Perceived Stress and Anxiety in Women during Labour: A Case of Tamale West Hospital, Tamale, Ghana

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Authors' contributions

This work was carried out in collaboration with all authors. Authors NA, MA, HI, VNY, WY, YA and PPMD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors NA, PPMD and YA managed the analyses of the study. Authors MA, HI, VNY and WY managed the literature searches. All authors read and approved the final manuscript.

Article Information

Original Research Article

ABSTRACT

Aim: To investigate the prevalence of intrapartum anxiety and stress, its effect on duration of labour as well as associated factors among parturient women.
Design: This study was a cross-sectional study.

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Setting: This study was carried out at the Tamale West Hospital, Tamale, Ghana, from April to May 2017.

Methods: One hundred and thirty-eight (138) participants with a singleton pregnancy and cervical dilation of 4 cm were enrolled. Duration of labour, stress and anxiety were measured using the Friedman's curve, Kessler Psychological Distress Scale and Perceived Stress Scale respectively.

Results: Among the 138 participants, the prevalence of a severe form of intrapartum anxiety and stress were 8.7% and 8.0% respectively. Analysis revealed that age, marriage duration, pre-pregnancy body mass index, height, weight, gestational age, duration of labour and parity showed significant association with stress and anxiety.

Conclusion: several factors were found to influence the occurrence of stress and anxiety among pregnant women in labour. It is essential to prevent or reduce intrapartum anxiety and stress from occurring by identifying all the high-risk women and strengthening intrapartum-related education and mental intervention.

1. INTRODUCTION

Pregnancy and delivery are significant and positive life experiences for most women. However, a substantial number of women are more or less afraid of childbirth [1,2] and it is reported that approximately 10-14% of women fear child birth. Some of these women actively avoid becoming pregnant, seek termination of pregnancy or try to induce a miscarriage [2].

Some women dread and avoid childbirth despite desperately wanting a baby. Stress and anxiety of parturition have been known for ages since Marcé – a French psychiatrist – wrote in 1858: "If they are primiparous, the expectation of unknown pain preoccupies them beyond all measures and throws them into a state of inexpressible anxiety. If they are already mothers, they are terrified of the memory of the past and the prospect of the future" [3]. Labour is an important phenomenon and may be one of the most painful and stressful events that mothers experience during their lifetime. It is characterised by tremendous physiological and psychological changes that require major behavioural adjustment [4]. Childbirth has short, medium and long-term implications for the well-being of babies, women, their families and society [5]. Worldwide, there are clear differences between the problems faced by childbearing women in developing countries and those women in developed countries. Selye [6] defined stress as a non-specific result of any demand upon the body, be it the effect of mental or somatic. Stress was also defined as "a dynamic, progressive relationship between the person and the environment" [7]. Anxiety and stress in the course of labour may mar communication between the woman and the maternity staff, and poor communication may complicate clinical decisions and delay obstetric interventions.

Conversely, labour stress and anxiety has been linked to detrimental outcomes including immunosuppression, fluid and electrolyte imbalance, delayed wound healing, diminished uterine contractions and prolonged labour in the mother [8]. Ryding, Wijma, Wijma, & Rydhström [9] have also reported that labour stress can have deleterious effects on neonatal neural development and behaviour including impaired motor ability, impaired balance reactions, shorter attention spans, impaired muscle coordination and tonicity, greater infant irritability, and decreased coping ability.

Studies have found that certain variables including young maternal age, nulliparity, pre-existing psychological problems, lack of social support and a history of abuse or adverse obstetric events, low level of formal education and absence of antenatal education were linked to increased labour stress [3]. Furthermore, a high level of labour stress and anxiety has been associated with increased numbers of labour procedures [10].

Stress and anxiety have long been known to affect human well-being (biophysical and emotional) and may even threaten survival [7, 11]. Physical and psychological stressors produce an increase in catecholamine released from adrenal medulla together with changes in circulating levels of adrenocortical hormone [12]. Labour and birth are stressful events [13]. Studies on animals and humans have identified that stressors such as anxiety during labour are associated with increased levels of stress

hormones; adrenaline, noradrenaline and dopamine [14].

Studies have shown that increased in adrenaline levels resulted in reduced uterine contractility, abnormal fetal rate patterns and prolonged labour. Despite the fact that various studies have assessed prevalence and determinants of intrapartum anxiety and stress in developed countries, there is still a paucity of data from developing countries with almost none from Ghana. The purpose of this study, therefore, was to explore the prevalence as well as the effects of stress and anxiety on the duration of labour.

