them from the utilization of those services [5]. Consequently, the mother who perceived getting all the components of ANC services was more likely to repeat the ANC visit. In this study, a mother exposed to maternal health messaging was found to be, on average, three times more likely to use ANC services. These findings were echoed in studies conducted in Pakistan and Nigeria [20, 27]. Mothers who had not perceived health workers behavior as discriminatory had three times ANC utilization than mothers who had perceived health workers behavior as discriminatory, indicating that the discriminatory behavior of health workers lower the ANC utilization which was similar to Nepal Maternal Mortality and Morbidity Study [11]. This is likely because positive past experiences encourage future utilization, and negative experiences discourage them. The mothers exposed to FCHV were about twice more likely to utilize ANC service than their counterparts. This is because exposure to FCHV increases the possibility of sharing information about health services.

CONCLUSION

This is the first study conducted among the most disadvantaged caste (Dalit) that identified ANC utilization rate and critically analysed factors affecting them in the Mahottari district of Nepal.

Despite the provision of ANC service to community level by the government, its full utilization was lower (42%) in Dalit caste, which was lower than the national figure (69.4%). The major reasons reported by women interviewed for the low utilization of ANC were-lack of information regarding ANC service and the prohibitively far distance of health facility. ANC utilization was significantly associated with the education of women and husband, the non-waged occupation of mother, perceived "good quality" of ANC, exposure to SDIP and maternal health message and FCHV, and the perceived unbiased behaviors of health workers

Maternal health intervention targeted to Dalit women recommended to increase ANC utilization among Dalits. The program should focus on improving the quality of ANC service, promoting unbiased behavior of health workers, increasing the mobilization of FCHV and community health workers of government health facilities in Dalit community; and implementing awareness activities and dissemination of health messages to support demand generation and the uptake of ANC service by Dalits. Simultaneously, improving the education of a couple could be a strategy to improve the ANC utilization in the long term. Further, coordination with other sectors would be vital for Dalit women to have daily income.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethics approval was obtained from the Institutional Ethical Review Board, Institute of Medicine, Tribhuvan University Nepal (Approval Number 79 (6-11-E)2 071/072).

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are basis of this research.

CONSENT FOR PUBLICATION

All participants signed the study consent before participating in the study

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this research are available within the article and its supplementary materials.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest, financial or otherwise.

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SUPPLEMENTARY MATERIAL

Supplementary material is available on the publishers website along with the published article.

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