

A Bio-Ecological Perspective on Risk Awareness and Factors Associated with Substance Use during Pregnancy in Communities of the Western Cape Province, South Africa

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Abstract—Substance use among pregnant women is a perennial problem in the Western Cape Province of South Africa. There are many influential elements related with substance use among women of childbearing-age. Factors associated with substance use during pregnancy were explored using qualitative research approach and bio-ecological theoretical framework was utilised to guide the study. Participants were selected using purposive sampling. Participants accessed from the Department of Social Development who met the inclusion criteria of the study were interviewed using semi structured interviews. Participants were referred for psychological intervention during the interview if deemed necessary. Braun and Clarke's six phases of thematic analysis were used to analyse the data. The study adhered to ethical measures for the participants' protection. Participants had been knowledgeable about the study earlier than the initiation of the interviews and the important points of their voluntary participation had been explained. The key findings from this study illustrate that social factors, individual area and romantic relationship are the major contributing factors to substance use among pregnant ladies in this sample. Recommendations arising from the study encompass that the stakeholders, rehabilitation centers, Department of Health and future researchers ought to act proactively against substance use all through pregnancy.

Keywords—Bio-ecological factors, pregnancy risk awareness, antenatal care, substance use.

I. INTRODUCTION

SUBSTANCE use during pregnancy has negative side effects that are harmful to both mother and foetus [1]. One of the studies done indicates that substance use during pregnancy causes hypertension and placental abnormalities, which affects the development of the foetus [2]. The infant may suffer long-lasting effects such as eye defects, delayed motor development and learning impairments.

Despite the general factors that have an influence on substance use, little is known about the factors that influence the continuous use of substances during pregnancy. This study endeavours to generate new knowledge regarding factors

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influencing substance use during pregnancy. In addition, the study provides insight into different experiences that pregnant women endure during pregnancy. This study further plays a significant role in adding to qualitative studies regarding the phenomenon at hand.

Despite the harmful effects associated with substance use, the South African National Drug Master Plan (2013-2017) still reports a sustained increase in substance distribution and illegal drug use in the Western Cape [3]. The prevalence of Foetal Alcohol Spectrum Disorder (FASD) in the Western Cape is greater compared to other provinces in South Africa where there has been a shift from alcohol to drug use [4]. The South African Community Epidemiology Network on Drug Use (SACENDU) reported that, in 2015, there was a shift from methamphetamine use to cannabis as the primary substance used in the Western Cape Province [5].

II. SUBSTANCES COMMONLY USED BY PREGNANT WOMEN

A. Background

Substance use during pregnancy is one of the challenges affecting pregnant women globally, as indicated by the high daily cumulative prevalence rates worldwide [6]. A study conducted in the United States showed that along with tobacco and alcohol, pregnant women commonly use cannabis and illicit substances [7]. Substance use treatment relapses are estimated to be over 60% among individuals that seek treatment [8]. A study done by the United State Health Care revealed that the majority of women with Substance Use Disorders continue taking substances throughout pregnancy due to treatment relapse [9]. About 36.9% of pregnant women self-reported the use of alcohol during pregnancy in the Cape Metropole in South Africa [10]. The same study also reported a high usage of crystal methamphetamine among pregnant women through a urine screening analysis in the Midwife Obstetric Unit (MOU) Cape Town in 2014 [10]. Statistics South Africa (2015) reported that about 70,000 babies were born in Cape Town in 2015. An estimated 6% (4,200) of these babies were prenatally exposed to methamphetamine [11]. The most commonly used substances in the Western Cape Province include alcohol, cigarettes, hookah pipe, and methamphetamine [12]. A study conducted in 1999 in the Cape Metropole evidently found that 42.8% of pregnant women consume alcohol during pregnancy [13]. Another

study reported that the minimum intake of alcohol is two to four times per week in Cape Town and that 46.2% of pregnant women were found to be within this range [14]. The use of methamphetamine has increased dramatically in South Africa from 1% in 2002 to 51% in 2006, with significantly more pronounced use in Cape Town and the nearby townships [15]. A study published in South Africa reported that the use of methamphetamine had increased from 1% to 2.2% in the Western Cape Province since 2008 [16]. Substance use is increasing with various drug administration methods such as injection use, which also increases risk for HIV infection [17].

