

Anxiety Disorders Through Pregnancy: A Study of an Antenatal Cohort in a Tertiary Hospital in Calabar Nigeria, Sub-Saharan Africa

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Abstract: Anxiety disorders affects pregnant women, even in countries of the West African sub-region. Very few longitudinal studies are reported in this environment. Little is known about the incidence and course of anxiety disorders in pregnancy. This study aims to determine the incidence, progression and socio-demographic variables associated with anxiety disorders in an antenatal cohort. Fifty-six women in their first trimester and 146 women in their second trimester attending the antenatal clinic of the University of Calabar teaching hospital, were recruited into a cohort. One hundred and eighty-seven women were followed-up to term of pregnancy. Calculated sample size was 175. The study was prospective, longitudinal in design. Assessments were 8 weeks apart with clinical interviews carried out on all respondents, assisted by the Mini International Neuropsychiatric Interview (MINI) for making diagnoses and the Hospital Anxiety and Depression Scale (HADS) for a symptom count. Each respondent was assessed at least once in subsequent trimesters after recruitment. From the obtained results, the mean age of respondents was 29.31 years (SD \pm 4.86). Most of the women were socially advantaged. The incidence of generalized anxiety disorder (GAD) using strict MINI criteria was 0(0%) in the first and second trimesters and 2(1.1%) in the third trimester, whereas using clinical criteria allowing for all cases of GAD including the milder cases, the incidence was 1(1.8%), 10(5.1%) and 3(1.7%) for the first, second and third trimesters, respectively. The cumulative incidence for GAD was 2(1.0%) using MINI criteria and 14(6.9%) using clinical criteria. Mean HADS anxiety scores consistently and significantly decreased throughout pregnancy. There were no risk factors for severity of anxiety at term. New cases of anxiety disorders do occur in pregnancy. Burden of distressing symptoms may be higher in early pregnancy. More community studies are needed to generate findings that are more representative of all pregnant women.

Key words: Anxiety • Incidence • Pregnancy • Antenatal

INTRODUCTION

Anxiety has been variously defined. Anxiety disorders differ from normal feelings of nervousness or anxiousness and involve excessive fear or anxiety [1]. Anxiety disorders can also be said to be a group of mental disorders characterized by feelings of anxiety and fear. These disorders include generalised anxiety disorder (GAD), panic disorder, phobias, social anxiety disorder, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD)[1]. Pregnancy has been defined by the WHO as the period of nine months or so for which a woman carries a developing embryo and foetus in her uterus [2].

Epidemiologically, findings from the research literature before 1980 are likely to be of limited use because of absence of operational criteria guiding research [3]. Cultural differences in symptom presentation may also limit generalizability of conclusions across cultures [4]. Additionally, most epidemiological research is based on DSM-III criteria, until just recently and most work has been done in high-income countries [5].

Anxiety disorders are one of the most common mental disorders [6]. They have been reported globally as illustrated by a cross-national study [7] consisting of independently conducted community surveys in ten different countries, high, moderate- and low income inclusive. The life-time prevalence of Panic disorder based

on DSM-III criteria ranged from 0.4 per 100 in Taiwan to 2.9 per 100 in Italy. The World Mental Health Survey (WMHS) initiative recently reported a prevalence of 3.6% in both sexes (4.6% in females, 2.6% in males) [8]. A recent systematic review and meta-analysis [6] of 87 studies across 44 countries reported a global point prevalence of 7.3% and a 12-month prevalence of 11.6%. The lifetime prevalence of anxiety disorders has been reported in another systematic review to be 16.6% [9].

Some socio-demographic characteristics have been very frequently associated with anxiety disorders in the literature. Increasing age has been associated with lower risk of developing an anxiety disorder [6]. Females are 2-3 times more likely to develop an anxiety disorder than males [6].

Living in an urban city was found to also increase the risk when compared to residing in a rural area [10]. Being married has been reported in the literature to predict lower a likelihood of developing an anxiety disorder [11]. Other factors that have been reported to increase the risk of having an anxiety disorder include psychosocial stressors like socioeconomic disadvantages [12] and relationship difficulties [13], exposure to violence [14], trauma [15] and conflict [16]. Anxiety disorders have been found to rank 6th among the contributors to non-fatal health loss globally as at 2015 having led to a global total of 24.6 million years lived with disability (YLD) [8].

