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Socio-demographic predictors of knowledge, attitude and practice of antenatal exercise among pregnant women

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ABSTRACT

Background and Aims: Physical exercises during the period of pregnancy have proved to be valuable to many pregnant women. This study aims to explore the knowledge, attitude and practice of exercise during pregnancy among antenatal mothers in Al Baha region. *Methods:* A cross-sectional research design was conducted in over sixteen months of pregnant women across two hospitals (i.e., King Fahad Hospital and Prince Mishari bin Saud Hospital) in the region of Al-Baha, Saudi Arabia. A total of 118 participants (pregnant women) were approached with a structured interview questionnaire administered by trained health personal. The study questionnaire was designed with 98 items. In this study, the analysis of the data was performed using R Studio software; this involved calculating descriptive statistics in order to highlight certain demographic details of the participants and the application of inferential statistics to verify the research hypotheses. Multiple logistic regression analysis was employed to evaluate the effect of the participants' knowledge, behaviour and attitude on their engagement with antenatal exercises during their pregnancy. *Results:* A multiple logistic regression analysis showed the knowledge about the antenatal exercises was approaching the significance regarding participants' employment status and BMI classification. The results indicated that the participants' employment status, age and Body Mass Index played a statistically significant role in predicting their attitudes towards and practice of antenatal exercises during their pregnancy. Results showed that overweight participants seemed to have inadequate practice of antenatal exercises during pregnancy than others. *Conclusions:* A majority of Saudi pregnant women demonstrate inadequate knowledge, but the practice and attitude of pregnant women were favourable.

Keywords: Knowledge, Practice, Attitude, Antenatal exercise, Physiotherapy, Pregnancy

1. INTRODUCTION

Antenatal care is an essential aspect of ensuring the well-being of both the fetus and the expectant mother (Kaur et al., 2021). The promotion of appropriate antenatal healthcare exercises is crucial for the safety of mother

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and baby and this has been found to enhance neonatal outcomes (Jarni et al., 2021; Nayak et al., 2015; Nkhata et al., 2014). However, a lack of awareness and understanding of the importance of these exercises often leads to their neglect (Sarfraz et al., 2013; Sheth et al., 2019). Studies have shown that engaging in exercise when pregnant can have a positive effect on a woman's psychological well-being, reduce gestational weight gain, alleviate back pain, shorten labour, decrease the need for caesarean section and speed up recovery times (Jarni et al., 2021; Nkhata et al., 2014; Sarfraz et al., 2013; Seneviratne et al., 2016; Sui et al., 2012).

The role of physiotherapy in obstetrics is highly important, during both the antenatal and postnatal periods (Ali, 2019; Bell and Palma, 2000; Sarfraz et al., 2013). Antenatal exercises, such as breathing exercises, aerobics, pelvic floor exercises, core stability, back care and postural education are designed to maintain physical fitness and cardiovascular endurance in pregnant individuals (Nayak et al., 2015; Sarfraz et al., 2013). Research has demonstrated that low-impact, moderate-intensity exercises carried out regularly can prevent excessive weight gain, gestational diabetes and pre-term labour, while promoting stress tolerance and neuro-behavioural relaxation in the developing fetus and aiding the mother's recovery after giving birth (Barakat et al., 2013; Barakat et al., 2019; Janakiraman et al., 2021; Nayak et al., 2015; Sarfraz et al., 2013; Vargas-Terrones et al., 2019).

Recent research has shown that exercise is generally safe for the mother and the fetus during pregnancy and it supports the idea of the majority of pregnant women carrying out regular exercise (Ali, 2019; Barakat et al., 2019; Janakiraman et al., 2021; Jarni et al., 2021). Despite this, in developing countries in particular, pregnant women typically fail to engage in the amount of exercise recommended (Okeke et al., 2020). This can be attributed to factors such difficult socio-economic conditions, the limited access to high-quality healthcare facilities, a lack of high-level education and fear of exercising during pregnancy (Ali, 2019; Barakat et al., 2019; Janakiraman et al., 2021; Jarni et al., 2021; Okeke et al., 2020; Sabr et al., 2021; Al-Fadhly et al., 2022). According to the American Congress of Obstetrics and Gynecology, pregnant women are recommended to engage in moderate exercise for 30 minutes on most days of the week (Mbada et al., 2015). However, there are also conservative opinions and myths such as the idea that is not safe for pregnant women to engage in exercise (Mbada et al., 2015). Additionally, cultural perceptions are an important factor in this, as in certain cultures women may feel pressurised into resting while they are pregnant (Ali, 2019).

