Optimum utilization of antenatal and postnatal cares among young women in Tigray, Northern Ethiopia: A community based-cross sectional study

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Abstract

Background: Optimum antenatal and postnatal care services are recognized to be among the most effective interventions to reduce maternal and newborn morbidity and mortality. However; optimum antenatal care (ANC) and postnatal care (PNC) service utilization among young women in Africa is very low, especially in rural zones. Therefore, this study was conducted to determine the magnitude of optimum ANC and PNC services utilization and the factors associated, in the Eastern Zone of Tigray, Northern Ethiopia.

Methods: Using a cross-sectional study design, 352 young women aged 15 to 24 were interviewed. Among those, 101 and 100 were eligible and included for studying optimum ANC and PNC service utilization, respectively. Multivariable logistic regression models were performed to identify independent determinants of the two outcome variables (optimum ANC and PNC utilization).

Results: Optimum ANC and PNC services utilization was reached in 75% (95%CI: 64.50-84.20) and 16% (95%CI: 9.00-24.00) of the cases, respectively. Being older (20-24 years old vs. 18-19: AOR=9.21; 95% CI: 1.62-52.25) and knowing the availability of adolescent and youth friendly health service (AYFHS) (AOR= 4.01; 95% CI: 1.08-14.89) were significantly associated with optimum ANC service utilization. Furthermore; knowing the availability of AYFHS (AOR=10.81; 95%CI: 1.57-71.18) and having the right to decide about her own health care spending (AOR=6.16; 95%CI: 1.22-31.05) were significantly associated with optimum PNC service utilization.

Conclusion: In rural zones in Tigray, PNC services utilization is far away from the optimum, while ANC service utilization is closer, even if a significant number of young women did not receive optimum ANC services. The presence of an AYFHS and its knowledge are shown to be related to an increase of optimal services utilization and hence interventions need to be designed accordingly.

Background

World Health Organization (WHO) defined optimum Antenatal Care (ANC) as a rationally designed program of four visits at different gestational weeks [of pregnancy] focusing on the essential elements of proven efficacy [1, 2]. In the same way, optimum Postnatal Care (PNC) refers to a care for every mother and baby with in the first 24 hours after delivery and a total of four visits in the successive six weeks [3].

Optimum utilization of both services significantly reduces maternal and newborn morbidity and mortality in the globe [4–10]. Being the first element in the continuum of maternal healthcare, ANC provides a unique opportunity for awareness creation on the importance of institutional delivery [7, 11–15]. Furthermore, utilization of PNC services has been demonstrated to be associated with higher uptake of postpartum modern contraceptives, reducing unintended pregnancies and providing adequate child spacing in between births, all elements that increase women's reproductive health care [16].

Besides, PNC is effective in prevention of physical and cognitive impairments as well as disability resulting from a postnatal cause [17–20]. Furthermore, full PNC uptake decreases maternal deaths and is also essential for the first 1,000 days of newborn's life [8, 17, 21].

However, optimum ANC and PNC service utilization among youths in Africa [13, 22] in general and in Ethiopia in particular are very low [23] and this is even worse among the rural dwellers [24–27]. Range of factors affect the utilization of optimum ANC and PNC among young women, especially in rural contexts. Literature yields that age, wealth status, ability to communicate with health care providers, and the existence of health complications [7, 13, 28–31]. Cultural and social norms also inhibit young to ask, obtain information, discuss and express their worries about sexual and reproductive health issues because it is often considered as taboos to discuss sexuality issues with families or community members [30, 32].

Moreover, health services utilization in most of low-income countries depends on household out of pocket payment, obviously reduced in poorer families [33]. In addition, families in different countries seem to view PNC as a service needed only when there is a problem with the mother or newborn [31, 34] and being apparently healthy was the most mentioned reason for not attending PNC in Ethiopia [28]. Thus, young women need special attention in order to improve the utilization of ANC and PNC services. However; studies, on both optimum services, to help these attentions are rare in the country among youth age group. Therefore, this study aimed to determine utilization of optimum ANC and PNC among young women in a rural African area, namely, the Eastern Zone of Tigray, Northern Ethiopia through quantitative survey.

