Introduction

Civil registration is defined as continuous, permanent, compulsory recording of the occurrence and characteristics of vital events (e.g., birth etc.) through decree or regulation in accordance with the legal requirement of a country.[3] However, global estimates suggest that more than 36% of all births are not registered.[3] Around 51 million births go unregistered every year in developing countries, which translates to one in three children globally. One out of every three developing countries has a birth registration rate of lesser than 50%. In South Asia, the region with the largest number of unregistered children, this increases to more than one out of two or over 24 million children not registered in 2007. Sub-Saharan Africa has the highest percentage of children under age five who are not registered at birth, with the figure as high as 66%. The picture for a developed nation for birth registration stood at more than 92%.[3-5]

Registration of Births in India

Some steps on registration of births, still births and deaths in India was taken way back in 1873 on voluntary basis under civil registration system (CRS), but was made compulsory under the unified legislation in the country entitled Registration of Births and Deaths (RBD) Act, 1969. In spite of existence of legislation for almost three decades, national birth registration stood at 55% by 2001 which further led to revamping of CRS across nation. The current registration has risen on a positive note to 70% as per available report[6,7] with the problem still prevailing especially in northern India.

Registration of Birth in Haryana (India)

Registration of Births in Haryana is carried out under the provisions of RBD Act, 1969 and Haryana registration of B&D Rules, 2002 made there under which came into effect from the year 2005. The Health Department became principal agency for registration of vital events (e.g., birth) and medical officer in public health sector, secretary in municipalities and executive officer in cantonment board have been designated as


table
The re-vamping of CRS in the State of Haryana led to higher birth registration, enthusiasm, enhanced visibility and appreciation among stakeholders. Keeping this in the background, a study was undertaken in a rural center of Haryana (India) to document time elapsed between birth and registration; describe the socio-demographic profile of registered births and find out any un-registered births.

Materials and Methods

The study was undertaken in Lakhan Majra block, a rural area of the district Rohtak with approximate 1-lakh agrarian population residing in 24 villages. The area is well-connected with all season motorable roads and served by three functional primary health centers (PHCs) under public health system.

Considering study objectives and feasibility, out of three birth registering units in the block, one PHC was selected randomly and all records related to births registered for the year 2010 and 2011 by this center were retrieved, scrutinized for completeness and data collection carried out during 1st November’ 2011-31st January’ 2012 on a structured proforma based on CRS. The selective study variables included date of birth and registration, sex, place of birth, type of delivery, assistance during delivery, birth order, education of mother and father, occupation of mother and father, age of mother at marriage and present delivery. House to house visits was undertaken with the assistance of anganwadi workers and/or Accredited Social Health Activists in the area and all births during the study period were contacted to identify non-registration. With decentralization of birth registration at PHC in the State of Haryana (India), any births that happened prior to reference study year but registered during the study period were excluded from the analysis. There were 25 such births registered during this period.

The data was entered into Microsoft Excel spread sheath and analysis carried out by computing descriptive statistics to describe the socio-demographic profile and time-elapsed between birth and registration. Chi-square test was also applied using software statistical package (Statistical Package for the Social Sciences, USA version 16) and only significant items ($P < 0.05$) reflected in the table. Distribution of births was analyzed to explore the existence of any seasonality pattern according to quarter (q1 [January-March]-90 days; q2 [April-June]-91 days; q3 [July-September]-92 days; q4 [October-December]-92 days).

Results

Total births registered at PHC was 616 (340 [2010] and 276 [2011] respectively). Time elapsed between birth and registration was computed to be lower, i.e., 9.38 days ($\pm 7.46$) during 2011 in comparison with 10.52 days ($\pm 8.73$) in 2010, suggesting early birth registration [Table 1]. Nearly, 92% (2010) and 97% (2011) births were registered within stipulated 21 days. Births happened throughout the year; however, Quarter-3 recorded maximum (31.1%) proportion of births followed by Quarter-1 (24.6%). Socio-demographic profile of births registered at rural center is shown in Table 2. Male: female ratio at birth was 1.2:1. Higher education was noticed for both father and mother in 2011 in comparison with 2010. The majority of father by occupation were farmers (42.9%) in 2010 while it was laborer (51.0%) for 2011. Almost all (98.0%) mother’s occupation was shown to be nil suggestive of them being house-wives. However, in this region they contribute significantly in agriculture and/or livestock management in addition to doing household chores. The reported age of marriage was 18 years amongst 63.2% (2010) and 57.6% (2011) mothers whereas for the rest it had shifted to higher age of 19 years or beyond. Mode of deliveries were normal vaginal. All (100%) births in the area covered by PHC were found to be registered at this or higher center depending on the place of delivery (rural/urban area). There is an omission/commission of the birth format noticed under CRS that needs urgent attention of the authorities.

