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Determinants of Antenatal Exercise among Pregnant Women Attending Antenatal Clinic in Owo, Ondo State

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Abstract

Despite proven benefits of Regular physical exercise in all phases of life, especially in pregnancy, pregnant women are not seen demonstrating good practice of antenatal exercises at various health centers in Owo. This study aimed to examine the determinants of Antenatal Exercise among Pregnant women in Ondo State. A cross-sectional survey was conducted among 172 pregnant women attending antenatal clinics at FMC Owo. A researcher-structured questionnaire consisted of four sections (A-D) based on the study objectives was administered on pregnant women assisted by trained nurses on each clinic day. Data was analyzed using SPSS version 25.0 and results was presented on frequency /percentage tables, and ANOVA was used to test hypotheses at 95% CI. Most women were in their active reproductive age (28.5 years ±4.02SD), their knowledge, and practice of antenatal exercise were fairly good but most did not follow recommended guidelines by American College of Obstetricians and Gynecologists guidelines. Common factors that determined practice of antenatal exercise are number of deliveries (62%), place of residence (54.7%), Health status (70.4%) and economic status (64.0%). This study concluded that there was no significant relationship between knowledge and practices (1.32), but significant relationship exists between occupation (4.43), parity (3.92) and practice of antenatal exercise respectively. Women antenatal exercise practice is still a challenge as it does not meet the recommended guidelines by the American College of Obstetricians and Gynecologists. However, it is recommended that health education on the importance of regular practice of antenatal exercise should be emphasized.

Keywords: *Antenatal Exercise, Determinants of Antenatal Exercise, Knowledge, Practice of Antenatal Exercise, Pregnant Women.*

Introduction

Globally, pregnancy and labour are remarkable experiences for women and their families, although the two events represent a period of increased vulnerability for the women and the unborn babies [1]. Antenatal care (ANC) is a component of reproductive healthcare that presents a lifesaving and unique opportunity for disease prevention, health promotion, early diagnosis and prompt treatment of sicknesses during pregnancy through evidence-based practices [2]. Exercise is a physical activity that involves planned, repetitive and structured movement which

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leads to improvement and maintenance of a number of components of physical fitness, while Ante Natal Care Exercise (ANCE) serves as a health promotion component with many benefits designed to prevent complications in pregnancy [3]. In view of the above, the American College of Obstetricians and Gynecologists (ACOG) recommended that light to moderate physical activity during pregnancy should be practiced to minimize risks. The college recommended a minimum of 150 minutes per week moderate exercise for postpartum and healthy pregnant women because of it most benefit to women and their unborn baby [4].

The global Maternal Mortality Ratio (MMR) in 2015 was 216, and the MMR of Sub-Saharan Africa (SSA) was 546, while Ethiopia alone had high MMR of 412, in which the majority of deaths occurred during the reproductive age group [5]. In Nigeria, the MMR was reported to be 814 per 100,000 live births, according to WHO, with about 34% of global maternal deaths occurring in Nigeria and India alone [6]. The risk assessment survey by WHO as cited showed that, the chances of a Nigerian woman dying during pregnancy, childbirth, postpartum or at post-abortion stage was 1 in 22 as against 1 in 4900 in developed countries showing the magnitude of maternal mortality problem in Nigeria [7]. Antenatal Exercises (ANE) for pregnant women have been suggested to promote safe delivery, health safety and good foeto-maternal health, maintain physical fitness as well as cardiovascular strength which help to avoid unwanted weight gain, gestational diabetes and preterm labour, neuro-behavioural relaxation and stress tolerance [8]. In Africa, studies have shown that there was a low level of physical exercise in pregnancy among pregnant women which ae mostly attributed to inadequate knowledge of antenatal exercise during pregnancy and lack of awareness about the benefits of antenatal exercise [9]. Another study reported that 46% and 76.4% pregnant women are physically inactive in South Africa and Ethiopia [10]. While in Southern Nigeria especially in Calabar metropolis, it was reported that pregnant women's knowledge about antenatal exercise benefits was good. However, a good number of pregnant women still demonstrated unfavorable attitude towards it practices which may be due to some factors identified as hindrance to the benefit of exercise [11].

