

Antenatal Care: Is It Really a Modifiable Factor for Stillbirth Prevention?

Pratima Mittal¹, Harsha S Gaikwad², Nishi Choudhary³

Received on: 07 March 2023; Accepted on: 14 April 2023; Published on: 29 April 2024

ABSTRACT

Stillbirth is a major cause of perinatal death in India. Deciphering the cause of stillbirth will help in formulating prevention strategies to bring down the stillbirth rate. Our objective is to explore the antepartum and intrapartum causes and risk factors of stillbirths.

Materials and methods: This was a prospective observational study done under WHO-SEARO project. This study included all stillbirths occurring in Safdarjung Hospital from August 2015 to December 2018. Verbal autopsies were done, and thorough antenatal records were documented and analyzed.

Results: Out of 1,09,578 deliveries, 2,689 were stillbirths (2.4%). Among these, 1,583 (58.9%) were unsupervised and unbooked pregnancies, whereas 1,106 (41.1%) pregnancies were supervised and booked. Significantly lower percentage of patients in unbooked pregnancies had iron-folic acid intake; significantly higher percentage of mothers had anemia, hypertension, diabetes, and antepartum hemorrhage compared with booked pregnancies. Among antepartum causes, hypertension (23.4%), abruptio (18.5%), and infection (3.4%) were the leading causes for stillbirths. Intrapartum causes constituted 39% of total stillbirths; a higher percentage was in the unbooked pregnancies. Approximately, 89% of patients with stillbirth had delayed seeking of healthcare facility.

Conclusion: The most common cause of stillbirth was hypertensive disorders of pregnancy followed by abruptio placentae in this cohort. Various maternal-related factors are significantly higher in unbooked pregnancies. Reducing these factors might reduce the prevalence of stillbirth.

Keywords: Antenatal care, Stillbirth, Unbooked pregnancy.

Journal of South Asian Federation of Obstetrics and Gynaecology (2024): 10.5005/jp-journals-10006-2277

INTRODUCTION

Stillbirth is a serious adverse outcome of pregnancy and a major cause of perinatal death in India. Despite the existing health programs on women's and children health, 3.2 million stillbirths occur globally every year mostly in developing countries.¹ In 2014, the Every New-born Action Plan set a target of 12 or fewer stillbirths per 1,000 in every country by 2030.² However, India is still among the top 10 countries with stillbirth rate of 23.3 per 1,000 births in 2015.³ This rate varies across different states of India with a variation of 20–66/1,000 births.⁴

According to the WHO, for international comparisons, stillbirth is defined as a baby born with no signs of life, at or after 28 weeks of gestation.⁵ Stillbirth is a tragic event influenced by maternal, fetal, and social factors. Deciphering the cause of stillbirth has implications for future pregnancies and formulating prevention strategies. To formulate stillbirth prevention strategies, it is especially important to know the trends, risk factors, and causes of stillbirth. Despite being a major public health issue, there is limited research and policy for stillbirth.

Many studies have suggested various stillbirth prevention strategies to reduce the rate of stillbirth, which include acknowledging the actual burden, providing high-quality antenatal care and intrapartum care, and using the stillbirth rate as the indicator of the quality of healthcare.⁶ In a systematic review, in low- and middle-income countries, it has been shown that perinatal audits conducted at the health facility level by healthcare providers can definitely improve the quality of care.⁷ The antenatal care trial conducted by the World Health Organization (WHO) suggested that focused antenatal care results in good outcomes for both

¹Department of Obstetrics and Gynaecology, ESIC Medical College and Hospital, Faridabad, Haryana, India

^{2,3}Department of Obstetrics and Gynaecology, VMMC and Safdarjung Hospital, New Delhi, India

Corresponding Author: Nishi Choudhary, Department of Obstetrics and Gynaecology, VMMC and Safdarjung Hospital, New Delhi, India, Phone: +91 1126730240, e-mail: choudharynishi@yahoo.co.in

How to cite this article: Mittal P, Gaikwad HS, Choudhary N. Antenatal Care: Is It Really a Modifiable Factor for Stillbirth Prevention? *J South Asian Feder Obst Gynae* 2024;16(3):214–218.