There is paucity of literature on anxiety disorders in Africa and the West African sub region. The WHO estimates that the lowest proportion (10%) of the 264 million suffering from an anxiety disorder, are in Africa [8]. Country estimates of percentage of the population with anxiety disorders are available with the WHO and as at 2015, Niger has the lowest prevalence of 2.5%. Nigeria's is 2.7%, Ghana 2.8%, Liberia 2.7%, to mention just a few [8]. The Nigerian survey of mental health and well-being (NSMHW) reported a 12-month prevalence of anxiety disorders to be 4.1% and lifetime prevalence, 5.7% [17].

Specifically, the aim of study to determine the incidence of anxiety disorders in each trimester of pregnancy, to investigate the progression of anxiety symptoms scores through the trimesters of pregnancy and to determine the relationship between the socio-demographic characteristics of pregnant women and the severity of the anxiety at term.

MATERIALS AND METHODS

Setting of Study: This study was conducted at the Antenatal clinic (ANC) of the University of Calabar

Teaching Hospital (UCTH), located within the Calabar metropolis.

Selection of Subjects: Systematic random sampling method was used to recruit subjects into the study. Registered ANC attendees within their 4 to 20 weeks of gestation constituted the sampling frame derived from existing clinic register. A fair die was tossed to determine the first subject using the derived list.

Study Design: A prospective, cohort design was used in this study to allow for the estimation of incidence and permit a determination of the progression of symptom scores

Ethical Consideration: Ethical approval was obtained from the Ethical Review Board of the University of Calabar Teaching Hospital where the study was conducted. Informed consent was obtained from potential participants and data obtained was treated as confidential.

Sample Size Determination: The sample size for this study was calculated using the relation below:

$$n = z^2pq/d^2 [18]$$

and adjusting for anticipated non-response [19] rate of 10% was rounded up to 200.

Therefore, estimated sample size was two hundred (200) subjects.

Inclusion Criteria: Registered ANC attendees between 4 and 20 weeks of gestation, women aged between 18 and 45 years as well as those residing within Calabar to permit easier follow-up

Exclusion Criteria: Women taking prescribed medication for an anxiety and/or depressive disorder, Women who refuse to consent to the study and women who are too ill to participate in the study.

Study Duration: The total length of the study (recruitment and follow up) was 7 months.

Instruments: The instruments that were used to collect data from participants in this study are:

Sociodemographic Variables Questionnaire: A questionnaire designed by the researcher was used to collect information from participants concerning variables

like age, level of education, marital status, medical history and obstetric history. The questionnaire was interviewer administered.

Hospital Anxiety and Depression Scale (HADS):

The HADS is a brief (14-item), self-report measure of anxiety and depression developed by Zigmond and Snaith [20]. The authors recommend a score of 0-7 to be normal, 8-10 borderline. 11-21 abnormal scores for the anxiety subscale. Validity coefficients reported in a Nigerian antenatal population are, sensitivity of 92.9% and specificity of 90.2% for the anxiety subscale [21]. It was used in this study to generate a symptom count for each participant so that progression was easily assessed.

Mini-international Neuropsychiatry Interview (MINI):

The MINI is a short structured diagnostic interview, developed by psychiatrists and clinicians in the United States and Europe, for DSM-IV and ICD-10 Axis 1 psychiatric disorders [22]. The interview is divided into 16 modules (A-P) corresponding to categories of diagnoses. For this study, the modules D (Panic Disorder), E (Agoraphobia), F (Social Phobia) and N (Generalized Anxiety Disorder) were used to interview participants.

During these interviews, respondents with mild anxiety disorder who did not meet all MINI criteria for diagnoses were included in the incidence of disorders. For a mild anxiety disorder, respondents had to meet all the criteria for a diagnosis of GAD except the duration criteria of 6 months (we used a symptom duration of at least 1 month) [23].