There is a dearth of research on the concepts of determinants of antenatal exercise especially on attitude, and practice among pregnant women towards antenatal exercise in Nigeria, particularly in Ondo State. A high percentage of energy expended by pregnant women were on household chores which may not have been targeted towards regular antenatal exercise. The level of knowledge, attitude and practice of antenatal exercise among pregnant women in Ondo State could not be ascertained due to the limited literature on the subject matter coupled with lack of national recommendations of antenatal exercise. However, during our clinical practices at various health centers in Owo, we observed that regular health education on the benefits of antenatal exercise and the dangers associated with some sedentary lifestyles among pregnant women were not emphased by health care workers during antenatal clinic visits particularly in FMC Owo. Despite the proven benefit of ANE and health education intervention, at various health centers in Owo, pregnant women observed not demonstrate good knowledge, and practice of antenatal exercises. Most pregnant women go into labour ward with various obstetric complications during delivery which may be associated to their sedentary lifestyle and probably due to poor knowledge and practice of ANE. These complications are in no doubt contributed to maternal mortality in the state, and the Country at large. Based on the above situation among women in Owo, this study aimed to examine the determinants of

Antenatal Exercises (ANE) among pregnant women attending antenatal clinic in Federal Medical Centre, (FMC) Owo.

Research Questions

1. Will knowledge of pregnant women attending antenatal clinic determine the practice of Ante Natal Exercise (ANE) in Federal Medical Centre (FMC) Owo, Ondo State?
2. Will pregnant women occupation determine practice of ANE in FMC. Owo, Ondo State?
3. What is relationship of pregnant women's level of education and her practice of ANE in FMC Owo, Ondo State?
4. Will pregnant women parity determine the practice of ANCE among pregnant women attending FMC. Owo, Ondo State?

Hypotheses

Ho_1: There is no significant relationship between the knowledge of pregnant women and practice of antenatal care exercise in FMC Owo, Ondo State.

Ho_2: There is no significant relationship between the occupation of pregnant women and the practice of antenatal exercise in FMC Owo, Ondo State.

Ho_3: There is no significant difference between educational level and practice of the practice of antenatal exercise in FMC Owo, Ondo State.

Ho_4: There is no significant relationship between the parity and the practice of antenatal exercise in FMC Owo, Ondo State.

Methods

Study Design

This study is a descriptive cross-sectional survey conducted among pregnant women attending antenatal clinics that constituted this study population in FMC, Owo Ondo State. The Taro Yamane formula was used to determine the sample size of this stud, that is; for a population of 176, with a margin error of 0.05 (5%), the calculation was: n = 176 / (1 + 176 * 0.05^2) = 123 + 10% attrition rate given 172 as study population. A purposive sampling technique was used to select pregnant women who visited the antenatal clinic and met this study inclusion criterion. Data was collected using researcher's- designed questionnaire written in English Language and translated into Yoruba language for women who could not speak and understand English language. The questionnaire consisted four sections (section A to D) based on the study objectives. Section A elicits socio-demographic characteristics, Section B assessed the knowledge level of pregnant women on antenatal exercises, Section C was on the practice of antenatal exercises and Section D was on factors that determine practices of antenatal exercise. A face and content validity of the instrument was established through interaction with nurses and midwives who were experienced in ANE working in the antenatal care units of various health centres in the study area. While the reliability of the instrument was determined using Test – Retest method. A pilot test was conducted in general hospital Owo from which eighteen copies (i.e.10% of the sample size) of the instruments was administered on pregnant women with similar characteristics to the study population. The data collection process took a period of two weeks, assisted by trained research assistants. The result was correlated giving r 0.79 which confirmed the reliability of instrument.

