

Original article

# Using Web-Based Questionnaires for Collecting Data on Risk Factors of Preterm Birth in Tripoli hospitals, Libya

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## ABSTRACT

**Background and aims.** Preterm birth is a leading cause of perinatal mortality and long-term morbidity as well as the long-term health consequences and cognitive outcomes. This study aimed to evaluate the risk factors and consequences of preterm birth. **Methods.** A prospective cross sectional study was conducted from July 2021 to October 2021, By using an E-Questionnaire (Web-based questionnaire). Participants have access to the Web-based questionnaire through a website link created specifically for the nationwide study. **Results.** A total of 101 cases from Tripoli University Hospital and Tripoli Central Hospital included in this study. Most of the preterm births were observed in the age group between 21 - 30 years old and their weights ranged between 60kg - 79kg. The current study showed stress at 64% ( $p = 0.003$ ), working/standing for a long time at 61% ( $p = 0.021$ ), and exposure to pollutants at 94% ( $p = 0.000$ ) to be the most significant risk factor in preterm birth. Other factors such as: social support at 54% ( $p = 0.489$ ) and uterine contractions at 58.4% ( $p = 0.091$ ). **Conclusion.** Based on results, the study suggests prompt identification of all risk factors associated with preterm birth to apply immediate and appropriate specific interventions. Data from these studies provide a foundation and direction for future research in the area of racial disparity and indicated that some factors may not cause preterm birth.

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## INTRODUCTION

Preterm birth (PTB) is one of the most important problems in medicine today with an alarming frequency and economic impact [1]. Premature birth is when a baby is born too early, between 24 weeks and 37 weeks of pregnancy. World Health Organization (WHO) defines preterm birth (PTB) after 24 weeks and before 37 weeks' gestational age or before 259 days from the first day of a woman's last menstruation [2].

By the end of gestation, uterine contractility increases and reacts to excitatory mediators to eventually reach a state in which it forcefully ejects the fetus and other products of conception. Labor reaches when contractions of different areas of the uterine wall become stronger, more frequent and synchronous [3, 4]. Medically, PTB defines as regular uterine contractions and cervical changes (cervical dilatation  $\geq 2$  cm) that start before 37 weeks of gestation [5]. Most mortality and morbidity affect very preterm infants before 32 weeks' gestation, and especially "extremely preterm" infants before 28 weeks of gestation [6].

Yearly, there are 15 million (11.1%) preterm births of all births worldwide, and 13.3% of these births occur in South Asia alone [7]. Japan is recognized to have a comparatively low preterm birth rate compared to other nations, likely because of the frequent prenatal checkups provided by local governments in Japan [8]. But during the past few decades, the number of premature singletons born in Japan has grown [9,10], with an increase in cesarean section delivery rates cited as a contributing factor [10, 11]. In the USA, the preterm delivery rate is 12–13%; in Europe and other developed countries, reported rates are generally 5–9%. Preterm labor in the USA rate increasing from 9-5% in 1981 to 12- 7% in 2005 while Preterm birth rates declined from 2007 to 2014 [12]. The etiology of preterm birth has been linked to maternal infection through an inflammatory response inside the uterus [13]. Among the most widespread STIs in the

globe are chlamydia, gonorrhea, and syphilis. The frequency of chlamydia, gonorrhea, and syphilis has been rising nationally in the general population from 2013 through 2018 in the US, in line with the rising trends in preterm birth, according to surveillance statistics from the Centers for Disease Control and Prevention (CDC) [14].

Preterm birth rates for African-American women (14.8%) in 2021 were almost 50% higher than those among white or Hispanic women (9.5% and 10.2%, respectively) [15].

According to its clinical presentation, PTB has been categorized into spontaneous preterm labor (almost 50%) which refers to unplanned delivery before the 37th week of pregnancy. This type of preterm birth can result from infection or inflammation, while the cause of this labor usually unknown. Medically induced (delivery due to maternal or fetal complications) (20%) is a serious medical condition—such as preeclampsia exists. In this case, the healthcare provider might recommend a preterm delivery and healthcare providers often take steps to keep the baby in the womb as long as possible to permit additional growth and development, while also monitoring the mother and fetus for health issues. In addition, rupture of the membranes affects about (30%) [16, 17]. Researches indicate that even babies born at 39 weeks of pregnancy or later. Therefore, unless there are medical problems, healthcare providers should wait until at least 39 weeks of pregnancy to induce labor or perform a cesarean delivery to prevent possible health problems [18].

