

Applying the Ecological Model to understand pregnant women's perspectives on the modifiable constraints to physical activity during pregnancy

A qualitative research study

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Abstract

The benefits of physical activity (PA) during pregnancy are widely reported; however, PA practice is seemingly not a valued habit among pregnant women attending public antenatal health centres in the Eastern Cape of South Africa. Guided by the ecological model, we sought to explore modifiable barriers to PA among pregnant women.

Semi-structured interviews involved a purposive sample of 15 pregnant women. Interview questions were guided by the ecological model constructs at intrapersonal, interpersonal, and environmental level. Thematic analysis was applied to summarise the modifiable barriers to PA during pregnancy.

Three main themes emerged, based on the modifiable barriers to PA during pregnancy that belong to the varying Ecological Model constructs. On the intrapersonal level, 5 themes emerged, namely, time-constraint beliefs, feeling of tiredness, low energy, lack of motivation, and a lack of knowledge on benefits and types of PA. Two themes emerged for the interpersonal level, lack of PA advice and lack of information on PA recommendations and guidelines. Another theme defined the environmental level lacking resources. Most themes related to individual factors, which prevent PA-promoting behaviour.

Overall, intrapersonal factors relating to tiredness and exhaustion, lack of time beliefs, work and household commitments, and lack of motivation were key modifiable barriers to PA by the women. The findings provide insights into possible interventional strategies to optimise PA during pregnancy among women in this setting. Appropriate knowledge, education and advice on the benefits, types, and intensity of PA in pregnancy are needed.

Abbreviations: MET = metabolic equivalent, PA = physical activity, WHO = World Health Organization.

Keywords: ecological model, modifiable physical activity barriers, pregnant women, South Africa

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1. Introduction

The unique and vulnerable nature of pregnancy,^[1,2] confers changes in lifestyle behaviours of a pregnant woman, including physical activity (PA), which can affect her health and that of the fetus.^[1,3–5] Against this backdrop, the World Health Organization (WHO) has characterised maternity health as a global health priority.^[6] Now, there is a paradigm shift beyond just aiming to reduce the direct causes of maternal morbidity, but the focus has been to address the modifiable health risk factors, which include PA.^[7] The World Health Organisation^[6] defines “physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure”, and health promotion as “the process of enabling people to increase control over and to improve their health”. Physical inactivity has been recognised as the fourth leading risk factor for non-communicable diseases, and a global burden.^[8] Considering the escalating rate of non-communicable diseases, some of which are linked to physical inactivity, the WHO launched a global action plan to tackle physical inactivity by a relative 10% by 2025, and 15% by 2030.^[8–10] Notwithstanding the physical, psychological and social health benefits of PA to the general population, and the pregnant woman, few pregnant women (15%) meet the current PA recommended guideline of 150 min of moderate intensity PA per week, or the metabolic equivalent (METs) of 600 MET minutes per week (MET mins/wk).^[11]

The reasons for the non-participation, inactiveness and decline in PA during pregnancy varies from one geographical setting to another, and are shaped by context-specific factors. Previous studies have found non-modifiable determinants of PA such as older, married,^[12,13] low socioeconomic,^[13] non-formal education and women working at home^[12,14] as less likely to be active during pregnancy. However, these non-modifiable factors are unchangeable through application of intervention. Both quantitative and qualitative studies on modifiable correlates of PA during pregnancy have reported interwoven and contrasting findings. Studies have reported time constraints,^[15–17] childcare responsibilities,^[15] work and family responsibilities,^[15,16,18–21] and lack of resources.^[16,22] Psychosocial barriers cited include lack of support,^[23,24] motivation,^[16,19,23] and little or no advice from their healthcare providers.^[15,25–27] In addition, body image,^[23] and lack of confidence^[28,29] are reported as psychosocial limiting factors affecting PA during pregnancy. Physical factors include musculoskeletal pain,^[15,21,28,29] nausea,^[21,30] fatigue,^[15,16,19,21,23] and concern for the baby.^[16,21,29] Apparently, the above-mentioned constraints characterise the constructs of the Ecological Model, which posits PA as an interplay of intrapersonal (for example, self-efficacy), interpersonal/social (for example, social support) and physical environment (for example, access to facilities) factors.^[31] However, unlike in the general population where this model has gained wide applicability in understanding the multiplicity of the factors influencing PA, such models have been rarely used^[21] by researchers to investigate the correlates of modifiable barriers to PA among pregnant women.