Discussion

A cross-sectional descriptive study was undertaken to document time interval between birth and registration and describe the profile of births registered at a PHC in a rural block of Haryana. The time elapsed between birth and registration was found to be

| Item | 2010 | 2011 | Total |
|------|------|------|-------|
| Birth registered at PHC (n) | 340 | 276 | 616 |
| Time elapsed between birth and registration (days) | | | |
| Mean | 10.52 ($\pm 8.73$) | 9.38 ($\pm 7.46$) | 10 ($\pm 8.19$) |
| Median | 9.0 | 8.0 | 8.0 |
| Range | 1-81 | 1-88 | 1-88 |
| Births according to q time-frame; # (%): | | | |
| January-March (q1) | 85 (25.0) | 67 (24.2) | 152 (24.6) |
| April-June (q2) | 73 (21.4) | 58 (21.0) | 131 (21.2) |
| July-September (q3) | 112 (32.9) | 80 (28.9) | 192 (31.1) |
| October-December (q4) | 70 (20.5) | 71 (25.7) | 141 (22.8) |

PHC: Primary health center; q: Quarter
Table 2: Profile of registered births at a rural center, Haryana

| Item                                      | 2010 n (%) | 2011 n (%) | Total n (%) |
|-------------------------------------------|------------|------------|-------------|
| **Level of education: Father**           |            |            |             |
| Nil                                       | 23 (6.7)   | 36 (13.0)  | 59 (9.5)    |
| Up to 5th class                           | 77 (22.6)  | 26 (9.4)   | 103 (16.7)  |
| 6-10th class                              | 170 (50.0) | 149 (53.9) | 319 (51.7)  |
| 11th class or more                        | 70 (20.5)  | 65 (23.5)  | 135 (21.9)  |
| **Level of education: Mother**            |            |            |             |
| Nil                                       | 76 (22.3)  | 59 (21.3)  | 135 (21.9)  |
| Up to 5th class                           | 69 (20.2)  | 54 (19.5)  | 123 (19.9)  |
| 6-10th class                              | 160 (47.0) | 126 (49.2) | 286 (46.4)  |
| 11th class or more                        | 35 (10.2)  | 37 (13.4)  | 72 (11.6)   |
| **Occupation of father**                  |            |            |             |
| Farmer                                    | 146 (42.9) | 103 (37.3) | 249 (40.4)  |
| Laborer                                   | 134 (39.4) | 141 (51.0) | 275 (44.4)  |
| Others                                    | 60 (17.6)  | 32 (11.5)  | 92 (14.9)   |
| **Age of mother at marriage (years)**     |            |            |             |
| 18                                        | 215 (63.2) | 159 (57.6) | 374 (60.7)  |
| 19                                        | 89 (26.1)  | 74 (26.8)  | 163 (26.4)  |
| 20 or more                                | 36 (10.5)  | 43 (15.5)  | 79 (12.8)   |
| **Age of mother at this delivery (years)**|            |            |             |
| Up to 19                                   | 04 (1.1)   | 01 (0.3)   | 05 (0.8)    |
| 20-24                                      | 198 (58.2) | 162 (58.6) | 360 (58.4)  |
| 25-29                                      | 121 (35.5) | 94 (34.0)  | 215 (34.9)  |
| 30 or above                                | 17 (5.0)   | 19 (6.6)   | 36 (5.8)    |
| **Place of birth**                        |            |            |             |
| Institution                               | 169 (49.7) | 80 (28.9)  | 249 (40.4)  |
| Home                                      | 171 (50.2) | 196 (71.1) | 367 (59.5)  |
| **Assistance during delivery**            |            |            |             |
| Government institution                     | 51 (15.0)  | 26 (9.4)   | 77 (12.5)   |
| Private institution                       | 09 (2.6)   | 05 (1.8)   | 14 (2.2)    |
| Doctor/nurse/trained dai                  | 275 (80.8) | 245 (88.7) | 520 (84.4)  |
| TBA                                       | 05 (1.4)   | Nil        | 05 (0.8)    |
| **Birth order**                           |            |            |             |
| One                                       | 117 (34.4) | 76 (27.5)  | 193 (31.3)  |
| Two                                       | 128 (37.6) | 111 (40.2) | 239 (38.7)  |
| Three                                     | 73 (21.4)  | 60 (21.7)  | 133 (21.5)  |
| Four or more                              | 22 (6.4)   | 29 (10.5)  | 51 (8.2)    |
| **Sex**                                   |            |            |             |
| Male                                      | 185 (54.4) | 152 (55.0) | 337 (54.7)  |
| Female                                    | 155 (45.5) | 124 (44.9) | 279 (45.2)  |

