LOW BACK PAIN INCIDENCE, ANTHROPOMETRIC CHARACTERISTICS AND ACTIVITIES OF DAILY LIVING IN PREGNANT WOMEN IN A TEACHING HOSPITAL CENTER ANTENATAL CLINIC

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ABSTRACT

Context: Although Low back pain (LBP) is a common problem during pregnancy, there is a death of empirical data on its etiology and possible risk factors especially in African population.

Objective: The aim of this study was to investigate the relationship between LBP, anthropometric characteristics and Cumulative Index of Activities of Daily Living (CIADL) among pregnant women.

Study design: A cross sectional survey sample of pregnant women (N=310) attending the antenatal clinic of University of Maiduguri Teaching Hospital was conducted using a close ended questionnaire to elicit information on socio-demographic characteristics, maternity record, activities of daily living functions performed as home chores and LBP experience. Anthropometric measurement of height, weight, waist circumference and hip circumference were also recorded.

Result: A simple majority of the participants (52.3%) had LBP with lumbar type being predominant (55.1%). Majority of the pregnant women (55.6%) who experiences LBP were in their third trimester of pregnancy and pregnant women with formal education (χ^2=31.6, p=0.001) and civil servants (χ^2=5.8, p=0.03) tends to report LBP more than the others without education and of other occupation respectively. Primigravid women tend to report LBP more frequently than the multigravid (χ^2= 9.9, p=0.001) and parity was tenuously but inversely associated with *LBP (r= -0.18 p= 0.002)*. While body weight was tenuously associated (r= 0.120 p= 0.035) with LBP, CIADL was not associated with LBP during pregnancy (r= -0.02, p= 0.71).

Conclusion: The study affirms LBP as a common problem during pregnancy and this pain is unrelated to the intensity of chores performed by the cohorts of pregnant women in their homes.

INTRODUCTION

Pregnancy is a period that is characterized by hormonal, anatomical, cardiovascular and pulmonary changes[1] with concomitant edema and weight gain which may have possible effect on pregnant women's balance and posture.[2] Low Back Pain (LBP) is a common problem during pregnancy[3,4,5] and majority of women report their first episode of

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LBP during pregnancy.[6,7] This pain was perceived to be severe enough to cause a substantial proportion (19%) of American women not to have another pregnancy due to fear of LBP reoccurrence.[8]

LBP is a condition of pain, aches, stiffness or fatigue localized to lumbosacral region of the spine[9]. Pregnancy-related LBP has been defined as any type of idiopathic pain arising between the 12th rib and the glutei folds during the course of the pregnancy, and which is not attributed to a specific pathological condition such as a disc herniation.[10] It has been suggested that pregnancy-related LBP is almost a normal problem during the initial stage in pregnancy and only becomes a cause for concern when it persists as the pregnancy advances.[11]

There has been controversy as to whether LBP is an essential component of a healthy pregnancy. This controversy is not deemed mitigated by a previous study that found no correlation between LBP and the health of a pregnancy.[5] It has also been suggested that LBP may play a protective role by forcing them to be more cautious during activities and safeguard them from accidents during pregnancy.[12] Nevertheless, anthropometric parameters such as height, weight and waist-hip ratio, and the type of job and house chores the woman does, have been identified as possible causes of LBP in pregnancy.[10]

Previous studies have reported strong relationship between pregnancy LBP and parity, whereas the relationship between LBP and age, height, weight, race, fetal weight, and socioeconomic status remains unclear due to conflicting findings.[6,13,14,15] The type of ADL the pregnant women engage in during pregnancy causes different level of stress on their back and the prevalence of LBP has been attributed to specific type of work or activity engaged in during pregnancy.[16] Working in a constrained posture; prolonged periods of standing, lifting, twisting, bending forward; inability to take breaks at will; and post-work fatigue[7,14,17,18] have been suggested as causes of LBP in pregnant women. Ironically in another study, women who work for short time frequently experience severe pain than those who worked for a prolonged period.[19]

