

## **Knowledge, attitude and willingness towards analgesia for labor among mothers attending antenatal care at a hospital in Kigali, Rwanda**

**Diane Uwamahoro,**

**Affiliation: Mount Kenya University, Rwanda**

### **Abstract**

Analgesia in labor plays a crucial part in affecting maternal satisfaction. This study aimed to assess the knowledge, attitude, and willingness towards analgesia for labor. A cross-sectional study design was employed among 334 pregnant women antenatal care attendant and were included using systematic sampling technique.

The mean age of participants was 36.3 (6.3 Std. deviation). Of all the 334 participating women, 251 gave information on monthly income. The average monthly income was 150596 (107.2 USD), with a minimum of 40000 (33.3 USD) and maximum of 1200000 Rwf(1000.0 USD). About 60% of participating women were from rural place of residence and more than 80% were married. Occupation status, government employed (16.8%), merchants (7.8%), farmers (12.6%), students (16.5 %), and others (46.4%) types of work workers. Almost two-third (62.6%) of the study participants have attended 1-3 ANC visits and 42.8% had history of cesarean section delivery. Overall, 69.7% of the participating women had a good knowledge on analgesia during labor. However, more than three-fourth (75.2%) had a negative attitude towards analgesia. Three-quarter (75.2%) were willing to go for analgesia during labor. Multivariate analysis indicated, women with history of previous cesarean section delivery were 6.8 times more likely to know about analgesia compared to their counterparts (AOR: 6.81; 95 % CI: 3.31 to 14.3;  $P < 0.001$ ). Moreover, women from rural place of residence were 50% more likely having negative attitude than from urban (AOR:0.51; 95 % CI: 0.27 to 0.94;  $P < 0.001$ ). Number of previous deliveries was significantly associated with positive attitude towards analgesia during labor. Women aged 40 and above years were 3.1 times more willing for analgesia during labor than women aged 20 to 30 years, and this difference was significant (AOR:3.10; 95 % CI: 1.38 to 6.72;  $P = 0.006$ ). Data from the interviews revealed that poor knowledge related to information, rural place of residence, primigravida, and no history of previous cesarean section delivery were associated with negative attitude. Young age of pregnancy was also associated with lower likelihood of willing to have analgesia during labor. Comprehensive intervention on information and awareness raising about analgesia during labor among pregnant women of ANC attendance should be instigated.

**Key words:** Labor, Analgesia, pregnant women, Antenatal care attendants, Rwanda

## Background of the study

The labor pain is probably the most severe pain that most women endure in their lifetime (Suresh, 2015). Since pain relief in labor has always been surrounded by myths and controversies, providing effective and safe analgesia in labor have remained a perennial challenge (Ezeonu et al., 2017). According to the American College of Obstetricians and Gynecologists (ACOG, 2019), labor is associated with severe pain for many women. However, although labor has been portrayed as a painful, life-threatening and fearsome event in woman's life since the earliest recorded history and has held that status until the last century (Simpson & Catling, 2016). It is very difficult to quantify pain and many women describe it as worst pain they have experienced in their lives it remains making their memories of childbirth sour and bitter (Sharma., Menia., Bedi., & Dogra, 2013). Pain relief in labor has always been surrounded with myths and controversies. Hence, providing effective and safe analgesia during labor has remained an ongoing challenge. The delivery of the infant into the arms of a conscious and pain-free mother is one of the most exciting and rewarding moment in medicine (Sharma. et al., 2013).

The severity of pain parallels with the duration and intensity of contraction. In the second stage additional factors, such as traction and pressure on the parietal peritoneum, uterine ligaments, urethra, bladder, rectum, lumbosacral plexus, fascia and muscles of the pelvic floor increase the intensity of pain (Alleemudder et al., 2015).

Under no circumstance should a woman be allowed to bear pain which is amenable to safe intervention while under the care of a physician and it is therefore recommended that in the absence of any contraindication, pain relief should be provided in labor on maternal request. Analgesia for labor is therefore an important factor in the management of pregnant women during childbirth (Njiru, Esiromo, & Omari, 2014).