The understanding of physical activity is a crucial factor that shapes attitudes towards engaging in such activities (Knox et al., 2015). The perception of exercise and physiotherapy has a direct impact on people's motivation to engage in exercise programmes that may be beneficial to them. Therefore, it is essential to create awareness and provide adequate knowledge on antenatal physiotherapy among women, as this can be a significant determinant of their participation in these activities. Consequently, pregnant women should be encouraged to partake in antenatal physiotherapy sessions as per their doctors' recommendations, supervised by qualified physiotherapists. However, the state of antenatal care in some country has long been declining, particularly in rural and underdeveloped urban areas, as reported by Roy et al., (2013) thus; there is a need for improvement in the quality of services and awareness of the guidelines for antenatal care. Safe motherhood relies on quality antenatal care (Sarfraz et al., 2013; Sheth et al., 2019).

Research on women's understanding and perceptions of antenatal exercises and their attitude towards them is limited in Saudi Arabia (Ali, 2019). As previously noted, having sufficient knowledge and understanding is crucial for pregnant mothers to hold a favourable attitude towards antenatal physiotherapy. In light of this, this study was conducted to assess the understanding and perspectives of expectant mothers in the Al-Baha region regarding exercise during pregnancy and also the level of exercise that these women engage in.

2. METHODS

Data Collection and Sample

This study featured a cross-sectional research design to examine the significant socio-demographic predictors (i.e., age, current gestation month, socio-economic status, employment status, number of family members, first pregnancy or not, number of children, and Body Mass Index (BMI) classification) of knowledge, attitude and practice relating to antenatal exercise (Antenatal exercises) among pregnant women in Al-Baha, Saudi Arabia. Following approval from the Institutional Review Board of Al Baha University, data collection began from January 2021 to May 2022. The data for the study were obtained from structured interview questionnaire administered by trained health personal (i.e., five physical therapists) across two hospitals (i.e., King Fahad Hospital and Prince Mshari bin Saud Hospital) in the region of Al-Baha, Saudi Arabia. The questionnaire items were obtained from a previously validated instrument that has been used in multiple studies across multiple countries around the world (Jarni et al., 2021; Nkhata et al., 2014).

Measures

The study questionnaire (i.e., Knowledge, Attitude and Practice (KAP) of antenatal exercise among pregnant women) was designed with 98 items (39 items measured sociodemographic information, 37 items measured knowledge relating to antenatal exercises during pregnancy, 16 items measured attitude relating to antenatal exercises during pregnancy and 6 items that measure practice relating to antenatal exercises during pregnancy). The measures used in this study specifically examined data obtained from the KAP of antenatal exercise among pregnant women questionnaire relating to age, current gestation month, socio-economic status (i.e., high income, middle income or low income), employment status (i.e., employed or unemployed), number of family members, if first pregnancy (i.e., first pregnancy or not), number of children and Body Mass Index (BMI) (i.e., underweight, normal weight, overweight or obese).

Additionally, participants' knowledge, practice and attitude of antenatal exercises were measured by the study questionnaire and was analysed for this research. First, for the knowledge scale, the scores ranged from 0 to 37. Participants who replied to the 37 knowledge questions, scored more than or equal to the mean value were defined to have adequate knowledge of antenatal exercises during pregnancy. Second, for the attitude scale, the scores ranged from 0 to 16. Participants, who replied to the 16 attitude questions, scored equal or more than to the mean value were defined to have a favourable attitude of antenatal exercises during pregnancy. Finally, for the practice scale, the scores ranked from zero to 6. Participants who replied to the 6 practice questions, scored more or equal to the average value were identified to have adequate practice of antenatal exercises during pregnancy.