2. MATERIALS AND METHODS

2.1 Study Area

This study was carried out at the Tamale West hospital in Tamale, Northern region of Ghana from April to May 2017, among women in labour visiting Tamale West Hospital for delivery. The Hospital which is currently a referral hospital for the Tamale Metro sub-district health centres provides 24-hour services and has seven functional wards, namely Male, Maternity, Labour, Emergency, Children, Female and Surgical wards. The hospital has approximately 300 staff nurses.

2.2 Study Design

This study was a cross-sectional survey conducted at the Tamale West Hospital.

2.3 Sample Size Determination

The target population was women in labour visiting Tamale West Hospital. The necessary minimum sample size for the study was calculated to be 138 women, based on the assumption that 10% of the pregnant women experience anxiety [15], with an expected difference of 5% between the sample and the general population and a type I error (α) of 0.05.

$$n = \frac{z^2(1-p)p}{d^2}$$

Where n = minimum sample size; Z = standard normal variance=1.96 to obtain a power of 95% confidence interval (β=5%) and a type 1 error probability of 5%; d=Absolute standard error=0.05; p=prevalence=10%.

2.4 Sampling Procedure

Purposive sampling technique was used to select participants from the parturient women who visited the labour ward within the stipulated time of data collection. Women were assessed for their eligibility for participation in the study using a pre-defined set of criteria. Primigravida and multigravida women with an uncomplicated singleton pregnancy with cephalic presentation were screened first for eligibility. Women who were selected for a caesarean section had cervical dilatation of more than 4 cm at the time of admission or were booked for induction and augmentation were excluded from the study.

2.5 Data Collection

Questionnaires were administered to respondents and appropriate guidance was given to respondents to enable them to make informed choices. Prior to administering questionnaires, the purpose of this study was explained to respondents and confidentiality assured as well as the right to opt out at any moment without any repercussions. The questionnaire was organised into four categories:

2.5.1 Socio-demographic characteristics

They included age, educational level, employment, socioeconomic status, marital status, duration of relationship, number of previous children, gestational age and any complications experienced throughout pregnant.

2.5.2 Duration of labour

The timing of the duration of labour was commenced using the following criteria: being in the active phase of the 1st stage with a cervical dilatation of 4 cm. A 4-hourly vaginal examination was carried out to ascertain the cervical dilatation. The diagnosis of prolonged and normal duration of labour was made based on the criteria in Table 1. With division of 1st stage of labour into latent and active phases in mind, the active phase was calculated by excluding latent phase. For the purpose of this study, latent phase of the 1st stage and 4th stage of labour were exempted.

2.5.3 Anthropometric measurements

Obesity was assessed using the Body Mass Index (BMI) which was calculated with weight in kg and height^2 in (m^2). The World Health

Organization (WHO) creteria for weight classification of BMI <18.5 kg/m^2, 18.5-24.9 kg/m^2, 25-29.9 kg/m^2 and ≥30 kg/m^2 were used to define underweight, normal, overweight and obese respectively.

2.5.4 Blood pressure measurement

Both systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured at the same level as the heart whiles the participants were in the sitting position, using a sphygmomanometer. All measurements were taken twice for each person as well as a confirmatory check with a digital BP apparatus and the average was taken as final. Respondents were given a 15 minutes period of rest, before and after the first blood pressure reading. Hypertension was defined as systolic blood pressure, ≥140 mmHg and/ or diastolic blood pressure ≥90 mmHg.

2.5.5 Stress data

The Perceived Stress Scale (PSS) is a classic stress assessment instrument originally developed by Cohen, Kamarck [16] remains a popular choice for helping to understand how different situations affect feelings and perceived stress. The questions in this scale ask about feelings and thoughts during the last month. PSS are scored by following these directions:

- ✓ First, reverse your scores for questions 4, 5, 7, and 8. On these 4 questions, change the scores like this: 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0.
- ✓ Now add up your scores for each item to get a total.
- ✓ Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.

Stress score was assessed using the Perceived Stress Scale (PSS).

- ✓ Scores ranging from 0-13 would be considered low stress.