Data Collection

Following the approval for the conduct of this study, pregnant women were selected on every antenatal clinic visiting day using convenient sampling technique until the sample saturation was reached. On each visiting day, the sampled women were approached and the purpose of the study was explained for their consent to participate in this study. Upon their inform consent for this

study, the questionnaire was designed in English Language and was administered to women who could read and write in English language and same was translated into Yoruba language for pregnant women who did not understand English language for their comprehension. Two graduate nurses (interns) working in FMC Owo, were selected and trained as research assistants for two days using researchers-designed manual. The research assistants helped in administering the instrument to the pregnant women during the clinic visit days for the period of two Months of August to September, 2024.

Data Analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 25.0 and descriptive analysis was used to analyze objectives 1-3 by developing frequency distribution tables and presented in frequency percentage tables. While inferential statistics was used to analyze the hypothesis, the One-way Analysis of variance for significant relationship between the dependent and independent variables used at 0.05 level of significance.

Results

Table 1. Social Demographic Characteristics of the Pregnant women

Variables Options		**Frequency**	**Percentage**
Age (Mean 28.5±4.02)	≤20	16	9.3
	21-30	84	48.8
	31-40	63	36.6
	41 and above	09	5.2
Religion	Christian	102	59.3
	Islam	66	38.4
	Traditional	04	2.3
Educational status	None	08	4.7
	Primary	08	4.7
	Secondary	62	36.0
	Tertiary	94	54.7
Occupation	Full house wife	34	19.8
	Self employed	80	46.5
	Civil servant	58	33.7
Number of pregnancies	First pregnancy	37	21.5
	Second pregnancy	65	37.8
	3 or more pregnancy	70	40.7
Family income per month	Less than 50,000	50	29.1
	50,000-100,000	74	43.0
	Above 100,000	48	27.9
Number of children	One	64	37.2
	Two	48	27.9
	Three	51	29.7
	Four and above	09	5.2
Place of resident	Rural	50	29.1
	Urban	122	70.9

Study Survey; 2024

Table 1 shows demographic characteristics of pregnant women who participated in this study with a response rate of 97.7%. The mean age of the pregnant women was 28.5years with a standard deviation of ±4.02. More than half (59.3%) of women were Christians, and 54.7% had tertiary educational qualification, among whom 46.5% were employed. A reasonable number (34%) of them earned between ₦50,000 and ₦100,000 per Month which put the working women at disadvantage of financial support to buy antenatal materials for use during pregnancy to facilitate ANE. Regarding the parity of pregnancies, 40.7% of women have had three or more pregnancies and 27.9% have more than one child, and majority of women were resident in urban communities.

Table 2. Knowledge of Pregnant Women on the Antenatal Exercises (N=172)

Questions	**Options**	**Yes** Frequency (%)	**No** Frequency (%)
What is your definition of physical exercise?	(a) Eating good food	33(19.2)	139(80.9)
	(b) Rest and sleep	41(23.8)	131(76.2)
	(c) Sitting in one place	44(25.6)	128(74.4)
	(d) Movement of parts of the body	136(79.1)	36(20.9)
What types of body exercises do you know?	(a) Working at home	43(25.0)	129(75.0)
	(b) Walking on the street	61(35.5)	111(64.5)
	(c) Daily housekeeping activities	41(23.8)	131(76.2)
	(d) Exercise base on training	140(81.4)	32(18.6)
What is the benefit of antenatal exercise	(a) Maintaining correct posture.	42(24.4)	130(75.6)
	(b) Painless delivery	52(30.2)	120(69.8)
	(c) Reduce fatigue/facilitate labour	29(16.9)	143(83.1)
	(d) Delivery of twins	128(74.4)	44(25.6)
What effect does exercise have on your pregnancy?	(a) Complications during delivery.	31(18.0)	141(82.0)
	(b) Delivery by operation.	45(26.2)	127(73.8)
	(c) Easy delivery.	122(70.9)	50(29.1)
	(d) Increasing blood pressure	73(42.4)	99(57.6)
How regular will exercise in pregnancy be done?	(a) Increased	50(29.1)	122(70.0)
	(b) Moderate	116(67.4)	56(32.6)
	(c) Decreased	41(23.8)	131(76.2)
	(d) Avoided completely	47(27.3)	125(72.7)
Stop exercising and contact your doctor if experiencing discomforts	(a) Headache only	41(23.8)	131(76.2)
	(b) Vagina bleeding	149(86.6)	23(13.4)
	(c) Chest pain	102(59.3)	70(40.7)
	(d) All of the above	155(90.1)	17(09.9)
Which type of antenatal exercise do you know?	(a) Walking	51(29.7)	121(70.3)
	(b) Dancing	45(26.2)	127(73.8)
	(c) Cycling	54(31.4)	118(68.6)
	(d) Sleeping	125(72.7)	47(27.3)