Procedure for Administration of Instruments: Subjects consisting of ANC attendees within 4 to 20 weeks of gestation were recruited to participate in the study as first or initial engagement E_0 . All subjects were assessed for presence and severity of anxiety using MINI and HADS respectively. The socio-demographic variables questionnaire was also administered at E_0 only. The MINI modules used were modules D, E, F and N. Subsequently, subjects without anxiety disorder were followed up for repeat assessment for anxiety disorder after eight (8) weeks. Subjects with anxiety disorder were referred to the Psychiatry unit of the University of Calabar Teaching Hospital (UCTH), but were also followed up for repeat assessment for anxiety disorder after eight (8) weeks. This constituted the second engagement E_1 for subjects with or without anxiety disorder. A repeat (third) engagement E_2 of all subjects with or without anxiety disorder was carried out at 8 weeks after second engagement or E_1 with each subject. For some subjects

(those recruited at 20 weeks of gestation), their E_2 corresponded with term and did not need further assessments. For others, they were followed up till term when they assessed for the last time. This constituted the fourth engagement E_T for subjects with or without anxiety disorder.

Statistical Analysis: Data management and analyses were performed with Statistical Package for the Social Sciences (SPSS) version 21.0. Frequency counts and chi-squared (χ^2) tests were used for categorical variables while continuous variables were analyzed using the t-test and analysis of variance (ANOVA) when comparing more than 2 groups. The level of significance was set at 0.05 for all tests.

RESULTS

Sociodemographic Characteristics of Respondents: A total of 202 women were recruited into the study (Table 1). Fifty-six women (27.7%) were in their first trimester of pregnancy while 146 (72.3%) were in their early second trimester. For a balanced comparison, these two groups of women were considered separately in some analyses as seen in subsequent tables. On the whole, about 187 women (92.6%) were followed to term while 12 women (5.9%) lost their pregnancies at different times during follow up. Three women (1.5%) could not be reached on any of the 3 phone numbers they volunteered, neither were the addresses they gave valid. Of the 15 women that were lost to follow-up, 7 women were of the group recruited in the first trimester of pregnancy while 8 women were of those recruited in the second trimester.

Progression of Anxiety Through the Trimesters among Respondents recruited in the First trimester: Nine women (16.1%) out of 56 women recruited in the first trimester of pregnancy scored above cut-off (score of 8) in the anxiety subscale of the Hospital Anxiety and Depression Scale (HADS) in the first trimester. The proportions of those who scored above cut-off in this group decreased to 5 (10.2%) out of 49 women (7 women in this group had miscarriages between first and second trimester) for the anxiety subscale of the HADS in the second trimester and decreased further to 3 (6.1%) out of 49 women for the anxiety subscale by the third trimester

Progression of Anxiety Through the Trimesters among Respondents Recruited in the Second Trimester: A similar pattern of decreasing frequencies of those who scored above cut-off in the anxiety subscale of the HADS

Table 1: Sociodemographic characteristics of respondents

| Variable | Frequency (N=202) | Percentage (%) |
|--|--------------------|----------------|
| Age groups (in years) | | |
| 18-29 | 113 | 55.9 |
| 30-44 | 89 | 44.1 |
| Mean age ± SD | 29.31 ± 4.86 years | |
| Family of origin | | |
| Monogamous | 135 | 66.8 |
| Polygamous | 42 | 20.8 |
| Single parent | 25 | 12.4 |
| Enjoys financial assistance | | |
| Yes | 187 | 92.6 |
| No | 15 | 7.4 |
| No formal education | | |
| Primary | 1 | 0.5 |
| Secondary | 56 | 27.7 |
| Tertiary | 143 | 70.8 |
| Occupation | | |
| Unemployed | 38 | 18.8 |
| Student | 32 | 15.9 |
| Employed | 132 | 65.3 |
| Average family monthly income (in Naira) | | |
| ≤ 20000 | 7 | 3.4 |
| 21000-60000 | 42 | 20.8 |
| 61000-120000 | 67 | 33.2 |
| >120000 | 68 | 33.7 |
| No response | 18 | 8.9 |

was also obtained among 146 respondents recruited in the second trimester of pregnancy. Twenty-eight women (19.2%) of 146 women in the second trimester scored above cut-off in the anxiety subscale, whereas only 10 (7.2%) scored such by the third trimester.