Source of support: Nil

Conflict of interest: None

mother and baby.⁸ Cuba, Saudi Arabia, and Thailand were randomly allocated to provide either the new model (27 clinics in low- and middle-income countries perinatal mortality was significantly lower with standard antenatal care visits than in those with less than three antenatal visits.

The aim of our study was to estimate the stillbirth rate and to determine the antepartum and intrapartum causes and risk factors of stillbirths in a tertiary care hospital in India over a period of 3 years, and to assess the impact of antenatal care in reducing stillbirths.

MATERIALS AND METHODS

This was a prospective observational study done under WHO-SEARO (World Health Organization-Southeast Asian Region Office)

NBBD (Newborn Birth Defect) and Stillbirth Registry project. This study was conducted in the Department of Obstetrics and Gynecology from August 2015 to December 2018 in a tertiary care academic institute. Informed consent was taken from patients before the recruitment of the patients.

All stillbirths presenting after 20 weeks of gestation with no signs of life were included in the study. A booked case was defined as a pregnant woman who visited an antenatal clinic for more than thrice during the antenatal period. While an unbooked case was one with no or less than three visits to a healthcare facility. Based on the appearance of the baby and time of birth in relation to labor, stillbirth was classified as antepartum (macerated) and intrapartum (fresh) stillbirth. Antepartum stillbirths were those occurring before the onset of labor and intrapartum stillbirths were those stillbirths occurring during labor and birth.

Verbal autopsies were conducted according to a questionnaire validated by WHO in India. A detailed history was taken preferably from the mother or the available family member especially inquiring about the presence of any high-risk factors in present or previous pregnancies. Photographs of the babies with gross congenital anomalies were taken and infantogram were done after informed consent. Autopsy of the stillborn was offered to parents when the obvious cause of stillbirth could not be identified; however, none of the parents gave consent for the same.

The placenta and cord were examined by a trained gynecologist and the findings were recorded for each case. A gross examination of the placenta for its weight, size, color, clots, length, entanglement, and any abnormalities was done. All the information gathered was filled in on prestructured pro forma developed by the WHO on its website app SEARO. After complete data entry, the most likely cause of the stillbirth was assigned using the cause of death and associated conditions (CODAC) stillbirth classification.

Statistical Analysis

The demographic data were recorded as number (%) or mean \pm SD or median (range) as appropriate. To compare the baseline parameters between the two groups of patients, Chi-square test was used for categorical variables, Student's *t*-test was used for the continuous variables with normal distribution and Wilcoxon–Mann–Whitney U test was used for continuous variables without normal distribution. A two-sided *p*-value < 0.05 was statistically significant. Data were analyzed using IBM SPSS Statistics software (version 21.0, Chicago, IL, USA).

RESULTS

During the study period of August 2015 to December 2018, there were 109,578 deliveries in the hospital, out of which 106,889 were live births and 2,689 were stillbirths. The stillbirth rate was 24 per 1,000 live births. Among the stillbirths, 1,583 (59%) were in unbooked mothers and 1,106 (41%) were in booked mothers (Table 1). Sixty percent (1,634) of cases were antepartum stillbirths, whereas 39.2% (1,055) of cases were intrapartum (Table 2). Seventy percent (774) of booked cases had late bookings after 32 weeks. About 42.5% (325) of booked patients had their first antenatal check-up between 32 and 36 weeks and 27.5% (208) patients were found to have their antenatal check-ups after 36 weeks in the late third trimester. The number of stillbirths was highest at 40 weeks of gestation followed by the next peak at 32 weeks (Fig. 1). The number of stillbirths was constantly higher at varied periods of gestation in

Table 1: Demographic profile

Demographic profile	Unbooked (N = 1583)	Booked (N = 1106)	<i>p</i> -value
Maternal age (years)	26 \pm 4	26 \pm 5	0.148
BMI (kg/m ²)	23.9 \pm 3	24.6 \pm 4	0.000
Socioeconomic status			
Lower class	67.2%	59.4%	0.000
Middle class	7.4%	11.7%	
Gravida			
Primigravida	62.2%	65.4%	0.183
Multigravida	37.8%	34.6%	
Family history (DM, HTN)	0.8%	2.4%	0.001
Iron folic acid intake	20.8%	67.8%	0.000

Table 2: Types of stillbirths

	Number of stillbirths		<i>p</i> -value
	Unbooked (N = 1583)	Booked (N = 1106)	
Intrapartum (fresh) stillbirth (1,055) 39.2%	620 (39.2%)	435 (39.3%)	0.931
Antepartum (macerated) stillbirth (1,634) 60.8%	963 (60.8%)	671 (60.7%)	

unbooked patients. The observed peak in the number of stillbirths at 32 weeks is attributed to inadequate antenatal care, especially in the third trimester.