B. Bio-Ecological Systems Theoretical Framework

The study was guided by the bio-ecological systems theoretical framework that is based on an understanding of human behaviour within the natural environment [18]. The bio-ecological systems theoretical framework looks into the environmental influences on individual behaviour. The framework also illustrates the interlinking between an individual's developmental processes, the current life content, and the era of development which affects a person's behaviours within the ecosystem. Based on the bio-ecological systems framework, an individual's development is affected either positively or negatively by the existential environment. Therefore, Bronfenbrenner categorizes various environments into five levels: the microsystem, the mesosystem, the exosystem, the macrosystem, and the chronosystem. All these levels are interrelated, and play an influential role in one's behavioural and environmental adaptation. Despite the environment as the existential structure that surrounds individuals, the framework also explores the Person Process Context Time model that influences an individual domain [19].

C. Methods, Participants, Data Collection, Ethical Approval and Data Analysis

A qualitative research approach was utilised as it allowed for detailed and in-depth exploration of the phenomenon.

Pregnant women were purposively sampled through informants at the Department of Social Development. The sample included eleven pregnant women who were using substances, regardless of socio-economic background status and race. Pregnant women between aged of 18-45 years using any type of substance were invited to participate in the study. These participants were using different kinds of substances including alcohol, cigarettes, methamphetamine, dagga, mandrax and cannabis. All participants indicated that they were using more than one substance; the majority of participants were smoking cigarettes or drinking alcohol in addition to one or two more substances.

Semi-structured interviews were conducted to gather the data. The bio-ecological systems theoretical framework informed the development of the interview guide. A pilot study was conducted to determine whether the semi-structured interview guide addressed the research aims. Participants who voluntarily agreed to participate in the study signed informed consent that contained their agreement declaration, their rights

during data collection, and the ethics concerning the confidentiality and the respect of their anonymity. Interviews were audio recorded with participants' permission and transcribed in order to maintain the credibility of the study. Participants that showed distress when discussing the risks associated with using substances during their pregnancy were referred to the social workers and registered counsellors for further intervention.

The study was approved by the Humanities and Social Sciences Research Ethics Committee of the University of the Western Cape (HS/17/5/21).

The data were analysed using the six steps for thematic analysis proposed by Braun and Clarke [20].

III. FINDINGS

A. Factors Associated with Substance Use during Pregnancy

The results below highlight different factors that were deemed to be associated with substance use among these pregnant women. Factors were identified and categorised into three main themes, which are; social factors, individual domain factors, and romantic relationship factors. The main themes were further divided into sub-themes and reported in Table I.

TABLE I
 INFLUENTIAL FACTORS OF SUBSTANCE USE

Thematic Category	Sub-themes
Social factors	Accessibility Limited access to treatment Substance exposure
Individual domain factors	Personal choice Unplanned substances Substance addiction Coping mechanism
Romantic relationship factors	Abusive relationship Intimate partner influence

One of the themes that emerged is social factors. These factors are represented by the following three sub-themes: accessibility, limited access to treatment, and exposure.

Accessibility is one of the factors found to be influencing substance use during pregnancy. Most of the interviewees corroborate the continual use of substances during pregnancy due to the easy availability of such substances in their respective communities. For example, two of the participants' explicitly stated:

In our surrounding it is everywhere, when I go to visit my mom and my sister I don't use it but here it's everywhere. When you hang out with friends that use you do not want to be left out. More especially among our race, coloured people we do use substance.
 Participant D

Even young children are using drugs because it is sold everywhere.
 Participant K

Limited access to treatment is one of the sub-themes conveying lack of both medical and psychological treatment as a factor contributing to continuous use of substances throughout pregnancy. The participants' responses showed

that there is limited access to assistance due to a huge number of people in need of assistance. The following excerpts illustrate this theme:

I think counseling will help me but I'm discouraged because they will be a lot of people there and I will have to wait for hours. Participant I

Some of the participants expressed that they relate the use of substances during pregnancy to early exposure to substances during childhood. One of the participants described this in the following excerpt:

I was still very young when I started smoking both cigarette and dagga. I was influenced by my cousin's long time ago. My aunties are still drinking and they keep sending me for beers. Participant B

The second theme that emerged as an influential factor for substance use is the individual domain. There are four core sub-themes: personal choice, unplanned pregnancy, coping mechanism, and substance addiction constitute its core.