Incidence of Anxiety Disorders in the Trimesters of Pregnancy: During the clinical interviews, mild anxiety disorders were found but did not meet strict criteria of the Mini International Neuropsychiatric Interview (MINI) which diagnosed disorders of moderate and above severity as described earlier. The cumulative incidence of generalized anxiety disorder (GAD) meeting MINI criteria was 1.0% over the entire period of pregnancy. For all diagnosed cases on clinical interview, including the milder ones that did not meet MINI criteria, the incidence is as shown in Table 2 and they are represented as clinical GAD. There was no new case of panic disorder, agoraphobia or social phobia during the period of follow up.

Relationship Between Respondent Characteristics and Severity of Anxiety at Term: In order to determine how

respondents with more severe symptoms at term differ from those without severe symptoms at term, respondent characteristics were evaluated against severity of symptoms for association (Table 3).

Table 3 shows sociodemographic characteristics in relation to anxiety symptoms severity.

Clinical and Pregnancy Related Characteristics of Respondents in Relation to Anxiety Symptoms Severity

Parity: Nulliparous respondents had a higher rate of severe anxiety symptoms at term (9.5%) compared to multiparous respondents (9.0%). This however was not a significant difference ($X^2 = 0.012$; $p = 1.000$).

Problem in Last Pregnancy: Those respondents who have a history of problematic pregnancy in the recent past pregnancy have a higher rate of severe anxiety symptoms at term (12.2%) compared to those who didn't (7.7%), but the difference was not significant ($X^2 = 0.731$; $p = 0.519$).

Planned Pregnancy: Planned pregnancies generated less rates of severe symptoms of anxiety at term among respondents (8.7%) compared to a rate of (10.8%) for unplanned pregnancies. ($X^2 = 0.165$; $p = 0.749$).

Illness and Other Chronic Medication in Present Pregnancy:

Respondents who were ill during their pregnancy had severe symptoms of anxiety at term at about twice the rate for respondents who were not ill in the course of their pregnancy (15.0%: 8.4%). This was not a significant difference ($X^2 = 0.964$; $p = 0.400$) as it can be seen that the higher rate was generated by a few (3 respondents out of 20) who were ill compared to 14 out of 167 respondents who were not ill. This was also the case between those taking other medications besides the routine ones during their pregnancy and those who were not (16.7%: 8.6%; $X^2 = 0.890$; $p = 0.606$).

Psychoactive Substance Use in Pregnancy: None of the 3 respondents using psychoactive substance during pregnancy had severe symptoms of anxiety at term being simply too few compared to 17 out of 184 respondents not using substances. This difference in rates was not significant ($X^2 = 0.305$; $p = 0.750$).

Anaemia in Pregnancy: Similar rates existed for the presence of severe symptoms of anxiety at term between respondents with and without anaemia in pregnancy, 8.0% and 10.0% respectively. There was no significant difference between these rates ($X^2 = 0.215$; $p = 0.800$).

Table 2: Incidence of anxiety disorders in the trimesters of pregnancy among respondents

| Mini and clinical diagnoses | First trimester n(%) | Second trimester n(%) | Third trimester n(%) | Cumulative incidence ^a n(%) |
|-----------------------------|----------------------|-----------------------|----------------------|--|
| MINI GAD | 0(0.0) | 0(0.0) | 2(1.1) [#] | 2(1.0) |
| CLINICAL GAD | 1(1.8) | 10(5.1) | 3(1.7) | 14(6.9) |

Table 3: Relationship between Sociodemographic Variables of Respondents and Severity of Anxiety at Term