The unbooked cases had low BMI as compared with the booked cases which was a significant factor. The number of primigravidas was higher in booked cases than the unbooked cases. The unbooked antenatal women were mostly from lower socioeconomic strata (67.2%). Antenatal intake of iron and folic acid supplementation was much lower in the unbooked cases as compared with the booked cases. Out of the total number of stillbirths, 1,588 (59%) were preterm (<37 weeks) and 1,101 (40.9%) were term (\geq 37 weeks) stillbirths. Sixty percent of the preterm stillbirths were unbooked and 57% of term stillbirths were unbooked (Table 3).

Among the maternal factors, the most common cause of stillbirths was hypertension being 24% in unbooked pregnancies and 22% in booked pregnancies (Table 4). Antepartum hemorrhage was the second most important cause resulting in 15.2% of antepartum stillbirths in unbooked pregnancies and 10.1% in booked pregnancies (*p* = 0.003). Diabetes accounted stillbirths more in booked, 48 (8.2%) pregnancies than in unbooked, 31 (3.8%) pregnancies. Most of the booked patients in this category had antenatal booking after 32 weeks. Fetal growth restriction as an attributable cause was found more in unbooked pregnancies, 364 as compared with the booked pregnancies, 275. In pregnancies with fetal growth restriction, antepartum stillbirths were significantly more in booked cases and intrapartum deaths were less. About 21% of total stillbirths were term pregnancies with birth weights less than 2500 gm. Out of these cases, 16% were unbooked and 5% were booked. Anemia was found to be the most important associated factor significantly more in unbooked pregnancies (25%, *p* = 0.000). Among intrapartum factors (Table 5), the occurrence of nonprogress

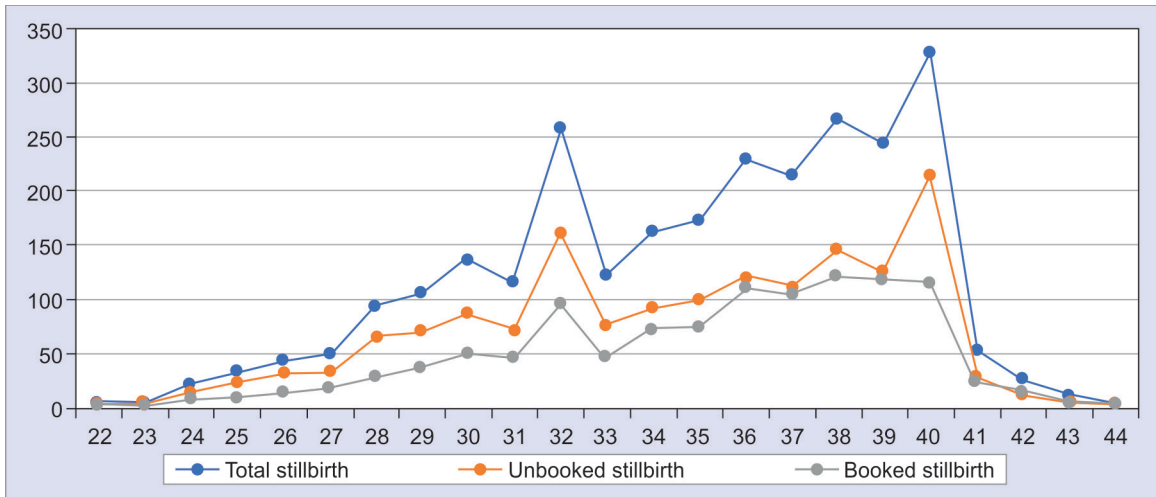


Fig. 1: Distribution of stillbirths over a period of gestation (horizontal axis – period of gestation, vertical axis – number of stillbirths)