Methods

Source of data

This study was performed within the project "#Youth at the Center" lead by Comitato di Collaborazione Medica (CCM), a non-governmental organization committed to promote the right to health and ensure access to essential health care in Africa. The project aimed at developing adolescent and youth friendly health services (AYFHS) in 20 health centers in the eastern zone of Tigray. Moreover, using qualitative and quantitative approaches, it aimed at identifying the general knowledge, attitude, and practice on AYFHS and determines their significant correlates.

For this purpose, a community-based cross-sectional study with 99.5% (631/634) of response rate was conducted house to house from May 23 to June 30/2018 in order to investigate health needs and service utilization among randomly selected youths and adolescents. Interviewer administered structured questionnaire was used (**Supplementary file-1**) to collect the data through two local languages (Tigrigna and Saho). From these data, information on ANC and PNC were extracted and analyzed for this study.

Study participants

Eighteen to 24 years old young women with history of pregnancy were included in this study. Those who were pregnant during the data collection (n = 16) were excluded to reduce selection bias as their time for optimum ANC could be later after the data collection period. One additional woman was excluded by PNC analysis, as she did not have information about her PNC utilization. Final sample consisted in 101 and 100 women for ANC and PNC study, respectively (Fig. 1).

Study variables

Dependent variables:

Optimum ANC service utilization was defined as having received at least 4 ANC visits during pregnancy for the most recent delivery.

Optimum PNC service utilization was defined as having received at least 4 PNC visits during the most recent pregnancy

Independent variables:

The following exposures were tested as predictors of optimum ANC and PNC: demographic and socio-economic variables (age, marital status, educational level, religion, ethnicity), awareness and knowledge about AYFHS (knowing the availability of AYFHS in their area, knowledge on type of AYFHS given, ever received information and counseling about sexual reproductive health, knowing at least one criteria for abortion, and awareness on how to protect herself from HIV); sexual-related variables (age at first sex, condom use, history of contraception use, and communication about menses with family members); gynecological and pregnancy-related variables (number of ever had pregnancy, ever had unwanted pregnancy, and current pregnancy status).

Statistical analysis

Two separate analyses were developed for optimum ANC and PNC. Accordingly, in each model, categorical variables were described using frequency and percentages. Bivariate associations were tested using chi-square test or Fisher's exact test, when the hypotheses for conducting chi-square test were not met. Variables for which a p-value ≤ 0.25 was found in the bivariate analyses were entered in to two multivariable logistic regression models (one for ANC and another for PNC) to identify independent determinants of both outcomes and Adjusted Odds Ratio (AOR) and 95% Confidence Interval (95% CI) were calculated. Hosmer and Lemeshow tests (HLT) were used to see the model fitness for both outcomes.

All analyses were performed using SPSS version 21 and a significance level of $\alpha = 0.05$ was considered.

Results

Description of the sample considered for both ANC and PNC analyses are presented in **Table 1**. The mean (± SD) age of the study participants was 21.55 (± 1.74) years and about two-third (66.4%) of them were living in a family with less than four members. Above a quarter (28.7%) of the participants had sex before

18 years of age, and three-fourth (74.3%) of the study participants were married. Furthermore, almost one every ten young women were living in an area where there is community youth centers. Among the young women eligible for optimum ANC utilization, only 37.6% (n = 38) of them knew the availability of AYFHS in their area. Above 70% (n = 72) of the participants had history of contraception use.

Table-1: Demographic and socio-economic characteristics of the study participants on the study on optimum ANC and PNC service utilization in Eastern zone of Tigray, Northern Ethiopia.

Variable	ANC study(N=101)		PNC study(N=100)	
	Frequency	Percentage	Frequency	Percentage
Age				
18-19 years	7	6.9	7	7.0
20-24 years	94	93.1	93	93.0
Mean age (±SD)	21.65 (±1.67)		21.67 (±1.67)	
Marital status				
Other than married	26	25.7	26	26.0
Married	75	74.3	74	74.0
Religion				
Orthodox	89	88.1	88	88.0
Muslim	5	5	5	5.0
Catholic	7	6.9	7	7.0
Ethnicity				
Tigrawayti	90	89.1	89	89.0
Irob	11	10.9	11	11.0
Family size				
1-4 members	65	64.4	64	64.0
5-11 members	36	35.6	36	36.0
Educational status				
Nil to primary(0-8)	63	62.4	63	63.0
>= Secondary (Grade 9 and above)	38	37.6	37	37.0
Availability of road access to the nearby HF				
Yes	74	73.3	73	73.0
No	27	26.7	27	27.0
Availability of community youth center				
Yes	10	9.9	10	10.0
No	91	90.1	90	90.0
Age at first sex				
Before 18 years	29	28.7	29	29.0
At 18 and above	72	71.3	71	71.0

Among the young women who were eligible for ANC service utilization, three-fourth (75.30%, 95%CI: 64.50–84.20) had optimum ANC service utilization during pregnancy for the most recent delivery. However, only 16% (95%CI: 9–24) of participants had an optimum service utilization for PNC (**Table-2**).