Data Analysis

Data analyses were conducted in R Studio, which included a calculation of descriptive statistics to summarize characteristics of the participants and the use of inferential statistics to test the study's hypotheses. The study used multiple logistic regression analysis to assess the odds of participants' knowledgeability, attitude and practice regarding antenatal exercises during pregnancy. The analysis generated three models that test the study's hypothesis. Fixed covariates in the three models included socio-demographic data for the participants' characteristics (i.e., age, current gestation month, socio-economic status, employment status, number of family members, first pregnancy, number of children and BMI classification).

First, the study used a multiple logistic regression analysis to examine if socio-demographic variables were predictors of participants' knowledgeability regarding antenatal exercises during pregnancy. For this mode, a dummy variable was created with the value of "1" if the participant had adequate knowledge of antenatal exercises during pregnancy and "0" if the participant had inadequate knowledge of antenatal exercises during pregnancy. Second, the study used a multiple logistic regression analysis to examine if socio-demographic variables were predictors of participants' attitude regarding antenatal exercises during pregnancy. For this mode, a dummy variable was created with the value of "1" if the participant had a favourable attitude of antenatal exercises during pregnancy and "0" if the participant had an unfavourable attitude of antenatal exercises during pregnancy. Finally, the study used a multiple logistic regression analysis to examine if socio-demographic variables were predictors of participants' practice regarding antenatal exercises during pregnancy. For this mode, a dummy variable was created with the value of "1" if the participant had adequate practice of antenatal exercises during pregnancy and "0" if the participant had inadequate practice of antenatal exercises during pregnancy. To determine statistical significance, the alpha level for model coefficients was set to < 0.05 for all analyses.

3. RESULTS

Sample Characteristics

A total of 118 participants (pregnant women) completed the full survey patients (Mean age = 31.4, SD = 5.87). The mean current gestation month for the participants was about five months (Mean gestation month = 4.93, SD = 2.22) (Figure 1). Additionally, the plurality of participants 40.7% (n=48) reported being in the high-income level of the socio-economic status and 60.2% (n=71) of the participants were unemployed. Most participants (91.5%) reported that this pregnancy was not their first and the average number of children (mean number of children = 3.14, SD = 1.80) and family members (mean number of family members = 3.30, SD = 1.80) among participants was about three. Finally, 46.6% (n=55) of the participants were classified as being obese (Table 1).

Table 1 Socio-demographic characteristics of study subjects (N = 118)

	n	(%)
Socio-economic Status		
High-income	48	(40.7)
Middle-income	42	(35.6)
Low-income	28	(23.7)
Employment Status		
Employed	47	(39.8)
Unemployed	71	(60.2)
First Pregnancy		
Yes	10	(8.5)
No	108	(91.5)
Body Mass Index Classification		
Underweight	2	(1.7)
Normal weight	32	(27.1)
Overweight	29	(24.6)
Obese	55	(46.6)
	Mean	SD

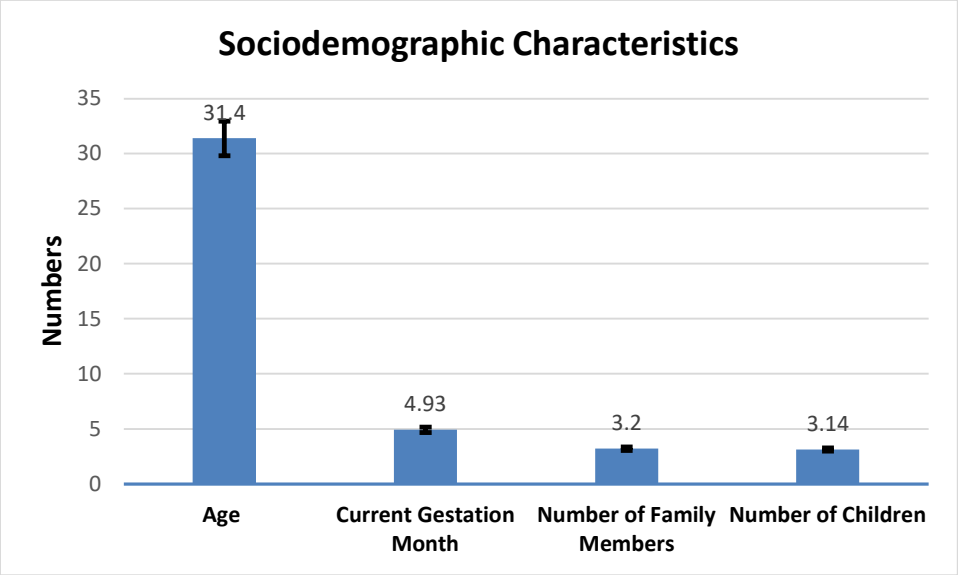

Figure 1 Socio-demographic characteristics of study subjects (N = 118)