The use of analgesia in labor is widespread in modern obstetric practice, and its benefits in terms of pain relief are well-recognized and its use has increased globally in recent time. However, there is a wide disparity in its use among countries, and intra-country variation also exists (ACOG, 2019). The practice of analgesia is higher in high-income countries where it is considered as the mainstay of labor analgesia in 50%–90% of obstetric units. This is in sharp contrast to what is obtained in low-income countries with only between 1.3% and 12% of participants benefitting from epidural analgesia (Ezeonu et al., 2017). Moreover, in some cases, like in cardiac diseases in pregnancy, analgesia is an important component of labor management. However, in some cultures, unassisted natural births are valued and seen as a source of pride and women are taught that labor pain is natural and the ability to accept and endure labor pain is a sign of womanhood (Ezeonu et al., 2017). A study done in Togo found that refusal of painless labor was motivated by religious belief that painful delivery was in the natural order whereas some women who refused painless delivery stated that pain was the best expression of their femininity (Njiru et al., 2014). Some studies, however, found that many women would choose analgesia if it was offered to them. In a study done in Nigeria, the majority of women described labor pain as severe and more than 86% of them would want the analgesia. Another study in Northeastern Nigeria found that 81.6% of the parturient would like analgesia whereas 78.8% would recommend analgesia for labor (Ezeonu et al., 2017).

The knowledge of epidural analgesia in labor among pregnant mothers has been investigated by many studies to be varying. In a study conducted by Karn *et al.*, 76% of women knew that epidural analgesia was a method of labor pain relief (Karn, Yu, Karna, Chen, & Qiao, 2016). In contrast, a study done in Northeastern Nigeria found that the knowledge for analgesia in labor

was only 18%. A study by Atiya *et al* found that out of the women who participated in their study, only 9.1% had the knowledge of epidural analgesia as compared to 62.5% who knew about use of injections as a form of labor analgesia (Barakzai, Haider, Yousuf, Haider, & Muhammad, 2010). Njiru *et al* also assessed the level of knowledge regarding labor analgesia and found out that knowledge was high among those who used labor analgesia as compared to women who did not use any form of labor analgesia (Njiru et al., 2014).

The intensity of labor pain has also been associated with post-partum mood disorders. A study by Boudou *et al* confirmed the link between the intensity of labor pain and mood disorders in early post-partum period (Boudou, Teissèdre, Walburg, & Chabrol, 2007). In another study, Njiru *et al* found that memories of labor pains can evoke intense negative reaction in some women (Njiru et al., 2014). Early detection of risk factors such as pain will help improve on the psychological impact of labor and especially on post-traumatic stress disorders (Ezeonu et al., 2017). Most women in labor require pain relief during delivery “analgesia in labor plays a crucial part in affecting maternal satisfaction during one of the most painful periods of a woman’s life” (Leanne, 2012). However, general public underestimate the intensity of pain experienced by women in labor and doesn’t understand the relief offered by the analgesia provided during labor. The underestimation of the labor pain results into public health problems that follow childbirth such as postpartum depression and having their memories of childbirth sour and bitter (Alleemudder et al., 2015).

Analgesia for labor is widely used in other parts of the world. However, analgesia for labor was not a common practice in Rwanda until 2010. Robert *et al* also found out that the practice of labor analgesia was not offered to all parturients despite an increase in medical knowledge of epidural analgesia in recent decades (James, Prakash, & Ponniah, 2012; Robert et al., 2020). It was officially introduced in Rwanda, launched on September 17, 2020, at King Faisal Hospital Kigali and later in other referral and private gynecological hospitals in Rwanda (Mbabazi, 2020). No current study assessed the knowledge, attitude or willingness on the use of analgesia for labor among Rwandan pregnant mothers. In addition to fear of childbirth women may not be aware of the analgesic options for labor since it is new in Rwanda. Several studies that have been conducted worldwide mentioned that culture, age, socioeconomic background, and education may have a strong influence on the attitude toward analgesia in labor.

Despite the effectiveness of analgesia for labor, it is not practiced in many obstetric units in Rwanda (Mbabazi, 2020). Lack of skills for the administration of epidural analgesia, ignorance on the part of the pregnant mothers, and the extra cost for providing epidural analgesia in labor contributed to low utilization of analgesia for labor pain relief in low-resource settings (Simpson & Catling, 2016). Several studies that have been conducted worldwide mentioned that lack of knowledge on the existence of an option for labor pain relief, culture, age, socioeconomic background, and education may have a strong influence on the attitude toward analgesia in labor (James et al., 2012). There are currently no local studies that have assessed pregnant mother’ knowledge, attitude and willingness towards analgesia for labor in Rwanda. Therefore, this study aims to investigate the level of knowledge, the attitude and willingness of women on labor pain management at a hospital in Kigali, Rwanda.

## **Methods and materials**

### **Study Design**

A cross sectional study design was used.

