



RISK FACTORS OF LOW BIRTH WEIGHT BABIES: A CASE CONTROL STUDY

¹Ms. Surya Satheesh S, ²Mrs. Minimol Joseph, ³Prof. Sreeja G Pillai

¹MSc (OBG) Nursing, ² Assistant professor, ³Professor

Obstetric and Gynaecological Nursing, Govt. Nursing college, Pariyaram, Kannur, Kerala

Abstract

The present study was conducted to identify the risk factors of Low Birth Weight babies among postnatal mothers in selected hospitals at Kannur district. The objectives of the study were to identify the risk factors of Low Birth Weight babies among postnatal mothers and determine the strength of association between Low Birth Weight and risk factors. The conceptual framework used in the study was Nola J Pender's health promotion model. An unmatched case control design was used in this study. Study conducted among 250 mothers (125 cases and 125 controls) selected by consecutive sampling technique. Interview schedule, rating scale and checklist were used to identify the risk factors of LBW babies among postnatal mothers. In the present study, inadequate rest and sleep [OR-54.9, CI (142.8-250)], strenuous physical activities [OR-138.7, CI (1.492-1000)], eat processed/ junk foods [OR-20.01, CI (11.49-62.5)], medication/treatment [OR-95.38, CI (9.34-166.6)], passive smoking [OR-238.3 CI (2.132-29.85)], exposure to environmental pollutants [OR-318.8, CI (6.493-333.3)], screen time more than two hours per day [OR-30.77, CI (1.449-6.66)], urinary tract infection [OR-10.1, CI (5.0-20.83)], anaemia during pregnancy [OR-50.1, CI (6.75-333.3)], GDM [OR-11.30, CI (3.87-33.33)], placenta previa [OR-22.22, CI (2.92-166.6)], cervical incompetence [OR 22.97, CI (3.84-1000)], polyhydramnios [OR-1068.8, CI (1.0-142.8)], IUGR [OR-1068.8, CI (1.0-142.8)] and hypothyroidism [OR-11.96, CI (1.51-9.09)] were strongly associated with LBW. The findings have an implication in nursing practice, nursing education, nursing administration and nursing research.

Key words: Low Birth Weight baby, risk factors, postnatal mothers

Introduction

A positive pregnancy experience, defined as maintaining a healthy pregnancy for mother and baby including preventing or treating risks, illness and death, having an effective transition to positive labour and birth, and achieving positive motherhood including maternal self-esteem, competence and autonomy. 'WHO envisions that every pregnant woman and new-born, receives good quality of care throughout pregnancy, childbirth and the postnatal period', where quality refers to provision and experience of care from a health systems perspective.¹

Human birth is the most miraculous, transformational and mysterious event of life. Newborns are the most vulnerable group in getting adjusted to the new environment. LBW babies need special care after birth such as help with breathing, staying warm, protection against infection and getting enough nutrition. LBW infants are more prone to hypothermia because they have higher body surface area to weight, thereby exposing more skin surface into the environment. There are difficulties in self-feeding due to uncoordinated sucking and swallowing.²

According to UNICEF report, in 2014 about 27% of the babies are born with LBW in South Asia. According to National Family Health Survey 2015 report 17% of the babies are born with weight less than 2.5 kg in India. LBW is not only reflecting the health of the child, but points out the health status of the mother during her pregnancy period. The reduction of LBW forms an important contribution to the Millennium Development Goal [MDG] for reducing child mortality. Activities towards the achievement of the MDG's will need to ensure a healthy start in life for children by making certain that women commence pregnancy healthy and well-nourished and go through pregnancy and childbirth safely.³

Need and significance of the study

A hospital-based case control study was carried out to identify medical and social risk factors of LBW among infants delivered at Kannur Medical College and Hospital, Kannur District, Kerala. The study involved 110 cases (mothers who delivered a child with birth weight less than 2500 grams) and 220 controls (mothers who delivered a child with birth weight of more than or equal to 2500 grams). Using medical records, all the deliveries that have taken place in the hospital in the past three years (1st Jan 2013 to 31st Dec 2015) were listed separately as cases and controls. Simple random sampling method was used to select the required number of cases and controls. Data was collected using a pre-tested, structured questionnaire. Results showed that anaemia during pregnancy and gestational hypertension are important risk factors of LBW. Researcher recommended that all pregnant women must be screened on a monthly basis for early detection and treatment of risk factors.⁴