- ✓ Scores ranging from 14-26 would be considered moderate stress.
- ✓ Scores ranging from 27-40 would be considered high perceived stress

2.5.6 Anxiety data

The Kessler Psychological Distress Scale (K10) is a 10-item questionnaire intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent 4-week period. The K10 general rule states that, patients who rates most commonly "Some of the time" or "All of the time" categories are in need of a more detailed assessment. Patients who rate most commonly "A little of the time" or "None of the time" may also benefit from early intervention and promotional information to assist raising awareness of the conditions. "None of the time", A little of the time", "Some of the time" and "All of the time" were numbered one to four in that order to calculate the scores.

2.6 Statistical Analysis

Data was analyzed using MS Excel (2013 edition) and Graph Pad Prism version 6.0. The data was presented as mean ± SD (standard deviation) or percentages. Correlation was used to assess the relation among different variables. Unpaired T-test was to compare continuous variables whiles Chi square analysis was used to compare categorical variables and a p value < 0.05 was considered statistically significant.

2.7 Ethical Consideration

The study was conducted after approval from the Ethics committee of the School of Allied Health Sciences (Reference number SAHS/0014/17 dated 17/03/2017). Permission was also obtained from Tamale West Hospital. Informed consent was obtained from each participant, which emphasized the voluntary nature and the right to withdraw from the study at any point without affecting their routine care.

Table 1. Prolonged duration of labour classified by Friedman

	Nulliparous	Multiparous
Prolonged 1st stage	> 20 hours	>14 hours
Prolonged 2nd stage	>2 hours	>1 hour
Prolonged 3rd stage	> 1 hour	>30 minutes
Rate of cervical dilatation	1.2 cm/hr	1.5 cm/hr

3. RESULTS

3.1 General Characteristics of the Study Population

The total number of participants in this study was one hundred and thirty-eight (138), of which 116 (84.1%) were found to have a normal duration of labour whiles 22 (15.9%) had a prolonged labour. As shown from Table 2, the mean ± s.d. age of the studied population was 28±7.1 years. However, the participants with normal duration of labour were significantly (p <0.001) older (29.0 ± 7.0 yrs) than those with prolonged duration of labour (22.6 ± 5 yrs). In this study, majority of the participants had had some form of education (68.8%), i.e. basic, secondary or tertiary. Almost the entire population (89.9%) were married. Close to half of the respondents were unemployed 46.4%. Majority (82.6%) of the parturient mothers experienced no complications during pregnancy.

3.2 Anthropometric, Stress, Anxiety and Blood Pressure Findings of Respondents Stratified by Duration of Labour

From this study, the prevalence of hypertension was 16.67%. with no differences between the two groups. Although participants with normal duration of labour were taller and heavier than those with prolonged labour, BMI was significantly higher among participants with prolonged duration of labour. The average anxiety score in this study was 12.9±7.1 and this was significantly higher among participants with prolonged duration of birth (15.7 ± 7.7, p=0.04 vs 12.4 ± 7.7). Though stress scores were higher among participants with prolonged duration of labour, the difference was not statistically significant.

3.3 Prevalence of Stress and Anxiety Disorders among Study Participants

As shown in Fig. 1, 92.8% of the participants had some form of stress disorder with 84.8% having moderate stress and 8.0% having high stress whiles 7.2% had none. The prevalence of anxiety among the participants was 32.6%, with 14.5% experiencing mild anxiety, 9.4% experiencing moderate anxiety and 8.7% with severe anxiety whiles 67.4% had no anxiety.

3.4 Trend of Stress and Anxiety among Study Participants

From this study, 7.25% of the participants had neither anxiety nor stress. 60.14% of the studied population experienced stress but not anxiety, whiles 32.6% experienced both stress and anxiety, with a higher proportion of participants with prolonged labour (40.9%) experiencing both stress and anxiety.
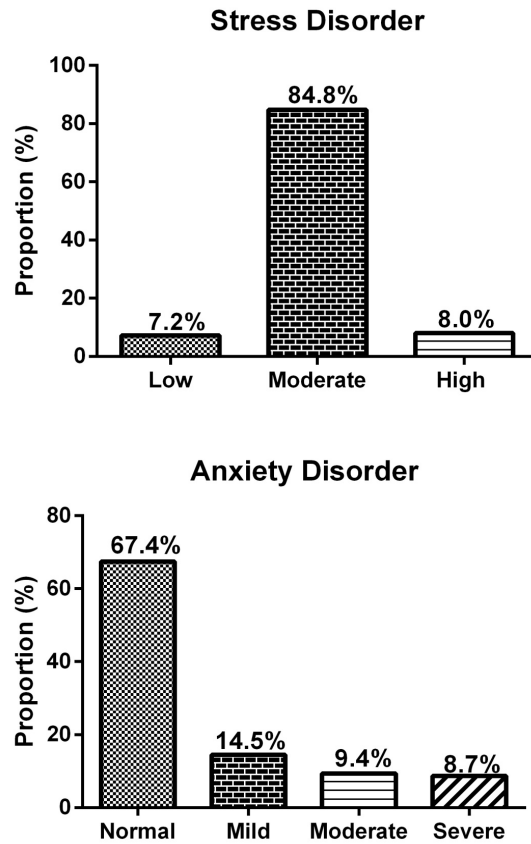
Stress Disorder

