

# Birth audit

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## Abstract

**Objective:** To describe profile of births occurring in teaching institution on selected parameters. **Materials and Methods:** Considering feasibility, four months were systematically chosen for two-year time frame over a decade to gather selected information of consecutive singleton intramural births from log books of labor room on structured pro-forma. Data management was done using software package and analysis carried out by computing descriptive statistics (%) and Chi-square test. **Results:** It was observed that there were a total of 2862 and 1527 singleton births (>28 weeks) recorded for the sampled time-frame of 2009 and 1999 respectively reflecting increased quantum of institutional deliveries over time-span. Out of 2862 births, monthly distribution was 21.8% (Jan), 20% (Apr), 37.2% (July) and 21.1% (Oct) with similar picture for 1999. The birth according to 8-hourly timeframe was computed to be 31.6% (12 am-8 am), 34.3% (8 am-4 pm) and 34.0% (4 pm to 12 am) for 2009 while it was 28.6%, 38.6% and 32.8% for 1999 ( $P < 0.05$ ). Births took place through-out seven days of week; however, Sunday (12.0%) was the least popular day while Thursday (18.7%) recorded maximum proportion of births during 2009. Slightly higher proportion of pre-term births were recorded during 2009 (21.76%) in comparison to 1999 (18.53%). The caesarian section rose to 26.1% from 20.2% ( $P < 0.05$ ) while M:F ratio at birth was 1.28 and 1.17 with similar proportion (92.3%; 93.0%) of newborns being discharged live during 2009 and 1999 respectively. **Conclusion:** It provides snapshots of birth occurring in a teaching hospital and within study constraints finding could be utilized for improving quality of care, health communication, better utilization of human resource and logistics.

**Key words:** Birth, caesarian section, day, delivery, institution, month, outcome, perinatal mortality, record, retrospective, sex, time

## INTRODUCTION

Birth has been described vividly with contrasting critiques and images by artist, anthropologist, demographer, sociologist and medical fraternity since time immemorial. Yet, topic offers freshness and depth, invites attention and attracts researcher to unfold different dimensions associated with the phenomenon. The path to discovery still continues. With this background, a cross-sectional record based retrospective study was undertaken to describe profile of births occurring in a medical college hospital of northern India on selected parameters.

## MATERIALS AND METHODS

The study was conducted in one of the publically funded teaching institution of northern India which provides round the clock specialist's tertiary care services to patients largely belonging to lower/middle socio-economic strata of both rural and urban setting. University of Health Sciences, Rohtak (Haryana) has a current sanctioned seats of 200 (MBBS), 75 (Nursing) and 75 (Pharmacy) at undergraduate level, in addition to post-graduation and other paramedical courses. Currently, it caters to an avg. daily OPD attendance of more than 5000 patients and 80,000 annual admissions supported by 1750 in-patient beds.

Considering feasibility and resource constraints (lack of electronic database, skilled manpower for data collection, time etc.) it was envisaged to collect all pertinent information of births (beyond 28 weeks) by systematically selecting months of January, April, July and October for the year 2009. The same procedure

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was adopted for the year 1999 for comparison purpose. Preventive measures are taken for upkeep of records and assistance of staff was solicited in retrieving old records. Selected information (month, day, time of maternal hospital admission and birth, estimated period of gestation based on last menstrual cycle, type of delivery, sex of newborn, and outcome) of all consecutive singleton intramural births was extracted manually from the log books maintained in the labor room. The data collection was carried out by investigators using structured proforma from Feb to May 2010 after taking permission from authority. At least one of the investigators was available as supervisor during both the study time-frame. Nearly 3.1% [88 (2009) and 49 (1999)] case entries were incomplete/illegible, hence excluded from study. Time of day was divided into 3 intervals- 12 midnight to 8 am, 8 am to 4 pm and 4 pm to 12 midnight. Analysis was carried out by calculating proportion (%) and Chi-square test using software statistical package (SPSS ver. 16) and considered significant and reflected in the table at level  $P < 0.05$  to assess change in trend overtime frame.

## RESULTS

There were a total of 2862 and 1527 singleton births recorded for the sampled time-frame of 2009 and 1999 respectively reflecting increased (46.6%) quantum of institutional deliveries over the period. Out of 2862 births, monthly distribution was 21.8% (Jan), 20% (Apr), 37.2% (July) and 21.1% (Oct) with similar picture for 1999 [Table 1]. Majority of maternal admission was noticed during the time-interval of 8 am-4 pm, 44.8% (1999) and 40.8% (2009) respectively with a significant rise from 28.7% (1999) to 34.8 (2009) for 4 pm-12 am. The birth according to 8-hourly timeframe was computed to be 31.6% (12 am-8 am), 34.3% (8 am-4 pm) and 34.0% (4 pm to 12 am) for 2009 while it was 28.6%, 38.6% and 32.8% for 1999 ( $P < 0.05$ ). Births took place through-out seven-days of week; however, Friday recorded highest proportion of births (16.2%) in 1999 and Thursday (18.7%) during 2009 ( $P < 0.05$ ). The male: female ratio at birth was 1.28 (2009) and 1.17 (1999). Similar proportion (92.3%; 93.0%) of newborns was discharged live. The caesarian section (CS) recorded was higher in 2009 (26.1%) in comparison to 1999 (20.2%). The rise was found to be statistically significant ( $P < 0.5$ ).

