

Research Article

# Factors Associated with the Completion of Antenatal Care in Podor Health District in 2020 (Senegal)

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## Abstract

**Introduction:** The Ministry of Health and Social Action recommends at least four antenatal care (ANC). This indicator is not sufficiently documented in Podor health district. This study aimed to identify factors associated with the completion of ANC in this district. **Methods:** A cross-sectional study was conducted from 19 to 22 June 2020 in Podor health district, located 490 km away from Dakar in northern Senegal. The study population included women who had given birth in the 24 months preceding the survey. A two-stage cluster sampling was carried out. Data were collected during a face-to-face interview using an electronic questionnaire created with Open Data Kit Collect (ODK Collect) software. The adjusted Odds ratio (aOR) and its 95% confidence interval (CI95%) were calculated. **Results:** A total of 832 women were interviewed. Their average age was 26.5 ± 6.6 years, and they were mainly uneducated (54.1%), married (96.2%), and from rural areas (72.8%). The study showed that 51.20% of women surveyed underwent at least four ANC. Married women (aOR= 4.14), those who walked to reach health facilities (aOR=1.69), and those who watched television at least once a week (aOR=1.66) were significantly more likely to undergo at least four ANC. **Conclusion:** We need to raise awareness among women of reproductive age and resource persons through the mass media, and improve the geographical accessibility of health facilities to increase ANC coverage.

## Keywords

Antenatal Care, Cross-Sectional Study, Senegal

## 1. Introduction

According to the World Health Organization (WHO), nearly 287,000 women died in 2015 from complications related to pregnancy and childbirth. Around 70% of these deaths occurred in sub-Saharan Africa [1].

In Senegal, the maternal mortality rate stands for 315 maternal deaths per 100,000 live births [2].

The WHO believes that one of the best ways to save

women's lives is to ensure that all women have access to antenatal care (ANC) during pregnancy [1].

ANC reduces maternal and perinatal mortality and morbidity both directly, through the detection and treatment of pregnancy-related complications, and indirectly, through the identification of women and girls at increased risk of developing complications during labor and delivery, thus ensuring

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their transfer to a facility offering an appropriate level of care [3].

In addition, women's contact with ANC services also represents an opportunity for the management of concomitant diseases such as Human Immunodeficiency Virus (HIV) and malaria, which are recognized as indirect causes of maternal mortality (27.5% of all maternal deaths) [4].

In 2017, the WHO published a document entitled "WHO recommendations for antenatal care to make pregnancy a positive experience". This document reports that at least eight contacts are recommended to reduce perinatal mortality and improve women's experience of care [3].

However, in Senegal, the Ministry of Health and Social Action (MSAS) recommends that all pregnant women must undergo at least four antenatal care [5].

Maternal and child health is a priority for the Senegalese authorities. Programmatic objectives have been set in the 'integrated strategic plan for reproductive, maternal, newborn, child and adolescent health 2016-2020'. The plan is to increase the ANC completion rate (at least 4 ANC) from 48% in 2015 to 70% in 2020 [5].

In addition, the investment plan to reduce maternal, neonatal, infant and child, adolescent and youth mortality identifies optimal ANC coverage as one of the high-impact interventions [6].

The availability of data is a condition for the success of health policies. For example, according to the Demographic and Continuous Health Survey conducted in 2019 (2019-DHS) in Senegal, 98% of women received at least one ANC, provided by a skilled caregiver. In contrast, the percentage of women who have undergone at least four ANC is 55.5% [7].

DHS surveys are an important source of information for public policy-making. Too often, however, these surveys provide data at national rather than sub-national level [7]. Consequently, it appeared necessary to have data on ANC at the sub-national level to align actions with local realities.

It is against this backdrop that we conducted this study in Podor health district. The objective was to identify factors associated with the completion of ANC in the Podor health district.

## 2. Materials and Methods

### 2.1. Study Setting

Senegalese healthcare system is a three-tier pyramid. The central level, the intermediate level, and the operational level. The latter corresponds to the health district, which is the population's first point of contact with the health system, providing preventive care, including ANC [8].

Podor health district is located in northern Senegal and belongs to the department of the same name of Saint Louis region. The district is 490 km away from Dakar. In 2020, the

population was estimated at 247,891, 45% of whom lived more than five km away from the nearest health facility. The population lives in three ecological zones: the Dieri, the Walo, and along the national highway. The Walo is flooded by the Senegal River, making it difficult to access during high-water periods. In winter, the roads in Dieri are impassable [9].