### **Study Setting**

The study area was carried out at La Croix du Sud Hospital Kigali, Rwanda. It is a private hospital that provides a wide range of medical care services with majoring on Gynecology-Obstetric. It is located at KG 201 St 7, Remera Sector, and Gasabo District in the City of Kigali. It has consultants, medical officers, clinical officers and nurses with more than 300 staff: 37 specialists, 9 General Practitioners, 60+Nurses, 10 Lab Technicians, and 2 Physiotherapists and others. It had 104 Beds including intensive care unit (ICU) and neonatal intensive care unit (NICU). It has recorded > 1 million visitors from 2009 and >100 thousand ANC visitors annually. More than 30 thousand babies were delivered since its establishment with more than 3 thousand deliveries annually.

### **Target Population**

The participants of this study were pregnant women attending the antenatal clinic of La Croix du Sud Hospital Kigali, Rwanda during the study period from June to July 2023. The study recruited mothers who were attending ANC and who consented to participate in the study during the study periods.

### **Sample Design**

#### **Sample size and sampling procedure**

The sample size for quantitative data was determined using single population proportion formula (WW D: Biostatistics,1999). with the assumption that the proportion of knowledgeable pregnant women attending antenatal care in a similar setting in Cameroon about knowledge on analgesia was approximately 31.9% (Robert et al., 2020), with a 95% confidence level, a 5% marginal of error and 80% power as design effect.

$$N = \frac{Z^2 P(1-P)}{d^2} = \frac{1.96^2 * 0.319(1-0.319)}{(0.05)^2} = 334$$

- Where  $z=1.96$ ;  $p=0.319$   $d=0.05$
- The total sample size was 334 pregnant women and included in our study. Participants were selected using simple random sampling technique.

### **Sampling Technique**

A systematic random sampling method was applied among attendants on a daily basis by applying a random starting point with a fixed, periodic interval. The sampling interval was 3 to 4 and it was calculated by dividing the population size by the desired sample size. Mothers were recruited according to their order of attending the ANC during the period of Data Collection.

### **Inclusion Criteria**

Antenatal care attendant women with confirmed positive pregnancy test were eligible for the present study. Women under 18 years old and not willing to participate in this study were excluded.

### **Data Collection Methods**

Data was collected using a face-to-face interview by trained data collectors using printed questionnaires. All data collection were done in the ANC waiting room of the La Croix du Sud Hospital in Kigali, Rwanda.

### Data Analysis

Data was manually checked for completeness and data entry was done in excel then was imported to SPSS software version 25 for statistical analysis. Descriptive analysis was carried out and was presented using tables and graphs with frequency and percent for categorical variables. Mean and standard deviation was used for quantitative descriptive information. Knowledge score was calculated by summing up of the variables (14 variables) related to knowledge (1= to those who know the correct answer, and 0= to those who don't know the correct answer). Participants who scored more than half proportion of the total questions were classified as having a good knowledge and those who scored less than half were classified as poor knowledge towards anesthesia during labor. Attitude of participants was calculated from 19 variables related to attitude and were grouped in to two using similar method for knowledge and grouped in positive attitude and negative attitude. Chi Square test was used to assess the associated factors with Knowledge, attitude, and willingness of participants towards anesthesia during labor. Furthermore, a multivariate logistic regression analysis was done to find factors associated with willingness towards anesthesia during labor after adjustment. All variables which were found significantly associated with willingness on anesthesia during labor were considered for multivariate analysis. P-value less than 0.05 was considered as statistically significant.

### Results

In this study, 334 women participated. The mean age of study participants was 36.3 (6.3 Std. deviation). Of all the participating women, 251 gave information on monthly income and the average monthly income was 150596 (128607.3 std deviation), with a minimum of 40000 and maximum of 1200000 Rwandan frank. Detail sociodemographic characteristics of all are presented in Table 1.

**Table 1. Socio demographic characteristics of study participants**

	Variables	Frequency (n)	Percent (%)
Residence	Urban	134	40.1
	Rural	200	59.9
Marital status	Married	275	82.3
	Others	59	17.7
Level of education	None	5	1.5
	Read and write	23	6.9
	Primary	43	12.9
	Secondary	142	42.5
	College and above	121	36.2
Occupation			

	Government employed	56	16.8
	Merchant	26	7.8
	Farmer	42	12.6
	Student	55	16.5
	Others	155	46.4
Number of Pregnancies	Primigravida	97	29.0
	Multigravida	237	71.0
Number of deliveries	Nullipara	87	26.0
	Para-1	120	35.9
	Multipara	127	38.0
Frequency of ANC attendance in the current pregnancy	No visit	30	9.0
	1-3	209	62.6
	4 and above	95	28.4
Type of last delivery	Vaginal	113	33.8
	Cesarean	143	42.8
	Missing	78	23.4

About 60% of the participants in this study were from rural place of residence. More than 80% of women participant were married. Similarly, more than third-fourth were with secondary and above level of education, while a negligible number 5 (1.5%) had never attended schooling. Regarding to occupation status, 16.8% were government employed, 7.8% were merchants, 12.6% were farmers, 16.5 % were students, and the remaining 46.4% were other types of work worker. Of all the study participants, 29% were primigravida and 26% were nullipara. Almost two-third (62.6%) of the study participants have attended 1-3 ANC visits. Concerning the type of previous last delivery, 33.8% have delivered with spontaneous vaginal delivery and 42.8% cesarean section delivery as shown in Table 1.

