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Preterm Birth and Associated Factors at Al-Sadaqa Teaching Hospital, Aden-Yemen

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Abstract

Introduction: Preterm birth (PTB) complications is a leading cause of neonatal death, with neonatal sepsis and birth asphyxia. The objective of this study was to determine frequency and factors associated with PTB.

Methods: A retrospective descriptive study was conducted in Al-Sadaqa Teaching Hospital, during the period January 1st to December 31st 2014. Data were available on admissions from the medical records extracted from the hospital Statistics Department and analyzed by SPSS.

Results: In the study period, 2869 births were recorded. Of them, 229 births were preterm (8%) with 50.3% males and 49.7% females. Extremely PTB was 60% of very low birth weight compared with 2.9% of moderate PTB with a statistically significant difference. Preterm deliveries encountered more among mothers with < 4 gravidity (69.9%) and mothers with no antenatal care (66.8%). Preterm delivery occurs in 52.4% as idiopathic without known cause.

Conclusion: PTB constituted 8% of all deliveries. The study concluded the importance of conducting epidemiological studies to aid in the prevention of preterm birth by determining risk factors that may be amenable to control on a population basis and by identifying high risk groups that can be targeted by clinical services. Encouraging focused antenatal care specially for high risk pregnancies and proper utilization of maternal and child health services is also highly recommended.

Keywords: Premature, birth weight, Maternal Factors, Maternity Hospital, Aden-Yemen.

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الولادة المبكرة والعوامل المرتبطة بها في مستشفى الصداقة التعليمي عدن-اليمن

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ملخص الدراسة

المقدمة: الولادة المبكرة هي سبب رئيسي لوفاة الاطفال حديثي الولادة، والسبب هو تسمم حديثي الولادة والاختناق عند الولادة. هدفت الدراسة تحديد التكرار والعوامل المرتبطة بالولادة المبكرة.

المنهجية: أجريت دراسة استرجاعية لجميع الحوامل اللاتي تمت ولادتهن في قسم الوضع بمستشفى الصداقة التعليمي، خلال الفترة من الأول من يناير الي 31 ديسمبر 2014. تشمل البيانات المستخرجة من الملفات السريرية اثناء فترة الولادة والمستخرجة من قسم الاحصاء بالمستشفى باستخدام برنامج SPSS.

النتائج: خلال فترة الدراسة تم تسجيل 2869 ولادة من بينهن 229 ولادة خدج (8%) بواقع 50.3% ذكور و49.7% إناث.حدثت الولادة المبكرة للغاية لـ60.0% من المواليد ذو الوزن المنخفض جدًا مقارنة بـ 2.9% من الولادات متوسطة التبكير وهي نتيجة ذات دلاله إحصائية. كانت الولادة المبكرة أكثر بين الأمهات اللاتي لديهن أقل من 4 ولادات (69.9%) والأمهات اللاتي لم يتلقين رعاية ما قبل الولادة (66.8%). وقد حدثت الولادة المبكرة في 52.4% بدون سبب واضح.

الاستنتاج: حدثت الولادات المبكرة في 8% من مجموع الولادات. خلصت الدراسة إلى أهمية إجراء الدراسات الوبائية للمساعدة في الوقاية من الولادة المبكرة من خلال تحديد عوامل الاختطار المجتمعية التي قد تكون قابلة للسيطرة وتحديد الفئات المعرضة للخطر والتي يمكن استهدافها من قبل الخدمات السريرية. كما يوصى بشدة بتشجيع الرعاية المركزة قبل الولادة خاصة لحالات الحمل عالية الخطورة والاستخدام السليم لخدمات صحة الأم والطفل.

الكلمات المفتاحية: الولادة المبكرة، الوزن عند الولادة، عوامل الولادة، مستشفى الولادة، عدن - اليمن.

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Introduction

Globally, World Health Organization (WHO) estimated 135 million live births in 2010, with 15 million of them were born too early (11.1%). Over 60% of preterm births (PTB) occurred in sub-Saharan Africa and South Asia [1]. Prematurity is a major health problem because it is a leading cause of neonatal mortality [2].

