

**Original Article****Identifying Obesity as a Cause of Stillbirth- A Prospective Study**

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**Abstract**

**Introduction:** Stillbirth is defined as no signs of life at birth. Stillbirth is a relatively understudied and under-reported public health issue. Obesity has been studied as a risk factor of stillbirth. Apart from a higher association of medical disorders in obese women leading to stillbirth, obesity has been identified as an independent risk factor for stillbirth.

**Material and Method:** A prospective non-interventional observational study was conducted with effect from January 2016 to December 2017 at Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College, Shimla.

**Results:** A total number of 180 still births occurred during our study period over a span of 2 years.

The incidence of stillbirth was highest at term between 37 to 41+6 weeks period of gestation. Of the study population 53.33% were overweight (BMI between 25- 30) and 24.44% were obese (>30).

**Conclusion:** The risk of stillbirth is higher in obese women. Risk of stillbirth increases linearly with gestational age. The highest risk of stillbirth is at term.

**Keywords:** Obesity, over-weight, stillbirth, Body mass index.

**Introduction**

Stillbirth is a relatively understudied public health issue, with no identifiable classification system. Stillbirth is defined as no sign of life at birth. Stillbirth is a relatively under reported and under-defined entity. The incidence of stillbirth varies from state to state and is higher in developing countries. The occurrence of intrapartum stillbirth reflects the skill of birth attendant and emerging obstetric care of the country. It is very important to study the etiology of stillbirth, to make

improvement in preventive outcome. The most common cause of perinatal mortality is congenital malformation, the incidence of which is 25-40%.<sup>[1]</sup> The rate of still birth is a strong indicator of perinatal care in the country. Each case of stillbirth should be individually investigated to reach to the most appropriate cause of stillbirth. Determining the probable cause of stillbirth may not only aid the women to bear such a drastic consequence but may also help in prevention of future similar outcome. Identifying cause of

stillbirth may also help us in creating policies for better future outcome.

As such, women with a higher risk of stillbirth, such as hypertensive, diabetic women, women with previous history of stillbirth should be attended in a special high risk antenatal clinic. Every effort should be made to protect the woman from this irreparable loss. Antepartum surveillance has not yet been proven to be absolutely promising in prevention of stillbirth, yet it has been widely used in women at high risk of still birth.<sup>[2]</sup>

Obesity has been studied as an independent risk factor for still birth. Among pregnant women there has been a rising incidence of obesity. Obesity is associated with multiple pregnancy related problems, including hypertension, diabetes, delayed onset of labor, higher incidence of cesarean section. The risk of stillbirth is approximately 2-5 times higher in obese women.<sup>[3]</sup> Risk of obesity is linearly increasing with gestational age. A strong dose dependent association between obesity and risk of still birth has been studied, the risk increases linearly with increase in body mass index. The rising incidence of obesity is associated with rising obstetric and perinatal mortality.

A strong association has been noted between the gestational age of delivery and stillbirth in obese women, but yet there is no definite period of gestation defined for termination of pregnancy in obesity. There is also insufficient evidence to support that early termination of pregnancy may benefit obese women in prevention of stillbirth.

Obesity as an important and preventable cause of stillbirth. The objective of this study was to study the demographic characteristics of women with stillbirth, to ascertain whether obesity and overweight women were at a higher risk of stillbirth and adopt remedial measures for the same.

### Material and Methods

A prospective non-interventional observational study was conducted with effect from January

2016 to December 2017 at Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College, Shimla. We analysed all pregnant women who had an antepartum or intrapartum stillbirth.

### Inclusion Criteria

- All pregnant women whether booked or unbooked, who delivered a stillborn during the study period, were included in this study.
- Stillborn at >20 weeks period of gestation or weight >500 gm were included in the study.

### Exclusion Criteria

- Women with multiple gestation were excluded.
- Women bearing a foetus with some congenital malformation incompatible with life were excluded from the study.

If the last menstrual period was reliable, gestational age was calculated from the last menstrual period or the earliest ultrasonography was used to define the gestational age. Demographic data including age, parity, literacy level, socioeconomic status, booking status were noted. Body mass index was calculated as ratio of pre-pregnancy weight (in kilogram) and height square (in metres). Weight was recorded as recalled by the pregnant patient, and height as on the first antenatal visit. BMI was calculated and women were classified as underweight (<18.5kg/m<sup>2</sup>), normal (18.5-24.9 kg/m<sup>2</sup>), overweight (25.0-29.9 kg/m<sup>2</sup>), obese (>30.0 kg/m<sup>2</sup>).

Written informed consent was taken from all pregnant women enrolled in the study.

### Results

A total number of 180 still births occurred during our study period over a span of 2 years. Total number of live births during the study period were 12,842. Table 1 depicts the stillbirth rate and perinatal mortality rate.