### Knowledge of study participants about anesthesia and labor

Table 2 shows the percentage distribution of pregnant women on knowledge towards anesthesia. Overall, 85.3% of the women have heard information about anesthesia. The highest proportion was on general anesthesia (65.9%) and epidural anesthesia was the lowest which was 3.9%.

**Table 2. Knowledge of study participants about anesthesia and labor**

Variables	Frequency (n)	Percent (%)
Any health information about Anesthesia		
Yes	285	85.3
No	49	14.7
Type of anesthesia heard		
General	220	65.9
Epidural	13	3.9

	Lumbar	83	24.9
	Both lumbar and Epidural	1	0.3
	All	4	1.2
	Missing	13	3.9
Any Operation in the past			
	Yes	151	45.2
	No	183	54.8
Type of Anesthesia given			
	General	34	10.2
	Epidural	14	4.2
	Lumbar	123	36.8
	Missing	163	48.8
What is Anesthesia for you			
	Know	282	84.4
	Don't know	52	15.6
Purpose of Anesthesia			
	Know	287	85.9
	Don't know	47	14.1
know the different forms of Anesthesia			
	Yes	27	8.1
	No	307	91.9
Is Epidural Anesthesia necessary for labor			
	Yes	20	6.0
	No	314	94.0
Route of Epidural anesthesia			
	Know	17	5.1
	Don't know	317	94.9
Type of health facility where they receive Epidural anesthesia			
	General Hospital	93	27.8
	District Hospital	158	47.3
	HCS	2	0.6
	National referral Hospital	81	24.3
Who do you think will give you the Epidural anesthesia?			
	Surgeon	5	1.5
	Surgeon Assistant	1	0.3
	Anesthesiologist	306	91.6
	Nurse	7	2.1
	Don't know	15	4.5
Know complications of Epidural anesthesia			
	Know	264	79.0
	Don't know	70	21.0
Type of anesthesia having high complication			
	Know	94	28.1

Types of anesthesia complication	Don't know	240	71.9
	Know	39	11.7
	Don't know	295	88.3
Willing for Epidural Anesthesia	Yes	251	75.1
	No	83	24.9
	Total	334	100.0

According to the findings of this study, 45.2% of the participants had previous history of operation. Of whom 10.2% had received general anesthesia, 4.2% received epidural anesthesia, and 36.8% received lumbar anesthesia.

Regarding to the knowledge on benefits of anesthesia, 85.9% of all the women knew its purpose but a small proportion (8.1%) knows the different forms of anesthesia. Majority (94%) of the participating women did not know that anesthesia is necessary for labor.

In regard to the specific questions on epidural anesthesia, a small proportion know the route or administration of epidural anesthesia (5.1%), type of health facility where it can be offered, and who should administer it. However, knowledge on epidural anesthesia, type of anesthesia who have complications, types of complications were 79%, 28.1%, and 11.7% respectively.

In this study we found that regardless of the previous knowledge on epidural anesthesia, the proportion of women who were willing to go for epidural anesthesia during labor in their current pregnancy was 75.1%.

### Participants Level of knowledge, attitude, and willingness on analgesia for labor among ANC attendant women

Overall score of good knowledge, negative attitude and willingness towards anesthesia for labor were 69.8%, 75.2%, and 75.2% respectively.

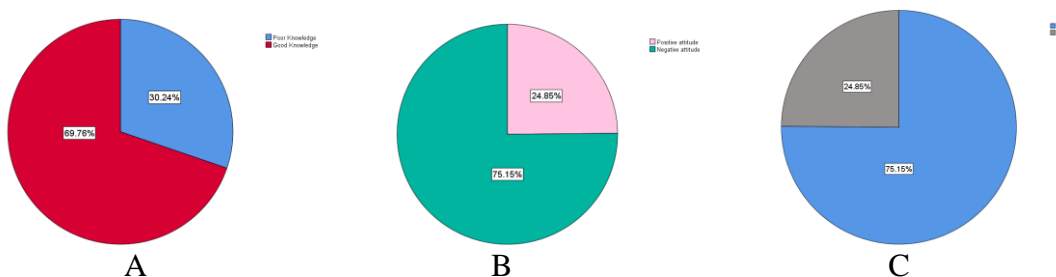


Figure 1 Overall score of knowledge (A), attitude (B), and willingness(C) towards analgesia for labor

### Factors associated with willingness towards anesthesia for labor

The factors associated to the willingness on analgesia for labor among mothers attending antenatal clinic at La Croix du Sud Hospital Kigali, Rwanda are presented in Table 2.