How does a good posture help in pregnancy?	(a) Help in maintaining posture	83(48.3)	89(51.7)
	(b) Helps in painless delivery	71(41.3)	101(58.7)
	(c) Leads to easy delivery	103(59.9)	69(40.1)
	(d) Prevents backache/fatigue	74(43.0)	98(57.0

Study Survey; 2024

Table 2 above Knowledge of pregnant women about ANE shows majority (79.1) of women knew the correct meaning of ANE, as 81.4% were able to identified types of ANE as exercise base on training by health workers. On the benefits of ANE, larger proportion (74.4) of women wrongly believed that ANE is beneficial only to facilitate delivery of twins, as 67.4% of women opined that ANE should be done moderately, as similar percentage suggested that they will stop exercising and contact the doctor if experiencing discomforts. Unfortunately, 72.7% of them mentioned sleeping as type of ANE compared to some claimed that good posture facilitates easy delivery. These results inferred that despite the women's appreciable knowledge of ANE, many of them could not know the best types of ANE that is beneficial to their gestational status.

Table 3. Practice of Antenatal Exercise by Pregnant Mother (N=172)

Pre-Requisites	**A**	**ST**	**NA**
Emptying bladder immediately you feel pressed	53(30.8)	115(66.9)	4(2.3)
Wearing loose and comfortable clothing	49(28.5)	109(63.4)	14(8.1)
Removing shoes and spectacles	58(33.7)	102(59.3)	12(7.0)
Drinking water before the exercise	53 (30.8)	100 (58.1)	19 (11.1)
Appropriate Position: a. Standing			
Standing erect with abdomen/buttocks tucked	58 (33.7)	106 (61.6)	8 (4.7)
Standing with your weight evenly distributed	60 (34.9)	103(59.9)	9 (5.2)
b. Bend and Lift Position			
keeping back straight and bend knees	53 (30.8)	111 (64.5)	8 (4.7)
Using leg muscles to move body up and down	61 (35.5)	98 (57.0)	13 (7.6)
c. Sitting			
Sitting on comfortable chair which supports back/thighs	59 (34.3)	104 (60.5)	9 (5.2)
Feet resting comfortably on the floor	44 (25.6)	110 (64.0)	18 10.5)
d. The correct way of getting out of the bed			
Turning to one side	49 (28.5)	112 (65.1)	11 (6.4)
Bend knees and use arms to rise up	70 (40.7)	89 (51.7)	13 (7.6)
Slowly lower feet to the floor and support body	65 (37.8)	96 (55.8)	11 (6.4)
Sitting upright and hold the sides of the bed	51 (29.7)	109(634)	12 (6.9)
Leaning forward while holding the sides of the bed	58 (33.7)	104 (60.5)	10 (5.8)
Using leg muscles to rise up	61 (35.5)	95 (55.2)	16 (9.3)

