

# Prevalence and risk factors of preterm births in the National Ribat University Teaching Hospital, North Sudan, January to April 2012

## Abstract

Although major advances have been made in both obstetric care of the high-risk patient and in neonatal care, prematurity and its consequences remains the major contributor to perinatal mortality and the purpose of the study was to measure the prevalence of preterm births in the National Ribat University Teaching Hospital from January to April 2012. Premature birth is defined as birth before the 37th week of gestation. The study done was descriptive a case-series hospital based, the study conducted 74 ladies who gave birth to preterm births in the NRUTH by using data collection forms filled from the hospital records during the mentioned period.

The study showed that the percentage of preterm births in the period mentioned was 4.7% of all births, the majority where product of spontaneous preterm vaginal births, from which 88% were born between 34 and 36 weeks of gestation, major risk factor was found to be pregnancy - induced hypertension and its complications and gestational - diabetes mellitus and its complications. In conclusion, the prevalence of the Preterm Births in the NRUTH was found to be high compared to a study made in the Maternity Hospital in Sudan. It is recommended that more researches including a cross-sectional study or cohort study to be done to identify preventable causes of preterm births and the long term complications of it and lower the burden on families and health facilities.

**Keywords:** prevalence, risk factors, preterm births, National Ribat University Teaching Hospital

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**Abbreviations:** NRUTH, National Ribat University Teaching Hospital; ANC, antenatal care; BMI, body mass index; BP, blood pressure; C/S, caesarean section; DM, diabetes mellitus; ERB, ethical research board; GDM, gestational diabetes mellitus; HTN, Hypertension; PG, Primigravida; PID, pelvic inflammatory disease; PIH, pregnancy induced hypertension; PPRM, preterm premature rupture of membranes; PROM, premature rupture of membranes; PTB, preterm births; BG, blood glucose; USA, United States of America; UTI, urinary tract infections; VD, vaginal delivery

## Introduction

Preterm deliveries are those that occur at less than 37 weeks gestational age; however, the low-gestational age cutoff, or that used to distinguish preterm birth from spontaneous abortion, varies by location.<sup>1</sup> The preterm birth rate has risen in most industrialized countries, despite advancing knowledge of risk factors and mechanisms related to preterm labour, and the introduction of many public health and medical interventions designed to reduce preterm birth.<sup>2</sup>

Preterm births account for 75% of perinatal mortality and more than half the long-term morbidity world-wide.<sup>1,3,4</sup> In Sudan according to a 3 month research which was done in Omdurman maternity hospital it was found that among 3240 live birth at maternity hospital during the 3 months period of the study, 126 (3.8%) were a live preterm birth. About 99 live preterm births at a mean (SD) of 32.7 (2.2) gestational weeks were included in the final analyses. About 80 (81.0%) of these 99 preterm births were spontaneous preterm births and the rest 19 (19.0%) were medically indicated preterm births.<sup>5</sup> Although most preterm babies survive, they are at increased risk of

neurodevelopmental impairments and respiratory<sup>6</sup> and gastrointestinal complications.<sup>5</sup> Few studies about the prevalence of premature births was done in Sudan and incidence of premature births is increasing everywhere around the world and people are starting to look for the etiology behind it to try to prevent prematurity and its complication which include the short and long term complications which increase the health and financial burden on both the country and the community because of the increased needs of the incubators which are considered expensive especially in countries with no health insurance to cover the stay of a preterm baby.

There may be many preventable causes of premature births that could be used by the pregnant lady or provided by the health provider during pregnancy to prevent premature deliveries that are unknown yet. There was no previous researches that was found to be done in the NRUTH, Sudan and few studies was done in Sudan overall to know the real prevalence of preterm births in Sudan and much fewer were published world-wide to enable researchers to investigate and know more about the risk factors in Sudan contributing to preterm births, that is why this thesis was conducted. The general objective behind the study was to study the prevalence and risk factors of PTB's in the NRUTH. Specific objectives were to measure the prevalence of PTB in NRUTH, to identify the risk factors of PTB in NRUTH, to generate hypothesis regarding the association between demographic factors and PTB's and association between PTB's and chronic diseases.