Today, PTB is a syndrome that is located in many mechanisms including activate infection, inflammation, utero-placental circulation failure, bleeding, stress, and other medical and environmental mechanisms. It is also greatly influenced by the economic level of the country in which the pregnant woman lives, such as young and elderly pregnancy, diet, and low educational background. In addition to lifestyle and daily life, including smoking, drug addiction, housing environment, hard labor, and stress. Determination of risk factors for the prediction of premature birth is important for many of the epidemiologic factors. The purpose of this study was to evaluate the incidence of PTB and its contributing factors among babies delivered in University Tripoli Hospital and Tripoli Central Hospital.

## METHODS

### *Study design and data collection*

A prospective cross sectional study was conducted from July to October 2021. A total of cases included in the current study was 101 cases with a preterm birth and were delivered at the University Tripoli Hospital and Tripoli Central Hospital. The study reveals the most factors that appear with premature birth cases.

By using an E-Questionnaire created by Google Forms which has been distributed online to women who lives in Tripoli and had delivered at these two hospitals. The questionnaire was divided into three sections; each section consists of a number of questions. The first section included general information (age and weight), the second section questions related to the patient's environment, and the third section included questions related to the patient's medical history.

### *Statistical analysis*

Data were entered and analyzed by Microsoft Excel software version 2019 and IBM SPSS Statistics 26. Data were presented as frequency and percentage were used. Factor appearance proportion was tested using a One-Sample t Test of Proportions to obtain probability  $p < 0.05$ .

### *Ethical clearance*

The study was ethically cleared and approved with a supporting letter from the Medical Technology Research Team at the University of Tripoli/ Faculty of Medical Technology. Data were collected after getting approval using a web-based survey. All participants included in this study was voluntary based. Data confidentiality was kept through avoiding personal identifiers and anonymity of personal data records.

## RESULTS

A total of 101 women were filled an E-Questionnaire. As shown in table 1, most of cases ranged between 21 and 30 years of age (29.7%) and age group of 41-45 was (4%), and weights ranged between 60 and 79 kg (28.7). About 18% of cases was subjected to domestic violence and approximately half of cases 54% had social support (P value= 0.5). About 64% of cases was stressed during pregnancy (P value = 0.003) while 23% did not receive health care during pregnancy, 61% worked or stood up for long time (P value = 0.021), 94% have been exposed to environmental pollutant. According to medical history, a 60% of cases had infections; more than 50% of them had urinary tract infection (UTI) specifically, while 21% of cases had deformities. 11% of cases had chronic diseases, while 10% of them was hypertensive, 7% diabetics, and nearly 1% with heart diseases. Since more than 75% of cases was not dehydrated, 27% of them had bleeding during pregnancy, and 35% with history of preterm (p value = 0.002), 21% had a short period between pregnancies, and 20% had multiple pregnancies. More than 80% of cases did not undergo Vitro fertilization, or had a Placental Previa or abruption, while 41% of cases had uterine contractions (P value= 0.091).

**Table 1. Demographic characteristics of the study participants received a Web-Invitation (n=101)**

Variables	Percentage (%)
<b>Age group</b>	
16-20	12.90%
21-25	27.70%
26-30	29.70%
31-35	12.70%
36-40	12.70%
41-45	4.0%
<b>Weight</b>	
50-59	20.80%
60-69	27.70%
70-79	28.70%
80-89	14.90%
90-99	6.90%
Above 100	1.0%

**Table 2. Risk factors associated with (PTB) among newborn delivered at University Tripoli Hospital and Medical Central Hospital**