Despite the abundance of literature on LBP, etiology of pregnancy-related LBP remains poorly understood[10,20] and a review of previous studies reveals many discrepancies in epidemiological findings.[21] For example, the incidence of LBP during pregnancy ranges from 24% to 90% for different population samples in both retrospective and prospective studies[13,14,22,23,24] and there is no established fact or consensus on its causes.[20]

The extant literature shows that most studies that explicitly describe LBP during pregnancies were on different populations in the developed countries.[25] It is unclear whether there is any relationship between incidence of LBP and anthropometric characteristics including weight, height, BMI, waist circumference, hip circumference and waist-hip ratio among pregnant women. Empirical data on the relationship between incidence of LBP and cumulative index of ADL, parity and number of born children among pregnant women in a Nigerian population is unavailable. The aim of this study was to determine the relationship between incidence of LBP, anthropometric characteristics, pregnancy history and current stage, type of gravida, and cumulative index of activities of daily living (CIADL) in pregnant

women who attended antenatal clinic at the University of Maiduguri Teaching Hospital.

SUBJECTS, MATERIALS AND METHODS

Subjects

A convenient sample of pregnant women who were attending the ante-natal clinic of obstetrics and gynecology department of University of Maiduguri Teaching Hospital participated in this cross sectional survey study. Participants who have LBP due to other causes such as trauma or with known co-existing medical disease such as malignant or systemic diseases were excluded. Using a Yaro Yamane formula a minimum of 310 samples was determined to be adequate.[26]

MATERIALS

The participants completed a 38–item close ended structured questionnaire developed from a previous study.[27] Adaptations made to the original instrument were adding questions related to maternity record while activities that were not applicable to the target population's role in their milieu and environment such as watering of flowers, were removed from the questionnaire. The final questionnaire was assessed by six physiotherapists each with 7-15 years of practice experience and all attested to the face validity of the instrument. A test re-test reliability of 0.73 was also obtained when tested by 11 academic and clinical staff within a two weeks interval.

Section I of the five part questionnaire elicited information on the socio-demographic characteristics of the participants such as age, highest formal educational level attained, occupation and marital status. In section II, information from medical records including gestational age, parity status, number of children and history of previous delivery were obtained. Section III consists of items that elicit information on ADL of the participants and in section IV, information on the subjective report of LBP was obtained. Data on the anthropometric characteristics of the participants was recorded in section V.

From the response to section III items, the Cumulative Index of Activity of Daily Living (CIADL) was derived. CIADL is a product of the time spent (in minutes) per day in different ADL and a weight factor correlated with estimated oxygen consumption for that ADL.[27] Moderate activities such as cooking, sweeping and laundry has a weight factor of 4.0 and walking activities has a factor of 3.3.[28,29]

METHODS

Following approval by the Institutional Ethical Review Committee (IRC) of the University of Maiduguri Teaching Hospital, participants were contacted on their clinic days (Tuesdays and Thursdays) in the obstetrics and gynecology department of the University of Maiduguri Teaching Hospital. The purpose, benefits and possible risk of the study were explained to the participants, their informed consent was obtained and the test instrument (questionnaire) was distributed. Participants who could not read were assisted by the researcher in completing the questionnaire using a Hausa or Kanuri language version of the questionnaire. Upon completion, the questionnaires were either collected on the same day of distribution (n=187) or next appointment date (n=123).

Upon submission of the questionnaire, participants' weight, height, and waist and hip circumference were measured. Height was

measured using a wooden height meter while weight was measured using a weighing scale (Hanna bathroom scale model, China. BNo: 29072184) while an inelastic tape rule (150cm long. Butterfly brand, china) was used to measure hip and waist circumference. Waist-Hip ratio of the participants was obtained by dividing the waist circumference with the hip circumference. Height and circumferential measurements were recorded to the nearest centimeter (cm), while weights were recorded to the nearest 0.1 kg.