Table-2: Knowledge and utilization of adolescent and youth friendly health service among study participants in Eastern zone of Tigray, Northern Ethiopia.

Variable	ANC study (N=101)		PNC study (N=100)	
	Frequency	Percentage	Frequency	Percentage
Knew availability of AYFHS in their area				
Yes	38	37.6	37	37.0
No	63	62.4	63	63.0
Knew type of AYFHS given				
Yes	44	43.6	44	44.0
No	57	56.4	56	56.0
Ever received information & counseling about SRH				
Yes	82	81.2	81	81.0
No	19	18.8	19	19.0
Knew at least one criterion for abortion				
Yes	42	41.6	41	41.0
No	59	58.4	59	59.0
Aware how to protect oneself from HIV				
Yes	79	78.2	78	78.0
No	22	21.8	22	22.0
Ever used condom				
Yes	12	11.9	12	12.0
No	89	88.1	88	88.0
Ever had discussion about menses with family member				
Yes	82	81.2	81	81.0
No	19	18.8	19	19.0
Ever used contraceptive methods				
Yes	72	71.3	71	71.0
No	29	28.7	29	29.0
Currently using contraceptive methods				
Yes	41	56.9	40	40.0
No	31	43.1	31	31.0
Number of ever been pregnant				
One	68	67.3	67	67.0
Two and above	33	32.7	33	33.0
Ever had unwanted pregnancy				
Yes	11	10.9		
No	90	89.1	----	----
Currently pregnant				
Yes	16	13.7		
No	101	86.3	----	----
Number of ANC visits				
2-3 visits	25	24.8		
>= 4 visits	76	75.2	----	----
Number of PNC visits				
1-3 visits	-------	------	84	84.0
>= 4 visits			16	16.0
Place of PNC				
Home	----	----	57	57.0
Health facility	----	----	43	43.0

Age (20–24 years) and knowing the availability of AYFHS in their area were significantly associated with optimum ANC service utilization among young women in the rural districts of Tigray region (AOR = 9.21; 95%CI: 1.62–52.25 and AOR = 4.01; 95%CI: 1.08–14.89 respectively) (**Table-3**).

Table-3: a regression analysis for optimum ANC service utilization among young women in rural districts of Tigray, Northern Ethiopia (N=101); (HLT result=0.97).

Variable	Optimum ANC utilization Yes n (%)	No n (%)	COR (95%CI)	AOR (95%CI)
Age				
18-19 years	3 (42.9)	4 (57.1)	1	1
20-24 years	73 (77.7)	21 (22.3)	4.64 (0.96-22.36)	**9.21 (1.62-52.25)****
Marital status				
Other than married	20(76.9)	6(23.1)	1.31 (0.40-3.23)	NI
Married	56(74.7)	19(25.3)	1	
Family size				
1-4 members	49 (75.4)	16 (24.6)	1	
5-11 members	27 (75.0)	9 (25.0)	0.98 (0.38-2.51)	NI
Educational status				
Nil to primary	44 (69.8)	19 (30.2)	1	1
>= Secondary	32 (84.2)	6 (15.8)	2.30 (0.83-6.42)	2.30 (0.71-7.42)
Knew availability of AYFHS in their area				
Yes	31 (81.6)	7 (18.4)	1.77 (0.66-4.75)	**4.01 (1.08-14.89)***
No	45 (71.4)	18 (28.6)	1	1
Know type of AYFHS given				
Yes	35 (79.5)	9 (20.5)	1.52 (0.60-3.86)	NI
No	41(71.9)	16 (28.1)	1	
Ever had received info and counseling about SRH				
Yes	62 (75.6)	20 (24.4)	1.11 (0.36-3.46)	NI
No	14 (73.7)	5 (26.3)	1	
Knew at least one criteria for abortion				
Yes	29 (69.0)	13 (31.0)	0.57 (0.23-1.42)	0.49 (0.15-1.55)
No	47 (79.7)	12 (20.3)	1	1
Aware how to protect from HIV				
Yes	57 (72.2)	22 (27.8)	0.41 (0.11-1.52)	0.29 (0.07-1.28)
No	19 (86.4)	3 (13.6)	1	1
Main source of information for SRH				
Health worker	43 (70.5)	18 (29.5)	0.51 (0.19-1.36)	0.36 (0.10-1.27)
Other than health worker	33 (82.5)	7 (17.5)	1	1
Age at first sex				
Before 18 years	22 (75.9)	7 (24.1)	1.05(0.38-2.86)	NI
At 18 and above	54 (75.0)	18 (25.0)	1	
Ever had discussion about menses with family member				
Yes	61(74.4)	21 (25.6)	0.79 (0.23-2.60)	NI
No	15 (78.9)	4 (21.1)	1	
Ever had used contraceptive methods				
Yes	54 (75.0)	18 (25.0)	0.96 (0.35-2.61)	NI
No	22 (75.9)	7 (24.1)	1	
Number of ever had pregnancies				
One	54 (79.4)	14 (20.6)	1.93 (0.76-4.90)	2.59 (0.88-7.63)
Two and above	22 (66.7)	11(33.3)	1	1