## DISCUSSION

A study was undertaken to describe births occurring in a government medical college hospital of northern India on selected parameters, a first of its kind in this

**Table 1: Profile of births in a teaching institution according to selected variables**

Variable	1999		2009	
	N	%	N	%
Month of birth				
January	321	21.0	623	21.8
April	296	19.4	571	20.0
July	546	35.8	1065	37.2
October	364	23.8	603	21.1
Time of maternal admission*				
12 am to 8 am	272	26.5	464	24.4
8 am to 4 pm	459	44.8	777	40.8
4 pm to 12 am	294	28.7	662	34.8
Time of birth*				
12 am to 8 am	431	28.6	900	31.6
8 am to 4 pm	583	38.6	977	34.3
4 pm to 12 am	495	32.8	969	34.0
Day of birth*				
Mon	199	12.6	345	12.1
Tue	222	14.1	352	12.3
Wed	202	12.8	484	16.9
Thurs	214	13.5	534	18.7
Fri	256	16.2	396	13.8
Sat	230	14.6	407	14.2
Sun	204	12.9	344	12.0
Estimated period of gestation*				
28-36 weeks	283	18.53	623	21.76
37 weeks/above	1244	81.46	2239	78.23
Sex				
Male	822	54.0	1603	56.2
Female	699	46.0	1248	43.8
Type of Delivery*				
Vaginal	1218	79.8	2115	73.9
CS	309	20.2	747	26.1
Outcome				
Discharge live	1420	93.0	2643	92.3
Perinatal mortality	107	7.0	219	7.6

\*Statistically significant ( $P < 0.05$ )

region of country. The human beings in contrast to other species reproduce through-out the year but out of four systematically sampled (Jan, Apr, July, Oct) months, it was found out that the proportion of births were similar (19.0% to 23.0%) during all months except July (37.2% and 35.8%) corresponding to colloquial term of 'birth seasons' among obstetrician. India is the second most populous (1210 million persons, 2011) country in the world with nearly 25 million births taking place annually. The population control has been one of the greatest challenges with many policy interventions, strategies and measures in vogue since inception of National Family Planning Control program (1952) and current Reproductive Child Health (RCH) program of National Rural Health Mission (NRHM). Still a lot needs to be done in this direction using innovative strategies. Within study limitations as also there was no information on other co-variables, the finding technically indicates that maximum conception occurred during Nov-Dec. Public health implications e.g., family planning activities could be re-organized and specifically targeted during

these winter months that may have a higher resultant yield.

Time of maternal admission followed a downward trend from highest during day time (8 am to 4 pm) followed by evening and least in early morning during both study period with variation noted in proportion. With doubling of deliveries in recent years due to improvement of socio-economic conditions, level of education, enhanced advocacy for institutional deliveries in India [34% (DLHS, 1998-99); 47% (DLHS, 2007-08); 60.5% (SRS, 2010)], easy access to communication and free transport facilities under National Rural Health Mission (NRHM), the other aspect of this scenario also points out at rising occupational burden, stress and sleep deprivation amongst health professionals especially if accompanied by staff shortage. It may also point towards poor communication, quality of care including adverse outcome and threat to physical security as large number of birth are taking place outside the working hours of institution which is accompanied by reduced staff strength in comparison to routine day shifts. Recently, electronic surveillance has been installed at this unit to strengthen security.

In a study from Tokyo hospital, proportion of deliveries have been reported for the same 8-hourly period as 38.5% (day), 33.37% (evening) and 28.0% (night) respectively.<sup>[1]</sup> Similar pattern was noted for 1999 study frame however for 2009 proportion of birth were similar for evening (34%) and night (34%) period. In our study, Sunday (12.0%) and Monday (12.1%) appeared to be least popular day while Thursday (18.7%) recorded maximum births during 2009 while Tuesday has been the most and Sunday the least popular day of all births in USA.<sup>[2]</sup> This could be suggestive of a evolving phenomenon but larger study sample is required to validate the findings. To the best of our efforts, we could not retrieve any recent study reflecting proportion of births according to time and week days in the national context. Previous studies generally agree that *homo sapiens* births without medical intervention occur mostly at night as a result of ancient evolutionary adaptive pattern. Various reasons have been suggested to explain the advantage of nocturnal deliveries among diurnal species (lower activity of predators, group protection, better conditions for delivery and higher mother-infant bonding).<sup>[3]</sup> Contractions most frequently start in the middle of the night with a peak just after midnight.<sup>[4]</sup> However, it has been suggested that natural adaptation is blurred in modern population because of cultural factors, institutional policies and procedures.