**Table 2. Factors associated with willingness towards anesthesia for labor**



Independent Variables		Total	Willing for Epidural Anesthesia		X <sup>2</sup> -value	p-value
			Yes	No		
Age group	20-30 years	75	62 (24.7)	13(15.7)	21.095	<b>&lt;0.001</b>
	30-40 years	180	145(57.8)	35(42.2)		
	40 and above	79	44(17.5)	35(42.2)		
Residence	Urban	134	99(39.4)	35(42.2)	0.193	0.660
	Rural	200	152(60.6)	48(57.8)		
Marital status	Married	275	208(82.9)	67(80.7)	0.197	0.657
	Others	59	43(17.1)	16(19.3)		
Level of education	none	5	4(1.6)	1(1.2)	3.26	0.515
	Read and write	23	15(6.0)	8(9.6)		
	primary	43	29(11.6)	14(16.9)		
	secondary	142	109(43.4)	33(39.8)		
	College and above	121	94(37.5)	27(32.5)		
Occupation	Government employed	56	38(15.1)	18(21.7)	11.424	<b>0.022</b>
	Merchant	26	16(6.4)	10(12.0)		
	Farmer	42	27(10.8)	15(18.1)		
	Student	55	47(18.7)	8(9.6)		
	Others	155	123(49.0)	32(38.6)		
Number of Pregnancies	Primigravida	97	78(31.1)	19(22.9)	2.027	0.154
	Multigravida	237	173(68.9)	64(77.1)		
Number of deliveries	Nullipara	87	68(27.1)	19(22.9)	0.572	0.751
	Para-1	120	89(35.5)	31(37.3)		
Frequency of ANC attendance in the current pregnancy	Multipara	127	94(37.5)	33(39.8)	0.723	0.697
	No visit	30	24(9.6)	6(7.2)		
	1-3	209	158(62.9)	51(61.4)		
Type of last delivery	4 and above	95	69(27.5)	26(31.3)	0.001	0.970
	Vaginal	113	84(44.2)	29(43.9)		
	Cesarean	143	106(55.8)	37(56.1)		
Knowledge Category	Poor Knowledge	101	79(31.5)	22(26.5)	0.73	0.393
	Good Knowledge	233	172(68.5)	61(73.5)		
Attitude Group	Positive attitude	83	60(23.9)	23(27.7)	0.484	0.487
	Negative attitude	251	191(76.1)	60(72.3)		

In this analysis we found that women aged 30-40 years were more willing towards anesthesia compared to the young 20-30 years and 40 and above years old, and this difference was found statistically significant ( $P < 0.001$ ). Similarly, women's occupational status was found significantly associated with willingness towards anesthesia for labor ( $P = 0.002$ ). However, respondents' marital status, place of residence, level of education, number of pregnancies and deliveries, ANC visits, and type of last delivery were not associated with willingness towards analgesia  $P$  value  $> 0.05$  as shown in Table 2.

As indicated in Table 2, respondents with high level of knowledge score were more proportion for willing towards anesthesia during labor, but this difference was not significant with a P value =0.393. Moreover, there was an no association between attitude and willingness on analgesia for labor among mothers attending antenatal care with p value = 0.487 at a Hospital Kigali, Rwanda.

### **Multivariable analysis of factors associated with willingness on analgesia for labor**

Multivariate logistic regression was used to identify the independent factors associated with knowledge, attitude and willingness on anesthesia for labor among mothers attending antenatal clinic. Variables which were found significant in the bivariate analysis were considered together in a multivariate logistic regression analysis for adjustment (Table 3).

After adjusting for sociodemographic predictors, findings of a multivariable logistic regression analysis on determinants of knowledge about analgesia during labor among pregnant women revealed that married women were 1.5 times (AOR: 1.51; 95 % CI: 0.60 to 3.83) more likely to know about analgesia during labor, but this difference was not significant (P=0.38). Women from merchant, farmer, students, and other occupation category were 40% to 80% lower likely to know about analgesia during labor compare to women of government employed category. However, this difference was not significant (P>0.05). Women's number of pregnancy, number of deliveries, and frequency of ANC visits were significantly associated with knowledge on analgesia during labor, however none of them were found significant after adjustment (P>0.05).