As part of the measures to provide safe maternity care and improve neonatal outcome, one of the essential antenatal care services often neglected is the provision and advice on regular PA. However, as reiterated by the American College of Obstetricians and Gynaecologists,^[32] PA has become a fundamental aspect of women's lives and constitutes part of antenatal care as well; and therefore, for safe maternal and neonatal outcomes, routine antenatal exercise is recommended.^[32] Interestingly, there is a clarion call by the WHO for surveillance and monitoring of disease risk factors, and, PA is included.^[33] However, unlike other populations, in the literature, research on pregnancy PA is not widely available pregnant women are an under-researched population.

Moreover, in South Africa, there is a dearth of information concerning the modifiable restraining factors affecting PA participation during pregnancy. Understanding the modifiable barriers to PA during pregnancy is crucial as one of the components of the provision of quality antenatal and obstetric healthcare services to pregnant women, a special population sometimes neglected in the health-behaviour literature, nonetheless PA is fundamentally important for the future postpartum health of both mother and child.^[34,35] To facilitate future improvements in pregnancy PA, an understanding of the context-specific factors affecting PA participation during pregnancy is required. Compared to qualitative researches, quantitative approaches have largely dominated PA research. Although quantitative and qualitative approaches do share complementary characteristics, the qualitative research primarily focuses on gaining understanding and insights into a particular phenomenon, which in this case is the “barriers” to PA participation during pregnancy, and perhaps what to do to improve PA uptake among pregnant women. Such a task requires better insights into the reasons restraining pregnant women from PA practice.

Viewed in these contexts highlighted above, using a qualitative approach, this study explored the perspectives of pregnant women concerning the underlying modifiable barriers to PA participation during pregnancy. This kind of information is lacking in the Eastern Cape Province of South Africa. We hypothesised that barriers to PA during pregnancy among pregnant women in this setting would characterise the constructs of the ecological model. Such information may be useful when planning context-specific future PA interventions to optimise pregnancy PA.

2. Materials and methods

2.1. Study Design

A qualitative descriptive approach was deemed relevant because it enables understanding of that which determines behaviour in the context of PA participation during pregnancy. As indicated by Connolly et al^[36] qualitative methodology is particularly relevant to gain a deeper understanding of the complex factors affecting PA during pregnancy as they pertain to specific subgroups with cultural predispositions.

2.2. Participants selection

Participants were purposively selected pregnant women attending antenatal health clinics in Buffalo City Municipality in the Eastern Cape Province, South Africa. The age of the participants ranged from 18 to 36 years. Pregnant women who met the inclusion criteria (Table 1) were included in the study.

2.3. Data collection procedures

Semi-structured individual interviews were conducted with 15 pregnant women. The interview guide was contextualised and based on the ecological model constructs (at intrapersonal, interpersonal, and environmental levels). The interview guide questions focused on the modifiable barriers to PA during pregnancy. Participants' interviews continued until saturation (when no new emerging facts or themes became evident). Interviews were conducted at the health clinics in a quiet room provided by the health facility manager, and interviews lasted between 45 to 60 minutes each. Permission was obtained from the pregnant women to audio-record the interviews and the recordings. The interview guide was not provided to the participants; nevertheless, participants were provided the chance

Table 1
Participant inclusion and exclusion criteria.

Included	Excluded
Pregnant women	<18 years of age
Attending antenatal care at the study sites (Primary health clinics)	Pregnancy complications (hypertension)
Single pregnancy	Persistent excessive shortness of breath
All level of trimester	Severe chest pain
	Regular and painful uterine contractions
	Vaginal bleeding
	Disabilities or pre-existing health conditions preventing the effect of PA
	Unable to speak English

to freely express their views on the barriers affecting prenatal activity, beyond the items in the interview guide.