While other interviewees indicated how the social factors play an influential role in substance use, others revealed that the use of substances during pregnancy is based on their own personal choice. The following direct extracts from one of the participants state it in a clear way:

I do not blame my friends though I blame myself, because being on substances today is not my friend's choice but mine. It's my own choices. Participant C

Yes my surrounding has an influence on me and most of my friends. All of us we are now using substances. I started using substances when I was in high school. I did not have children by that time. I stopped but continued using, I stopped for few months again then I do it again. However, I do not blame my friends for using substances it is myself. Participant C

The majority of the participants agreed that unplanned pregnancies influenced their substance use. Those who supported this view explained that when they realized they were pregnant, they were stressed and, therefore, tried to do something to forget their situation. Participants narrated their experiences with statements below:

When I have found out that I was three months pregnant it made me sad. Participant H

I spent my first two months of pregnancy taking substances like before because I did not even know that I was pregnant. Participant J

Substance addiction affected the continual use of substances among some participants. In addition, other participants showed how substance use has become part of their behaviour from which they could not refrain.

I am already addicted. Participant B

I have been using drugs for a long time and it is hard for me to stop. I have been using these substances for about 15 years now. Participant D

The majority of pregnant women participating in the study admitted that stress is a key factor influencing them to use substances. They revealed that they use substances when they are stressed and this serves as a way to take their minds off the stressors as expressed below:

The major thing for me is stress. There is nothing else besides it. The father of this kid likes stressing me. So, I drink alcohol and smoke most of the times. Participant G

The time when my mommy was very sick I stopped for a moment but when she passed away it became worse. Participant I

B. Romantic Relationships

The last theme that emerged from factors associated with substance use shows the way romantic relationships have an influence on substance use. There are romantic relationships that are mainly rooted in substance use; taking substances together becomes a bonding experience. Results further show that not all pregnant women who use substances do so out of free will; some of the pregnant women are forced into substance use by their intimate partners.

Most of the participants indicated that being in an abusive relationship influenced their use of substances during pregnancy. Some of them have also revealed that their partners force them to take substances regardless of their pregnancies. Participant H explained:

He beats me up with everything he can grab. He is crazy. I have been hospitalized because of him. I am on alcohol and cigarette and I am in an abusive relationship which keeps me into this stuff. Participant H

Some of the participants admitted that they co-participate in substance use alongside their partners. This is the result of influence from their partners. The following extracts clearly indicate the impact of partner influence on participant B and C:

My boyfriend and I, we smoke together; every night he goes to buy then we smoke. Participant B

My boyfriend is also using so both of us we are using substances.' Participant C

IV. DISCUSSION

The factors associated with substance use during pregnancy were explored within the Bio-ecological Systems Theoretical Framework.

A. Social Factors

Accessibility (Exosystem): The study found that accessibility to substances occurs because of interactions between various aspects of the microsystem and the mesosystem [21]. According to the bio-ecological systems theoretical framework, the microsystem refers to the immediate living environment in which individuals have direct contact with day-to-day life, and the mesosystem is marked by the interaction between an individual and the microsystem aspects such as the home environment [22]. Hence, the geographical location where the substances are accessed can be viewed as being on the exosystems level. Pregnant women in this study have indicated that they were using substances because of easy accessibility in their communities. Participants further elaborated that dealers of substances around their area provide substances on credit, which confirms that access to substances encourages pregnant women to use

them. The findings have further shown that substances were accessed from illegal traders in their communities. This differs from studies conducted before which explored the perceived ease of social exchange of substances where it has been found that substances were mostly accessed among friends and through social networks [23].

Limited access to treatment (Mesosystem): Pregnant women who use substances seldom volunteer to seek treatment in medical centres in the United States [24]. As a result, the government implemented the so-called “in-hospital arrests” among pregnant women who use substances. In contrast, the current findings have indicated that women who use substances in Cape Town communities were willing to go for rehabilitation. They do, however, encounter challenges, such as lack of treatment facilities and overcrowded facilities. Therefore, limited access to treatment within certain communities is associated with the prevalence of substance use. According to the guiding framework, treatment facilities can be seen as a mesosystem level factor.

