



Original Article:

Seasonal Variation of Delivery Rate: A Four Years Study in a Rural Tertiary Care Centre.

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Citation

Chattopadhyay S, Pal A, Jana N, Maity D, Bandopadhyay S. Seasonal Variation of Delivery Rate: A Four Years Study in a Rural Tertiary Care Centre. *Online J Health Allied Scs.* 2014;13(2):1. Available at URL: <http://www.ojhas.org/issue50/2014-2-1.html>

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Submitted: Jun 30, 2014; Accepted: Jul 20, 2014; Published: Aug 30, 2014

Abstract: Objective: To determine if there are monthly variations in the rate of deliveries in Burdwan Medical College West Bengal, India. **Materials and Methods:** A retrospective descriptive study carried out in the Burdwan Medical College. We extracted the total number of deliveries from the hospital records for over four year period and analyzed the figures for the monthly variation in delivery rates. This was repeated for a standardized 30-day month and the findings noted. The extracted data then fed into a computer and analysis was performed, based on the grouping of the delivery rates per month. **Results:** The monthly distribution of total deliveries showed a slightly sinusoidal pattern with two peaks. A major peak spanning two months, August and September and another small peak in April and May. The figure also depicted the nadir number of deliveries to occur majorly in February and March and another in December. **Conclusion:** There is a seasonal variation in delivery rates in our study.

Key Words: Delivery rates, Seasonal variation.

Introduction:

Humans have the potential of year round reproduction in a cyclical pattern. A fertile woman has the potential of conception following unprotected sexual intercourse at the time of ovulation. Ovulation in humans occurs cyclically. Studies abound on the seasonal variation of various obstetric events. It has been shown in some studies that the incidence of eclampsia and pre-eclampsia is season-dependent.[1-5] The seasonal effect on the rate of ectopic pregnancy, spontaneous abortion, and even the seasonal effect of conception have been studied with conflicting results.[6,7] However, many of these studies had no reference to seasonal

variation in the delivery rate, as a possible variable that may have resulted in an apparent seasonal difference in the incidence of these conditions.

The study aims at reviewing the monthly distribution of deliveries. The monthly distribution of deliveries approximately reflects the monthly distribution of conception, as each delivery reflects a conception that occurred about nine months earlier. The knowledge gained of seasonal variation in conception and delivery will be important in various aspects of health system planning, especially those concerning reproductive health issues. In batching for assisted reproduction, the findings could assist in predicting periods of improved successful outcome. It will also assist in the better understanding of these reproductive issues and the factors that affect their occurrence. Knowledge of seasonal variation in the delivery rates may also be necessary denominator in validating the apparent seasonal variation in various reproductive health statistics. Considering the dearth of information on the seasonal distribution of deliveries, it become necessary at this in time, to document such variation, if any, and thus provide some evidence on its existence or otherwise.

Materials and Methods

This is a retrospective descriptive study carried out in Burdwan Medical College, West Bengal, India. This medical college hospital is a tertiary care centre with an annual delivery of 23,000 approximately. This hospital caters the poor rural population of West Bengal, India and is a state owned hospital.

The four years' records of deliveries were extracted. The extracted data was analysed with the help of a computer, based on the grouping of the delivery rates per month. The

monthly delivery rates were standardized to a uniform 30-day month, to eliminate the disparity that may result from the difference in the number of days in the various month of the year, and the analysis was repeated. This study was approved by the ethical committee of the Burdwan Medical College, West Bengal.

Results

The total number of deliveries recorded in this hospital over the study period was 70,911 with average monthly delivery of 1477. The range of monthly deliveries was 1189 to 1865. The monthly distribution of total deliveries showed a slightly sinusoidal pattern with two peaks. A major peak spanning two months, August and September and another small peak in April and May. The figure also depicted the nadir number of deliveries to occur majorly in February and March and another in December. This pattern persisted even after correction for the differential number of days in the month of the year.

Month	2010	2011	2012	2013
Jan	1230	12660	1350	1230
Feb	1260	1290	1200	1260
March	1200	1200	1290	1080
April	1360	1339	1424	1323
May	1500	1350	1380	1530
June	1395	1222	1299	1463
July	1290	1380	1350	1500
August	1500	1530	1620	1800
Sept	1706	1744	1670	1885
Oct	1750	1650	1650	1890
Nov	1633	1535	1594	1790
Dec	1470	1470	1500	1530

Discussion

This study found a significantly higher monthly delivery rate in the months of August, September, April and May and a significantly lower monthly delivery rate in December, February and March. The single highest monthly delivery occurred in the month of September and single lowest in December. This, by implication infers the highest monthly conception to be in January and the lowest monthly conception to be in April. These findings relate favorably with reports in different parts of the world, which have reported significant variations in the monthly delivery rates. The recent National vital statistics report of the United States reports that birth peak historically in August and reaches a nadir in February.[8] Our study also follows more or less same variation. Studies from Norway and Australia reported seasonal variation in birth rates.[9,10] Yadava et al., working in India, reported the maximum indices of deliveries in the month of August to October and lowest from April to June.[11] They extrapolated this to indicate the maximum conception rates in the winter season. Warren et al have also reported a significant bimodal seasonal trend in the estimated monthly number of conceptions.[12] Different reasons have been adduced for the seasonal variations observed in these studies. Seasonal variations in sperm quality and also in ovarian activity have been proposed.[13] Seasonal variation in coital activity among couples is the possible factor influencing the seasonal variation in conception and delivery. Increase in cohabitation is expected in the cold seasons as in the haematin festive seasons of December in Nigeria, but the peak conception rate was found to occur in July (which corresponds to the height of the rainy season which is often hot). The effect of photoperiod, melatonin, and temperature are other mechanisms that have also been proposed.[14]

Despite these, different geographical locations will experience different months of peak and nadir in the number of deliveries, as a result of differences in altitudes and climatic conditions[6,15] as seen in this study compared with others from different climatic regions.[8-10]

One limitation of this study is that it is hospital-based, and therefore, failed to capture all the births in the community. This is unlikely to influence the outcome of this study as Benin city is almost entirely urban and well over 70% of deliveries are hospital-based.[16] In addition, it is unlikely that there will be significant seasonal variations in access to the studied hospitals, which are located in different parts of the city. Occasional industrial action leading to closure of one or more of the hospitals is another limiting factor. This is unlikely to affect the findings, as there has been no industrial action that has affected more than one of the centers at the same time, as they are run by different levels of management and most of the industrial actions have been short and often spared the labour wards of the hospitals from such action.

Conclusion

The study of seasonal variations in health and health-related issues plays a great role in understanding the variables that affect the various events. Understanding the variation in conception and delivery rates is of immense value in time-assisted reproductive procedures, in other issues relating to reproductive care, and when planning for a more efficient service delivery.

Acknowledgements:

We are grateful to the Principal and Medical superintendent cum Vice Principal of Burdwan Medical College for their kind permission to conduct the study.

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