| Variable | HADS Anxiety Scores AT Term | | Total N=187 | X2 | P |
|----------------------|-----------------------------|---------------|-------------|-------|-------|
| | <8 n=170 n(%) | ≥ 8 n=17 n(%) | | | |
| Age groups | | | | | |
| 18-29yrs | 93(89.4) | 11(10.6) | 104(100.0) | 0.626 | 0.457 |
| 30-44yrs | 77(92.8) | 6(7.2) | 83(100.0) | | |
| Family of origin | | | | | |
| Monogamous | 112(91.1) | 11(8.9) | 123(100.0) | 0.010 | 1.000 |
| Others | 58(90.6) | 6(9.4) | 64(100.0) | | |
| Financial assistance | | | | | |
| Yes | 158 (90.8) | 16 (9.2) | 174(100.0) | 0.160 | 0.923 |
| No | 12 (92.3) | 1 (7.7) | 13(100.0) | | |
| Educational level | | | | | |
| Tertiary | 117(90.0) | 13(10.0) | 130(100.0) | 0.426 | 0.593 |
| Secondary or less | 53(93.0) | 4(7.0) | 57(100.0) | | |
| Occupation | | | | | |
| Paid employment | 111(91.0) | 11(9.0) | 122(100.0) | 0.002 | 1.000 |
| No paid employment | 59(90.8) | 6(9.2) | 65(100.0) | | |
| Income groups | | | | | |
| <60000 naira | 44(91.7) | 4(8.3) | 48(100.0) | 0.003 | 1.000 |
| >60000 naira | 114(91.9) | 10(8.1) | 124(100.0) | | |

DISCUSSION

General Sociodemographic and Pregnancy-Related clinical Characteristics of Respondents:

Majority (89.1%) of the women in this study were married. This distribution as regards marital status is similar to what was obtained in a study by Thompson and Ajayi in their sample of 314 women in western Nigeria, where they found that 93% of their respondents were married [24]. These figures, however, are higher than what is obtained in the general population e.g. 71.4% in the Nigeria Demographic and Health Survey (NDHS) of 2013, Demographic N. Health Survey [25]. They difference may be in the fact that married women are more likely to afford antenatal care and may thus be over-represented in antenatal care populations.

Most of the women in this study were Christians. This is not surprising as majority in the southern or coastal parts of West Africa practice the Christian religion. The socioeconomic characteristics of respondents in this study suggested that, relatively advantaged women may have been over-represented in the study sample. Over 90% of them had attained secondary education or higher, while less than 2% had only primary education or no education. Women of higher

educational status are more likely to be of higher socioeconomic status and thus afford the relatively high antenatal care bills at our study site.

Less than 20% of the women in this study were unemployed and largely dependent on their husbands for 'up-keep', as well as, spending most of their time at home. This is similar to a 20% rate of unemployment status reported among 165 Greek pregnant women by Gourounti, *et al.* [26]. Thompson and Ajayi [24] however reported lower unemployment rates of 3.2% among pregnant women in western Nigeria. These differences may be due to the different ways of assessing employment status and the different employment opportunities available to women in various parts of sub-Saharan Africa.

The average family incomes per month of respondents in this study were grouped according to a method used by Oguoma *et al.* [27] Close to 70% of respondents belonged to the high and upper middle-income groups, further showing the predominance of the socially advantaged in our study sample. Most researchers in the West African sub region have reported higher proportions of pregnant women in the low-income groups or low socioeconomic status. Adewuya *et al.* [23] for instance, found that 39.4% of their study sample consisted of women of low socioeconomic status.

The raise of ANC fees and consequent selection of women who can afford to pay at our study site may contribute to our relatively unusual findings.

In this study, 80.7% of women were happy when they knew they were pregnant and were eager to have the baby. This may be because women that planned to get pregnant are more likely to go for antenatal care and thus over-represented in ANC populations.

Less than a third of respondents (23.3%) in this study reported to having frequent or severe illness in the last pregnancy. A study in the West African sub-region among women attending ANC in semi-urban areas reported 13.3% of participants as having had a pregnancy-related admission during the previous pregnancy [23]. This was another specific though limited way to assess the same parameter. Our study also found that 12.4% of respondents had serious or chronic illness in present pregnancy while the abovestudy by Adewuya *et al.* [23] reported a rate of 6.1% having had a pregnancy-related admission in current pregnancy. The higher rates of illness in previous and present pregnancies reported in our study may be because not all serious illnesses in pregnancy require admission.

Also, majority (98.5%) of respondents in this study were currently not using any psychoactive substances. This is similar to what is reported by Thompson O and Ajayi I reported in a Nigerian antenatal population where 99.7% did not smoke cigarettes during that pregnancy and 94.2% also did not use alcohol in any form Thompson and Ajayi [24]. It is possible that most pregnant women decide to avoid psychoactive substance use in pregnancy to avoid harm to their unborn child.