Substances exposure (Microsystem): Exposure to substances encourages one to use substances and to accept this as a common act. The results of this study have indicated that pregnant women continue to use substances due to their early exposure to substances. This is similar to another study, which demonstrated that family influence, neighbourhood, school, and exposure to friends using substances had a strong association with substance use [25]. Women who use substances during pregnancy expose their children to substance use, which reinforces the behaviour, making it a generational problem. This is comparable to a study conducted in the Western Cape that illustrates a correlation between risky substance use behaviour among learners and poor parental care and early exposure to substances [16]. Moreover, rebellious behaviour and attraction to other peers engaging in substance use are more likely to develop from childhood exposure to substances [26].

Many pregnant women have reported that, since their childhood, they were exposed to tobacco and alcohol use. Childhood exposure to substances occurs when children are growing up and observing or witnessing parents or any other family members using substances such as alcohol in the family [27]. Some participants have reported that, when they were growing up, their family members used to send them to buy substances and this has influenced them to start using these at a very young age. They admitted that they could not cope without using substances, even during their pregnancies.

It has also been observed that exposure occurs as a form of peer influence that results from interactions within and between various systems levels. This factor portrays the reinforcing role of substance using peers. The results have shown that the fear of being left out of the friendship cycle is another influential factor among pregnant women who use the substance. This fear has constrained participants to accept substances in the name of friendship. Thus, exposure to substances can be seen as a mesosystem factor because it includes interactions between various aspects of the microsystem such as family members, neighbours, and

friends.

B. Individual Domain

Some developmental outcomes are highly influenced by an individual’s characteristics [28]. In this article personal choice, unplanned pregnancy, substance addiction and coping mechanisms emerged as influences in the individual domain.

Some participants have personally decided to use substances throughout their life span. This choice influences them to use substances even when they are pregnant. Those participants have clearly stated that they lacked interest in any form of treatment intervention or programme. However, not all choices lead to healthy positive living. Personal choice is also influenced by a person’s mentality and how he or she views the context (micro, meso, exo, macro, and chronosystems) of life in general. The choice to use substances is immediately perceived and can be based on emotional and mental resources that include an individual’s intelligence [29]. The study has also demonstrated that participants who have confirmed that using substances was their personal choice, had painful past experiences, such as losing parents from a young age, which they had not yet dealt with.

Unplanned pregnancy forms part of the individual domain since it is based on personal decisions. In this study, it is observed that the continual use of substances among pregnant women was due to their emotions as a result of the unexpected pregnancy. Based on the study findings, most participants realized that they were pregnant three months into the pregnancy. This gives a clear indication that one of the personal factors that influenced substance use among these pregnant women is the unplanned nature of their pregnancy. It is also observed that pregnancy goal fulfilment has a significant influence on structuring healthy and goal-oriented behaviour [30]. Women who fail to achieve their short-term goals, such as giving birth to a certain number of babies within a given period, see no reason for practicing a healthy pregnancy lifestyle due to anger and frustration as a result of the unplanned pregnancy.

Substance addiction remains one of the major causes of the continuation of substance use during pregnancy. The majority of pregnant participants in this study were addicted and could not cope without substances due to their fear of withdrawal symptoms. Addiction is characterised by the following characteristics: difficulty in abstaining from substances, uncontrollable cravings, dysfunctional interpersonal relationships, and emotional response due to substances [31]. Addiction is an individual domain that influences the use of substances. The current study found that pregnant women within the study’s geographic setting were addicted to methamphetamine and cigarettes. This is similar to a study conducted in Cape Town by [14], which investigated the prevalence of substance use among pregnant women and non-pregnant women. The study showed that the most common addictive substances used by women were methamphetamine and cannabis. A study confirms the finding that in South Africa, among pregnant women, broadly used substances were

methamphetamine and the cannabis [7]. Both findings confirm that addiction is an influential factor in substance use during pregnancy.