A= Always, ST= Some Time, NA= Not at All

Study Survey; 2024

Table 3 shows various antenatal exercise practices among pregnant women attending antenatal care in Owo. Few women knew various preparation for ANE, as few pregnant women (2.3%) did not empty their bladder when they feel pressed, 8.1% wear loose and comfortable clothing, 7% removed shoes,

spectacles and 11.1% drank water before the exercise. An average range of 58.1% to 67.0% women practices deep breathing, Box breathing and Purse Lips breathing exercises as forms of ANE. This may probably be a reflection of their average knowledge about ANE in this study. Majority of women practices different positioning, such as relaxation, perineal massage and visualization technique as forms of ANE, against few pregnant women who did not practice ANE. Generally, the practice of antenatal exercise among pregnant women attending antenatal care in this study was fairly good (49.4%). This may probably be a reflection of women's average knowledge about the correct meaning and practice of ANCE.

On the appropriate positioning, only about 35.0% stand erect with abdomen/buttocks tucked and weight evenly distributed always and about 65% of women sometimes keep back straight and bend knees to lift weight, while 57% use leg muscles to move body up and down. Substantial number (61%) of pregnant women sometimes sit on chair that supports back while only 25.6% always rest their feet comfortably on the floor. Before raised from bed, slightly above average pregnant women 65.1%, 63.4% and 60.5% occasionally turn to one side, sit upright and hold the sides of the bed and lean forward while holding the sides of the bed respectively. Although, women clear understanding of various of ANE practices was not clear due to health workers not communicating to pregnant women organized ANE program during their antenatal clinic visits Owo health centers.

Table 4. Determinants of Pregnant Women Practice of Antenatal Exercise

Factors affecting antenatal exercise	Always	Some Time	Not at All
a) Educational status	51(29.7%)	90(52.3%)	31(18.0%)
b) Age	61(35.5%)	61(35.5%)	50(29.1%)
c) Number of pregnancies	67(39.0%)	74(43.0%)	31(18.0%)
d) Occupation status	59(34.3%)	99(57.6%)	14(08.2%)
e) Economic status	44(25.6%)	110(64.0%)	18(10.5%)
f) Place of residence	94(54.7%)	51(29.7%)	27(15.7%)
g) Peer group	71(41.3%)	97(56.4%)	04(02.3%)
h) Lack of mass media Campaign	33(19.2%)	112(65.1%)	27(15.7%)
i) Number of deliveries	106(61.6%)	56(32.6%)	10(05.8%)
j) Regular ANC visits	64(37.8%)	99(57.6%)	09(05.2%)
k) Traditional belief	49(28.5%)	88(51.2%)	35(20.4%)
l) Health status of pregnant women	40(23.3%)	121(70.4%)	11(06.4%)
Time spent in the clinic	77(44.8%)	49(28.5%)	46(26.7%)

Study Survey; 2024

Table 4 shows factors that determine ANE practices, little above average number of pregnant women opined that numbers of deliveries and places of residence constantly affect their practice of antenatal exercise. Other factors identified are their health status (70.4%), Lack of mass media Campaign (65.1%), economic status (64.0%), occupational status/regular ANE visit (57.6%) each, peer group (56.4%) and educational status 52.3% are major factors that determine antenatal practice. But claimed that age and time spent in the clinic and traditional belief has nothing to do with practice of antenatal exercise (29.1%, 26.7% and 20.4%) respectively.