Table 3: Delivery details

	Unbooked (N = 1583)	Booked (N = 1106)
Baby gender		
Ambiguous	0%	0.2%
Female	49.8%	44.8%
Male	50.2%	54.9%
Mode of delivery		
Cesarean section	221 (14%)	154 (13.9%)
Instrumental	15 (0.9%)	11 (1.0%)
Vaginal	1347 (85.1%)	941 (85.1%)
Baby birth weight (grams)		
BWt 500–1000	255 (16.1%)	143 (12.9%)
BWt 1001–2500	955 (60.3%)	662 (59.9%)
BWt 2501–3000	276 (17.4%)	201 (18.2%)
BWt > 3000	97 (6.1%)	100 (9.0%)
Period of gestation (weeks)		
<28	03%	01%
28–32	17%	10%
33–36	14%	11.3%
≥37	23.4%	17.5%
≥37 weeks (BWt ≤ 2500)	436 (16%)	139 (05%)

Table 4: Maternal factors

		Unbooked (N = 1583)	Booked (N = 1106)	p-value
Anemia	Intrapartum	239 (38.5%)	111 (25.5%)	0.000
	Antepartum	246 (25.5%)	152 (22.7%)	
Hypertension	Intrapartum	140 (24.8%)	108 (22.6%)	0.397
	Antepartum	214 (24.7%)	166 (22.2%)	
Diabetes mellitus	Intrapartum	9 (1.5%)	12 (2.8%)	0.135
	Antepartum	22 (2.3%)	36 (5.4%)	
Fetal growth restriction	Intrapartum	116 (18.7%)	66 (15.2%)	0.134
	Antepartum	248 (25.8%)	209 (31.1%)	
Antepartum hemorrhage	Intrapartum	173 (27.9%)	110 (25.3%)	0.345
	Antepartum	146 (15.2%)	68 (10.1%)	
Infection	Intrapartum	17 (2.7%)	14 (3.2)	0.652
	Antepartum	38 (3.9%)	23 (3.4%)	
Preterm labor	Intrapartum	24 (3.9%)	12 (2.8%)	0.441
	Antepartum	24 (2.5%)	16 (2.4%)	
Cholestasis	Intrapartum	3 (0.5%)	5 (1.1%)	0.220
	Antepartum	7 (0.7%)	8 (1.2%)	
Eclampsia	Intrapartum	19 (3.1%)	7 (1.6%)	0.133
	Antepartum	17 (1.8%)	6 (0.9%)	
Chorioamnionitis	Intrapartum	9 (1.5%)	2 (0.5%)	0.118
	Antepartum	14 (1.5%)	6 (0.9%)	

of labor (2%) and premature rupture of membrane (PROM) (6%) were seen significantly more in unbooked cases of stillbirths.

DISCUSSION

This study compared various responsible factors for stillbirth in booked and unbooked pregnant women. In our study, the stillbirth rate was 24/1,000 births, the rate being higher as it is a tertiary care referral hospital and receives many high-risk pregnancies. In the present study, CODAC classification has been used to assign the cause of stillbirth which was also used in very few studies for classification.⁹ Many developed countries have stillbirth rate of 3–5 per 1,000 births, the rate is tenfold higher in developing

countries.¹ This could be the result of inaccurate data collection, underreporting of stillbirths, and a large number of home deliveries which go unreported.¹⁰ The difference in the stillbirth rate also reflects the quality of antenatal and intrapartum care being provided in different regions.

In our study, we found that 60% of stillbirths were antepartum in both booked and unbooked groups and 70% of patients in booked group had late booking between 32 and 38 weeks for antenatal care. These booked patients though had an adequate number of antenatal visits at a health center; however, they came to the higher health facility late and apt interventions could not