Factories	Yes or NO	Percentage	P value
<b>Domestic violence</b>	Yes	18%	/
	No	82%	
<b>Social support</b>	Yes	54%	0.489
	No	46%	
<b>Stress during pregnancy</b>	Yes	64%	0.003
	No	36%	
<b>Health care during pregnancy</b>	Yes	43%	/
	No	23%	
	late	34%	
<b>Working / standing for a long time</b>	Yes	61%	0.021
	No	39%	
<b>Exposure to environmental pollutants</b>	YES	94%	/
	NO	6.0%	
<b>Infection</b>	No	41%	/
	UTI	38%	
	Vaginal	12%	
	Uterine	6%	
	Gum	3%	
<b>Deformities</b>	No	88%	/
	Cervix	6%	
	Uterus	5%	
	Fetal	1%	
<b>Chronic diseases</b>	No	82%	/
	Hypertension	10%	
	Diabetic	7%	
	Heart disease	1%	
<b>Dehydration</b>	Yes	25%	/
	No	75%	
<b>Bleeding during pregnancy</b>	Yes	27%	/
	No	73%	
<b>History of preterm</b>	Yes	35%	0.002
	No	65%	

Short period between pregnancies	Yes	21%	/
	No	79%	
Multiple pregnancy	Yes	80%	/
	No	20%	
Vitro fertilization	Yes	4%	/
	No	96%	
Placenta previa or abruption	Yes	12%	/
	No	88%	
Uterine contractions	Yes	41%	0.091
	No	59%	

## DISCUSSION

Recent global estimates suggest that more than 1 in 10 or an estimated 15 million babies born in 2010 were preterm, of which more than 1 million died as a result of preterm birth and related complications [7].

It is obvious that different risk factors contribute to the high incidence of preterm delivery in various locations. The high rates in North America may be partially explained by the aging of pregnant women, which increases maternal difficulties and C-sections. Another possibility would involve rising frequencies of multiple pregnancies. Contrarily, high rates of preterm birth in Africa are likely caused by intrauterine infections or a lack of access to medications such as oncolytic medicines [12, 19, 20]. This study shows different risk factors that may lead to preterm labor, and determine the ones with great influence on this medical phenomenon.

The risk of preterm births was higher among mothers between 26 and 30 years old (29.7%). The current study did not show any significant association between mothers and age less than 20 years old. However, it has been reported that women who delivered preterm babies at the highest rate were under 18 or over 35 (11.7% and 11.4%, respectively), had less than 12 years of schooling (12.2%), and had several infant pregnancies (62.8%) [21]. According to another study, significant risk factors for preterm birth were women with no educational background (33.2%) and those who had previously had low birth weight babies (20%) [22].

The results of this study are consistent with a popular theory regarding one PTB etiology. When bacteria enter the uterus and trigger the release of inflammatory cytokines, which have been linked to several subtypes of PTB, infection may result in an early delivery [23, 24]. In this study, 59.4% of mothers had infections, and 63% of them had urinary tract infections. Yet, other studies have indicated that the risk of early delivery among women with a UTI persists despite therapy, which is similar to our findings [25, 26, 27].

In terms of chronic diseases, 8.9% of cases have hypertension, and 6.9% have diabetes. While the study by Bekele et al, 2017, 33% of cases have hypertension, and 43% have diabetes, which was a high score [22]. Whereas the study of Rao et al., 2014 referred that 21.4% of cases have hypertension and 8.4% have diabetes [28].

On the other hand, study on, 2014 reported that 13% of cases have hypertension and 4.4% have diabetes, which is the closest to our findings, and also presented that 5.6 % of cases had bleeding during pregnancy and 7.2% of cases had a history of preterm [29]. Regarding multiple pregnancies, the study by Bekele et al., 2017 showed that 30.3% of cases experienced multiple pregnancies [22] Whereas, the percentage was 53.9% according to Alijahan & Hazarti, 2014 [30], and with a percentage of 19.8% of cases in this study. A recent study reported that placenta Previa reported as a risk of preterm birth by 30% [31].

The current result has showed that, women who gave birth prematurely were more likely to experience maternal stress throughout pregnancy (64%, P Value > 0.05). Same result has been demonstrated in another study shown that maternal stress during pregnancy is more than twice as common among women who gave birth preterm compared to women who gave birth at term [32].

## CONCLUSION

The gestational age, UTIs and mental stress showed a significant correlation with PTB in this study. Public education campaigns about the potential risk factors of preterm delivery should be launched. In addition, more research should be done to identify any other genetic and environmental risks that a fetus may encounter during the course of pregnancy that could result in preterm birth. Thus, a suitable preventative program must be implemented to lower the rate of preterm birth in the country.

### Disclaimer

The article has not been previously presented or published, and is not part of a thesis project



**Conflicts of interest**

The authors declare no conflicts of interest.