2.4. Trustworthiness

Trustworthiness was maintained by applying the concepts of credibility, transferability, dependability and conformability as applicable in qualitative research. Bracketing was achieved by putting aside the researcher own views regarding barriers to PA participation during pregnancy. There was prolonged engagement with the participants during data collection, as the interviews lasted for at least 45 minutes. The participants were given in-depth explanations about the study to enable them to answer the questions appropriately. Regarding member checking, the researchers asked each participant to review the researchers' interpretation of the interview data – this was done to ascertain if it were a true reflection of their views. The data-collection instrument used yielded consistent results (dependability). An external, professional, independent co-coder helped to validate the data as applied in qualitative research.

2.5. Data Analysis

The researchers transcribed the audio-recorded interviews verbatim, and thereafter they repeatedly read all transcribed interviews and field notes.^[37] The thematic content analysis method as described by Creswell,^[37] based on the 3 levels defining the constructs of the ecological model, was applied for data analysis. Participants' names were concealed for the reason of anonymity. Interview transcripts were carefully reviewed for accuracy. Texts that appeared to describe modifiable PA barriers were outlined. Codes were created, based on the 3 levels of the ecological model, where possible. List of all the topics were drawn up and similar topics were grouped together and clustering identified. The most descriptive wording for the topics was identified and categorised. Subcategories within the 3 levels of the ecological model were defined. The modifiable barriers belonging to each category were categorised separately. Data was grouped as themes and sub-themes, identified by both authors and an independent coder. The authors reached a consensus regarding the data analysis and presentation of the findings.

2.6. Ethics Statement

The Human Research Ethics Committee of the University of Fort Hare (Ref# 2019=06=009=OkaforUB) granted ethical approval for the study. In addition, the Eastern Cape Provincial Department of Health Ethics Research Committee approved the study protocol and gave permission for the researchers to conduct the study in the selected health clinics. The nature and aim of the study were explained to the participants who provided written informed consent prior to participation and data collection.

3. Results

Of the 15 pregnant women interviewed, the mean age was 29.4 years (SD=3.2 years). Most of the participants were peri-urban (n=11), black (n=10), unmarried (n=11), had secondary education (n=10), unemployed (n=13), nulliparous (n=8), and had vaginal delivery (n=11). Most participants reported no antepartum haemorrhage (n=14), chronic illness (n=13), non-smokers (n=12), do not drink alcohol (n=10), and were in their

Table 2
Characteristics of the participants (n = 15).

Variables	n
Mean age = 29.4 yr	
Residential area	
Peri-urban	11
Urban	4
Race	
Black	10
Coloured	5
Marital status	
Married	4
Never married	11
Educational level	
Primary	1
Secondary	10
Tertiary	4
Employment status	
Unemployed	13
Employed	2
Parity	
Nulliparous	8
Primiparous	5
Multiparous	2
Delivery mode	
Vaginal	11
Caesarian section	4
Antepartum haemorrhage	
Yes	1
No	14
Chronic illness	
Yes	2
No	13
Smoking status	
Yes	3
No	12
Alcohol use	
Yes	5
No	10
Pregnancy status	
1st trimester	4
2nd trimester	7
3rd trimester	4

second trimester of pregnancy (n=7) (Table 2). Analysis of the interviews showed 3 main themes highlighting the modifiable barriers to PA within the context of the framework of the ecological model (Table 3). Participants' identities were concealed; instead, a number was assigned to represent extracts and quotes of individual participants. For example, (P3) represents a quote from Participant 3, and so forth.

3.1. Time-related barriers

Three main themes emerged, based on the modifiable barriers to PA during pregnancy, that belong to the varying Ecological Model constructs. Five themes belong to the intrapersonal level (time constraints' belief, feeling of tiredness and low energy, lack of motivation, and safety concerns, and lack of knowledge). Two themes were classified under the interpersonal construct (lack of PA advice and lack of information on PA recommendations and guidelines). Environmentally, a lack of resources was the only theme identified. Most of the themes related to the individual level.