Anxiety Disorder

Fig. 1. The prevalence of stress and anxiety disorder among the studied participants stratified by the severity of the condition

3.5 Correlation of Variables

From Table 4, age showed an inverse correlation with anxiety. Parity was also negatively associated with stress and anxiety and whiles weight showed a negative correlation with both stress and anxiety, height showed an inverse association with only anxiety and duration of marriage was also negatively associated with only stress.

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Table 2. General characteristic as well as obstetric parameters of the studied population classified by labour duration

Variable	Total (n=138)	Normal Labour (n=116)	Prolonged Labour (n=22)	P Value
Age (yrs)	28±7.1	29.0 ± 7.0	22.6 ± 5.0	<0.001
Highest educational level				
Illiterate	43(31.2%)	36(31.0%)	7(31.8%)	0.94
Basic/J.H.S.	39(28.3%)	29(25.0%)	10(45.5%)	0.05
Secondary	33(23.9%)	30(25.9%)	3(13.6%)	0.22
Tertiary	23(16.7%)	21(18.1%)	2(9.1%)	0.30
Employment status				
Unemployed	64(46.4%)	48(41.4%)	16(72.7%)	0.007
Employed	53(38.4%)	48(41.4%)	5(22.7%)	0.10
Gainfully employed	21(15.2%)	20(17.2%)	1(4.6%)	0.13
Monthly Income (Ghc)	658.1±502.3	673.5 ± 502.4	483.3 ± 511.5	0.38
Marital status				
Married	124(89.9%)	108(93.1%)	16(72.7%)	0.004
Single	14(10.1%)	8(6.9%)	6(27.3%)	0.004
Marriage duration	7.4±6.1	7.8±6.2	4.9±4.8	0.08
Parity	2.0±2.1	2.2 ± 2.1	0.8 ± 1.3	0.003
Nulliparous	45(32.6%)	31(26.7%)	14(63.6%)	<0.001
Multiparous	93(67.4%)	85(73.3%)	8(36.4%)	<0.001
Gestational age (Weeks)	38.3±1.6	38.3 ± 1.5	38.4 ± 1.3	<0.92
Complications				
Yes	24(17.4%)	18(15.5%)	6(27.3%)	<0.18

Categorical data are presented as proportion and compared using chi-square whilst continuous data are presented as Mean ± SD and compared using unpaired t-test

Table 3. Anthropometric, stress, anxiety and blood pressure findings of respondents classified by duration of labour

Variable	Total (n=138)	Normal Labour (n=116)	Prolonged Labour (n=22)	P Value
Blood Pressure				
Systolic (mmHg)	124.2±14.3	124.0 ± 14.7	125.2 ± 12.0	0.71
Diastolic (mmHg)	80.9±12.76	80.7 ± 13.0	82.0 ± 11.8	0.66
Hypertensive	23(16.7%)	20(17.2%)	3(13.6%)	0.68
Weight (Kg)	65.5±11.3	66.7 ± 8.1	59.1 ± 8.1	0.003
Height (m)	1.6±0.1605	1.7 ± 0.2	1.5 ± 0.2	<0.001
BMI (Kg/m^2)	24.42±4.371	24.0 ± 5.3	26.8 ± 5.3	0.005
Weight Classes				
Under weight	2(1.5%)	1(0.9%)	1(4.6%)	0.19
Normal	39(28.3%)	31(26.7%)	8(36.36%)	0.36
Over weight	55(39.9%)	49(42.2%)	6(27.27%)	0.19
Obesity	42(30.4%)	35(30.2%)	7(31.82%)	0.88
Stress Score	19.2±4.7	19.0 ± 5.4	20.1 ± 5.4	0.31
Stress Categories				
Low	10(7.2%)	9(7.8%)	1(4.5%)	0.59
Moderate	117(84.8%)	98(84.5%)	19(86.4%)	0.82
High	11(8.0%)	9(7.8%)	2(9.1%)	0.83
Anxiety Score	12.9±7.1	12.4 ± 7.7	15.7 ± 7.7	0.04
Anxiety categories				
Normal	93(67.4%)	80(69.0%)	13(59.1%)	0.37
Mild	20(14.5%)	16(13.8%)	4(18.2%)	0.59
Moderate	13(9.4%)	11(9.5%)	2(9.1%)	0.95
Severe	12(8.7%)	9(7.7%)	3(13.6%)	0.37