*Suggestive; significant (P<0.05); Omission/omission in birth formal; TBA: Traditional birth attendant

very encouraging, i.e., 9 days and 8 days (median) during 2010 and 2011 respectively. The maximum birth registration occurred with-in the stipulated period of 21 days as prescribed under CRS thereby indicating rising community awareness, motivation, importance of need for certificate (especially to avail benefits under child developmental schemes and at the time of school admission etc.). This was aided by easy access to CRS and relative user-friendliness of the health system in contrast to erstwhile registering units (police stations) of vital event in rural areas. Overall current status of birth registration in the entire State of Haryana is atleas 94%[8] while our study clearly indicates rising trend of early birth registration in a rural area. National Family

Health Survey, Haryana (2005-06) reported birth registration of 70% but time elapse between birth and registration was not the scope of this survey, hence no information on this account.[3]

To the best of our ability, we could not retrieve any published study with similar objectives having been conducted in rural India in recent years.

Seasonality of health events, especially infection is well-known. Human births have also been shown to follow a seasonal pattern and is considered to be a world-wide phenomenon.[10][11] Various hypothesis/factors have been put forth for this pattern that can be grouped into three categories, seasonality due to social factors (marriage, holidays, contraception, etc.) that influence the frequency of intercourse; seasonality due to climatological factors that directly affect human fecundity; and seasonality due to energetic factors that principally affect female fecundity.[12] Month wise maximum proportion of birth recorded was during September (11.3%) followed by August (10.7%). Seasonality in births was observed in the present study with a peak occurring during third-quarter and trough during second-quarter. This was similar to findings of a study by Anand et al. undertaken in a rural area of Ballabgarh, (Haryana).[13] The findings suggest that maximum conception occurred during the months November-January that has a public health bearing. Family planning activities could be re-organized and directed during this period for higher resultant yield. Few of our limitations are non-generalizability of study findings; smaller universe of 2-year time frame and no information on pregnancy duration, but similar studies may be undertaken for larger time frame in other areas to estimate the frequency/variation.

Education especially maternal has long been considered an important influencing factor on diverse developmental/social issues, e.g., fertility and inter-alia maternal and infant health has been shown to have a profound effect on the number of births and the risk of adverse birth outcome. In spite of certain inherent limitations of record based study, present study brings out rising level of education, delayed age of marriage of women in rural areas while in-contrast birth order of three or more (>25%) indicates still less importance being given toward small family size or limited access to appropriate family planning services etc., The study finding indicates definitive improvement of the demographic profile viz, NFHS-3 and District Level Household and Facility Survey (2007-08), Haryana survey. In this study, social characteristics are not being correlated with birth registration because of a narrow range in time trend of birth registration observed during the reference period.

Overall adverse sex ratio (0-6 years) is an area of concern in the prosperous States of northern India due to intense desire for male child. National figure in the context of sex ratio accounted for 914 girls/1000 boys while the corresponding figure for Haryana is 830 (2011 Census)[14] that has improved from the previous census (2001) figure of 819. The proportion of male to female recorded at birth in the present study was similar for both time-frames with total as male (54.7%) and female
of births in rural India are attended by traditional birth attendants (45.2%) probably suggesting no untoward human intervention. However, it cannot be commented. On review of the literature, sex ratio at birth for adjoining State of Delhi was males (52.3%) and female (47.7%).[1] National Neo-natal Perinatal Database in India (n = 17) reported 52.9% (male) to 47% (female) at birth.[16] The social measures being taken in the State of Haryana for women empowerment including girl child directed developmental schemes and strict implementation of legislation (pre-conception and pre-natal diagnostic techniques Act) is showing evidence of favorable situation, but still a lot needs to be carried out in this direction.