Socio-demographic predictors of participants' knowledge ability regarding antenatal exercise during pregnancy

A multiple logistic regression analysis was used to examine if sociodemographic variables (i.e., age, current gestation month, socio-economic status, employment status, number of family members, first pregnancy, number of children and BMI classification) were predictors of participants' knowledgeability regarding antenatal exercises during pregnancy. According to the Nagelkerke, R^2 statistic, the model explained 10.3% of the variance regarding the dependent variable (i.e., Knowledgeable of antenatal exercises Vs. Not knowledgeable) regarding antenatal exercise during pregnancy. None of the participants' socio-demographic characteristics emerged as being statistically significant predictors in this model. However, participants' employment status and BMI classification were approaching significance ($p < .05$). A complete breakdown of the regression results for the socio-demographic predictors of knowledge ability among Saudi women regarding antenatal exercises during pregnancy is presented (Table 2).

Table 2 Socio-demographic predictors of participants' knowledge ability regarding antenatal exercises

	Knowledgeable of Antenatal exercises Vs. Not Knowledgeable 95% CI for odds ratio (OR)		
Variable	aOR	Lower	Upper
Age	1.05	0.96	1.15
Current Gestation Month	1.08	0.87	1.34
Number of Family Members	1.83	0.39	8.40
Number of Children	0.55	0.12	2.52
Socio-economic Status			
High-income	Ref.	Ref.	Ref.
Middle-income	1.21	0.40	3.70
Low-income	2.03	0.62	6.67
Employment Status			
Employed	Ref.	Ref.	Ref.
Unemployed	0.42^	0.16	1.12
First Pregnancy			
Yes	Ref.	Ref.	Ref.
No	0.29	0.05	1.77
Body Mass Index Classification			
Underweight	Ref.	Ref.	Ref.
Normal weight	0.20	0.01	4.00
Overweight	0.05^	0.002	1.17
Obese	0.17	0.01	3.39

Note: *p < .05; aOR = adjusted odds ratio; CI = confidence intervals;
^ = Approaching Significance

Socio-demographic Predictors of Participants' Attitude Regarding Antenatal Exercise during Pregnancy

A multiple logistic regression analysis was used to examine if sociodemographic variables (i.e., age, current gestation month, socio-economic status, employment status, number of family members, first pregnancy, number of children and Body Mass Index (BMI)) were predictors of participants' attitudes regarding antenatal exercises during pregnancy. According to the Nagelkerke, R^2 statistic, the model explained 17.8 of the variances in the dependent variable (i.e., Favourable attitude of Antenatal exercises Vs. Unfavourable) regarding antenatal exercise during pregnancy. Participants' age, employment status and BMI classification emerged as being statistically significant predictors in this model ($p < .05$). Participants' age significantly increased someone's likelihood of having a favourable attitude regarding antenatal exercises during pregnancy (aOR = 1.16, 95% CI = 1.04, 1.29). Second, participants' employment status significantly decreased their likelihood of having a favourable attitude regarding antenatal exercises during pregnancy (aOR = 0.20, 95% CI = 0.07, 0.61). Third, participants' BMI classification significantly decreased their likelihood of having a favourable attitude regarding antenatal exercises during pregnancy (aOR = 0.04, 95% CI = 0.002, 0.97). A complete breakdown of the regression results for the socio-demographic predictors of attitude among Saudi women regarding antenatal exercises during pregnancy is presented (Table 3).