Hypotheses

Table 5. One-way Analysis of Variance showing the Relationship between Variables as Determinants of Antenatal Exercise Practices

Knowledge and Practice of Pregnant Women on Antenatal Exercise						
Source	SS	d/f	MS	Fcal.	Ftab	Decision
Between Groups	1.03	2	.52	1.32	3.05	Accept
Within Groups	66.02	169	.391			
Total	**67.047**	**171**				
Occupation and Practice of the Women on Antenatal Exercise						
Between Groups	.617	2	3.309	4.432	3.0495	
Within Groups	88.034	169	.521			Reject
Total	**88.651**	**171**				
Parity and Practice of the Women on Antenatal Exercise						
Between Groups	2.195	2	1.097	3.918	3.0495	Reject
Within Groups	148.660	169	.280			
Total	**150.855**	**171**				
Educational status and Attitude of the pregnant women on Antenatal Exercise						
Between Groups	.974	2	.487	.788	3.0495	Accept
Within Groups	104.537	169	.619			
Total	**105.512**	**171**				

Study Survey; 2024

Table 5 shows the outcome of hypotheses tested in this study, Ho_{1-4} states that there are no significant relationship between knowledge and practice (Fcal =1.32 < Ftab=3.05), educational level and attitude toward practice of antenatal exercise (Fcal =.788< Ftab=3.0495). However, the table further shows a significant relationship between parity of pregnant women (Fcal = 4.432 > Ftab=3.918), and occupation of pregnant women and the practice of antenatal exercise (Fcal = 4.432 > Ftab=3.918), respectively. These were done by comparing the calculated F-ratio with the tabulated value at P=0.05 probability level (95% CI).

Discussion

This current study examined the determinants of antenatal exercises among pregnant women attending antenatal clinic in Federal Medical Centre Owo, Ondo State Nigeria.

Demographic Characteristics of Pregnant Women about Antenatal Exercises

Women demographic characteristics in this study shows that most pregnant women were in their active child bearing age with mean age of 28.5 years ±4.02SD. These finding is similar to a survey conducted among 189 pregnant women with mean age of 28.9±4.63 among pregnant women [8]. Predominantly, 77% of pregnant women in this study practices Christianity as religion, about 55.0% of them were traders, and majority of them have obtained tertiary educational qualification. This implies that women age, religion, occupation and educational status may have significant influence on women knowledge and practice of ANE in Owo community. This current finding was supported by a study with respondents age of 27.5 years ±5.86, haven 38.4% who had tertiary educational qualifications, and majority (85.1%) were Christian and 83.1% of them lived in urban

settlement [5]. Also corroborating with this current study was a study conducted in Israel among 266 pregnant women with mean age of 27.86+4.79 years and were within the age range of minimum of 18 years and maximum of 44 years [8].

Knowledge Level of Pregnant Women about Antenatal Exercises

This present study shows appreciable number of pregnant women who expressed good knowledge of antenatal exercise (77.3%). The outcome of this study was not surprising considering the educational and economic status of women in this study. Although, other studies on ANCE attracted little attention in the past but the reviewed studies in recent past (half-decade) showed large number of women reported to have low knowledge of antenatal exercise among Ethiopian pregnant women and the Nigerian pregnant women showing an appreciable improvement of pregnant women knowledge about ANE in this current study comparatively [5, 8, 12].

In this current study, women's knowledge level about ANE has probably been influenced significantly as 79.1% of women were able to defined ANCE correctly and viewed it as an activity involving moving of body parts, also 81.4% were able to identified types of exercises respectively. Some proportion of women in this study appreciated the benefits of antenatal exercises to health, such as helping to maintain correct posture, painless delivery and reduces fatigue and facilitates labour (24.4%, 30.2%, while 16.9%) claimed that ANCE should be based on training of pregnant women respectively. The women educational status may have also probably translated into high level of knowledge about ANE in Owo communities of Ondo State. Although there was paucity of information relating to this finding from the previous studies however, a related study reported no significant difference between pregnant women level of awareness and practice of antenatal exercise [13]. Furthermore, these results inferred that despite the women's level of education and appreciable knowledge about ANE, many could not know the appropriate types of ANE that is beneficial to them.