### 2.2. Study Population and Data Collection

A cross-sectional study was carried out. The study population comprised women who gave birth in the 24 months preceding the survey. A two-stage cluster sampling (1.village/neighborhood and 2.household) was carried out. Data were collected during an individual interview using an electronic questionnaire created with Open Data Kit Collect (ODK Collect) software downloaded onto smartphone tablets. Data collection took place from 19 to 22 June, 2020. The 25 interviewers were students trained in questionnaire administration. Training methods included guided reading, PowerPoint, role-playing, and field training. The sample size was estimated at 832 women. Details of how to calculate the sample size can be found elsewhere [10].

### 2.3. Studied Variables

The variables collected were as follows:

#### *Dependent variable*

It corresponded to ANC completion, meaning the completion of at least four ANCs. This variable was collected using the following questions:

*Did you see anyone for ANC when you were pregnant with 'NAME'? (1. Yes, 2. No)*

*During this pregnancy, how many times did you receive ANC? (1. Number of times, 2. Don't know)*

#### *Independent variables*

Individual characteristics: age, level of education, marital status, gender, frequency of newspaper reading, frequency of radio listening, frequency of television use.

Household characteristics: place of residence, distance between home and health facility, professional status of husband/partner, socio-economic level, family security grant, affiliation to a health insurance scheme, and types of transport used.

### 2.4. Statistical Analysis

Quantitative variables were described by means and standard deviation. Qualitative variables were expressed as absolute and relative frequencies (%). All these variables were represented by tables.

For analytical statistics, a bivariate analysis was firstly performed using the chi-2 test. Then, variables for which the p-value is less than or equal to 0.25 are included in a top-down stepwise binary logistic regression model. The

significance level is set at 0.05. The adjusted Odds ratio (aOR) and its 95% confidence interval (CI95%) were calculated. All analyses were performed with R software version 4.0.5.

## 2.5. Ethical Considerations

The study obtained ethical approval from the 'Research Ethics Committee' (CER) of Cheikh Anta Diop University, Dakar, Senegal (reference 0253/2017 / CER / UCAD). This study was conducted in accordance with the guidelines set out in the Declaration of Helsinki. Verbal informed consent was obtained from the participants after the presentation of the study objectives. The participant was informed of her right to refuse to participate in the study or to withdraw her consent at any time, without justification. Data were collected anonymously and confidentially.

## 3. Results

### 3.1. Characteristics of Participants

A total of 832 women with an average age of 26.75 years ( $\pm 6.95$ ) were involved in the study. More than half of the participants (59.38%) had no formal education. In terms of marital status, most of the women surveyed were married (96.76%). Just over three-quarters of the women were from rural areas (75.72%). To get to the health facility, the majority (64.18%) traveled less than five kilometers. Concerning different sources of information, the majority of respondents (84.13%) did not read the newspaper at all. Almost half the women (52.76%) listened to the radio almost every day, while more than half did not watch television at all (54.69%). The majority of women did not benefit from a family security grant (94.47%). Similar proportion were not affiliated with any health insurance scheme (95.07%). Most participants were paucigest (37.14%) (Table 1).

**Table 1.** Socio-demographic characteristics of participants, Podor health district, 2020, N=832.

Socio-demographic characteristics	Absolute frequency (N)	Relative frequency (%)
<b>Individual characteristics</b>		
Age		
< 20 ans	110	13,22
20-29 ans	439	52,76
30-39 ans	246	29,57
≥ 40 ans	37	4,45
Education level		
None	494	59,38
Primary	147	17,67
Medium	90	10,82
Secondary	77	9,25
Superior	24	2,88
Marital status		
Married monogamous	505	60,70
Married polygamist	300	36,06
Single	22	2,64
Divorced	5	0,60
Number of pregnancies		
Nulligest (0)	90	12,53
Primigest (1)	177	21,27
Paucigest (2-3)	309	37,14
Multigest (4-5)	183	22,00