Overall adverse sex ratio is an area of concern in

prosperous state of northern India with known female foeticide, infanticide and/or neglect. Globally, there are 105 baby boys to 100 girls at birth under natural circumstances. Sex ratio at birth (SRB) in India should be atleast 950 girls per 1000 boys for sustainability of society.<sup>[5]</sup> However according to sample registration system (2008-10) sex ratio at birth was 905 (India) and 848 (Haryana) girls per 1000 males. National figure of child (0-6 years) sex ratio accounted for 914 while the corresponding figure for Haryana was 830 (2011 Census)<sup>[6]</sup> that has improved from previous (Census 2001) figure of 819. The figure for Rohtak (Haryana) was grim with 807 girls/1000 boys. According to Civil Registration System (CRS) with 96% birth registration in the state of Haryana during 2011 (total births: 563,556), SRB stood at 833 girls/1000 boys (personal communication). In this study also higher male births were reported (sex ratio being 778 (2009) and 850 (1999) girls to 1000 boys). But the finding was not statistically significant. The female to male recorded a decline in 2009, probably suggesting human intervention. However it has been documented that sample size of birth observations should be more than 100,000 to obtain robust SRB within narrow 95% confidence range<sup>[7]</sup> while our sample size was very small. As large number of un-booked case directly present to tertiary care hospital for delivery, it may be argued that if the sex of foetus was known during anti-natal period, there were greater chances of male foetus being brought to hospital for delivery.

From a sociological dimension, father of male foetus have a more active lifestyle and considered to have risk taking attributes in comparison to 'philosophical/lazy' father of female foetus. This may be one of the reasons for shifting their spouse for delivery in health institution in comparison to comfortable home environment of delivery in rural areas under the supervision of traditional birth attendant (*dai*). However, exact reason cannot be elucidated. In the neighboring state of Delhi, out of all births, males were 52.3% and female (47.7%)<sup>[8]</sup> while another study carried out in Delhi hospital also recorded a decline with 865 (2005) and 806 (2009) girls to 1000 boys at birth.<sup>[9]</sup> National Neo-natal Perinatal Database (NNPD) in India reported 52.9% (male) to 47% (female) at birth.<sup>[10]</sup>

Surgical interventions during pregnancy are usually performed to ensure safety of the mother and child under conditions of obstetric risk. They are justified under certain circumstances but rise of caesarian section (CS) rate in last three decade has been an area of acute concern, attention and debate across globe. Out of all births occurring in USA, CS rate was 31.8%.<sup>[2]</sup> In 2001 an estimated 21.4% of all deliveries in England and Wales

were by CS, a five-fold increase since 1971.<sup>[11]</sup> In 1985, WHO had recommended that CS rate could be upto 15% of all deliveries while the most recent (2007-08) survey carried out by the international agency in Asian countries indicated CS rate of 46.2% (China), 35.6% (Vietnam), 34.1% (Thailand), 30.6% (Sri Lanka), 20.3% (Nepal), 19.8% (Japan), 18.8% (Philippines), 17.8% (India) and 14.7% (Cambodia).<sup>[12]</sup> While Indian literature reported the hospital CS rate of 26.2% in Raipur, 23.2% (Mangalore), 19-35% (Delhi teaching hospitals).<sup>[13-15]</sup> NNPD (2002-03) reported CS rate of 28.7%. Our study suggests a similar picture with rise of CS rate to 26.1% from 20.2% during last decade.

Teaching hospital attracts high risk patients and usually without antenatal registration as 56.9% mothers were not booked with the institution during antenatal period (2009). Our study revealed 92.3% newborns were discharge-live while NNPD (2002-03) reported 96.5%. Perinatal mortality rate in this study was 76.51 (2009) and 70.07 (1999) while a hospital in West Bengal (98.65) and Mexico reported as 20.5 per 1000 live and still births.<sup>[16,17]</sup> Stillbirth in India are under-recorded however according to available estimates perinatal mortality rate was 70 per 1000 live and still births.<sup>[18]</sup> On a corollary, an institutional study from neighboring Pakistan reported slightly higher (9.72%) perinatal mortality.<sup>[19]</sup>

In 2010, Caughey *et al.*<sup>[20]</sup> reported that neonatal outcomes do not differ between the daytime, evening and night time shifts in an institution with anesthesiology and obstetric staff on duty in-house 24 hours per day as also observed in present study. In addition, Bailit *et al.*<sup>[21]</sup> have found in their large multicenter study of teaching hospitals in United States that there were no important differences in maternal or neonatal morbidity rates according to work shift after unscheduled cesarean delivery. However, these studies are in sharp contrast to the Gould<sup>[22]</sup> and Suzuki<sup>[11]</sup> study which found that neonatal outcomes were worse at night in California and Tokyo respectively. This could be attributed to patient related factors, health care practices or reporting bias. Pre-term births constituted 9.6% (5%-18%) of all birth globally<sup>[23]</sup>, 12.7% (USA)<sup>[1]</sup>, India (13%) while a hospital study from Lucknow<sup>[24]</sup> reported 20.3% similar to our findings of 21.76% and 18.53%.

## CONCLUSIONS

To conclude, study provides a snapshot of births occurring in a teaching institution of northern India on selected parameters and findings could be utilized for improving quality of care, health communication, better

utilization of human resource and logistics.

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