In this study, women's type of previous delivery was found significantly associated with knowledge on analgesia during labor. Women who had previous history of cesarean section delivery were 6.8 times more likely to know about analgesia during labor than women who did not have history of previous cesarean section delivery (AOR: 6.81; 95 % CI: 3.31 to 14.3 ; P<0.001).



**Table 3. Univariate and multivariable analysis of knowledge category on analgesia for labor and independent variables**

Independent Variables		Knowledge Category							
		COR	95% C.I.			AOR	95% C.I.		
			Lower	Upper	P-value		Lower	Upper	P-value
Marital status	Others	Ref [1]				Ref [1]			
	Married	2.101	1.178	3.747	<b>0.012</b>	1.51	0.60	3.83	0.38
Level of education	none	Ref [1]				Ref [1]			
	Read and write	0.109	0.010	1.164	0.067	0.19	0.00	12.44	0.44
	Primary	0.944	0.094	9.526	0.961	0.62	0.01	35.95	0.82
	Secondary	0.490	0.053	4.502	0.528	0.40	0.01	21.22	0.65
Occupation	College and above	0.870	0.093	8.116	0.903	0.93	0.02	52.47	0.97
	Government employed	Ref [1]				Ref [1]			
	Merchant	0.223	0.078	0.639	<b>0.005</b>	1.60	0.46	5.54	0.46
	Farmer	0.613	0.224	1.676	0.340	0.63	0.19	2.04	0.44
	Student	0.310	0.126	0.760	<b>0.010</b>	1.67	0.51	5.46	0.39
Number of Pregnancies	Others	0.414	0.188	0.912	<b>0.029</b>	2.17	0.66	7.12	0.20
	Primigravida	Ref [1]				Ref [1]			
Number of deliveries	Multigravida	2.622	1.592	4.316	<b>P&lt;0.001</b>	0.70	0.18	2.66	0.60
	Nullipara	Ref [1]				Ref [1]			
	Para-1	3.215	1.764	5.860	<b>P&lt;0.001</b>	3.25	0.77	13.76	0.11
Frequency of ANC attendance in the current pregnancy	Multipara	2.771	1.550	4.953	<b>0.001</b>	3.12	0.76	12.82	0.11
	No visit	Ref [1]				Ref [1]			
	1-3	1.665	0.769	3.603	0.196	2.51	0.42	14.97	0.31
Type of last delivery	4 and above	4.667	1.888	11.533	<b>0.001</b>	3.51	0.52	23.48	0.20
	Vaginal	Ref [1]				Ref [1]			
	Cesarean	6.562	3.370	12.777	<b>P&lt;0.001</b>	6.81	3.31	14.03	<b>P&lt;0.001</b>

COR: Crud odds ratio, AOR: Adjusted odds ratio, C.I. confidence interval

**Table 4. Univariate and multivariable analysis of attitude towards analgesia for labor and independent variables**

Independent Variables		Attitude towards analgesia for labor							
		COR	95% C.I.		P-value	AOR	95% C.I.		P-value
			Lower	Upper			Lower	Upper	
Age group	20-30 years	Ref [1]				Ref [1]			
	30-40 years	0.757	0.407	1.406	0.378	0.779	0.394	1.539	0.473
	40 and above	1.763	0.783	3.969	0.171	2.133	0.832	5.473	0.115
Residence	Urban	Ref [1]				Ref [1]			
	Rural	0.414	0.238	0.720	<b>0.002</b>	0.506	0.273	0.938	<b>0.031</b>
Level of education	none	Ref [1]				Ref [1]			
	Read and write	0.325	0.031	3.378	0.347	0.884	0.078	9.995	0.921
	Primary	1.900	0.176	20.559	0.597	3.152	0.257	38.686	0.370
	Secondary	0.895	0.097	8.301	0.922	1.596	0.165	15.415	0.686
Occupation	College and above	0.590	0.064	5.466	0.642	1.826	0.180	18.538	0.610
	Government employed	Ref [1]				Ref [1]			
	Merchant	3.559	1.080	11.730	<b>0.037</b>	1.858	0.154	4.834	0.017
	Farmer	2.750	1.076	7.029	<b>0.035</b>	1.254	0.361	4.357	0.721
	Student	1.446	0.660	3.168	0.356	0.415	0.143	1.198	0.104
Number of deliveries	Others	2.487	1.282	4.824	<b>0.007</b>	0.760	0.342	1.688	0.500
	Nullipara	Ref [1]				Ref [1]			
	Para-1	3.322	1.644	6.714	<b>0.001</b>	2.666	1.232	5.768	<b>0.013</b>
	Multipara	1.032	0.575	1.853	0.915	0.783	0.400	1.533	0.475