*p-value < 0.05, **p-value < 0.01. NI-Not Included

Knowing the availability of AYFHS in their area and self-decision making for health care spending were the significantly associated variables with optimum PNC service utilization (AOR = 10.81; 95CI:1.57–71.18; AOR = 6.16; 95%CI: 1.22–31.05 respectively) (**Table-4**).

Table-4: Logistic regression analysis for optimum PNC service utilization among young women in rural districts of Tigray, Northern Ethiopia (N=100); (HLT=0.49).
*-p<0.05

Discussion

The current study determined the proportion of young women from rural areas who utilize optimum ANC and PNC services. The current study showed that about 75% of young women in rural zone in the eastern of Tigray (Northern Ethiopia) have an optimum utilization of ANC while it is lower for optimum utilization of PNC (16%). Older age and knowing the availability of AYFHS were observed to be positively associated with higher likelihood of optimum ANC use. Furthermore, optimum PNC use was observed to be increased in those women that know the availability of AYFHS and in those that have the right to make self-decision for health care spending.

The observed magnitude of optimum ANC utilization is close to what it was observed in a national Ethiopian survey (77.7%) [35], but significantly higher than what was found in other low-income countries, such as Nigeria (45–56%) [6, 36], Bangladesh (30%) [4], Côte d'Ivoire (60.2%) [37], and Democratic

Variable	Optimum PNC utilization Yes n (%)	No n (%)	COR (95%CI)	AOR (95%CI)
Age				
18-20 years	5 (15.2)	28 (84.8)	1	
21-24 years	11 (16.4)	56 (83.6)	0.97 (0.33-2.83)	NI
Marital status				
Other than married	5 (19.2)	21 (80.8)	1	
Married	11 (14.9)	63 (85.1)	0.83 (0.26-2.52)	NI
Family size				
1-4 members	11 (17.2)	53 (82.8)	1.39 (0.45-3.97)	NI
5-11 members	5 (13.9)	31 (86.1)		
Educational status				
Nil to primary	9 (14.3)	54 (85.7)	1	
>= Secondary	7 (18.9)	30 (81.1)	1.43 (0.51-4.97)	NI
Knew availability of AYFHS in their area				
Yes	14 (37.8)	23 (62.2)	**18.56 (3.91-88.11)**	**10.81 (1.57-71.18)***
No	2 (3.2)	61 (96.8)	1	1
Knew type of AYFHS given				
Yes	14 (31.8)	30 (68.2)	**12.60 (2.68-59.21)**	2.33 (0.36-15.31)
No	2 (3.6)	54 (96.4)	1	1
Knew at least one criteria for abortion				
Yes	12 (29.3)	29 (70.7)	**5.69 (1.68-19.23)**	2.75 (0.48-15.70)
No	4 (6.8)	55 (93.2)	1	1
Aware how to protect from HIV				
Yes	13 (16.7)	65 (83.3)	1.54 (0.41-5.85)	NI
No	3 (13.6)	19 (86.4)	1	
Decision maker for health care spending				
My self	11 (28.9)	27 (71.1)	**4.64 (1.47-14.70)**	**6.16 (1.22-31.05)***
Partner/parents	5 (8.1)	57 (91.9)	1	1
Availability of road access to the nearby HF				
Yes	11 (15.1)	62 (84.9)	0.91 (0.29-2.82)	NI
No	5 (18.5)	22 (81.5)		
Main source of information on SRH				
Health workers	14 (23.3)	46 (76.7)	**5.78 (1.24-27.05)**	1.02 (0.14-7.65)
Other than health workers	2 (5.0)	38 (95.0)	1	1
Number of ANC				
0-3 visits	2 (8.0)	23 (92.0)		1
>=4 visits	14 (18.7)	61 (81.3)	2.64 (0.56-12.53)	5.01 (0.64-37.37)
Ever had used contraceptive methods				
Yes	14 (19.7)	57 (80.3)	3.32 (0.70-15.63)	3.29 (0.45-23.87)
No	2 (6.9)	27 (93.1)	1	1

