Prevalence of meconium stained amniotic fluid at Federal Teaching Hospital Gombe- Nigeria.

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ABSTRACT

Background: *Meconium stained amniotic fluid (MSAF) during labour has been associated with adverse perinatal outcome with increased obstetric interventions.*

Objectives: *This study sought to determine the prevalence of MSAF in 'low risk' pregnancies in labour.*

Materials and Methods: *It is a prospective observational study carried out on 'low risk' pregnant women who presented in labour at the labour ward of Federal Teaching Hospital Gombe from April 10 to July 28, 2016. The patients were recruited consecutively and observed for meconium staining of the liquor. Those with greenish or brownish discolouration of the liquor or those with clumps of meconium in background clear liquor were taken as cases. The data and socio-economic details were captured in SPPS version 20 and results analysed.*

Results: *A total of 787 deliveries took place during the study period. Two hundred and seventy five women who presented in normal labour were recruited out of which 72 meconium had stained liquor. This gave a prevalence of 26.2%. Sixty three percent of the women were between the age 21 and 30 years; 80.7% booked at our centre; 88.4% were para 4 and below and 67% presented with cervical dilatation of between 4-6 cm.*

Conclusion: *The incidence of MSAF in "low-risk" pregnancies is high. Health Workers should be at alert in detecting and instituting appropriate measures so as to minimize the possible adverse effects.*

INTRODUCTION

The purpose of obstetric practice is to achieve at the end of the delivery process a happy mother and a healthy infant. Sometimes this objective is threatened by the presence of meconium in the amniotic fluid (AF), a condition that has long been associated with adverse labour outcome. [1]

Amniotic fluid refers to the fluid in the amniotic cavity where the foetus grows and develops. It serves as a shock absorber to protect the foetus from extraneous injuries among other functions. [2] Meconium is the first sterile intestinal discharge from the foetus, it is a viscous dark green substance composed of intestinal epithelial cells, lanugo, and mucus etc.[1] Meconium is produced as early as the tenth week in-utero but is not excreted until about 34weeks when the foetal gut has started to mature[3] but this is usually in very small quantities.

Meconium has been detected in the gut of the foetus as early as the 10th week in utero.[3] But it is not seen in the AF until about the 34th week. However the mechanism of meconium passage is not known. There are three prevailing theories that have been advanced for the possible passage of meconium into the AF.[4] It has been postulated that the passage of meconium is related to the maturation of the fetal gastrointestinal tract. It had been suggested that high levels of motilins (an intestinal hormone found to increase with gestational age) may be responsible for the stimulation of bowel peristalsis.[4] It was found that levels of motilins increase with gestational age.[4]

Another theory put forward is that the passage of meconium is a pathological process. It is thought that meconium is passed from the foetal gastrointestinal tract as a response to hypoxia leading to mesenteric vasoconstriction induced gut hyper peristalsis. This result in failing umbilical venous saturation and vagal stimulation.[4, 5] A third theory proposes that it is rather a defect in meconium clearance and not increase in secretion that leads to the accumulation of meconium in the AF. This reduced foetal clearance of meconium is thought to be as a result of impaired swallowing or an unidentified placental dysfunction.[4]

The incidence of MSAF varies according to gestational age and presence of chronic diseases in the mother. But the most important factor affecting the incidence is gestational age.[1,6,7]

In the mother, MSAF can serve as a culture medium for the growth and proliferation of microorganisms leading to chorioamnionitis and subsequently puerperal infections. Apart from these, both mother and foetus are subject to increased operative interventions with its associated complications[8].

It is because of these adverse outcomes, that many clinical regulatory bodies have recommended that labour with MSAF should be managed preferably with continuous electronic foetal monitoring and a health staff capable of performing neonatal resuscitation[8,10].

The objective of the study was to determine the prevalence of MSAF in other wise "low risk" pregnancies in labour.

Materials and Methods

This was a prospective observational study conducted at the labour ward of the Department of Obstetrics and Gynaecology Federal Teaching Hospital Gombe from April 10th to July 28, 2016. Clearance was obtained from the ethics and research committee of Federal Teaching Hospital Gombe and consent obtained from the patients after confidential talk and education. The study was conducted by the researchers and residents on duty during the study.

The sample size of 247 was determined using Taylor's [11] for infinite population from a prevalence of 20.4% from a similar study conducted in Lagos [12] using 1.96 confidence interval and tolerable margin of error 5%.

Pregnant women who presented at term (gestational ages of 37 to 42 weeks) in active phase of labour (cervical dilatation 4-10cm) with spontaneous onset, carrying a live singleton foetus in cephalic presentation were recruited consecutively as they presented in to the labour ward and were screened for inclusion criteria. Those with medical or obstetrical complications i.e. Hypertension, Diabetics, Antepartum haemorrhage, etc. or having foetuses with gross congenital anomalies as well as those who did not consent to partake in the study.

The presence of meconium was detected clinically[10] by inspection of the liquor for greenish or brownish discolouration or presence of clumps of meconium in clear liquor. A light yellow tinge discolouration is considered stale meconium and not included in the study. This was based on National institute of care excellence (NICE) grading of MSAF. NICE graded MSAF into three [13], Grade 1 is when the liquor is thin or light and does not contain particulate meconium, Grade 2 is when it is greenish and thick or contains particulate meconium in a background thin or yellow base and grade 3 when the liquor is thick and scanty or described as having a "pea soup" characteristic and is usually dark green or brown. MSAF is simply classified into Thin and Thick [5], NICE grade 1 corresponds to thin MSAF while Grade 2 and 3 correspond to Thick MSAF. Those who do not have meconium present in the AF and those with thin (stale) MSAF (NICE Grade 1) were not included in the study.