**REFERENCES**

1. Abu Hamad K, Abed Y, Abu Hamad B. Risk factors associated with preterm birth in the Gaza Strip: Hospital-based case-control study. *Eastern Mediterranean Health Journal*. 2007;13(5):1132-1141. doi:10.26719/2007.13.5.1132
2. van den Broek N. Millennium development goal 5: Alternative paths to delivery. *Expert Review of Obstetrics & Gynecology*. 2012;7(3):197-199. doi:10.1586/eog.12.18
3. Ferré C, Callaghan W, Olson C, Sharma A, Barfield W. Effects of maternal age and age-specific preterm birth rates on overall preterm birth rates — United States, 2007 and 2014. *MMWR Morbidity and Mortality Weekly Report*. 2016;65(43):1181-1184. doi:10.15585/mmwr.mm6543a1
4. Garfield RE, Yallampalli C. Control of myometrial contractility and Labor. *Basic Mechanisms Controlling Term and Preterm Birth*. 1994:1-28. doi:10.1007/978-3-662-21660-6\_1
5. Gee RE, Winkler R. Quality measurement. *Obstetrics & Gynecology*. 2013;121(3):507-510. doi:10.1097/aog.0b013e3182840e20
6. Gurung A, Wrammert J, Sunny AK, Gurung R, Rana N, Basaula YN, Paudel P, Pokhrel A, Kc A. Incidence, risk factors and consequences of preterm birth - findings from a multi-centric observational study for 14 months in Nepal. *Arch Public Health*. 2020 Jul 17;78:64. doi: 10.1186/s13690-020-00446-7.
7. Blencowe H, Cousens S, Oestergaard MZ, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with Time Trends since 1990 for selected countries: A systematic analysis and implications. *The Lancet*. 2012;379(9832):2162-2172. doi:10.1016/s0140-6736(12)60820-4
8. Isayama T. The clinical management and outcomes of extremely preterm infants in Japan: Past, present, and future. *Translational Pediatrics*. 2019;8(3):199-211. doi:10.21037/tp.2019.07.10
9. Sakata S, Konishi S, Ng CF, Watanabe C. Preterm birth rates in Japan from 1979 to 2014: Analysis of National Vital Statistics. *Journal of Obstetrics and Gynaecology Research*. 2017;44(3):390-396. doi:10.1111/jog.13460
10. Yorifuji T, Naruse H, Kashima S, Murakoshi T, Kato T, Inoue S, Doi H, Kawachi I. Trends of preterm birth and low birth weight in Japan: a one hospital-based study. *BMC Pregnancy Childbirth*. 2012 Dec 26;12:162. doi: 10.1186/1471-2393-12-162.
11. Kodama Y, Sameshima H, Ikenoue T. Temporal trends in perinatal mortality and cerebral palsy: A regional population-based study in southern Japan. *Brain and Development*. 2016;38(4):386-391. doi:10.1016/j.braindev.2015.10.002
12. Beck S, Wojdyla D, Say L, et al. The worldwide incidence of preterm birth: A systematic review of maternal mortality and morbidity. *Bulletin of the World Health Organization*. 2010;88(1):31-38. doi:10.2471/blt.08.062554
13. Nadeau H, Subramaniam A, Andrews W. Infection and preterm birth. *Seminars in Fetal and Neonatal Medicine*. 2016;21(2):100-105. doi:10.1016/j.siny.2015.12.008
14. Centers for Disease Control and Prevention. <https://www.cdc.gov/>. Accessed March 4, 2023.
15. Premature birth. Centers for Disease Control and Prevention. <https://www.cdc.gov/reproductivehealth/features/premature-birth/index.html>. Published November 1, 2022. Accessed February 20, 2023.
16. Sameshima H. Definition and diagnosis of preterm labor. *Preterm Labor and Delivery*. 2019:7-15. doi:10.1007/978-981-13-9875-9\_2
17. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. *The Lancet*. 2008;371(9606):75-84. doi:10.1016/s0140-6736(08)60074-4
18. Razaz N, Muraca GM, Fink K, Boutin A, John S, Lisonkova S, Stephansson O, Cnattingius S, Joseph KS. Time of delivery among low - risk women at 37 - 42 weeks of gestation and risks of stillbirth and infant mortality, and long - term neurological morbidity. *Paediatric and Perinatal Epidemiology*. 2022;36(4):577-587. doi:10.1111/ppe.12868
19. Tyson JE, Parikh NA, Langer J, Green C, Higgins RD. Intensive care for extreme prematurity — moving beyond gestational age. *New England Journal of Medicine*. 2008;358(16):1672-1681. doi:10.1056/nejmoa073059
20. Romero R, Espinoza J, Kusanovic JP, et al. The preterm parturition syndrome. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2006;113:17-42. doi:10.1111/j.1471-0528.2006.01120.x
21. van den Broek NR, Jean-Baptiste R, Neilson JP. Factors associated with preterm, early preterm and late preterm birth in Malawi. *PLoS ONE*. 2014;9(3). doi:10.1371/journal.pone.0090128
22. Bekele, I., Demeke, T., Dugna, K.. Prevalence of preterm birth and its associated factors among mothers delivered in Jimma University specialized teaching and referral hospital, Jimma Zone, Oromia Regional State, South West Ethiopia. *Journal of Women's Health Care*. 2017;06(01). doi:10.4172/2167-0420.1000356
23. Romero R, Grivel JC, Tarca AL, Chaemsaitong P, Xu Z, Fitzgerald W, Hassan SS, Chaiworapongsa T, Margolis L. Evidence of perturbations of the cytokine network in Preterm Labor. *American Journal of Obstetrics and Gynecology*. 2015;213(6). doi:10.1016/j.ajog.2015.07.037
24. Jafri S, Ormiston ML. Immune Regulation of systemic hypertension, pulmonary arterial hypertension, and preeclampsia: Shared disease mechanisms and translational opportunities. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*. 2017;313(6). doi:10.1152/ajpregu.00259.2017