Table 5: Labor complication

		<i>Unbooked (N=1583)</i>	<i>Booked (N=1106)</i>	<i>p-value</i>
Nonprogress of labor	Intrapartum	7 (1.1%)	11 (2.5%)	0.084
	Antepartum	4 (0.4%)	12 (1.8%)	0.006
PROM	Intrapartum	38 (6.1%)	15 (3.4%)	0.050
	Antepartum	38 (3.9%)	30 (4.5%)	0.601
Abruptio placentae	Intrapartum	116 (18.7%)	73 (16.8%)	0.421
	Antepartum	109 (11.3%)	55 (8.2%)	0.039
Fetal distress	Intrapartum	52 (8.4%)	49 (11.3%)	0.118
	Antepartum	75 (7.8%)	49 (7.3%)	0.715
Prolonged second stage	Intrapartum	8 (1.3%)	9 (2.1%)	0.323
	Antepartum	3 (0.3%)	5 (0.7%)	0.217
Obstructed labor	Intrapartum	19 (3.1%)	19 (4.4%)	0.263
	Antepartum	7 (0.7%)	9 (1.3%)	0.215

prove to be very beneficial. Ashish KC et al. also reported in their study that the risk of having an antepartum stillbirth (SB) was 4.5 times higher in the patients who were unbooked compared with those who had at least one antenatal care visit.¹¹ Our study showed the peak of stillbirths at ≥ 37 weeks of gestation, that is, 23.4% of total stillbirths in unbooked cases and 17.5% in booked cases that occurred after 37 weeks of gestation. The highest number of stillbirths was at 40 weeks and then at 32 weeks. This critical period is very important and adequate antenatal care is a must during this period; also emphasized in the study done in South Africa.¹² This signifies that in the last trimester of pregnancy, patients with risk factors should be apprised of regular antenatal visits. A study reported increased intrauterine deaths between 35 and 38 weeks were attributed to the reduced number of antenatal visits in the third trimester. Lawn JE et al. have highlighted in their study that 60% of stillbirths are from rural areas with poor antenatal care and limited access to transport facilities to healthcare centers.² In our study, 89% of patients reported late to healthcare centers resulting mostly in intrapartum stillbirths. Many of these referred cases of stillbirths were preventable with appropriate antenatal management and improved intrapartum care.

In our study, unbooked cases had lower body mass index (BMI) with significantly less intake of iron and folic acid in these women and belonged to lower socioeconomic strata. Anemia was found to be the most important risk factor both in unbooked (38%) and booked (25%) pregnancies, significantly resulting more in intrapartum stillbirths, similar results have been shown in another study.¹³ In a systematic review, it has been shown that folate deficiency attributes significantly to abruption, preeclampsia, and stillbirths.¹⁴ Our study also showed increased stillbirths in cases with significantly low folic acid intake. In many high-income countries, major stillbirth risk factors include advanced maternal age, primiparity obesity, and smoking,¹⁵ however, in our study, both unbooked and booked cases had no significant difference in maternal age and parity. BMI of mothers was also normal (18.5–24.9 kg/m²), not being a risk factor for stillbirth as shown in other studies.¹⁶ Hence, it is good antenatal care which has an impact on stillbirths.

In present study, hypertension during pregnancy was an important cause of stillbirth in concurrence with other studies,^{17,18} In this study, 24% of unbooked and 22% of booked cases having

stillbirth cases attributed to hypertensive disorders of pregnancy. Majority of these cases were preeclampsia and eclampsia. Though the number was higher in unbooked pregnancies, there was no statistically significant difference between both groups probably because most cases came with intrauterine deaths resulting in the decrease of previous high blood pressure (B.P.) records. This may have led to the misclassification of hypertensive disorders of pregnancies. At our care center most of these women were referred and received poor antenatal care earlier. Our study had 50 eclampsia cases, with 36 of them being unbooked and unsupervised leading to adverse maternal and perinatal outcomes. Another important cause of stillbirth in our study was antepartum hemorrhage due to abruption, 20% in unbooked and 16% in booked cases. Abruption resulted in significantly a higher number of antepartum stillbirths in unbooked pregnancies in concurrence with other studies.^{17,19} Though abruption is unpredictable in the majority of cases, timely identification of the risk factors can help in recognizing the high-risk pregnancies and their proper management.¹⁵