Categorical data are presented as proportion and compared using chi-square whilst continuous data are presented as Mean ± SD and compared using unpaired t-test
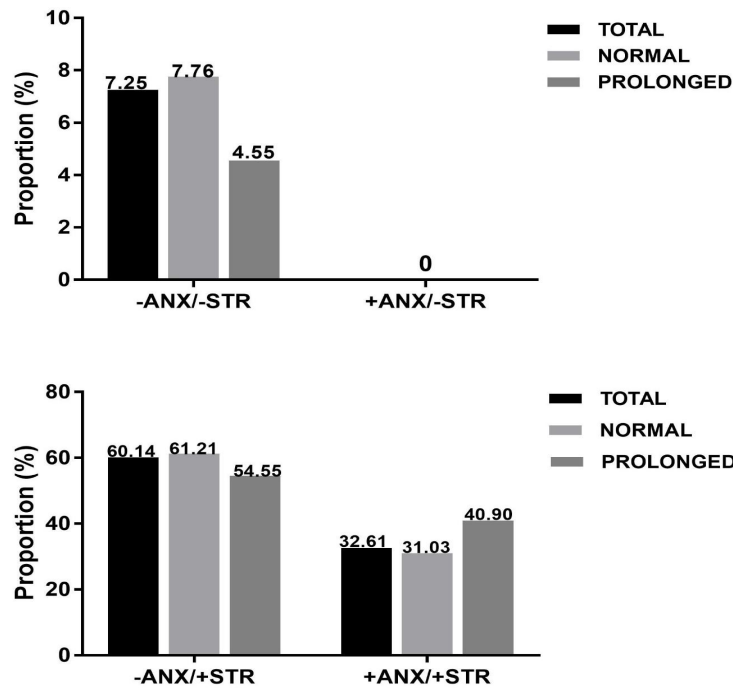
Fig. 2. The prevalence of various combination of stress and anxiety disorder among the studied participants
Key- -ANX-STR = those without both stress and anxiety disorder, +ANX-STR = those with only anxiety disorder, -ANX+STR = those with only stress and +ANX+STR = those with both stress and anxiety disorder

Table 4. Correlation of the variables

Variables	Income	DOM	Parity	GA (Weeks)	SBP	DBP	Weight	Height	BMI	DOL	Stress	Anxiety
Age (yrs)	-0.03	0.87	0.89	-0.03	0.30***	0.27**	0.52	0.4	0.16	-0.11	-0.34	-0.31***
Income (Ghc)		-0.25*	-0.19	0.13	0.05	0.08	-0.04	0.12	-0.09	-0.09	-0.13	-0.11
DOM (yrs)			0.89	-0.02	0.27*	0.3***	0.38	0.21	0.25	-0.12	-0.19*	-0.14
Parity				-0.06	0.24	0.25*	0.53	0.32***	0.23	-0.12	-0.28***	-0.25**
GA (Weeks)					0.17	0.15	0.07	-0.02	0.07	-0.05	-0.11	0.02
SBP (mmHg)						0.79	0.24*	0.02	0.22	-0.04	-0.11	-0.1
DBP (mmHg)							0.3***	0.06	0.24**	-0.07	-0.10	-0.05
Weight (Kg)								0.34	0.65	-0.11	-0.26**	-0.21*
Height (m)									-0.49	-0.16	-0.41	-0.3***
BMI (Kg/m^2)										0.02	0.08	0.03
DOL (minutes)											0.03	0.00
Stress												0.56

*Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed), ***Correlation is significant at the 0.001 level (2-tailed). Boldface r = Pearson product moment correlation coefficient with a medium size (0.30 ≤ r ≥ 0.50) effect: boldface and underlined r= Pearson product moment correlation coefficient with a large size (r > 0.50) effect

4. DISCUSSION

Suppression of labour activity and prolonged deliveries due to anxiety, strong emotions, and stressful events has been reported in women since ancient times and are known to occur in many other mammalian species. Despite the growing literature, there are gaps that need to be addressed. Definitive studies that link stress, anxiety and prolonged labour duration need to be further explored. This study was performed to assess the prevalence of intrapartum anxiety and stress as well as their effect on duration of labour in parturient women attending Tamale West Hospital.