A retrospective record-based case control study was conducted to identify maternal factors associated with LBW in KMCT Medical College, Mukkam, Kerala. All babies born in the KMCT Medical College hospital during January to April 2014 were included in the study. A total of 60 cases and 124 matched controls were included in the study. Data collection was done using registers from medical record section of Obstetrics and Gynaecology department. All babies born with birth weight less than 2500 g were included in cases and those born with birth weight more than 2500 g selected as controls. Results showed that, 81.7% of the neonates had birth weight between 2 to 2.5 kg while remaining 18.3% had birth weight less than 2500 g. Low maternal haemoglobin is an important risk factor for LBW. Researcher recommended the need to conduct further studies to identify other maternal risk factors of LBW such as effect of spacing and maternal weight gain.⁵

A health facility-based unmatched case-control study was carried out to identify associated risk factors of LBW among the mothers who delivered in health facilities of Dang district of Nepal. The total sample size for the study was 369. Samples were randomly selected independent of the exposure status in the ratio of 1:2 (123 cases and 246 controls). Information regarding exposure status was assessed through interviews and medical records.

Multivariate logistic regression found that having the kitchen in the same living house, iron intake less than 180 tablets, maternal weight gain during second and third trimester less than 6.53 kg, co-morbidity during pregnancy, preterm birth were the risk factors associated with LBW. Researcher concluded that the identified risk factors can be efficiently prevented through small actions that a family can apply and the mother can easily carry out.⁶

An institution-based unmatched case-control study was conducted to identify determinants of LBW among 279 (93 cases and 186 controls) new-borns delivered from March 15 to April 30, 2019, in Addis Ababa public hospital, Ethiopia. Consecutive and systematic random samplings were employed to select cases and controls, respectively. All new-borns with LBW and normal birth weight were included. Data was collected by interview using structured and pretested questionnaire. The study revealed that, the independent predictors of LBW were maternal height ≤ 155 cm (95%), complications during pregnancy, gestational hypertension, incomplete ANC, and low maternal education level. Findings of this study will add to the current knowledge about predictors of LBW particularly regarding nutritional factors, maternal Mid Upper Arm Circumference (MUAC), Body Mass Index (BMI) which has not been well explained by other studies.⁷

A hospital based cross-sectional study was undertaken to find out the prevalence of LBW babies among 220 postnatal mothers delivered in College of Medical Sciences and Teaching Hospital, Bharatpur, Rajasthan. Questionnaire was used to collect the data from post-natal mothers. The prevalence of LBW was found to be significantly high (23.6%). Socio-cultural and maternal risk factors, dietary intake during pregnancy and period of gestation were found to be significantly associated with LBW babies. The study concluded that the problem of LBW babies was found to be prevalent and associated with various risk factors.⁸

Conceptual framework

Conceptual framework of the present study is based on Nola J Pender's Health promotion model

Research methodology

A quantitative non experimental research approach with unmatched case control design used to identify the risk factors of LBW babies among postnatal mothers

Population

The population refers to a total category of persons or objects that meet the criteria for study established by the researcher, any set of persons, objects or measurements having observable characteristics in common. In the present study, population refers to postnatal mothers.

Sample and sampling technique

Sample is the representative unit of a target population selected by the investigator. In the present study sample consist of all postnatal mothers admitted in selected hospitals at Kannur district selected by consecutive sampling technique.

Sample size was estimated using My sample size software version: 2.1. The sample size estimated to be 310, 155 cases and 155 controls

Tools and methods of data collection

Tool I: Interview schedule to identify the risk factors of Low Birth Weight babies among postnatal mothers related to socio-personal, obstetric and clinical variables

Section A - Socio personal variables: Consist of ten items include age, religion, residence, educational status, occupation, economic status, type of family, crowding index, diet and travel during pregnancy.