Data analysis

Descriptive statistics of mean and standard deviation were used to describe the physical characteristics, sociodemographic characteristics and pattern of ADL of the participants. Spearman correlation coefficient and chi square were used to determine the relationship among variables including sociodemographic, anthropometric characteristics, data on maternity record including parity, previous birth history and number of children, CIADL and the incidence of LBP among the pregnant women at a level of 0.05.

RESULTS

Characteristics and Cumulative Activity of Daily Living of the Participants

The mean age, body mass index and waist circumference of participants was 25.61 $\pm$ 5.02 years 25.92 $\pm$ 5.37 kg/m^2 and 96.62 $\pm$ 11.36 cm respectively, while their mean hip circumference, mean waist-hip ratio and the mean CIADL were 100.93 $\pm$ 11.56 cm, 0.96 $\pm$ 0.10 and 1093.70 $\pm$ 647.05 MET-min/day respectively. All the participants were married, more than half were full time housewives (53.5%, n=166), 37.1% (n=115) had a higher level of formal education and an overwhelming majority (91.4%, n=192) had a previous history of normal virginal delivery.

Almost all the pregnant women in the present study cook (98%, n=304) while more than half of them were full time house wife. Majority of the participants (54.5%, n=169) cook, sweep and do laundry, only 8.4% (n=26) cook and sweep while very few (1.9%, n=6) engage in only sweeping in the house. A substantial number of the participants (35.2%, n=109) walk for less than 15 min in a day, and 23.9% (n=74) walk for more than an hour a day (Table 1).

Incidence and Pattern of LBP

A simple majority of the participants (52.3%, n=162) had LBP out of which 85.8% (n=139) reported pain onset during pregnancy. Only 10 (6.2%) of the pregnant women with LBP were in their first trimester, 62 (38.3%) of them were in their second trimester and 90 (55.6%) were in their third trimester. Also, the pain was reported to be aggravated by activities by 60.6% (n=97) of the pregnant women, while rest and other things aggravated the pain in 30% (n=48) and 9.4% (n=15) of the women respectively. LBP was reported to be relieved by rest by 72.8% of the women, whereas activities and others measures relieve the pain in 19.1% (n=31) and 8% (n=13) of them respectively.

Seventy nine (49.4%) pregnant women who reported LBP during pregnancies experienced pain in the night, 37.5% (n=60) reported pain experience during the day, while 13.1% (n=21) of the pregnant women felt pain in the morning. The pain experienced was reported to last for some seconds, minutes or up to some hours by only three (1.9%), 97 (60.6%) and 60 (37.5%) participants respectively. LBP was said

to be mild and moderate by two and eight women respectively in their first trimester of pregnancy and none of the women in the first trimester reported severe pain. However the highest incidence of severe LBP was reported by women in the second trimester of pregnancy (n=25) and the highest incidence of moderate LBP was by women in the third trimester of their pregnancy (n=53).

Eighty nine (55.1%) women with LBP reported having the pain at lumbar region and 73 (44.9%) at sacro-iliac region. Many (42.9%, n=69) of these pregnant women described the pain as throbbing, some described it as aching (14.9%, n=24), shooting (13.7%, n=22) or stabbing (28.6%, n=46). Ninety one (56.2%) pregnant women with LBP reported no radiation of the pain while 33.3% (n=54) reported radiation onto the thigh and 10.5% (n=17) reported radiation down to the calf muscles (Table 2).

Differences by Demographic characteristics

Low back pain tend to be frequent among those with formal education compared to those without education (χ^2=31.6, p<0.001), and also tend to occur among women with primigravid compared to those with multigravid pregnancies (χ^2=9.8, p<0.001). Civil servants tends to report LBP more than pregnant women of other occupations (χ^2=5.8, p=0.03). Pregnant women in their third trimester tend to report LBP than those in the second or first trimesters of their pregnancies (χ^2=26.7, p<0.001). Pregnant women in the second trimesters who reported LBP tend to have their pain relieved by rest than those in other trimesters (χ^2 =26.7, p=0.003). LBP in pregnant women in their first trimesters tend not to radiate to other body parts compared to pregnant women who reported pain in the second and third trimester (χ^2=11.0, p=0.04). Pregnant women with LBP who are carrying their first babies tend to report LBP more frequently when compared to those who had carried one or more pregnancies before (r= -0.18 p= 0.002).