Table 3**Modifiable barriers to physical activity.**

Level	Theme	Sub-themes
Intrapersonal	Belief in time-related barriers	Belief that there is not enough time to participate in physical activity Work, school and household commitments impede physical activity Feeling of tiredness and exhaustion obstruct engagement in physical activity Lack of energy to engage in physical activity
	Lack of motivation	Feeling of needing to get enough rest most of the time and rather watch television Having no interest in physical activity
	Lack of knowledge	Lack of knowledge on the benefits and types of physical activity recommended during pregnancy
Interpersonal	Lack of information and advice from support groups	Lack of advice on physical activity recommendations and guidelines Lack of information about physical activity and exercise
Environmental	Lack of resources	No money to register at gym nor for transport to gym

On an intrapersonal level, most women could not exercise or participate in PA during pregnancy because they believed they lacked time. After coming back from school, they felt tired and had no time to do any PA. They expressed themselves in the following way:

“I agree with sister about tiredness. I also feel tired after I come back from school. I also did not know the benefits of exercise during pregnancy.” (P2).

“I do not exercise regularly because of a lack of time, and sometimes I travel and cannot make time to exercise or do any physical activity.” (P3).

“I do not have the time to exercise because my class starts at 08:00 and ends at 14: 00 every day. I get so tired all the time. I do not have enough energy to do anything; not even to study these days. I sit most of the time and watch television.” (P7).

Women indicated on the intrapersonal level that work and household responsibilities were barriers to their participation in PA. For example, upon returning home from work, the women expressed that they felt exhausted and would want to rest:

“I feel very heavy. I am working in the shop, and after work, I do feel tired. What I do, is to eat, watch television for a while, and go to bed. I sleep a lot.” (P4).

“I attend to so many clients at my work place (post office) every day. Therefore, after work, I am tired. I need to just rest and sleep.” (P1).

“Selling at the shop is a demanding job. It makes you feel tired. I do no longer have the energy to engage in any physical activity.” (P8).

Household chores also prevent them from performing exercise or physical activity. They expressed this in the following way:

“I look after my sister’s child the whole day. There is no extra time to do any other activity.” (P2).

“I am always cooking food or preparing food for my family. There is time left to do any physical activity.” (P9).

“During weekends, I do some washing (clothes) and clean the home. I am occupied by these activities and therefore have no time to do something else like exercise or physical activity. I take laundry and cleaning the house as my physical activities.” (P15).

Most of the women expressed the feeling of tiredness as the main reason for their non-participation in PA on an intrapersonal level. They gave the following reasons:

“I am always feeling too tired to do any physical activity. What I do mostly is to sit and watch television.” (P6).

“I sleep often because I feel tired always.” (P1).

“I do not have the energy to do any exercise or physical activity. I do feel very tired and like sleeping and watching television.” (P13).

“I feel tired the whole day. Where do I have the energy to do exercise or physical activity?” (P7).

3.2. Lack of motivation for PA

Perhaps, since most of the women did not received advice from midwives or other health provider about the benefits of PA, at an intrapersonal level, they felt demotivated to engage in PA. However, some women indicated being encouraged by their relatives to participate in PA, at least walking. One participant mentioned a cultural reason as a demotivating factor:

“I think the PA during pregnancy is good and beneficial although I do not do exercise. Sister, there is something I didn’t tell you before: back at home, especially we Africans, I was told that it is not good to exercise during pregnancy so as to avoid hurting oneself as well as the baby.” (P11).

“There is nothing motivating me to exercise. The only thing I do is to lie down and sleep. I like my sleep. Shame!” (P13).

3.3. Lack of information and advice from support groups

On an interpersonal level, most of the participants expressed being uninformed about PA. They indicated receiving no

information about the need or importance of PA for their health and the baby. Therefore, most of the women did not engage in any PA during pregnancy. They narrated:

“The little information I have about exercise and physical activity is from my friend. I also see and hear about it from the television because I watch it a lot.” (P10).

“I don’t know the type of exercise that is good for me, and how to do the exercise. I think that a pregnant woman should not involve herself in any exercise because, for me, what if she gets hurt and ends up hurting her baby?” (P7).

“I do know that a pregnant woman should be moving around, but I don’t know any type of exercise, except walking. I sometimes take a walk to the shop to buy a few groceries.” (P2).

“I also don’t know the benefits of exercise during pregnancy.” (P14).

Again, on an interpersonal level, most of the women did not receive any advice from the midwives concerning PA, which limited their participation in PA during pregnancy. They shared their experiences as follows:

“The midwives don’t tell us about exercise and physical activity when we attend the clinics. I then assume that it is not safe.” (P15).