## Materials and methods

The study design was a case-series hospital based study done from hospital records of NRUTH in which the total number of all deliveries was known, then records of those who delivered prematurely was further examined.

NRUTH is one of the leading teaching hospitals in the Sudan that is located in Khartoum State-Khartoum/Burri. The hospital was made initially for providing health care and services for policemen who were retired and those who still work in police. Later it grew up to receive patients from all over Sudan. The hospital is rated as one of the best in Khartoum state as it includes all major medical departments and higher specializations like neurosurgery and pediatric surgery. Most of the consultants working in the hospital are broadly recognized.

Study population was from hospital records of all women who delivered in the NRUTH from January to April 2012. The study included all the PTB's in that period and excluded all the miscarriages and term deliveries. The population coverage under the study was 1553 women, those who gave birth to PTB's where 74 women. Data was collected from hospital records using data collection forms; there is a good quality control by the Statistic Department for the hospital records. Data processing and analysis was computerized using SPSS ver. 16.0.

Ethical approval was taken from the university ethical research board (ERB) and the hospital administration. Consent was taken from the Head department of Statistics in NRUTH, name of patients were not taken but symbolized by numbers instead to guarantee confidentiality. Variables under the study were divided in to demographic, obstetric and medical variables. Demographic included age and occupation, while obstetric variables included GA at delivery, number of live births and miscarriages, type of delivery, type of vaginal delivery and causes of induction, type of C/S and its indication, presence of complications during pregnancy, ANC, Family history of PTB. Medical variables included presence of a chronic disease and social bad habits.

## Results and discussion

According to the research it was found that the prevalence of PTB's in the NRUTH is 4.7% (Figure 1), when comparing this result to the results elicited by a research done in the Omdurman maternity hospital about the prevalence of PTB's (3.8%)<sup>5</sup> it may be considered high, this result maybe reflected to many causes 1st of which is the good quality control of the Statistic Department in the NRUTH, 2nd is that in the NRUTH there is health insurance for all policemen and their families which make it easier for people to come to the hospital for the sake of an incubator which most non-insured patients will not afford, 3rd it is also possible that Omdurman Maternity Hospital is more representative to the general population. The overall prevalence of PTB in these two researches done in North Sudan is much lower than the results obtained from developed countries as the frequency of preterm births is about 12-13% in the USA and 5-9% in many other developed countries<sup>2</sup> and this could be reflected to the educational level of the people in developing countries, as many deliveries occur at home and many of the preterm births are unrecognized. This percentage of PTB's is considered high when looking at the short and long term complications of PTB's to the infant born, his/her parents and to the health system of the country.

Concerning the age of the pregnant ladies who gave to PTB's, 54% of those who gave birth to PTB's aged between 26-35, although the mean age of marriage in the Sudan is relatively lower than the rest of the world, 27% where 18-25 years old and 19% where between 36 and 45 years. There is insufficient evidence to determine if older maternal age is an independent and direct risk factor for preterm birth and small for gestational age birth.<sup>7</sup>

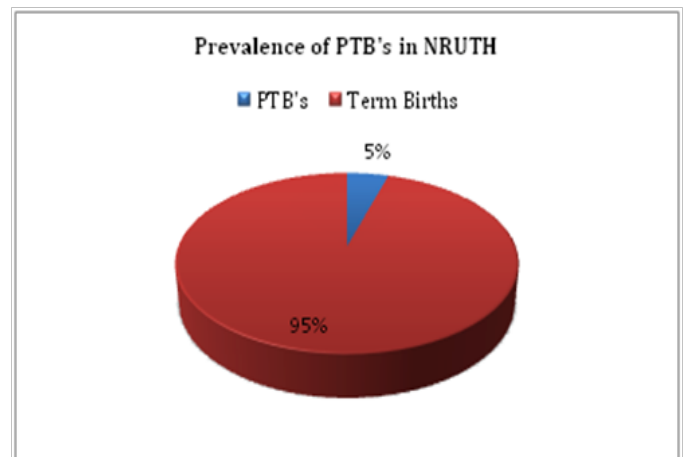


Figure 1 The prevalence of PTB's in the NRUTH.