Table 1: Characteristics and Activities of the Participants

Characteristics	n	%	Characteristics	n	%
Occupation			**House help**		
Civil Servant	70	22.6	Yes	107	34.6
Business	19	6.1	No	202	65.4
House Wife	166	53.5			
Student	55	17.7			
Formal Education			**Activities of Daily Living**		
Nil	80	25.8	Cooking	70	22.6
Primary	13	4.2	Sweeping	6	1.9
Secondary	102	32.9	Laundry	0	0
Tertiary	115	37.1	Cooking/Sweeping	26	8.4
Gestational Age			Cooking/L aundry	36	11.6
1st trimester	20	6.5	Laundry/Sweeping	3	1.0
2nd trimester	118	38.1	Cook/Swep/Laund.	169	54.5
3rd trimester	172	55.5			
Parity			**Time spent working**		
Nulliparous	98	31.6	< 1 hour	133	43.0
Multiparous	212	68.4	1-2 hours	113	36.6
History of Previous Delivery			2-3 hours	63	20.4
Virginal del ivery	192	91.4			
Caesarean section	18	8.6	**Duration of walking**		
Number of Children			<15 minutes	109	35.2
≤3	122	57.8	Up to 30 minutes	127	41.0
≥4	89	42.2	> I hour	74	23.9

Housewife = full time ho usewife ; Cook/Swep/L aund. = Cooking/Seeping/Laundry

Table 2: Incidence and Pattern of Low back pain among pregnant women

Characteristics	n	%
LBP		
Yes	162	52.3
No	148	47.7
LBP Occurrence		
Before pregnancy	23	14.2
During Pregnancy	139	85.8
Location of the pain		
Lumbar region	89	55.1
Sacro-iliac region	73	44.9
Aggravating factor		
Rest	48	30
Activities	97	60.6
Others	15	9.4
Relieving factor		
Rest	118	72.8
Activities	31	9.1
Others	13	8
Characteristics of the Pain		
Aching	24	14.9
Throbbing	69	42.9
Shooting	22	13.7
Stabbing	46	28.6
Grade of the pain		
Mild	23	14.1
Moderate	93	57.1
Severe	47	28.8
Pattern of Radiation		
No radiation	91	56.2
Radiate within the thigh	54	33.3
Radiate down the calf	17	10.5

Others in the relieving factors for the LBP include use of medication etc.

DISCUSSION

Almost the entire participant in the present study cook (98%, n=304) and more than half of them were full time house wife. This is an indication that household chores and especially cooking remain a gender specific role assigned to the cohorts of women in this study. It affirm that women staying home to raise children and not going out to work is a common practice in this part of the world.

Prevalence and characteristics of LBP

More than half of the pregnant women in the present study reported they had LBP during pregnancy, affirming the high prevalence of LBP (52.3%). This finding is comparable to 49% reported in a study by Berg *et al*[14], 51% in that of Sturesson *et al*[12] and 52.5% in that of Ayanniyi *et al.*[25] A priori, with about 14.2% of the women reporting LBP experience that started before conception, it appears more pregnancy related LBP exists in the pregnant women in the present study compared to other studies in which 20-25% of pregnant women have LBP that predates their pregnancies.[12, 30]

The present study shows a steep increase in the frequency of LBP among pregnant women in the second trimester of pregnancy compared to those in the first trimester and a modest increase in their third trimester compared to second trimester. On average, 56% increase in LBP incidence was noted among those in the third trimester compared to those in the first trimester. The steep increase in the frequency of LBP with advancing gestational period observed in the present study is at variance with that of Ostgaard and Anderson[30] who found LBP among pregnant women to increase by about 25% among women in their third trimester compared to those in the first trimester.