25. Schneeberger C, Geerlings SE, Middleton P, Crowther CA. Interventions for preventing recurrent urinary tract infection during pregnancy. *Cochrane Database of Systematic Reviews*. 2012. doi:10.1002/14651858.cd009279.pub2
26. Pararas MV, Skevaki CL, Kafetzis DA. Preterm birth due to maternal infection: Causative pathogens and modes of prevention. *European Journal of Clinical Microbiology & Infectious Diseases*. 2006;25(9):562-569. doi:10.1007/s10096-006-0190-3
27. Mazor-Dray E, Levy A, Schlaeffer F, Sheiner E. Maternal urinary tract infection: Is it independently associated with adverse pregnancy outcome? *The Journal of Maternal-Fetal & Neonatal Medicine*. 2009;22(2):124-128. doi:10.1080/14767050802488246
28. Rao CR, de Ruitter LE, Bhat P, Kamath V, Kamath A, Bhat V. A case-control study on risk factors for preterm deliveries in a secondary care hospital, Southern India. *ISRN Obstetrics and Gynecology*. 2014;2014:1-5. doi:10.1155/2014/935982
29. Lu L, Qu Y, Tang J, Chen D, Mu D. Risk factors associated with late preterm births in the underdeveloped region of China: A cohort study and systematic review. *Taiwanese Journal of Obstetrics and Gynecology*. 2015;54(6):647-653. doi:10.1016/j.tjog.2014.05.011
30. Momeni M; Danaei M; Kermani AJ; Bakhshandeh M; Foroodnia S; Mahmoudabadi Z; Amirzadeh R; Safizadeh H. Prevalence and risk factors of low birth weight in the southeast of Iran. *International journal of preventive medicine*. <https://pubmed.ncbi.nlm.nih.gov/28348722/>. Accessed March 4, 2023.
31. Jansen, C. H., Van Dijk, C., Kleinrouweler, E., Limpens, J., Kazemier, B., Van Leeuwen, E., Pajkrt, E. Risk of preterm birth for placenta previa or low-lying placenta and possible preventive interventions: A systematic review and meta-analysis. *Frontiers in Endocrinology*. 2022;13. doi:10.3389/fendo.2022.921220.
32. Lilliecreutz C, Larén J, Sydsjö G, Josefsson A. Effect of maternal stress during pregnancy on the risk for preterm birth. *BMC Pregnancy and Childbirth*. 2016;16(1). doi:10.1186/s12884-015-0775-x