Republic of Congo (41.2%) [38]. A proper ANC service utilization is strongly related to higher opportunity to detect and manage adverse pregnancy outcomes, including mothers' death [39]. In Ethiopia, maternal mortality ratio is high, accounting for 401 maternal deaths per 100,000 live births [40], that is about 50 times higher than in high-income countries. These factors suggest that major effort should be done in order to increase the level of adherence to the optimum ANC service utilization to reduce maternal mortality.

Results from this study suggested that older young women (20–24 years old) have an increased probability to receive optimum ANC than younger mothers (18–19 years old). Several other studies observed similar results [30, 41], even if there is still debate on it [35]. Among other explanations, pregnancies in younger women are more probably unwanted [42] and there is a clear association between unintended pregnancies and a reduced health seeking behavior[43, 44].

As regarding PNC, only 16% of young women were observed to have an optimum utilization. This extremely low utilization is almost the same with national average of the country [45, 46], and Myanmar (19%) [8], and even higher than the study results from Nigeria (7.8%)[6]. Absent or reduced PNC service utilization was observed to be associated with an increase of neonatal death both in the first week and in the first month in Sub-Saharan Africa [47]. Moreover, an increased maternity services utilization was found to be associated to several health outcomes of the newborns, including greater attendance of underweight infants at child welfare clinics [48] and a better control for HIV (Human Immunodeficiency Virus) possible infection in children of HIV infected mothers [49]. PNC services utilization has been demonstrated to be associated with higher uptake of postpartum modern contraceptives, reducing unintended pregnancies and providing adequate child spacing in between births, all elements that increase women reproductive health care [16].

Results from our study indicated high drop out in the continuum of maternal and newborn care. This high dropout could be explained by different reasons like: cultural barriers [13, 50–52], dissatisfaction from previous service [52], and autonomy to receive health service [13]. A possible further explanation for the low use of PNC might be also due to low level of awareness about the importance of the service even when there are no complications after birth [6, 10, 13, 28, 31, 46].

Interestingly, in our study, optimum PNC service utilization was associated with self-decision making for health care spending. Though PNC is free service in Ethiopia, is probably related with the general autonomy of the young women [52] and with the indirect costs, like transport cost.

Finally, knowing the availability of AYFHS around the dwelling area was a significant determinant for optimum use of both ANC and PNC services, consistently with what was already found in literatures [52, 53]. This information is important for public health implications, suggesting the importance of AYFHS development and communication interventions.

Strength and limitation

There are several limitations of the study that should be taken into account. First, it is cross-sectional design does not allow to infer causality. Second, data are self-reported and this could lead to misclassification or to recall-bias. Finally, it was not studied the relation between optimal ANC and PNC utilization and mother or child health outcome. Despite these limitations, this study is important as it gives a clue on how women in a rural African are utilizing ANC and PNC services in the continuum of care, using standardized methods for collecting data in a representative sample of Tigray women with a high rate of response and participation.

Conclusion

Even if the Maputo Plan of Action in 2006 laid the foundation to create integrated sexual and reproductive health care plans in Sub-Saharan African countries, including Ethiopia, the maternal and newborn health strategies have still many components missing [54]. In rural zones of Northern Ethiopia, PNC services utilization was very low, reaching the optimum in less than one every five cases. Moreover, significant number of young mothers did not receive the WHO suggested optimum ANC services. Therefore, public health strategies to improve the utilization of ANC and PNC services should be designed, including the strengthening of AYFHS.