**Table 1:** Stillbirth and perinatal mortality

Total number of deliveries	12,842
Number of stillbirth	180
Stillbirth rate	14.01%
Perinatatal mortality rate	20.01%

Table 2 depicts the demographic profile of pregnant women having stillbirth. 60% of these women were in the age group of 20-30 years. Among the women having stillbirth 63.33% were unbooked and 66.67% resided in rural areas. The highest number of patients (48.89%) were from lower middle class status. Maximum number of patients were primigravida (56.67%). The incidence of stillbirth was highest at term between 37 to 41+6 weeks period of gestation.

**Table 2:** Demographic details (n=180)

Characteristic	Number of stillbirth	Percentage
<b>Age</b>		
<20 years	20	11.11%
20-30 years	108	60%
>30 years	52	28.89%
<b>Booking status</b>		
Booked	66	36.67%
Unbooked	114	63.33%
<b>Residence</b>		
Rural	120	66.67%
Urban	60	33.33%
<b>Socioeconomic status</b>		
Upper	15	8.33%
Upper Middle	40	22.22%
Lower Middle	88	48.89%
Upper Lower	20	11.11%
Lower	17	9.44%
<b>Gravidity</b>		
Primigravida	102	56.67%
Multigravida	78	43.33%
<b>Period of gestation at birth</b>		
<28 weeks	38	21.11%
28+0 to 33+6 weeks	40	22.22%
34 to 36+6 weeks	28	15.55%
37+0 to 41+6 weeks	64	35.55%
>42 weeks	10	5.55%

Table 3 depicts the characterisation of women according to the BMI. Of the study population 53.33% were overweight (BMI between 25- 30) and 24.44% were obese (>30).

**Table 3:** Body mass index (n=180)

Characteristic	Number of stillbirth	Percentage
<b>Body Mass Index</b>		
<18.5 (underweight)	16	8.89%
18.5 - 24.99 (normal)	24	13.33%
25 - 30 (overweight)	96	53.33%
>30 (obese)	44	24.44%

## Discussion

This study aims to identify the risk factors for stillbirth. Stillbirth was more commonly observed in unbooked and in women residing in rural areas, probably because of lack of medical facilities, ignorance, poor transport facilities. Obesity has been identified as an important risk factor for occurrence of stillbirth. This study emphasises on the importance of identifying obesity as an important risk factor for stillbirth. Similar result as this study have also been found in studies by Yao et al, Woolner et al<sup>[3,4]</sup>, where higher incidence of stillbirth has been noted in obese women.

Several hypothesis have been put forward to explain the possible cause of stillbirth in overweight and obese women, yet no proven cause. Most likely mechanism explaining the cause of still birth is uteroplacental insufficiency. Various changes in the placental structure in obese women, including impaired nutrient exchange and impaired blood flow have been speculated as the likely causes of stillbirth<sup>[4]</sup>. Pregnancy in obese women causes an exaggerated pro-inflammatory response leading to adverse fetal outcome.<sup>[5]</sup> Obese women have a higher risk of insulin resistance and of developing gestational diabetes, increasing the risk of stillbirth. Secondary to diabetes and obesity itself is a high risk for development of fetal abnormalities leading to stillbirth.

Obese women have exaggerated hyperlipidemia, which leads to endothelial dysfunction, placental dysfunction and platelet aggregation. These factors may also be responsible for stillbirth in such women.<sup>[6]</sup>

Apart from the above described pathophysiology of stillbirth in obese women, incidence of gestational diabetes and hypertensive disorders of

pregnancy are higher in them. The association of stillbirth with obese women may also be secondary to these pregnancy complications.<sup>[7]</sup>

Obese women are also at a higher chance of sleep disorders, which can lead to apnoea and fetal desaturation. This could theoretically lead to fetal deoxygenation and possibly still birth.<sup>[8]</sup>

There is a higher incidence of macrocosmic baby in obese women, and macrosomic babies are associated with a higher incidence of stillbirth.<sup>[9]</sup>

All the above theories are speculated to be cause of stillbirth in overweight and obese women. None of this hypothesis is yet completely proven. Obesity is a preventable cause of stillbirth. In this paper we have emphasised how obesity is associated with a higher chance of stillbirth. Primary prevention of obesity is required in women of child bearing age group. Higher level of education and awareness is required for dietary modifications and increasing physical exercise in women of child bearing age group. Secondary prevention of obesity includes diet and exercise in woman with high BMI. Antenatal period should be well supervised in overweight women. There is insufficient evidence of fetal surveillance in reducing risk of stillbirth.

### Conclusion

The risk of stillbirth is higher in obese women. Risk of stillbirth increases linearly with gestational age. The highest risk of stillbirth is at term. Obese women are at a higher risk of gestational hypertension, gestational diabetes, growth abnormalities. The safety of weight reduction in pregnancy is not well established. Increased awareness among reproductive age group is most important for primary prevention of obesity in women of child bearing age group.

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