Section B- Obstetric variables: Consist of twelve items such as consanguineous marriage, gravida, number of living children, regular antenatal check-up, blood group, regular intake of iron, folic acid and calcium tablets, received two doses of Td vaccine, fetal presentation, complication during the current pregnancy, period of gestation at the time of delivery, birth weight, sex of the baby and mode of delivery.

Section C- Clinical variables: Consists of four items such as height, weight, weight gain during pregnancy and BMI.

TOOL II: Rating scale to identify the risk factors of LBW babies among postnatal mothers related to practice during pregnancy Rating scale consists of eleven items such as takes adequate rest and sleep, perform daily exercises, strenuous physical activities, adequate diet including fruits and vegetables, eat processed/ junk food items, any medication/ treatment, smoking, in contact with people who smoke, drink alcohol, exposure to environmental pollutants and screen time more than two hours per day.

TOOL III: Checklist to identify the risk factors of LBW babies among postnatal mothers related to obstetric history, factors complicating pregnancy, medical and surgical history

Section A- Obstetric history: Consists of eight items such as previous LBW baby, family history of LBW baby, treatment for infertility, spontaneous abortions, habitual abortions, induced abortions, history of intra uterine death and birth spacing less than two years.

Section B- Factors complicating pregnancy: Consists of eleven items such as urinary tract infection, gestational hypertension, gestational diabetes mellitus (GDM), anaemia during pregnancy, vaginal infections, bleeding during pregnancy such as placenta previa, abruption, bleeding other than placental causes, history of abortion, gynaecological diseases during the pregnancy such as ovarian cyst, polycystic ovarian disease, fibroid uterus, cervical incompetence, polyhydramnios, oligohydramnios and IUGR.

Section C- Medical history: Consists of thirteen items such as heart diseases, diabetes mellitus, hypothyroidism, hyperthyroidism, kidney diseases, gastro intestinal diseases diseases, autoimmune disease, coagulation disorders, sexually transmitted diseases, asthma, allergy, vaginal infections, epilepsy, mental health problems like anxiety disorders, depression, mania, postpartum psychosis and any other medical problems.

Section D- Surgical history: Consists of two items such as previous LSCS, undergone any major operations.

Data analysis

Data would be analysed using descriptive and inferential statistics.

- Socio-personal variables, obstetric variables and clinical variables—frequency and percentage.
- Distribution of sample based on risk factors- frequency percentage.
- Chi square test to determine the association between LBW with socio personal variables, obstetric variables, clinical variables, practice during pregnancy, obstetric history, factors complicating pregnancy, medical and surgical history.
- The strength of association between LBW and risk factors by odds ratio.

Statistical significance would be set at $P < 0.05$ level of significance. Entire analysis will be done using statistical SPSS v22.0.

Findings

In the present study inadequate rest and sleep [OR-54.9, CI (142.8-250)], strenuous physical activities [OR-138.7, CI (1.492-1000)], eat processed/ junk foods [OR-20.01, CI (11.49-62.5)], medication/treatment [OR-95.38, CI (9.34-166.6)], passive smoking [OR-238.3 CI (2.132-29.85)], exposure to environmental pollutants [OR-318.8, CI (6.493-333.3)], screen time more than two hours per day [OR-30.77, CI (1.449-6.66)], urinary tract infection [OR-10.1, CI (5.0-20.83)], anaemia during pregnancy [OR-50.1, CI (6.75- 333.3)], GDM [OR-11.30, CI (3.87-33.33)], placenta previa [OR-22.22, CI (2.92-166.6)], cervical incompetence [OR-22.97, CI (3.84-1000)], polyhydramnios [OR-1068.8, CI (1.0- 142.8)], IUGR [OR-1068.8, CI (1.0-142.8)] and hypothyroidism [OR-11.96, CI (1.51- 9.09)] were strongly associated with LBW.