Our study showed significantly more antepartum stillbirths in booked cases than unbooked ones with diabetes mellitus, it is probably due to early diagnosis in booked cases, which once again emphasizes the impact of quality of antenatal care being given. Most of the cases reaching our tertiary care center already had an intrauterine fetal death. It has been shown that a comprehensive prenatal care program and multidisciplinary approach are the key to the management of high-risk cases such as diabetes.²⁰ In the present study, fetal growth restriction (FGR) was found to be one of the important factors associated with stillbirths constituting 23% of unbooked cases and 24% of booked cases in concurrence with other studies.¹³ Antepartum stillbirths were significantly more in booked (31.1%) cases of FGR than in unbooked (25.8%). Intrapartum stillbirths were more in unbooked FGR cases. Zhang X et al. in their study have seen that intrauterine restriction of fetal growth is a cumulative process and the fetuses dying subsequently grow slower than those live births born at the same gestational age. Placental insufficiency leads to decreased oxygen and nutritional supplements to fetus subsequently resulting in fetal death.^{21,22} Late detection of FGR leads to poorer outcomes and 85% of the total FGR cases reported at our center were referred. This might be the reason for an unfavorable outcome despite being categorized as booked pregnancy. Only 15% of the FGR cases with stillbirths were booked at our center and these cases had multiple overlapping factors. Additionally, present study had a higher prevalence of birth defects (9%) resulting primarily in intrapartum stillbirths in contrast to another study in which only 4.6% of birth defects were detected.¹³ This is associated with majority of congenital abnormalities being diagnosed late and referred to our center with restrictions of legal termination of pregnancy. Bhutta et al. in a systematic review recognized many interventions in low-resource settings to prevent stillbirths.²³ Few of the recommendations were periconceptional folic acid fortification, insecticide-treated bed nets or intermittent preventive treatment for malaria prevention, syphilis detection and treatment, detection and management of hypertensive disease of pregnancy, diabetes in pregnancy and FGR, routine induction to prevent post-term pregnancies, skilled care at birth, basic emergency obstetric care and comprehensive emergency obstetric care. Our study also emphasizes the need for implementation of these recommendations.

Limitations

Awareness about the importance of antenatal care and compliance thereof could not be assessed. Accurate delineation and description of the cause of stillbirth was sometimes difficult because of the sociocultural barrier in getting autopsy done for fetuses in both booked and unbooked cases.

CONCLUSION

Maternal socioeconomic status reduced antenatal care—less than 3 antenatal check-ups, lack of folic acid intake, hypertensive disorders in mothers, and antepartum hemorrhage were found to be important modifiable factors associated with stillbirths. Despite improvements in healthcare facilities, hypertensive disorders of pregnancy and FGR remain the most important preventable factors of stillbirth. A significant number of patients not getting good antenatal care and indeed we need to focus on good quality antenatal care, especially in the third trimester. Good quality antenatal care and early booking of antenatal patients are the key points to achieve the national goal of a stillbirth rate of $\leq 12/1,000$ total births by 2030.

CONTRIBUTIONS

NC – Data collection, review of literature and manuscript preparation.

PM, HG – Data compilation and critical revision of the manuscript.