The economic status of pregnant women in this present study was through self-employed or employment by organizations which earned them monthly salaries of between ₦50,000 and ₦100,000. This employment status would have enhanced their economic opportunity for financial self-supporting to meet their basic ANC needs and further facilitate their practice of ANE. Contrary to this current finding, was a study which revealed that 90.7% of women with appreciable level of educational qualifications was viewed as a possible means to facilitate women employment with private and public organizations for self-sustenance [16].

The average knowledge of antenatal exercise recorded in this study might be due to increase in the awareness through antenatal teaching by the midwives in the health centers, use of mass media and internet before this recent study. The knowledge level demonstrated by pregnant women who knew the exact meaning of exercise and types of exercises might also be due their exposure to various sources of health information. The majority of pregnant women who resides in urban area with parity three or more children might have gotten experiences from previous pregnancies and deliveries which might be an advantage for practice of ANE in Ondo state. Following the recommendations by ACOG, women with uncomplicated pregnancies should be encouraged to engage in aerobic and strengthen conditioning exercises before, during, and after pregnancy. This current study findings supports this recommendation as it will be easier for an educated women to implement the recommendation to later [4]. The finding in this study further revealed that only few women knew that antenatal exercise and maintaining correct posture reduces

fatigue and facilitates labour. This finding is in support of a study which reported that if women's knowledge level about antenatal exercise was below expectation, pegnant women will be deprive of beneficial effect of physical/antenatal exercise which is known to promotes good physical health and similarly poses no health risks to maternal or fetal health [13]. Similarly, antenatal exercise has been noticed by other studies to enhance post-natal recovery, improve skills, and prevent excessive weight gain, strengthen pelvic floor muscles, abdominal muscle strength, and prevent gestational diabetes [4, 5]. In an observational study on women who engages on exercise during pregnancy shows significant benefits in decreasing cesarean section, reducing birth risk and improving postpartum recovery time respectively [14]. Benefit of exercise during pregnancy in this study does not only prevent medical conditions, but also enhances mental health and well-being of mothers. This was also supported by other studies that physical exercise can be an essential factor in the prevention of depressive disorders of women in the postpartum period respectively [14, 15].

Significant proportion of women in this study opined that exercise in pregnancy should be moderated or should be stopped and physician should be contacted if experiencing complications like vagina bleeding and chest pain. This shows that pregnant women in Ondo state knew the consequences of strenuous exercise and stopping the ANE when experiencing such signs will stop the likely complications that may arise in pregnancy during exercise. It is believed that mild to moderate exercise in pregnancy is harmless except when they are engaged in strenuous activities before the exercise. Precisely, inestimable populations in Africa, particularly in Ondo state Nigeria. Evidence from recent studies supported this current finding that vigorous work exposure during pregnancy among black population [16, 12]. In Asian countries, the results were not different; China and Serbia. [17, 18] However, ACOG, which also documented that vigorous exercise is only safe during the third trimester for healthiest pregnancies supported these current findings [4].

Practice of Antenatal Exercises among Pregnant Women

On the practice of antenatal exercises, almost half of the pregnant women practiced antenatal exercise in one way or another which is similar to the findings from studies on practice of antenatal exercise in Nigeria (84.7%) considered to be higher compared with this current study, and in Canada (29%) respectively [5, 11]. Conversely, many studies such as study from Ethiopia and Tigray have reported low practice of antenatal exercise among pregnant women [18-20]. The difference might be due to variations in perceived benefit towards antenatal exercise among various settings and countries. Considering the specific responses regarding ANE practices, most pregnant women were not following the ACOG recommended guidelines even though some women occasionally practice antenatal exercise which is contrary to recommended ANE standard. This shows that despite the good knowledge and practice of antenatal exercise among pregnant women in Ondo State Nigeria, the patterns of practice are unsuitable and inadequate for optimum health benefits. In the developing regions, studies have reported that most of the pregnant women living in low-middle income countries (LMICs) are not sufficiently active and did not meet the present exercise guidelines during their pregnancy [20]. While in Ethiopia, majority of the pregnant women are below par with the ACOG recommendations [21].