Results

The study revealed association between LBW and socio-personal variables such as religion, residence, educational status, economic status, crowding index and travel daily during pregnancy, obstetric variables such as history of consanguineous marriage, gravida, number of living children, taken iron, folic acid and calcium tablets regularly and mode of delivery shows association with LBW babies. Clinical variables such as mother's height, weight and BMI were also associated with LBW. Other factors such as antenatal mothers who were not taking adequate rest and sleep, not perform daily exercises, not taking diet including fruits and vegetables, had strenuous physical activities, eat processed/ junk foods, on medication/treatment, in contact with people who smoke, exposure to environmental pollutants, had screen time more than two hours per day, had previous LBW baby, family history of LBW baby, spontaneous abortion, on treatment for infertility, birth spacing less than two years, urinary tract infection, anaemia during pregnancy, gestational hypertension, GDM, placenta previa, cervical incompetence, hypothyroidism and asthma were also identified as risk factors of LBW baby.

Limitations

- Sample size was reduced from 310 (155 cases and 155 control) to 250 (125 cases and 125 control) due to unavailability of required sample.

- Duration of data collection from each sample exceeds more than 45 minutes due to interruption.
- Interruption during data collection due to frequent breast feeding and crying.

Recommendations

- Similar study can be conducted with larger samples size for generalization of findings.
- Studies can be conducted to assess the knowledge of staff nurses working in obstetrics and gynaecology wards regarding risk factors of LBW babies.
- Studies can be conducted to assess the knowledge of post natal mothers regarding care of LBW babies.
- Follow-up studies can be undertaken to assess the practice of mothers regarding home care of LBW babies

References

1. WHO recommendations on antenatal care for a positive pregnancy experience—going beyond survival. An International Journal of Obstetrics & Gynaecology. <https://doi.org/10.1111/1471-0528.14599>. Available from: <https://obgyn.onlinelibrary.wiley.com/doi/10.1111/1471-0528.14599>
2. International journal of paediatric nursing. 2018. volume 4. page number:103
3. M Sarika, Vishwakarma Rashmi, Rao Rajasekhar. —Study of low birth weight babies and their association with maternal risk factors. International Journal of Paediatric Research. Available from: <https://pediatrics.medresearch.in/index.php/ijpr/article/view/632/1148>
4. Ismail Mohammed Imaad, Venugopalan P P. Case-control study on risk factors of low birth weight in a tertiary care hospital, Kerala. International Journal on Community Medicine and Public Health. Vol 4, No 3 (2016). Available from:114 <http://annalsofcommunityhealth.in/ojs/index.php/AoCH/article/view/162>
5. Pawar Anant, Kumar Durgesh. Maternal factors associated with low birth weight: a case control study in rural Kerala. International Journal of Community Medicine and Public Health 2017 Oct; 4(10):3793-3795. Available from: <https://www.ijcmph.com/index.php/ijcmph/article/download/1906/150>
6. C K Anil, Basel Lal Prem, Singh Sarswoti. Low birth weight and its associated risk factors: Health facility-based case-control study. PLoS ONE 15(6): e0234907. Published: June 22, 2020. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234907>
7. Mulu Baye Getaneh, Gebremichael Bereket, Desta Wondwossen kalkidanKebede Adimasu Mekonen, Aynalem Asmare Yared, Etahun Bimirew Melaku. eterminants of Low Birth Weight Among Newborns Delivered in Public Hospitals in Addis Ababa, Ethiopia: Case-Control Study. Paediatric Health Med Ther. 2020 Mar 24;11:119-126. doi: 10.2147/PHMT.S246008. PMID: 32273790; MCID: PMC7102875. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7102875/>

8. Bansal Prerna, Garg Sandeep, Upadhyay Prasad Hari. Prevalence of low birth weight babies and its association with socio-cultural and maternal risk factors among the institutional deliveries in Bharatpur, Nepal. Asian journal of medical sciences. Published: 01-01-2019. DOI: 10.3126/ajms.v10i1.21665. E-ISSN: 2091-0576. P-ISSN: 2467-9100

Available from: <http://nepjol.info/index.php/AJMS>