Various sources have estimated that between 25 to 75% of women experience stressful life events or social health issues during the antenatal period [17-20]. In this study, however, the prevalence of stress and anxiety were found to be 92.8% and 32.6% respectively among parturient women. The prevalence of stress in this study is higher than that in most similar studies [17-20], whiles the prevalence of anxiety in this study is higher than those of Boakye-Yiadom, Shittu [20], Kang, Yao [21] and Thiagayson, Krishnaswamy [22]. The variance in prevalence among the various studies may be attributed to the diverse research designs and assessment tools used. Although the prevalence of stress and anxiety may differ among different studies due to different measurement errors and sampling methodologies, there is agreement among these studies that stress and anxiety is a common problem during pregnancy and labour and that this has become an important public health issue, especially in developing countries.

Kessler, Angermeyer [23] showed that younger maternal age is a factor for anxiety in pregnancy. Other studies by Melender and Lauri [24] and Qiao, Wang [25] have demonstrated that nulliparous women are more likely to be ill-prepared for pregnancy and labour which can be attributed to the possibility of lack of experience. Even with the reliance on others for advice, most nulliparous women seem to fear the unknown especially in tolerance to pain and additional worry of possible deformities [26]. Similarly, in this study, it was found that age has a negative association with anxiety, that is, as women age the level of anxiety during labour reduces. This may be linked to the possibility of previous birth experience during the younger age which has made them more prepared for subsequent births.

Findings from this study provide evidence of a positive association between anxiety and duration of labour, as shown by a higher anxiety score among women with prolonged labour. This association could be attributed to the labouring environments that are associated with high rates of painful intervention, unfamiliar people, bright lights, noise and lack of privacy: all of which are sources of stress and anxiety in labouring women [27]. The presence of both anxiety and stress in parturient women have been reported to be complicating factors in prolonged duration of labour [8].

In this study, BMI was seen to be higher among women with prolonged labour. A study conducted by Bassiouny, Alaa [28] on the "Impact of Body Mass Index on the Progress of Labor in Egyptian Women", showed an increase in the duration of labour in cases of higher BMI. A similar finding was also put forward by Nuthalapaty, Rouse [29] on the association of maternal weight with cesarean risk, labor duration, and cervical dilation rate during labor induction.

The relationship between maternal age and labour progress is unclear. One study showed maternal age of more than 30 years to be associated with longer first stage of labour in nulliparous and multiparous at term who did not receive oxytocin or epidurals [30]. However, other studies have found no association between maternal age and the duration of the first stage [31]. Nevertheless, it was found out in this study that a higher maternal age was associated with shorter duration of labour and vice versa. The effect of maternal age on duration of labour could be linked to the effect of age on stress and anxiety. From this study, younger age was found to be associated with stress and anxiety, whiles stress and anxiety was associated with long durations of labour, hence the impact of age on the duration of labour.

5. CONCLUSION

Based on the findings, the prevalence of severe forms of anxiety and stress in women during labour were 8.7% and 8.0 % respectively. However, when all the forms of anxiety and stress are summed up, prevalence stands at 32.6% and 92.8% for anxiety and stress respectively.

Anxiety was found to lengthen the duration of labour. This study highlights the following factors: age, marriage duration, pre-pregnancy body

mass index, height, weight, gestational age and parity as impacting on the occurrence of stress and anxiety and subsequently the duration of labour.

This calls for the inclusion of prenatal screening for stress and anxiety as part of a routine check-up to identify and intervene early to reduce the adverse labour outcome in the high-risk group. The birth preparedness and complication readiness education should be intensified by the ANC to empower as well as enable expectant mothers cope with challenges of pregnancy and childbirth. A possible method of intervention is the early intrapartum teaching by midwives to improve mental preparation for labour and delivery.

CONSENT

Consent was sought from each participant before being included in the study. Subjects who did not give their consent were excluded from the study.

ETHICAL APPROVAL

Ethical clearance was sought from the Ethical Review Board of the School of Allied Health Sciences and the Tamale Teaching Hospital, Tamale.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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