COR: Crud odds ratio, AOR: Adjusted odds ratio, C.I. confidence interval

In this study, women aged 40 and above years were more than twice more likely to have a positive attitude compared to women of 20-30 years, but this difference was not significant (P=0.115). Women from rural place of residence were found about 50% less likely to know about analysis during labor compared to women from urban place of residence and this difference was significant (AOR: 0.51;

95 % CI: 0.273 to 0.938). Association with level of education and occupation with attitude towards analgesia during labor were found insignificant ( $P>0.05$ ). Regarding the number of pregnancies, women who were para-1 were 3.32 times and 2.67 times more likely to having a positive attitude about analgesia during labor compared to women of nullipara, and these differences were found statistically significant (AOR: 3.32; 95 % CI: 1.64 to 6.71) and (AOR: 2.67; 95 % CI: 1.32 to 5.77) respectively.

**Table 5. Univariate and multivariable analyses of willing towards analgesia for labor and independent variables**

Independent Variables		Willing towards analgesia for labor							
		COR	95% C.I.		P-value	AOR	95% C.I.		P-value
			Lower	Upper			Lower	Upper	
Age group	20-30 years	Ref [1]				Ref [1]			
	30-40 years	1.151	0.57	2.32	0.695	1.036	0.504	2.128	0.923
	40 and above	3.794	1.80	7.99	<b>P&lt;0.001</b>	3.050	1.384	6.722	<b>0.006</b>
Occupation	Government employed	Ref [1]				Ref [1]			
	Merchant	1.319	0.50	3.48	0.575	1.584	0.780	3.216	0.203
	Farmer	1.173	0.50	2.73	0.711	2.269	0.917	5.612	0.076
	Student	0.359	0.14	0.92	<b>0.032</b>	1.490	0.678	3.271	0.321
	Others	0.549	0.28	1.09	0.085	0.781	0.329	1.856	0.577

COR: Crude odds ratio, AOR: Adjusted odds ratio, C.I. confidence interval

Two socio-demographic variables (age and occupation) were significantly association with willingness towards analgesia during labor. Women aged 40 and above years were three-folds more likely willing for analgesia during labor than women of 20-30 years. This difference was significant (AOR= 3.79; 95%CI = 1.80 to 7.99; p value < 0.001) and (AOR= 3.05; 95%CI = 1.38 to 6.77; p value = 0.006) both before and after adjustment respectively.

Moreover, occupation status of women was found associated with willingness on analgesia during labor. Compared to government employed, students were 65% less likely to go for analgesia during labor and this difference was found significant. (AOR= 0.36; 95%CI = 0.14 to 0.92; p value = 0.032). However, this difference was not significant after adjustment (P=0.321).

## Discussion

The labor pain is probably the most severe pain that most women endure in their lifetime. Since pain relief in labor has always been surrounded by myths and controversies, providing effective and safe analgesia in labor have remained a perennial challenge (Barakzai et al., 2010; Ezeonu et al., 2017). This study was conducted to find out the level of knowledge, attitude and willingness on labor analgesia and to establish the factors associated with analgesia for labor among pregnancy women of antenatal attendants in a hospital in Kigali, Rwanda.

The mean age of study participants was 36 years with a minimum 21 and maximum 52 years. This age distribution concurs with a similar study East Africa Ethiopian study (Naod, Admasu, & Ahmed, 2016). The average monthly income of participants was 150596 Rwandan frank. Six tenth of the participants were from rural place of residence. More than eight-tenth of the participants have heard about analgesia for labor before. And 54% had history of any type of operation in the past, 36% received lumbar anesthesia, 79% knew some complications of anesthesia during labor, which is higher than a similar study in (Naithani, Bharwal, Chauhan, Kumar, & Gupta, 2011).

In this study we found that 68.9% of the participating women had a good knowledge about analgesia. This proportion on knowledge of analgesia was much greater than a similar study finding from Ethiopia (Naod et al., 2016).