Determinants of Antenatal Exercises among Pregnant Women

In this current study, the common factors identified as determinants of antenatal exercise were educational status, age, occupation, economic status, place of resident, mass media, mothers' parities, regular ANC visits and traditional belief. Comparing these current findings with other studies, some factors are found not limited only to individual/traditional beliefs and attitudes of women with respect to exercise in pregnancy. however, tiredness, illness conditions or uncomfortable environment also determines AN exercise [7]. Other findings also supported our current findings in the areas of pregnant women level of knowledge and educational status, safety concern of the pregnant woman and her physician, race/ethnicity, and previous involvement in regular exercise have also been implicated as important factors predisposing to exercise engagement [12].

Conclusion

Despite the good knowledge and moderate practice of antenatal exercise recorded in this study, significant number of women still lack willingness to practice ANE. Base on the current findings, it is concluded that there is no significant relationship between knowledge and practice, educational level and attitude toward practice of antenatal exercise (Fcal =1.32 < Ftab=3.05 Fcal =.788< Ftab=3.0495) respectively both at α=0.05. however, there exists a significant relationship between parity of pregnant women and the practice of antenatal exercise (Fcal = 4.432 > Ftab=3.918), as well as pregnant women occupation and practice of antenatal exercise, parity and practice of antenatal exercise (Fcal = 4.432 > Ftab=3.918) respectively. These were done by comparing the calculated F-ratio with the tabulated value at P=0.05 probability level of 95% CI.

Implication of findings to Nursing Practice, and Health Care System

Findings from this study have been able to delineate and highlight the Knowledge and Practice of antenatal exercise among Ondo state women. As a result of this finding, it is of immense benefit to nurses and other health care providers as it will guide in the planning and implementation of antenatal care health education precisely, the way antenatal exercise should be carried out during pregnancy for materno-fetal benefit. By so doing, maternal mortality rate would be reduced.

Nurses/Midwives: This current finding will enable nurses and midwives to be familiar with various determinants of antenatal exercise practices, and this finding will guide nurses in planning health education protocol for pregnant women on how to take advantage of these factors to effectively practice regular antenatal exercise while at home.

Policy Formulation: The findings of this work will serve as a reference material from which decision makers in healthcare system while formulating policies and guidelines for antenatal exercise in pregnancy.

Health Educational sector: The outcome of this study would improve the current state of nursing and other health professions to advance in professional education. In the same vein, the findings will create awareness on the need to focus more on the preventive health promotion measures like teaching of antenatal exercise during antenatal visits for maximum compliance among the Pregnant women.

This finding will also serve as a resource for education and information of the public on the invaluable and indispensable roles nurses and other health care givers play in the reduction of maternal mortality rate in Nigeria.

Recommendations

Considering the conclusion of the findings, it was recommended that:

1. Nurses and Midwives working in ANC should individualize their teaching in order to capture the entire population for a larger coverage.
2. There is urgent need for national bodies like Society of Gynecology and Obstetrics of Nigeria and Nursing and Midwifery Council of Nigeria to formulate and adopt her own recommended guidelines based on our uniqueness for effective health benefit.
3. In the main time, women should be encouraged to seek expert attention before undertaking any form of exercise during pregnancy in order to ensure that they follow the ACOG guidelines. for effective outcome

Ethical Considerations

The research proposal and letter of introduction addressed to the Chief Medical Director, FMC, Owo was submitted to the Health Research and Ethical Committee (HREC) of the institution and ethical approval with reference number FMC/OW/380/VOL/CXII/31 was obtained for the conduct of this study. The informed consent was also obtained following explanation on the purpose of this study to pregnant women and they were assured of their safety throughout the period of the study.

Authors' Declaration

We, authors of this study agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest

There was no conflict of interest of any form as regard to conduct of this study.

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