Socio-demographic Predictors of Participants' Practice of Antenatal Exercise during Pregnancy

A multiple logistic regression analysis was used to examine if sociodemographic variables (i.e., age, current gestation month, socio-economic status, employment status, number of family members, first pregnancy, number of children and Body Mass Index (BMI)) were predictors of participants' practice of antenatal exercises during pregnancy. According to the Nagelkerke, R^2 statistic, the model explained 18.3 of the variances in the dependent variable (i.e., Adequate Practice of Antenatal exercises Vs. Inadequate) regarding antenatal exercise during pregnancy. Participants' age, employment status and BMI classification also emerged as being statistically significant predictors in this model ($p < .05$). Participants' age significantly increased someone's likelihood of having adequate practice of antenatal exercises (aOR = 1.12, 95% CI = 1.01, 1.24). Second, participants' employment status significantly

decreased their likelihood of having adequate practice of antenatal exercises (aOR = 0.30, 95% CI = 0.10, 0.93). Third, participants' BMI classification significantly decreased their likelihood of having adequate practice of antenatal exercises (aOR = 0.004, 95% CI = 0.001, 0.90). A complete breakdown of the regression results for the socio-demographic predictors of practice among Saudi women regarding antenatal exercises during pregnancy is presented (Table 4).

Table 3 Socio-demographic predictors of participants' attitude regarding antenatal exercises

	Favourable Attitude of Antenatal exercises Vs. Unfavourable 95% CI for odds ratio (OR)		
Variable	aOR	Lower	Upper
Age	1.16*	1.04	1.29
Current Gestation Month	1.03	0.82	1.31
Number of Family Members	2.23	0.42	11.78
Number of Children	0.36	0.67	1.96
Socio-economic Status			
High-income	Ref.	Ref.	Ref.
Middle-income	1.27	0.38	4.22
Low-income	2.21	0.59	8.23
Employment Status			
Employed	Ref.	Ref.	Ref.
Unemployed	0.20*	0.07	0.61
First Pregnancy			
Yes	Ref.	Ref.	Ref.
No	1.22	0.10	14.37
Body Mass Index Classification			
Underweight	Ref.	Ref.	Ref.
Normal weight	0.09	0.004	1.98
Overweight	0.04*	0.002	0.97
Obese	0.06'	0.003	1.28
Intercept	0.08	0.0005	8.12

Note: *p < .05; aOR = adjusted odds ratio; CI = confidence intervals

Table 4 Socio-demographic predictors of participants' practice of antenatal exercises

	Adequate Practice of Antenatal exercises Vs. Inadequate 95% CI for odds ratio (OR)		
Variable	aOR	Lower	Upper
Age	1.12*	1.01	1.24
Current Gestation Month	1.02	0.80	1.29
Number of Family Members	5.008e-08	0.00e-07	Inf.
Number of Children	1.88	0.00e-07	Inf.
Socio-economic Status			
High-income	Ref.	Ref.	Ref.
Middle-income	0.91	0.26	3.53
Low-income	2.89	0.77	10.90
Employment Status			
Employed	Ref.	Ref.	Ref.
Unemployed	0.30*	0.10	0.93

First Pregnancy			
Yes	Ref.	Ref.	Ref.
No	1.09	0.00e-07	Inf.
Body Mass Index Classification			
Underweight	Ref.	Ref.	Ref.
Normal weight	0.11	0.005	2.45
Overweight	0.004*	0.001	0.90
Obese	0.006	0.003	1.34
Note: *p < .05; aOR = adjusted odds ratio; CI = confidence intervals			

4. DISCUSSION

In the current study, the mean age of the pregnant women in the sample was 31.4 ± 5.87. The present finding is in lines with previous research, which has reported similar mean ages, such as 25.15 (Kaur et al., 2021), 30 (Okeke et al., 2020), 25 ± 4.51 (Sujindra et al., 2015) and 27.5 ± 5.86 (Janakiraman et al., 2021). The study found that as the age of the participants increased, so did their likelihood of having a positive attitude and engaging in appropriate practice of antenatal exercises. However, other studies, such as those conducted by Kaur et al., (2021) and Nkhata et al., (2014) did not find a significant association between age and attitude or practice. Therefore, it is recommended to motivate pregnant women of all ages to participate in antenatal exercises.