Socio-demographic characteristics		Absolute frequency (N)	Relative frequency (%)
<b>Individual characteristics</b>			
Read the newspaper	Large multigest (6+)	73	8,77
	Not at all	700	84,13
	Less than once a week	16	1,92
	At least once a week	38	4,57
	Almost every day	78	9,38
Listen to the radio	Not at all	222	26,68
	Less than once a week	28	3,37
	At least once a week	143	17,19
	Almost every day	439	52,76
Watch television	Not at all	455	54,69
	Less than once a week	17	2,04
	At least once a week	67	8,05
	Almost every day	293	35,22
<b>Household characteristics</b>			
Place of residence	Urban	202	24,28
	Rural	630	75,72
Distance between home and healthcare facility	Less than 5 km	534	64,18
	Between 5 and 10 Km	141	16,95
	Between 10 and 15 Km	94	11,30
	More than 15 Km	63	7,57
Types of transport used to get to the healthcare facility	Walk	451	54,21
	Cart	306	36,78
	Public transport	45	5,41
	Personal vehicle	18	2,16
	Motorcycle	12	1,44
Professional status of husband/partner	Employed	790	94,95
	Unemployed	42	5,05
Socioeconomic status	Poorest	166	19,95
	Poor	167	20,07

Socio-demographic characteristics		Absolute frequency (N)	Relative frequency (%)
<b>Individual characteristics</b>			
	Medium	166	19,95
	Rich	167	20,07
	Richest	166	19,95
Family security grant recipient			
	Yes	46	5,53
	No	786	94,47
Membership of a health insurance scheme			
	Yes	41	4,93
	No	791	95,07

### 3.2. ANC Coverage

The study showed that 51.20% of women received at least four ANC (Table 2).

**Table 2.** ANC coverage, Podor health district, 2020, N=832.

Number of ANC	Absolute frequency (N)	Relative frequency (%)
None	92	11,06
< 4	314	37,74
≥ 4	426	51,20
Total	832	100,00

### 3.3. Bivariate Analysis of ANC Completion by Socio-Demographic Characteristics

Completion of ANC was related to school enrolment ( $p<0.001$ ), marital status ( $p=0.008$ ), socio-economic level ( $p<0.001$ ), walking to reach the health facility ( $p<0.001$ ), and watching television at least once a week ( $p<0.001$ ) (Table 3).

**Table 3.** Bivariate analysis of ANC completion by socio-demographic characteristics, Podor health district, 2020, N=832.

Variables	Completion of CPN				P value
	Yes		No		
	n	%	n	%	
Individual characteristics					
Age					
Under 20 years	52	47,27	58	52,73	0,376
20 years and over	374	51,80	348	48,20	
Schooling					
Yes	199	58,00	139	41,12	< 0,001

Variables	Completion of CPN				P value
	Yes		No		
	n	%	n	%	
No	227	45,95	267	54,05	
Marital status					
Married	419	52,05	386	47,95	0,008
Unmarried	7	25,93	20	74,07	
Number of pregnancies					
None	39	43,33	51	56,67	0,114
At least one	387	52,16	355	47,84	
Source of information					
Reads the newspaper at least once a week					
Yes	61	52,59	55	47,41	0,748
No	365	50,98	351	49,02	
Listen to the radio at least once a week					
Yes	309	53,09	273	46,91	0,096
No	117	46,80	133	53,20	
Watches television at least once a week					
Yes	219	60,83	141	39,17	<0,001
No	207	43,06	265	56,14	
Household characteristics					
Place of residence					
Rural	324	51,43	306	48,57	0,817
Urban	102	50,50	100	49,50	
Distance between home and healthcare facility					
Less than 5 km	284	53,18	250	46,82	0,126
More than 5 km	142	47,65	156	53,35	
Types of transport used to get to the healthcare facility					
Walk					
Yes	261	57,87	190	42,13	< 0,001
No	165	43,31	216	56,69	
Professional status of husband/partner					
Employed	405	51,27	385	48,73	0,872
Unemployed	21	50,00	21	50,00	
Socioeconomic status					
Low (poorest, poor)	146	43,84	187	56,16	< 0,001
High (medium, rich, richest)	280	56,11	219	43,89	
Family security grant recipient					

Variables	Completion of CPN				P value
	Yes		No		
	n	%	n	%	
Yes	27	58,70	19	41,30	0,295
No	399	50,76	387	49,24	
Membership of a health insurance scheme					
Yes	26	63,41	15	36,59	0,109
No	400	50,57	391	49,43	

### 3.4. Multivariate Analysis of ANC Completion by Socio-Demographic Characteristics

The results of the study showed that marital status, means of transport, and watching television at least once a week were associated with achieving optimal ANC. Married women were more likely to achieve optimal ANC (aOR = 4.14 [1.69-10.12]). The same trends were found for women who walked to the health facility (aOR=1.69 [1.3-2.27]) and those who watched television at least once a week (aOR=1.66 [1.23-2.25]) (Table 4).