The labour was managed using the NICE guidelines [13], when a woman presents in labour with spontaneously ruptured membranes vaginal examination was immediately done and the state the AF determined and recorded on the partograph. Those with intact membranes were ruptured artificially at presentation and AF was assessed for presence of meconium. For those with thick MSAF, they were immediately placed on continuous electronic foetal heart rate monitoring (Electronic FHRM) using the Cardiotocograph (CTG). A Senior Obstetrician is involved and a management plan is made. The patient and her partner were informed of the management plan and a verbal consent obtained. Blood is taken for Packed Cell Volume (PCV), grouping and cross matching and an

intravenous line set.

Where labour is delayed oxytocin for the augmentation of labour was used with caution following careful interpretation of the CTG. The Paediatrician is informed about the presence of thick MSAF and the CTG findings and invited to be present at the delivery. If at any point the foetal heart rate becomes abnormal Augmentation if initiated was stopped, patient was placed on left lateral position and given intranasal Oxygen. If the patient is still in the first stage of labour and remote from delivery the woman is delivered through emergency caesarean section. If however, the woman is at or near the second stage of labour delivery was effected by either forceps or ventouse as appropriate.

Patients that do not show any foetal heart rate abnormalities were monitored closely till the second stage is reached. The paediatrician and a trained midwife were present at the delivery. The delivery is completed in the usual way and the baby immediately handed over to the paediatrician.

Any time a labour develops NICE MSAF grade 2 or 3 (Thick MSAF) in first stage of labour (Cervical dilatation of 4-10) it was recorded as positive findings on a prepared proforma.

Results

There were a total of 787 deliveries during the study period. Two hundred and seventy five (275) women fulfilled the admission criteria and were included in the study. Out of these 72 women were detected to have significant MSAF. This gives a prevalence rate of 26.2%. Sixty three % of the women were between the age 21 and 30 years, 80.7% booked at our centre, 88.4% were para 4 and below and 67% presented with cervical dilatation between 4-6 cm (Table 1&2).

Table 1: Age, educational level, marital status, booking status, and parity.

Variable		Frequency	Percentage
Age	16 - 20	39	14.2%
	21 - 25	91	33.1%
	26 - 30	83	30.2%
	31 - 35	42	15.3%
	36 - 40	14	5.1%
	≤ 41	6	2.2%
	Total	275	100%
Educational level	Nil	11	4.0%
	Primary	48	17.5%
	Secondary	114	41.5%
	Tertiary	101	36.7%
	Others	1	0.4%
	Total	275	100%
Marital status	Single	2	0.7%
	Married	272	98.9%
	Divorced	0	0.0%
	Widowed	1	0.4%
	Total	275	100%
Booking status	Booked	222	80.7%
	Unbooked	53	19.3%
	Total	275	100%

Table 2, Parity, Cervical, dilatation, state of foetal membranes and babies' sex.

Parity	0	60	21.8%
	1 - 2	114	41.5%
	3 - 4	69	25.1%
	5 - 6	19	6.9%
	7 - 8	12	4.4%
	≤ 9	1	0.4%
	Total	**275**	**100%**
Cervical dilatation	4 - 6	186	67.6%
	7 - 8	53	19.3%
	≤ 9	36	13.1%
	Total	**275**	**100%**
Fetal membrane	Intact	201	73.1%
	Ruptured	74	26.9%
	Total	**275**	**100%**
Sex	Male	140	50.9%
	Female	135	49.1%
	Total	**275**	**100%**

Discussion

In our study, we found the prevalence rate of 26.2% of

significant MSAF which was quite high considering our study was on 'low-risk 'group. The incidence varies from 5.5 to 20% depending on the selection criteria.[5,6,11] Meena et.al.[5] also used low risk pregnancies but included grade NICE grade 1 but got a lower prevalence of 11.77%.

We decided to restrict our study to Thick MSAF because it has been shown that thin MSAF (NICE Grade 1) has no significant adverse labour outcome compared with clear AF [14,9,23]. Narang et. al. [9] also using prospective study found prevalence of 7.48% but used all deliveries after 36 weeks. In Lagos [11] a prevalence of 20.4% was reported but selection criteria included all deliveries and all grades of MSAF.

However our subjects were followed carefully throughout labour to detect MSAF, some of the studies were retrospective [5,] and some included preterm labour where the incidence is known to be very low[5, 11, 14]. Moreover the detection of MSAF was clinical, as there are no biochemical methods of its diagnosis [10] which may be subject to observer bias hence diagnosis of thin (stale) meconium may present challenges. Concentrating on thick meconium (NICE Grade 1 and 2) which is easily identified and combining NICE Grade 1 and 2 is a more objective way of identification.

The high incidence of MSAF in low risk pregnancies could translate to poor perinatal outcome considering that approximately 5% with MSAF will develop Meconium Aspiration Syndrome which has a case fatality rate of up to 40%[4].

It is recommended that labour complicated with passage of meconium should be managed by persons trained in neonatal resuscitation [15, 16]. 'High risk' labour is usually referred to tertiary centres while the low risks are managed at primary health centres. Reports from Dahanu-India showed that improvement in neonatal resuscitation decreased still birth rates.[17]

Conclusion and Recommendation

MSAF is a common condition encountered in otherwise 'normal labour' with a potential for serious adverse outcomes. Health workers managing labour should be alert to its presence and give it the necessary seriousness it deserves.

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Conflict of interest

The authors declare no conflict of interest.

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