A substantial proportion of the participants 40.7% (n = 48) in the present study reported having a high-income level. This contrasts with studies such as Ali, (2019) and Nayak et al., (2015) where 82% and 66% of the participants, respectively belonged to the middle class. Additionally, in the current study, 60.2% (n = 71) of the participants were unemployed. This is similar to the sample in studies by Kaur et al., (2021) (88%), Janakiraman et al., (2021) (52.7%), Ali, (2019) (82%), Sujindra et al., (2015) (74%) and Sheth et al., (2019) (81.9%), who reported that the majority of their participants were housewives. Nkhata et al., (2014) reported that only 22% of the participants were unemployed, which is in contrast to this and other previous studies. These contradictions may be due to the different socio-demographic and cultural backgrounds among the participants and their attitudes towards antenatal exercise during pregnancy. The present study found that employment status was approaching significance in relation to attitude towards and practice of antenatal exercise. In more detail, the unemployed participants on average showed a more unfavourable attitude towards antenatal exercises during pregnancy and engaged in it to a lesser degree than the employed participants. Furthermore, the study found that the participants had a mean number of children and family members of approximately three, which was consistent with the findings of Okeke et al., (2020) who reported that 65.7% of the participants had between one and three children.

The present study found that a majority of the participants (91.5%) reported that this was not their first pregnancy, which is consistent with previous research by Nkhata et al., (2014) (91.57%) and Ali, (2019) (72%) however, other studies have reported lower percentages, such as 58% (Nayak et al., 2015) and 44% (Kaur et al., 2021), which warrants further examination. The current study suggests that the number of pregnancies does not appear to be associated with knowledge, attitude or practice in relation to antenatal exercise. Nevertheless, this finding is contradicted by the results of Nkhata et al., (2014), which reported an association between the number of pregnancies and these variables. Therefore, it is suggested that further research is needed to understand the impact of the number of pregnancies on pregnant women's knowledge, attitude and practice towards antenatal exercise.

The current study found that participants' age and weight were positively associated with inadequate practice of antenatal exercises at the pregnant women. Furthermore, the unemployed participants were less likely to engage in sufficient levels of exercise than the employed individuals. These findings align with previous studies conducted in India (Puducherry) (Sujindra et al., 2015), Nigeria (Okeke et al., 2020) and Saudi Arabia (Al-Quaryyat region) (Ali, 2019). However, the current study's results are inconsistent with many studies that have reported that the pregnant women had a high level of knowledge about the antenatal exercise (Ali, 2019; Janakiraman et al., 2021; Okeke et al., 2020; Sujindra et al., 2015). However, these results contrast with findings from other studies conducted in Indian population (Mangalore) (Nayak et al., 2015) and Zambia (Nkhata et al., 2014). They also diverge from the results of earlier findings such as Jarni et al., (2021), Sarfraz et al., (2013) and Sujindra et al., (2015), which reported a positive attitude towards antenatal exercise among women during pregnancy.

The decreasing participation in exercise may be attributed to factors such as fatigue or lack of time among pregnant women, as well as a lack of knowledge regarding appropriate types of exercise. A failure to engage in adequate exercise during pregnancy may also be due to the cultural background of the participants and their society's attitude towards it.

It is important to acknowledge the limitations of the present study. The results of this research might not be generalizable to the entire population of Al-Baha as the participants were only recruited from two hospitals in the region. However, the information obtained in this study could still be useful in informing antenatal healthcare practices and improving maternal and neonatal outcomes in the Al-Baha region.

5. CONCLUSION

The results of our study indicate that knowledge about the practice of antenatal exercise during pregnancy in the Al-Baha region of Saudi Arabia is relatively low compared to international standards. Despite this, the attitudes and actual practice of antenatal exercise among these women appear to be relatively positive. These findings can be utilised to improve the health outcomes of pregnant women in Saudi Arabia through the development of targeted educational programmes and interventions.

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Author Contribution

Research proposal preparation, data collection, tool preparation, data analysis, preparation of final research, content writing, overview office work and final review were done by Wael Alghamdi.

Ethical approval

The study was approved by the Scientific and Research Committee of Al Baha University, Al-Baha (Ethical approval code: IRB/44114230-08-06-1444).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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