“In the clinic, midwives don’t tell much about physical activity and exercise during pregnancy and how long one should engage in it; neither do they mention the type exercise that is good for us.” (P3).

“Well, personally, I don’t receive advice concerning exercise from the midwives in the clinic; however, I think is because they don’t really know about it. You only teach what you know.” (P2).

“I remember asking sister about aerobics exercise during pregnancy, but she did not know about it, and even the types of exercise suitable for a pregnant woman and the intensity level.” (P1).

“I assume that the midwives attending to us at the clinics don’t talk in detail about exercise and physical activity to us because they don’t know much about it. Rather, we often receive advice on the need to stop smoking and decrease alcohol intake during pregnancy. We are always advised to eat well and get enough rest.” (P6).

“Midwives don’t ever say much about exercise, except to tell us to take a walk always. The midwife would say walking is good for our health.” (P4).

The participants did not receive any information about PA. As such, at an interpersonal level, they were not aware of the kind or

type of PA to embrace during pregnancy. This kind of information ought to come from the midwives, where they attend antenatal; however, the midwives rarely provide information about the benefits and types of PA. Rather, some of the women received information about PA from their fellow women, families and friends. They women narrated:

“This is my second pregnancy, and the midwives have never told me about exercise and physical activity. I do not know that engaging in physical activity or exercise is important.” (P4).

“This group have made me realise how important physical activity is, during pregnancy. However, I think that our healthcare people should do more. They should be able to engage with pregnant women in details about the importance of physical activity and the said recommendations.” (P11).

“Apart from other women or family friends, I have never received any information about physical activity.” (P8).

“The nurse midwives don’t talk about exercise and physical activity to us at the clinics. Sometimes the midwives would tell some of us to walk around the clinics. They do not explain to us why it is important for us to engage in exercise and physical activity. I expect they should tell us in detail what type of physical activity to do, how often and for what purpose.” (P5).

“The little information I have about exercise or physical activity during pregnancy is from my friend. She told me exercising during pregnancy is good for my health and the baby.” (P3).

“My mother-in law would tell me to do little exercise around the house, at least by walking around. She said exercise allows good circulation of blood in the body and aids a quick delivery.” (P2).

“My aunt would sometimes ask me to get up from the lounge and take a walk, so that I will feel better.” (P9).

3.4. Non-availability of resources

On the environmental level of the ecological model, the women highlighted a lack of financial resources to register in a gym or to pay for transport to the gym as the reason for not participating in PA. They stated:

“I want to exercise, but I cannot afford the price to register in the gym. It is costly.” (P5).

“I am staying far away from the gym, and I do not have money to pay for the gym fee and at the same time to transport myself there.” (P4).

4. Discussion

To our knowledge, this is the first study, drawing on the Ecological Model^[31] to explore the perspectives of pregnant

women concerning the underlying modifiable barriers to PA participation during pregnancy in the Eastern Cape Province in South Africa. The Ecological Model hinges on 3 constructs to explain behavioural change (intrapersonal, interpersonal and physical environmental factors).^[21] An understanding of these constructs in the context of modifiable barriers to PA participation during pregnancy in this setting may help to inform interventions policies that are contextually relevant to improve PA during pregnancy. The modifiable barriers to PA are varied and inconsistent among studies in different geographical settings. Women in our study highlight several barriers that impede their ability to engage in PA.

In this present study, pregnant women believing that they lacked time and felt tired were the most commonly reported barriers to PA during pregnancy. Most of the women expressed they felt tired and had no time to do any PA. Our study results agree with previous findings that a lack of time was a barrier to pregnant women where PA belonged to the intrapersonal level of the ecological model.^[15–17,21,38] Pregnant women associated their perceived lack of time with school, work and household responsibilities. Interventions to improve time management skills of pregnant women are crucial to discourage women from the excuse of a ‘lack of time’ for PA. Such interventions would be most feasible if initiated and executed by the health providers, and in this case, the midwives, who attend to women during antenatal care in the primary healthcare clinics. Women may be more willing to take advice from their healthcare providers concerning issues affecting their maternal health; therefore, the nurses/midwifery and obstetrics ought to incorporate, in their antenatal healthcare package, time management skills focusing on encouraging PA participation during pregnancy. Healthcare providers should play a fundamental role to preach the gospel of PA benefits during pregnancy to the women, which should take precedence over the excuse of ‘lack of time’. Women should be counselled to realise the importance of PA for maternal and fetal health, and as such, to create time to initiate, participate and maintain PA during and beyond pregnancy.