Most the respondents had social advantages like being raised in a monogamous family setting (66.8%). This was an attempt to explore childhood settings they may have been raised in, as children in monogamous settings are more likely to have experienced fewer childhood adversities than in other settings [28-30] Thompson and Ajayi [24] similarly reported that 78.5% of women in their antenatal sample were from monogamous families.

Majority (92.6%) of the respondents enjoyed financial/instrumental support (practical help) from spouse/family in times of need. Less than half (45.6%) of women in a study by Biratu *et al.* [31] had good social support. The possible reason for this difference from our finding is that their study was conducted at a primary care setting where antenatal care is affordable and assessable for the general population, including those with more social disadvantages.

The relationship between age and anxiety in pregnancy is inconsistent and conflicting in the literature. We found that there was no association between age and anxiety symptoms at term of pregnancy. Bodecs *et al.* [32] also found a lack of association between maternal age and anxiety in a Hungarian antenatal population. On the other hand, Adewuya *et al.* [33] found that a young maternal age (younger than 25 years) was significantly associated with an anxiety disorder in late pregnancy. In this study, we restricted ourselves to working with the adult population including only those between ages 18 and 45 years. Our average age was 29.31 years while that in the study [33] just mentioned was 26.86. This may have contributed to our difference in findings. Their sample had more representation of younger women and this may explain why they may have found a significant relationship between young age and anxiety disorders in pregnancy.

Incidence of Anxiety Disorders in Pregnancy: Very few studies [34-36] report incidence of anxiety disorders in pregnancy and almost all that do are in the western world. This makes it difficult to compare our present findings. A systematic review [37] on perinatal anxiety disorders notes that new onset GAD is unlikely during pregnancy due to the duration criterion for the diagnosis. This perhaps would explain the low incidence of GAD (1.0%) in this study.

Martini *et al.* [38] however, reported a cumulative incidence of anxiety disorders in pregnancy of 7.3% among 109 women in Dresden, Germany. This figure however included all the anxiety disorders unlike this study reporting a cumulative incidence for only GAD. Similarly, in our study when we added all the milder cases of anxiety disorder, the incidence went up to 6.9%, very close to theirs.

A local study [33] of anxiety disorders in late pregnancy suggests that GAD may be more prevalent in pregnant women (10.5%) compared to matched non-pregnant women (5.2%) serving as controls. This was a cross-sectional study unlike our study which is prospective in design and considered prevalence not incidence.

A first, more evident reason for our low rate of MINI GAD is that since our study was focused on incidence not prevalence, some women with anxiety disorders may have been excluded from the cohort at recruitment. Also, most women (72.3%) in the cohort were recruited in the second trimester thus limiting the duration of observation from development of symptoms to meeting

the 6 months criteria for GAD. As a matter of fact, the only 2 women diagnosed of GAD in this study are from among the few (27.7%) recruited from the first trimester. The skewed sample of socially advantaged women and the need for larger samples for incidence studies are other possible reasons for the low incidence of GAD reported in this study. It is also possible that these are the true incidence rates in this part of the West African sub-region.

This study also reported zero incidences for panic disorder, agoraphobia and social phobia. As stated earlier for GAD, there is paucity of data on incidence of these anxiety disorders in pregnancy. Northcott *et al.* [36] reported a rate of 3% for new onset panic disorder in a sample of 46 women in a high-income country. Their study used a retrospective questionnaire to estimate the rate of new onset panic disorder. This may result in an overestimation as retrospective methods are subject to recall bias [37]. Apart from the much smaller sample size in their study, diagnosis was made using a questionnaire and not clinical interviews. Their prevalence arguably only represents probable caseness [36]. Also, majority of our cohort were followed up for just two trimesters on account of late ANC registration and this may further constrict the possibility of case identification.