Emotional response is another category of influential factors that make pregnant women prone to substance use during pregnancy. Emotional response is influenced by an individual's reaction to various situations. The demand element includes an individual's reactions, expectations and present assumptions, besides how the individual responds to various situations and experiences them. Substance use has been linked to the emotional response, to feeling overwhelmed by stressors related to families, to personal matters and to society in general [32]. It further conveys that pre-existing mental health conditions among pregnant women has an influence on the risky pregnancy lifestyle caused by substance use [33], [34]. The findings of the current study confirm that substance use among pregnant women is influenced by the way individuals react to situations emotionally, and the bio-ecological systems theoretical framework confirms the manner in which individuals develop and adopt behaviours within the ecosystems.

The results of this study have shown that most pregnant women use substances as a stress relief mechanism. Participants have emphasised that substances make them forget about their challenges. Individual life challenges are major contributing factors to the drastic increase in substance consumption [35]. Substance use during pregnancy is one of the maladaptive ways of stress reduction [36].

Substance use is one of the mechanisms that pregnant women going through grief use as a coping mechanism. Grief is the psychological and physiological response due to disruption in attachment with a close individual as a result of death or separation [37].

Substance consumption increases due to the loss or death of a loved one [38]. The results have indicated that pregnant women, who have lost their loved ones during the pregnancy period, have engaged in substance use as a way to deal with the loss. Separation from intimate partners was also found as another main cause of grief in this study. Participants have reported that separation from a responsible father had a consequential effect on the pregnant women and resulted in the use of substances during pregnancy. The period of grief influences risky behaviour and disturbs mental functioning [39]. It is worth noting that grief is not just related to loss of intimate partners, but also to other family members. For example, a participant has explained that she lost her parents two years back and she is still struggling to cope with the loss.

C. Romantic Relationship Factors

Romantic relationships form part of the microsystem level due to interpersonal, bi-directional interactions that occur leading to face-to-face interactions [19]. The direct interaction between two people in the relationship therefore results in a direct and immediate contact (micro) system. Each individual processes these interactions with his/her very own personality, beliefs and temperament and these have an effect on the psychological functioning of other individuals [40]. In the case

of this study, findings indicate that partners in a relationship also have a huge influence on each other even when it comes to using substances. The theme is broken down into abusive relationships and intimate partner influence and leads to a better understanding of the influence of these factors on substance use during pregnancy. The two subthemes include the willingness of pregnant women to take substances with their partners and being forced into substance use during pregnancy by a romantic partner.

Abusive relationships (Microsystem): Romantic relationships have a major effect on substance use during pregnancy. Pregnant women need emotional support from their partners or the fathers of their unborn babies. Pregnant women become overwhelmed by the abusive treatment they face from their partners and turn to substance use. The World Drug Report indicates that substance use is also a risk factor that increases violence in the household [41]. The majority of participants who engage in substance use during pregnancy had experienced physical and emotional abuse from their partners. The study found that women who use substances during pregnancy were in relationships with partners who were using substances. Some of the participants highlighted that their partners were coercing them to take substances. A study done in Shaifa International hospital Islamabad observed that women are more likely to increase substance use because of the rapid occurrence of abusive behaviour from the intimate partners [42].

Intimate partner influence (Microsystem): The study found that intimate partners play a role in influencing pregnant women to take substances during pregnancy. Women and men have different influential factors with regard to substance use and men are more likely to influence women to take substances [43]. The findings also indicated that the majority of pregnant women viewed their partners as influencing agents in substance use. Taking substances develops into a lifestyle that keeps the relationship going between pregnant women and their partners.

The risk factor for pregnant women using substances with their intimate partners is that they might engage in sex work in exchange for substances if their partners stop making provision for them [44]. As a result, pregnant women become vulnerable to sexually transmitted infections. Intimate relationships' influence is mostly driven by a connection in which the two individuals share characteristics such as a likeliness of using similar substances. It becomes difficult for both parties to stop taking substances together when the woman becomes pregnant. As a result, they continue using substances as usual regardless of the pregnancy.

V. CONCLUSION

The current study is one among the few South African studies that entail substance use specifically among pregnant women [45]. These findings serve as a platform to detail information about substance use during pregnancy and encourage future researchers in a similar study area to continue filling the literature gaps. Furthermore, the study aimed to inform Health Care practitioners and guide policy

implementation on the need for substance use interventions specifically designed for this vulnerable population. The theoretical framework used helped to understand the levels of influential factors of substance use among pregnant women.

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