Premature birth accounts for 3.1% of the global burden of diseases [3] causing 35% of the 1.3 million annual deaths of babies in the world [4]. After pneumonia, it is the second most common cause of death in children under 5 years [4,5]. Prematurity is defined as gestational age less than 37 completed weeks of gestation measured from the first day of a woman's last menstrual period according to the WHO definition [6]. The etiology of prematurity is not clearly known but many obstetric factors may share in this problem including grand multiparity, multiple pregnancy, polyhydramnios, uterine malformation, placenta previa, incompetent cervix, premature rupture of membrane and amnionitis [2].

Based on gestational age groups, preterm delivery is classified into extremely preterm (less than 28 weeks), very preterm (28 to 32 weeks) and moderate preterm (32 to less than 37 weeks) [7]. PTB is a global problem with prevalence ranging between 5 and 18% across 184 countries[8]. Prematurity has been, and still is, one of the major causes of neonatal morbidity and mortality in intensive care units (ICUs) worldwide. It is considered the second leading cause of neonatal mortality after congenital anomalies, and a major determinant of neonatal and infant morbidity [9].

Immediate survival is expected with a significant proportion of short to long-term morbidity. Extremely preterm (less than 5% of all PTB) where early neonatal mortality is high with up to 50% of severe handicaps occurring among survivors born below 26 weeks [10]. It is associated with long term adverse health effects e.g. visual and hearing impairments, neurodevelopmental and behavioral effects, as well as family, economic and societal effects [11]. Despite the increased accessibility and improved standards of prenatal care in most countries, the incidence of PTB has continued to rise over the past two decades in some nations [12]. Late PTB (at 34–36 weeks of gestation) is still the most common type, accounting for up to 72% of all PTB in the USA in 2012 [13]. The greatest risk of mortality is in 24 hours after birth. In premature babies, mortality is 40 times more and in low birth weight (LBW) is 200 times more than neonates with normal weight [14].

The birth weight of an infant is the first weight recorded after birth, ideally measured within the first hours after birth, before significant postnatal weight loss has occurred. LBW is defined as a birth weight of less than 2500 g (up to and including 2499 g), as per the WHO [15]. This definition of LBW has been in existence for many decades. In 1976, the 29th World Health Assembly agreed on the currently used definition. Prior to this, the definition of LBW was '2500 g or less'. LBW is further categorized into very PTB (VLBW, <1500 g) and extremely

PTB (ELBW, <1000 g). LBW is a result of PTB, short gestation or intrauterine growth restriction (IUGR, also known as fetal growth restriction), or both [16].

Many countries have reported increased PTB rates over the past two decades [17] and this general trend was confirmed by an WHO global survey [12]. There are many reasons to expect PTB rates to rise. One reason is increasing multiple pregnancy rates, associated with the use of subfertility treatments and later maternal age at childbirth [18,19]. The PTB rate for multiples is 40–60%, compared with 5–10% for singletons [20]. Second, the survival of very preterm infants has improved markedly over recent decades because of medical advances in neonatal care, such as antenatal corticosteroids and surfactants [11].

There is scarcity in data regarding PTB in Yemen. Therefore, the present study aimed to determine the frequency of PTB and associated factors among preterm deliveries in Al-Sadaqa Teaching Hospital.

Methods

A retrospective descriptive study was conducted in Al-Sadaqa Teaching Hospital, the major referral maternity public hospital in Aden, Yemen during the period January 1st to December 31st 2014. The medical records of all mothers admitted to the labor room of maternal department during this period were reviewed. The demographic data and clinical details were recorded including age of mother, address, antenatal visits, history of previous abortion, gestational age, birth weight, number of deliveries, type of delivery, maternal health and gender of new born. Gestational age and birth weight were the dependent variables. Gestational age is classified as (1) extremely PTB: < 28 weeks; (2) very preterm: 28-32 weeks, (3) moderate preterm <32-<37 weeks. Birth weight was classified to very LBW < 1500 gram, LBW from1500 gram to less than 2500gram and normal weight from 2500+ gram [21]. Death was recorded during the first hours that newborn stay in the maternal side for resuscitation or delivered already died. Data were analyzed using SPSS (Statistical Package for Social Sciences version 20). Besides descriptive calculations (frequencies, mean and standard deviation), the Chi –squared test was performed for evaluation of qualitative data. Statistical significance level was established as p value $\leq$ 0.05. Permission to perform the study was obtained from the administrative office in Al-Sadaqa Hospital.