It is also possible that these anxiety disorders are rare in this part of the West African sub-region and there is some evidence to support this. A population-based survey in the region by Gureje *et al.* [39] for example, showed low rates of anxiety disorders. The 12-month prevalence rates reported in the survey were 0.0% for GAD, 0.3% for social phobia and 0.2% for agoraphobia even in an adequately powered community sample [39]. The authors adduced some reasons for the low rates compared to epidemiological surveys in high income countries. These reasons include true variations due to culture and ethnicity, as well as stigma towards mental illness that may affect reporting of symptoms [39]. These reasons may apply to this study as well.

Progression of Anxiety Towards Term among Respondents: Progression of disorders has been variously defined in the literature [40-43]. This study proposed to study the course of anxiety disorders in a cohort of pregnant women who did not have those disorders at the time of recruitment into the study. Progression of anxiety could be considered using two different approaches- the progression of diagnosed disorders and/ or the progression of symptoms.

First, we could consider the progression of disorders in the few new cases that were picked up at some point during pregnancy but before term. Using this approach, we would be aiming to answer questions such as the following: Of the new cases picked up, how many persisted till term? How many resolved before term? In order to answer this question, the course and progression of disorder in each of the identified cases was examined and presented in a diagram (Figures 5.3 and 5.4). Since the incidence was low, a case by case consideration was possible.

This study revealed that of the 14 women with an anxiety disorder, 5(35.7%) experienced remission of symptoms during pregnancy, most within 8 weeks. They did not experience another episode during the pregnancy and could thus be said to have recovered. These findings are not surprising considering that mild anxiety disorders can be self-limiting and remit spontaneously even without treatment [44, 45].

More than half of those with an anxiety disorder (64.3%) had the disorder persisting for the rest of the pregnancy. Some of these may persist as post-partum disorders with an addition from recurrences from those who had remission, largely because they did not seek help in the psychiatry clinic they were referred to. Most of them gave as a reason for not attending the psychiatric clinic that they did not think their condition was serious enough to warrant seeking expert help. Stigma to mental illness in our environment may also contribute to their reluctance to seek help despite evidence showing the effectiveness of a variety of mental health interventions [46, 47].

The second approach would be to consider the progression of anxiety symptoms in the entire cohort. The first approach, i.e., considering only disorders would be limited to the very small number of cases that were picked up during pregnancy. The advantage of the symptom progression approach is that anxiety symptoms in the entire cohort is considered and its rates taken as a general indicator of mental well-being in the group. Since pregnancy impacts upon every member of the group both physically and psychologically, this approach would be useful in determining the overall effect of pregnancy on the mental health.

A significant and consistent reduction of mean scores was also reported in this study from early pregnancy to late pregnancy. A similar reduction from the 18th to the 32nd week of gestation of mean anxiety scores has also been reported in a prospective study of more

than 8,000 pregnant women in England [48]. Teixeira *et al.* on the other hand reported a U-shaped pattern of change in mean STAI scores with first and third trimester scores highest and lower scores in second trimester [49]. This further supports the notion that the first trimester is a turbulent period for the mental health of most mothers trying to adjust to the physiological and psychological changes of pregnancy. The second trimester is a period of relative calm and stability as shown by the reduction in scores. Our study shows a further reduction in scores possibly from the joy of anticipating the birth of a new child.

CONCLUSION

Anxiety disorders are present in pregnancy even in women with social advantages. The incidence proportions of anxiety disorders in pregnancy are as high as 6.9% when milder cases are included. They can be as low as 1.0% for GAD when strict MINI criteria are adhered to. There were new cases of anxiety disorders in all the trimesters of pregnancy showing the need for screening measures to be instituted in all trimesters.

Limitations of Study: The study was conducted in a setting where only those who could afford to pay for services and thus the socially advantaged were over-represented. This limits the generalizability of our findings.

Authors Contributions: This work was carried with the collaboration of all the authors (Emmanuel Omamurhomu Olose, Owoidoho Udofia and Egbeh Samuel Otu). All the authors designed the study. Emmanuel Omamurhomu Olose wrote the protocol for the study. In addition, all the authors did the literature search and data analysis. Emmanuel Omamurhomu Olose and Owoidoho Udofia wrote the initial draft of the article while Egbeh Samuel Otu drew all the tables. All the authors made corrections for the final draft of this manuscript.

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