Pain intensity during pregnancy appears to fluctuate, with majority of the participants reporting worst pain at night. Majority (57.1%) of the pregnant women graded their pain as moderate, similar to findings in a previous study.[31,32] Our finding of higher frequency of lumber type of LBP compared to the sacroiliac type is in agreement with Ayanniyi *et al*[25] but at variance with that of Collinton.[21] This high frequency of lumbar LBP observed was more among primigravid participants compared to their multigravid counterparts who tends to report more sacroiliac LBP. The differences observed with this regard have been explained by a multi factorial interplay of hormonal sensitivity differences and previous antenatal experiences.[33]

Relationship between LBP Incidence, Anthropometric Characteristics and CIADL

Results from the present study showed that the weight of the pregnant women was tenuously but significantly related to LBP during pregnancy. This finding is at variance with those of others that disputed any relationship between weight and LBP during pregnancy.[4,5,21] Divergence between our findings and those of others may be explained by differences in methodology, and the possible differences in the physical characteristics of the subjects in the present study and others. Finding in the present study is however expected when viewed against the increase in weight experienced by the pregnant women attributable to fluid retention and weight of the fetus.[10] On the other hand, absence of any relationship between height, BMI, waist and hip circumference, waist-hip ratio and LBP, observed in the present study is consistent with the findings of previous

studies that found no association between anthropometric characteristics and LBP during pregnancy.[13,34]

Our study shows an increased severity and frequency of LBP among women in their forth to sixth months of pregnancies corresponding fairly to the time of rapid weight gain which has been determined to be between the fifth and sixth months of pregnancy.[35] Based on our findings, parallelism can be drawn between the time of increased frequency of LBP and pain severity among pregnant women in the present study, and the short time frame in which the mother's weight increases during pregnancy in an earlier study.[34]

Though in the present study, a large proportion (60.6%) of the participants reported that excessive house hold work (ADL) aggravated their LBP during pregnancies, no significant relationship between LBP and CIADL among pregnant women was observed. While this finding in the present study is in line with the results from Yip *et al,*[25] it is indirectly at variance with a previous report[16] that implicated high incidence of LBP among women that work throughout their pregnancy. Absence of any relationship between CIADL and LBP among the pregnant women in the present study indirectly affirms that physical activities and prescribed exercise has no adverse effect on symptoms during pregnancy. However unlike in a previous study in which vocational factors such as constrained work posture; prolonged periods of standing, lifting and twisting was found to be contributory to LBP,[14,18] our study assessed CIADLs rather than these other occupational factors.

The previous studies that either disputed weight as contributory to LBP during pregnancy, attributed high ADL to LBP during pregnancy or report high incidence of sacro iliac LBP were conducted in other parts of the world.[4,5,21] Findings of the present study is at variance with those previous reports but are consistent with that of Ayanniyi *et al;*[25] a study on a Nigerian population. Differences between our findings and those of others could be attributable to differences in the physical characteristics between our study populations and those of the other studies.

Limitation of the study

One limitation of the present study is the self-reported nature of some items on the questionnaire. Therefore, the reliability of the information obtained may not be ascertained as the history of LBP was self reported. Although the overall sample size in the present study may be considered reasonable and is comparable to those of previous studies[12,27] however, given that close to half of the pregnant women sampled in the present study reported LBP, some absolute but insignificant differences by subgroups of women with LBP may still be attributable to type II error.

CONCLUSION

Our study found that majority of pregnant women who attend antenatal clinic in a major regional teaching hospital center in Nigeria present with LBP. The results revealed that body weight of the pregnant women is tenuously associated with LBP, parity was tenuously but negatively associated with LBP, while performing high or low level intensity ADL at home was not associated with LBP in the cohort of pregnant women. Future large scale studies on the relationship between absolute and relative weight gain and LBP during pregnancy may elucidate the effect of

body weight on the incidence of LBP in the population of North Eastern Nigeria. The effect of general work, working posture, and psychological effect of the work and LBP in pregnancies may also be explored.

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