REFERENCES

- McClure EM, Nalubamba-Phiri M, Goldenberg RL. Stillbirth in developing countries. *Int J Gynecol Obstet* 2006;94(2):82–90. DOI: 10.1016/j.ijgo.2006.03.023.
- Lawn JE, Blencowe H, Waiswa P, et al. Stillbirths: rates, risk factors, and acceleration towards 2030. *Lancet Lond Engl* 2016;387(10018):587–603. DOI: 10.1016/S0140-6736(15)00837-5.
- Blencowe H, Cousens S, Jassir FB, et al. National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis. *Lancet Glob Health* 2016;4(2):e98–108. DOI: 10.1016/S2214-109X(15)00275-2.
- Lawn JE, Blencowe H, Pattinson R, et al. Stillbirths: Where? When? Why? How to make the data count? *Lancet Lond Engl* 2011;377(9775):1448–1463. DOI: 10.1016/S0140-6736(10)62187-3.
- Europe WHORO for. Definitions and indicators in Family Planning Maternal & Child Health and Reproductive Health used in the WHO Regional Office for Europe. 2000 [cited 2020 May 3]; Available from: <https://apps.who.int/iris/handle/10665/108284>.
- de Bernis L, Kinney MV, Stones W, et al. Stillbirths: ending preventable deaths by 2030. *Lancet Lond Engl*. 2016;387(10019):703–716. DOI: 10.1016/S0140-6736(15)00954-X.
- Pattinson R, Kerber K, Waiswa P, et al. Perinatal mortality audit: counting, accountability, and overcoming challenges in scaling up in low- and middle-income countries. *Int J Gynaecol Obstet Off Organ Int Fed Gynaecol Obstet* 2009;107 Suppl 1:S113–121, S121–122. DOI: 10.1016/j.ijgo.2009.07.011.
- Villar J, Ba'aqeel H, Piaggio G, et al. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet Lond Engl* 2001;357(9268):1551–1564. DOI: 10.1016/S0140-6736(00)04722-x.
- Frøen JF, Pinar H, Flenady V, et al. Causes of death and associated conditions (Codac) – a utilitarian approach to the classification of perinatal deaths. *BMC Pregnancy Childbirth* 2009;9(1):22. DOI: 10.1186/1471-2393-9-22.
- SOIN_PRINTED 14-9-2014.pdf [Internet]. [cited 2020 3]. Available from: https://www.newbornwhocc.org/SOIN_PRINTED%2014-9-2014.pdf.
- Ashish KC, Nelin V, Wrammert J, et al. Risk factors for antepartum stillbirth: a case-control study in Nepal. *BMC Pregnancy Childbirth* 2015;15:146. DOI: 10.1186/s12884-015-0567-3.
- Lavin T, Pattinson R. Does antenatal care timing influence stillbirth risk in the third trimester? A secondary analysis of perinatal death audit data in South Africa. *BJOG Int J Obstet Gynaecol* 2018;125(2):140–147. DOI: 10.1111/1471-0528.14645.
- Prasanna N, Mahadevappa K, Antaratani RC, et al. Cause of death and associated conditions of stillbirths. *Int J Reprod Contracept Obstet Gynecol* 2017;4(6):1970–1974.
- Ray JG, Laskin CA. Folic acid and homocyst(e)ine metabolic defects and the risk of placental abruption, pre-eclampsia and spontaneous pregnancy loss: a systematic review. *Placenta* 1999;20(7):519–529. DOI: 10.1053/plac.1999.0417.
- Flenady V, Koopmans L, Middleton P, et al. Major risk factors for stillbirth in high-income countries: a systematic review and meta-analysis. *Lancet* 2011;377(9774):1331–1340. DOI: 10.1016/S0140-6736(10)62233-7.
- Amark H, Westgren M, Persson M. Prediction of stillbirth in women with overweight or obesity—A register-based cohort study *PLOS One* 2018;13(11):e0206940. DOI: 10.1371/journal.pone.0206940.
- Vidyadhar B B. Review of socio demographic factors and obstetric causes of stillbirths at tertiary care hospital. *IOSR J Pharm IOSRPHR* 2012;2(3):475–478. DOI:10.9790/3013-0230475478.
- Wilkins A, Earnest J, Mccarthy EA, Shub A. A retrospective review of stillbirths at the national hospital in Timor-Leste. *Aust N Z J Obstet Gynaecol*. 2015;55(4):331–336. DOI: 10.1111/ajo.12337.
- Avachat SS, Phalke DB, Phalke VD. Risk factors associated with stillbirths in the rural area of Western Maharashtra, India. *Arch Med Health Sci* 2015;3(1):56–59. DOI: 10.4103/2321-4848.154946
- Dudley DJ. Diabetic-associated stillbirth: incidence, pathophysiology, and prevention. *Clin Perinatol* 2007;34(4):611–626. DOI: 10.1016/j.clp.2007.09.003.
- Zhang X, Joseph KS, Cnattingius S, et al. Birth weight differences between preterm stillbirths and live births: analysis of population-based studies from the U.S. and Sweden. *BMC Pregnancy Childbirth* 2012;12:119. DOI: 10.1186/1471-2393-12-119.
- Helgadóttir LB, Turowski G, Skjeldestad FE, et al. Classification of stillbirths and risk factors by cause of death—a case-control study. *Acta Obstet Gynecol Scand* 2013;92(3):325–333. DOI: 10.1111/aogs.12044.
- Bhutta ZA, Yakoob MY, Lawn JE, et al. Stillbirths: what difference can we make and at what cost? *Lancet Lond Engl* 2011;377(9776):1523–1538. DOI: 10.1016/S0140-6736(10)62269-6.