**Table 4.** Factors associated with ANC completion, Podor health district, 2020, N=832.

Variables	aOR [CI95%]	P value
Individual characteristics		
Marital status		
Married	4,14 [1,69-10,12]	0,002
Unmarried	1	
Watches television at least once a week		
Yes	1,66 [1,23-2,25]	0,001
No	1	
Household characteristics		
Types of transport used to get to the healthcare facility		
Walk	1,69 [1,3-2,27]	0,001
Other types	1	

## 4. Discussion

### 4.1. Strengths and Weaknesses

This study has two strengths. The first is the optimal sample size, which helps to ensure the accuracy of the results. The second is that this study is the first of its kind in the Podor health district. As such, it paves the way for further studies on the subject. However, this study also has two limitations. Firstly, the number of ANC performed could be overestimated, with participants tending to give ideal answers, giving rise to a social desirability bias. Secondly, the cross-sectional nature of the study makes it impossible to determine the causal link between the associated factors found and the completion of ANC.

### 4.2. ANC Coverage

The study showed that 51.20% of women surveyed underwent at least four ANC. This result is comparable to the national average. In fact, according to the DHS, around 56% of women performed at least 4 ANC in 2019 [7]. This result is lower than that of the Ghanaian study (86%) [11] and the Ethiopian study (78.5%) [12]. In contrast, other studies have revealed lower proportions. A Cambodian study of women who had given birth in the last five years found a rate of 32.6% attendance at healthcare services [13]. In northwest Ethiopia, the indicator stood at 21.6% [14].

### 4.3. Factors Associated with ANC Completion

This study showed that access to ANC services is influenced by individual and contextual characteristics.

Firstly, there was a statistically significant relationship between ANC completion and being married. This result may be due to the support that in-laws and husbands provide to women on the one hand. Conversely, unmarried pregnant women are said to be victims of stigmatization by the general

public and health personnel [15, 16].

In addition, watching television at least once a week was positively related to ANC completion. Similar results were found in Guinea and Ethiopia [17, 18]. This result is encouraging, and demonstrates the importance of mass media in raising public awareness of health-promoting behaviors. Broadcasting messages on television helps to increase women's knowledge of the benefits of ANC. However, in rural Senegal, only 37.8% have a television [19]. This is why, in such an area, two awareness-raising strategies would be necessary. On the one hand, home visits would be more effective. "Bajenu Gox" could play this role. On the other hand, broadcasting messages on the radio would be more effective [20].

In terms of context, access to ANC services on foot proved to be a facilitating factor for ANC completion. This could be explained by the prevalent transport challenges in Podor health district, particularly in the Dieri area. The most likely hypothesis is that women who live close to the nearest health facility are those who use ANC services the most [14]. Tessema ZT et al. argued the same findings in which women who reported that access to health care was not a big problem were more likely to use ANC services than those who reported that access to health care was a big problem [18]. In Senegal, one kilometer is a fifteen-minute walk to a health post [21]. The Cambodian study showed that women living 10-15km from health care services had a 72% lower chance of accessing ANC services, while those living more than 15km away had a 77% lower chance than women living 5km away [13]. Contrariwise, in his study conducted in northwest Ethiopia, Atnafu A showed that the chance of accessing maternal health services was multiplied by 5.59 in women who used motorcycles compared to those who reported walking to the health facility [14].

## 5. Conclusions

The study showed that the ANC completion rate was low in the Podor health district. In addition, married women, those who walked to reach health facilities, and those who watched television at least once a week were more likely to complete at least four ANC. Given these results, interventions should include raising awareness among women of reproductive age through the mass media and improving the geographical accessibility of health facilities. Further research would be needed to identify other barriers to access to ANC services.

## Abbreviations

ANC: Antenatal Care  
ODK: Open Data Kit  
WHO: World Health Organization  
HIV: Human Immunodeficiency Virus

MSAS: Ministry of Health and Social Action  
DHS: Demographic and Health Survey  
CER: Research Ethics Committee

## Conflicts of Interest

The authors declare no conflicts of interest.

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