It was found that 35% of those who had PTB's had at least one miscarriage before which was considered as a risk factor for PTB by the research done in Omdurman Maternity Hospital.<sup>5</sup> According to a research published in journal of reproductive medicine, Induced and spontaneous abortion are associated with similarly increased Odd Ratio's for preterm birth in subsequent pregnancies, and they vary inversely with the baseline preterm birth rate, explaining some of the variability among studies<sup>8</sup> premature, birth, labor, delivery, abortion, induced abortion, miscarriage and spontaneous abortion. Only studies that met prespecified objective criteria for methodologic design and reporting were included in the meta-analyses.

## Results

Twelve induced and 9 spontaneous abortion studies met inclusion criteria. Common adjusted odds ratios (ORs. 24% of those PTB's where delivered vaginally, 89% of which were spontaneous PTB's while the rest were induced PTB's. 76% where product of Caesarean section from which 50% were planned C/S and same number was emergency C/S, the most common cause which was found as an indication of preterm C/S was Preeclampsia and Eclampsia with percentage of 38% of all C/S done to PTB's, this indicate that Hypertensive disorders in pregnancy is one of the most important risk factors for PTB's and it is expected that if an adequate treatment is found there will be a dramatic drop in the incidence of PTB's all around the world.<sup>9,10</sup>

35% of all women who had PTB had one or more complications that occurred during that pregnancy most of which were GDM (31%) and PIH (31%) which lead to babies born prematurely, again this proves that hypertensive disorders along with GDM form important risk factors for PTB's and according to a previous research done by the American Diabetes Association it was found that HbA1c > or =7% at delivery was associated with spontaneous preterm delivery and because poor glycemic control was a risk factor for spontaneous and indicated preterm births, part of preterm delivery might be preventable.<sup>11</sup> Another research published by the American journal of obstetrics and gynecology found that the overall rates of preterm delivery were significantly higher among women with diabetes mellitus (38%) and hypertension (33.1%) than among control women (13.9%). Rates were also significantly higher for delivery at <35 weeks' gestation. Women with diabetes mellitus had significantly higher rates of both indicated preterm delivery and spontaneous

preterm delivery than did women in the control group. In addition, they had significantly higher rates of both indicated preterm delivery and spontaneous preterm delivery at <35 weeks' gestation than did control women. Compared with control women those with chronic hypertension had higher rates of indicated preterm delivery at both <37 weeks' gestation and at <35 weeks' gestation but there were no differences in rates of spontaneous preterm delivery.<sup>12</sup> Although a genitourinary infection was found to be a cause of preterm according to a research published earlier it was not found to be a leading risk factor of PTB as GDM and PIH in this research as it complicated only 8% of the PTB's.

## Conclusion

In conclusion the incidence of PTB's in the NRUTH in period between January to April 2012 was found to be 4.7 % and it is expected that if health awareness is improved among the population this percentage will rise and the true incidence of preterm births will be known.

The major risk factors that was found to be associated with PTB's in the NRUTH are hypertensive disorders and diabetes mellitus, were it is expected that if a strict control on each one is done the incidence of PTB's will drop and this will only happen with good patient - doctor relationship and continuous health education and good antenatal care for those high - risk patients.

It is recommended that further studies as cross-sectional or cohort study to be done in the same hospital to find more about the risk factors mentioned and to find the relationship between good BP and BG control by measuring HbA1c at time of delivery in patients with diabetes mellitus and the incidence of PTB's.

Education and training about the recognition and management of preterm labor and care for preterm live births should be promoted for both patient and their care-givers in order to minimize long - term complications associated with preterm births.

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## Limitations

The research was conducted from hospital records which are currently filled with the house-officers of each department who are less skilled and experienced than seniors and some important information's in the history might have been missed. The research was only funded by the author, limiting the access to some valuable and important investigations and various settings.

## Conflict of interest

The authors declare that there is no conflict of interest.

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