Multivariate analysis of the current study discovered an association between marital status and level of knowledge on analgesia during labor. Married women were 1.5 time more likely to know about analgesia during labor compared to women of another category (AOR: 1.51; 95 % CI: 0.60 to 3.83). This is similar to a study finding from (Goossens, 2018). Moreover, type of previous delivery was found having a significant association with knowledge. Women who had previous history of cesarean section delivery were 6.8 times more likely to know about analgesia during labor than women who did not have history of previous cesarean section delivery (AOR: 6.81; 95 % CI: 3.31 to 14.3;  $P < 0.001$ ). This association was in line to a previous study by (James et al., 2012; Naod et al., 2016). Although occupational status, number of pregnancies, number of deliveries and frequency of ANC visit were significantly associated with knowledge on analgesia during labor, none of them were found associated after adjustment ( $P > 0.05$ ).

A significant number of our patients (75.2%) had negative attitude towards anesthesia, which heralds the prompt need of anesthetists and stake holders to work hand in hand and improve Rwandans pregnant women health information regarding anesthesia and bring about a positive attitude towards the profession and its professionals. A better understanding and recognition of the importance of anesthesiology may help increase funding for research and development high profile areas of medicine such as research into maternal and child health during perinatal, antenatal, and postnatal care already benefited significantly in this way and persuade health care providing bodies to channel more resource in to this field (Naod et al., 2016). Although 32.6% respondents strongly agree for analgesia is a pain relief during labor, there were some more concerns with the maternal and fetal side effects when deciding against pain management. This may be due to a greater awareness about fetal side effects inline to a previous study (Jones et al., 2012; Naithani et al., 2011).

In Rwanda analgesia for labor can be administered at health center. However, 83.8 % responded that they had no opinion where analgesia can be administered by type of health facility. Further, information should be given to pregnant women about where women can receive this pain relief analgesia during labor.

Regarding to the willingness towards analgesia for labor among mothers attending antenatal clinic, on that mothers requested an epidural when they were in labor in their current pregnancy, the 75.15 % replied that they are willing to receive an epidural anesthesia during delivery for their current pregnancy. This proportion corresponds with a previous study by Ezeonu and colleagues (Ezeonu et al., 2017; Jones et al., 2012).

The proportion of willingness was significantly more among 40 and above years old women compared to 20 to 30 years old women (P-value <0.001). Similarly, occupation category was significantly associated with willingness towards anesthesia during labor. In this study marital status, level of education, number of pregnancies, number of deliveries, frequency of ANC attendance, type of last delivery, knowledge and attitude were not significantly associated with willingness towards analgesia (p value>0.05).

Adjusted multivariate analysis indicated that willingness on analgesia for labor was significantly more among respondents aged 40 and above years were more than triple times more willing to receive analgesia during labor (AOR= 3.05; 95%CI = 1.38 to 6.77; p value = 0.006). This finding concurs with another study in (Alleemudder et al., 2015; Ezeonu et al., 2017). While Occupation categories were significantly associated with willingness to an analgesia during labor, the difference was not significant after adjustment. The present finding was different from a previous study (Njiru et al., 2014), in which they found significant association with occupational category.

This study concluded that the discrepancy in the level of knowledge and acceptance could be attributed to the fact that childbirth is still viewed as a physiological process in most of the developing countries, which is managed with as little interference as possible. Many women still do not know that pain of labor can be relieved (Naithani et al., 2011). The high percentage (75.2%) of negative attitude towards analgesia during labor reveals there is a gap between women's understanding and attitude towards analgesia, and this requires comprehensive intervention on raising awareness on the different options of analgesia and fighting the cultural tabus which might have a negative influencing towards the appropriate decision during labor. The negative attitude towards analgesia during labor could also have been arisen due to misinformation on certain drugs used which can have harmful effects on the fetus. Therefore, further health education on areas about the possible choices and advantages of analgesia during labor should be incorporated in the ongoing guidelines of health education offered to antenatal care attendant women (Naithani et al., 2011).

A significant proportion of women have expressed their willingness towards analgesia for labor and women with higher educational levels, good knowledge about analgesia were more willing for analgesia during labor (80.9%). Women with high level of knowledge about analgesia were more willing towards analgesia during labor, but the difference was not significant both before and after adjustment with a p value > 0.05, this concluded that the mothers attended the antenatal care at Hospital Kigali, Rwanda had high willingness on analgesia for labor among pregnant mothers.

The researcher recommended that the antenatal clinic at hospital should make the mobilization of the knowledge, attitude and willingness towards analgesia for labor among pregnant women. Further research should conduct to assess the knowledge, attitude, and the willingness towards analgesia for labor among women attending other types of health facility including health centers, health stations, clinics, and hospitals.

Ethical Considerations

Ethical permission was sought out from the Mount Kenya University (MKU) Institutional Review Board (IRB) and the Hospital. Confidentiality of the study participants were maintained and individual identification or names were used on the questionnaire.

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