Another lifestyle behaviour identified by the women relates to work and household commitments, which affect their participation in PA. Most of the women indicated being exhausted after returning from work, and would rather prefer bed-rest a severe form of sedentary behaviour. The feeling of exhaustion could be explained in the light of the physiological changes that women experience during pregnancy.^[39–41] These changes are beyond a woman’s control, but perceived as a normal feature of pregnancy;^[39] therefore, they should not be seen as a deterrent to PA participation. In a similar vein, worldwide, prenatal exercise guidelines recommend women without contraindication should participate in regular PA throughout pregnancy.^[1,32,42,43] Our finding resonates with other studies which report work and family responsibilities as barriers to PA during pregnancy.^[15,16,18–21] In view of the above findings, antenatal PA interventions should extend to pregnant women in the work place. Relatedly, policymakers designing maternity leave policies should ensure compulsory leave for pregnant women to participate in health programmes involving activity interventions, as this may help improve and promote their health and well-being during pregnancy, and even in the postpartum period. These initiatives are worthwhile efforts to promote self-efficacy of pregnant women in PA participation.

The women in this study reported tiredness and a lack of energy as constraining factors for PA. The women also link these

factors to work, school and household commitments. The finding is consistent with other previous studies,^[15,16,19,20,38] in which pregnant women also did not engage in PA because of their perceived feeling of tiredness and their low energy levels. Therefore, it is important for healthcare providers to emphasise the role PA plays in reducing fatigue symptoms.^[38] Viewed within the public health context, our findings have implications for understanding and promoting PA during pregnancy. The framing of public health messages about PA during pregnancy should emphasise engagement in PA as having ‘fun’ and ‘feeling better’. This suggests the need to design PA interventions that go beyond serving a therapeutic purpose, but to be pleasurable and transformative in nature as well so as to change some narratives or ideologies around pregnancy.

A number of women who participated in this study expressed their lack of knowledge and motivation regarding PA. Within the context of a “lack of knowledge” frame, they mentioned a lack of advice on PA recommendations by midwives as a constraining reason for non-involvement in PA during pregnancy. Previous studies have reported similar findings indicating a lack of advice from health providers concerning PA.^[21,44] A study involving pregnant women from low socioeconomic status communities in Cape Town, South Africa, revealed that women did not receive PA advice and information from the healthcare providers at the clinics.^[45] The onus should fall on health providers, as promoters of PA among pregnant women, to provide advice and counselling on current PA recommendations and guidelines. In contrast to our finding, the study of Santo et al.^[27] found the overwhelming majority of women in a quantitative study had received PA advice from health providers. Health providers constitute an important fulcrum in maternal healthcare. Therefore, antenatal care providers should recommend appropriate advice on PA to pregnant women; it should be contextually relevant to an individual’s psychosocial environment.^[27] Similarly, women need support and motivation to engage in PA during pregnancy. In this study, women reported receiving no advice from midwives on the benefits of PA, and only their relatives encouraged their participation in PA, at least walking. These sentiments raised by the women in this study resonate with the reports from other studies concerning the lack of motivation by pregnant women to engage in PA.^[16,19,23,24] The complex nature of the factors influencing the behaviour to initiate and engage in PA suggests inter-collaborative support of the partner, friends, and mother’s groups, working synergistically with different organisations such as hospitals, community health centers, and local gyms in promoting PA in the community. Such a collaborative path would create the desirable PA awareness on where the women could find information, how to exercise, and the resources available to them.

Pregnant women in this study highlighted the lack of information on PA during pregnancy. Clearly, the women received little or no information on what types of PA they could participate in during pregnancy and whether it is safe or not. Faced with this dilemma, most of the women did not engage in PA during pregnancy. Health providers dealing with pregnant women are key in disseminating reliable and accurate scientific information on PA during pregnancy. However, as alluded to by women in this study, the midwives had rarely provided information on the types and benefits of PA during antenatal visits. Rather, some women had received such information from fellow women, family members and friends. Pregnant women, in this study and other similar studies, have reported receiving little

or no advice from their healthcare providers on PA,^[15,25–27,46] so this has been viewed as an interpersonal barrier affecting their active PA lifestyle. Providing evidence-based scientific information on PA during pregnancy is a modifiable barrier; therefore, measures to provide PA advice and counselling to pregnant women are needed. This might create awareness on the benefits of PA, and thus, encourage or motivate women to maintain an active lifestyle behaviour while pregnant. Posters and pamphlets can be used to raise awareness during antenatal visits.