Results

The total number of PTB was 229 or 8% of total 2869 newborn delivered at the maternal department. Males were 50.3% compared to 49.7% females. The mean gestational age of PTB was 32.6±3.9 weeks, with a mean birth weight of 2.3±0.7 kg. Table 1 shows that there were 11.8% extremely PTB, 29.7% very PTB, and 58.5% moderate PTB. While those with birth weight <1500 gram was mostly either extremely PTB (60.0%) or very PTB (37.1%); 87.7% of those with ≥2500 birth weight were of moderate PTB with a statistically significance difference.

Table 1: Birth Weight by the Type of PTB

Birth weight (gram)	Type of PTB								*p*
	Extremely PTB		Very PTB		Moderate PTB		Total		
	No.	%	No.	%	No.	%	No.	%	
< 1500	21	60.0	13	37.1	1	2.9	35	15.3	
1500-<2500	6	8.3	40	55.6	26	36.1	72	31.4	<0.001
≥2500	0	0.0	15	12.3	107	87.7	122	46.7	
Total	27	11.8*	68	29.7*	134	58.5 *	229	100.0	

** Percentage was taken from the total 229.*

The mean age of mothers at time of birth was 26.0±7 years. Table 2 shows more moderate PTB among mothers aged 18–34 years (61.0%) compared to mothers younger than 18 years (45.5%) and those more than 35 years (59.5%). Mothers from governorates other than Aden had more very PTB (41.2%) and extremely PTB (13.7%) compared to their counterparts from Aden. Mothers with no antenatal care had more very PTB (30.7%) and extremely PTB (14.4%) compared to mothers with antenatal visits. Extremely PTB and moderate PTB were encountered more among mothers with previous history of abortion (13.3% and 60.0% respectively) compared with those without history. Mothers with ≥ 4 gravidity had less extremely PTB (8.7%) relative to those with <4 gravidity (13.1%). Extremely PTB was presented more by breech delivery (14.3%) compared to those with normal delivery (11.7%). A lower percentage of moderate PTB (56.7%) was reported in women having no diseases compared with those having disease (60.6%). However, all differences were statistically insignificant.

Table 2: Maternal Features by the Type of PTB (n=229)

Maternal features	Type of PTB								*p*
	Extremely PTB		Very PTB		Moderate PTB		Total		
	No.	%	No.	%	No.	%	No.	%	
Age (years)									
<18	7	21.2	11	33.3	15	45.5	33	14.4	
18-34	12	7.8	48	31.2	94	61.0	154	67.2	0.066
35+	8	19.0	9	21.4	25	59.5	42	18.3	
Residency									
Aden	20	11.2	47	26.4	111	62.4	178	77.7	0.076
Other governorates	7	13.7	21	41.2	23	45.1	51	22.3	
Antenatal visit									
No visits	22	14.4	47	30.0	84	54.9	153	66.8	0.148
Any visits	5	6.6	21	27.6	50	65.8	76	33.2	
History of previous abortion									
Yes	6	13.3	12	26.7	27	60.0	45	19.7	0.858
No	21	11.4	55	30.4	107	58.2	184	80.3	
Gravidity									
< 4	21	13.1	47	29.4	92	57.5	160	69.9	0.633
≥ 4	6	8.7	21	30.4	42	60.9	69	30.1	
Type of delivery									
Normal	26	11.7	66	29.7	130	58.6	222	96.9	0.978
Breech	1	14.3	2	28.6	4	57.1	7	3.1	
Maternal diseases									
Not having disease	14	11.7	38	31.7	68	56.7	120	52.4	0.786
Having disease	13	11.9	30	27.5	66	60.6	109	47.6	

Among preterm deliveries; 90.8% were deliveries alive whereas 9.2% delivered already died or died during the first hours of stays in the hospital as illustrated in Table 3. The table also shows that the highest percentage of alive newborns were moderate PTB (63.5%) whereas the highest percentage of newborns who died where extremely PTB (57.1%) with a statistically insignificant difference.