Abbreviations

ANC-Antenatal Care, AOR-Adjusted Odds Ratio, AYFHS-Adolescent and Youth Friendly Health Service, COR-Crude Odds Ratio, CCM- Comitato di Colabrizino Medica, CI-Confidence Interval, HIV-Human Immunodeficiency Virus, PNC-Postnatal Care, SD-Standard Deviation, WHO-World Health Organization.

Declarations

Ethical approval and consent to participate

For the first study, which was used as a source of data for this manuscript, the Ethical clearance (with reference number of 0048/10) was obtained from the Institutional Review Board of Tigray Health Research Institute (IRB-THRI). Furthermore, respondents were informed about the objective and purpose of the study and written consent was obtained if participants were above the age of 18 years and their written assent with parent's/guardian's consent if otherwise was taken. Thus; we did not sought ethical clearance for the current manuscript as we used secondary data from our previous study.

Consent for publication

Not applicable for this.

Availability of data and materials

Due to ethical reason, the individual data are not available. Aggregated data could be obtained, by requesting them to the corresponding author. However, the dataset supporting the conclusions of this article is included within the article.

Competing interests

The author(s) declare that they have no competing interests.

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Authors' contributions

AB[1] contributed to the conception, design, data collection, analysis, interpretation and write up the first draft of the manuscript.

HT [2], GH [3], GF4, ND[5], TK[6] and MM[8] contributed to the data collection and revision of the manuscript.

WT[7] contributed to interpretation and revising the manuscript.

RF[9] contributed to the conception, analysis and interpretation of the results and revised the manuscript.

All authors read and approved the final manuscript.

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Figures

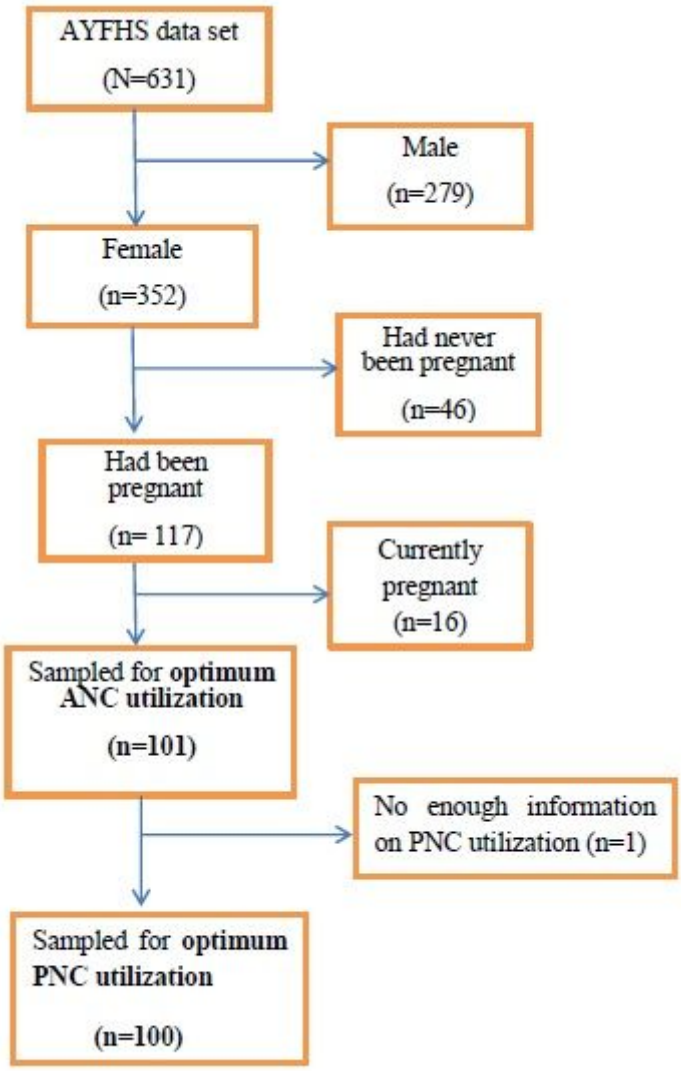

Figure 1

Schematic presentation of sampling procedure.

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