In this present study, the women mentioned they lacked financial resources to register at a gym or to transport themselves to the gym as a hindrance to PA. Similar to other studies, pregnant women with limited income perceived gyms to be generally very expensive, and thus a barrier to PA among pregnant women,^[16,22,47] but, interestingly, neither weather nor unsafe spaces were referenced by women. On the contrary, we found the lack of finance to register at a gym or to transport to the gym as a modifiable constraining factor expressed by the women for adopting inactive behaviour during pregnancy. We speculate that the excuses given by the women are unclear: “I want to exercise, but I can’t afford the price to register at the gym,” and “I do not have money to pay for the gym fee and at the same time to transport myself there”. Some of the pregnant women in the present study practiced walking or household activities as a form of PA, so questions around the gyms’ locations being far away or having a high cost appear inconsequential to the women. At most, if not moderate-vigorous intensity exercise, pregnant women could undertake walking, which is a simple, safe, and accessible form of PA that requires no expense. Walking, including stationary cycling, aerobic exercise, dancing, resistance exercises (such as using weights or elastic bands), stretching exercises, water aerobics are examples of exercise extensively studied and proven to be safe and beneficial during pregnancy.^[48] Therefore, women should be advised to engage in walking for relaxation and fun. However, moderate-vigorous intensity exercise confers more health benefits than mild intensity exercise.^[49,50] Pregnancy period offers a window opportunity for behaviour modification and adoption of a healthy lifestyle because of increased motivation and frequent access to medical supervision.^[51] Pregnant women are more likely to engage in PA, if encouraged by health providers to do so.^[25] Nonetheless, PA counselling of pregnant women should focus on individual needs, taking into account the psychosocial contexts to achieve the desirable optimal health benefits.

4.1. Limitations

Few pregnant women were interviewed in this study; thus, it limits the generalisability of the findings to other pregnant women in the region or entire South Africa. Nevertheless, the focus was to provide insights into the modifiable factors of pregnant women PA, and not to generalise the results. In addition, it is possible to expect variation in barriers as the pregnancy advances, however, our study did not focus specifically on a particular trimester to gauge the change related to each trimester. Trimester-specific barriers could inform interventions and guide antenatal health care PA advice at specific pregnancy time points. The strength of our study lies in the fact that the ecological model was applied as a theoretical framework to guide the study and data analysis.^[31]

4.2. Implications

Applying the ecological model, our study unveiled the modifiable barriers to PA in pregnant women attending antenatal healthcare. The findings pointed to understanding what interventions were relevant to address their needs to motivate and support pregnant women to engage in PA during pregnancy. Modifying the modifiable barriers to PA during pregnancy would encourage pregnant women to participate in PA, and this strategy could confer health benefits to the mother and the baby.

5. Conclusion

The findings highlight the barriers to PA participation during pregnancy, which through a change of behaviour and attitude, and assistance, are correctable. Summarily, intrapersonal barriers relating to tiredness and exhaustion, lack of time, work and household commitments, and lack of motivation were key constraining, but modifiable factors to PA by the women. Proper advice and information about the benefits, types of PA and intensity during pregnancy may motivate pregnant women to recognise the importance of PA. Armed with this knowledge, the pregnant women could create time to engage in PA, notwithstanding their work and household commitments, which have room for adjustments. Women without financial resources will also realise there are a variety of physical activities that can be performed without necessarily patronising a gym. Interventions that effectively support pregnant women to engage in PA have the potential to improve the women own and the lifelong health of their children. Therefore, support from the healthcare providers, family and friends would be valuable to motivate and ignite a change of attitude and practice towards PA by pregnant women. Viewed in this context, any antenatal intervention strategy should target these salient, but modifiable barriers to physical activity.

Author contributions

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