Rising trend of institutional delivery is noticed from 36.4% (NFHS-3, 2005-06), 42.6% (DLHS-3, 2007-08) to 60.1% (SRS, 2012). Based on local birth registration, total home delivery was 367 within the catchment villages of this center [Table 2]. Household poverty/social practice is behind this phenomenon. Total births reported in this PHC area with an approximate population of 27,000 was 1086 (571 [2010] and 515 [2011]) giving birth rate of 20.1 (21.1 and 19.0 respectively). For comparison, birth rate in the State of Haryana stood at 22.3/1000 according to Sample Registration System (December-2011). Self-transport or round the clock free ambulance services available under National Rural Health Mission had transferred the rest of the expecting mothers for delivery from villages to higher centers (e.g., district/medical college hospital). In which case birth registration formalities are carried out by respective urban units and no records are available at PHC while only local births are registered at this center. Taking total birth and home delivery in the area into cognizance, overall situation with institutional (sub-center/above) birth stood at very encouraging note, i.e., 66.2% (70% [2010] and 61.9% [2011] respectively).

On the parallel front, with the rise in socio-economic status in Haryana, there is simultaneous lesser tendency among farmers to do hard physical labor in fields. It is being observed that farmers/agents mobilize laborers by giving them diverse kind of financial and non-financial incentives (e.g., provision of free mobile handset, part of agriculture harvest) to work in fields. While the farmers in more prosperous State of Punjab offer additional incentives of drugs (poppy husk), liquor, food and free lodging. Therefore, alternative in-flux of landless laborers and their families from underdeveloped areas/states is being noticed, which is why there could be additional possibility of rise in home deliveries. The trend for promoting institutional deliveries requires intensive monitoring, supervision and corrective intervention in the changing scenario.

The assistance during delivery by doctor/nurse/trained dai have increased from 80.8% (2010) to 88.7% (2011). Skilled birth attendants are people with midwifery skills (e.g., doctors, midwives, nurses) who have been formally trained to proficiency in the skills necessary to manage a normal delivery, diagnose and refer obstetric complications. It is known fact that large numbers of births in rural India are attended by traditional birth attendants irrespective of their training status and they would continue do so in near future also. However, under any circumstances, they cannot be clubbed with doctor/nurse/auxiliary nurse midwife, at least on the birth format, which happens to be a legal document. This is an omission/commission of the birth format under CRS that needs urgent attention of the authorities. Further, it is also suggestive of training need of health personnel involved with the process of birth registration.

Acknowledgements

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References

1. Manual on Vital Statistics. New Delhi: Central Statistical Organization, Ministry of Statistics and Programme Implementation, Government of India; 2009.
2. UNICEF. The ‘Rights’ Start to Life: A Statistical Analysis of Birth Registration. New York: UNICEF; 2004.
3. UNICEF. A World Fit For Children. New York: UNICEF; 2007.
4. Cody C. Count Every Child: The Right to Birth Registration. UK: Woking Plan Ltd.; 2009.
5. Universal Birth Registration in Asia. Bangkok: Plan International Asia Regional Office; 2010. Available from: http://www.unescap.org/stat/meet/vs-Jun2010/session1-Dominga.pdf. [Last accessed on 2011 Jul 5].
6. National Commission on Population. Report of the Working Group on Registration of Births, Deaths and Marriages. New Delhi: 2001. Available from: http://www.populationcommission.nic.in/RPM_Report.htm. [Last accessed on 2011 Oct 12].
7. Annual Report on Registration of Births and Deaths in Delhi: 2008. Delhi: Directorate of Economics & Statistics and Office of the Chief Registrar (R&D); 2009.
8. Manual on Civil Registration System. Haryana: Chief Registrar (R&D); 2009.
9. National Family Health Survey (NFHS-3), Haryana, India, 2005-06. Mumbai: IIPS and Macro International; 2008.
10. Cowgill UM. Season of birth in man. Ecology 1966;47:614-23.
11. James WH. Social class and season of birth. J Biosoc Sci 1971;3:309-20.
12. Ellison PT, Valeggiia CR, Diana SS. Human birth seasonality. In: Brockman DK, van Schaik CP, editors. Seasonality in Primates: Studies of Living and Extinct Human and Non-Human Primates. Cambridge: University Press; 2005. p. 379-99.
13. Anand K, Kumar G, Kant S, Kapoor SK. Seasonality of births and possible factors influencing it in a rural area of Haryana, India. Indian Pediatr 2000;37:306-12.
14. Census 2011, India: Haryana (Provisional). Chandigarh: Directorate of Census Operations, Haryana, Ministry of Home Affairs, Government of India; 2011.
15. National Neonatal-Perinatal Database. Report: 2002-03. New Delhi: AIIMS; 2005.