Table 3: Outcome by the Type of PTB (n=229)

Outcome	Type of PTB								*p*
	Extremely PTB		Very PTB		Moderate PTB		Total		
	No.	%	No.	%	No.	%	No.	%	
Alive	15	7.2	61	29.3	132	63.5	208	90.8	<0.001
Died	12	57.1	7	33.3	2	9.5	21	9.2	

Discussion

Most of developing countries lack reliable data on the prevalence of PTB [9]. The problem of PTB is a multidimensional public health concern affecting not only maternal and child health but also reflects on the society. Preterm delivery is the chief problem in the obstetrics today, approximately 10% of all births are preterm [21]. Despite medical advances in the diagnosis and treatment of diseases, premature births are still a global problem in developed and developing countries [22]. This study sought to determine the frequency of PTB in Al-Sadaqa Teaching Hospital and to identify the most common possible associated maternal factors. In particular, it satisfied the need to obtain an updated estimate of its prevalence in Aden city. The prevalence of PTB in the recorded deliveries of this study was 8%. This is in agreement with a study done in King Fahad Hospital 8.2%[23]. Furthermore, 50.3% of the preterm infants were males, which is consistent with Cairo study [21]. The cause of male predominance is not yet completely explained, but it could be related to the fetal sex hormone effect that influences the labor-inducing deliveries [24].

The study findings of distribution of PTI by gestational age is higher than what was reported from Malawi; with extremely PTB of 11.8% versus 9.2% and very PTB of 29.7% versus 20.1% respectively [24]. This could be explained by the fact that our hospital is a referral hospital for all risky pregnancies from all districts of Aden city and adjacent governorates. The current study did not show any association between most maternal features and PTB. Maternal age 18-34 years appeared to have 67.2% of PTB. This is unexpected and higher than findings from Malawi [24], Zimbabwe [25], Nigeria [26,27].
In the present study, most of preterm came from Aden city, because Al-Sadaqa Hospital is the only referral hospital for all Aden Governorate.

The current study demonstrated that mothers with a parity of <4 were more likely to deliver prematurely (69.9%). This finding is not similar to the study done in India which had

shown that multiparous women were more likely to deliver preterm (47.5%) [28]. High parity is likely to increase the risk of PTB due to uterine changes such as myometrial stretching from previous pregnancies. The mothers with <4 parity may also have had a bad obstetric history which may be due to unidentified factors that may persist in subsequent pregnancies. History of previous abortion was not associated with preterm birth and this was not similar to the findings of other study done in Kenyatta national hospital [8]. On the other hand; mothers who sought antenatal care experienced less PTB (33.2%) as compared to the mothers who never sought antenatal care (66.8%) which was higher than the results of study done in Nigeria (58.4%) [27].

In the present study, 47.6% of mothers with maternal diseases such as premature rapture of membrane, urinary tract infection, pre-eclampsia, eclampsia and anemia had delivery preterm which is similar to study done in Kenyatta national hospital [8]. On the other hand, maternal morbidity, especially anemia was associated with the development of PTBs because it interferes with intra-uterine fetal growth. The same result may be obtained if blood supply of the fetus was interfered with by any cause as hemorrhage or hypertension [8].

The findings of the present study revealed that 90.8% PTB survived to discharge from the hospital during short period of staying in the hospital which is almost similar to study done in Eastern region of Saudi Arabia 92.4% [20].

The study has subjected to some limitations. The primary data source was the medical records of mothers. As the duration of admission was some times less than one day, some preterm babies stay in the hospital less than 24 hours and discharge without follow up for outcome.

Conclusion

The study found PTB frequency at 8% of all deliveries. It concluded the importance of conducting epidemiological studies to aid in the prevention of preterm birth by determining risk factors that may be amenable to control on a population basis and by identifying high risk groups that can be targeted by clinical services. Encouraging focused antenatal care specially for high risk pregnancies and proper utilization of maternal and child health services is also highly recommended.

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