



Household Expenditures on Illnesses during Infancy in a Rural Community: A Cross Sectional Study from Pondicherry

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ABSTRACT

Introduction: Health status of infants is considered as a proxy measure of socio-economic development of a nation. Although infants form a vulnerable group in any population, very few studies examined expenditure for healthcare in India in this group.

Methods: A cross-sectional community based study was conducted among households giving history of illnesses among child up to one year (i.e. born between 1st April 2012 to 31st March 2013) in selected four villages of rural Pondicherry during May-June 2013. Total 187 households were interviewed after obtaining written consent using a pre-designed questionnaire by house to house visit by the investigators.

Results: The mean direct expenditure incurred for an episode of illness was Rs.383.33±1608.18 and Rs. 508.81± 1627.09 for episodes leading to hospitalisation and non hospitalisation respectively. Mean indirect expenditure for hospitalisation and non hospitalisation episodes were Rs. 716.67±686.47 and 216.56±231.49. Whereas total expenditures incurred hospitalisation and non hospitalisation episodes were Rs.2100±1594.71 and Rs. 755.78±1716.03 respectively. Proportion of out-of-pocket expenditure was 61.0%. Private health facilities were preferred for treatment.

Conclusions: In the study area, more than half of the households in rural Pondicherry are making out of pocket expenditure on illnesses during infancy.

Key words: Out-of pocket expenditure, Infant, Rural Community

INTRODUCTION

India has adopted the primary health care model which emphasises that the healthcare should be universally accepted and the cost of healthcare should be affordable to country and community ¹. National Rural Health Mission (NRHM) was launched by Government of India launched in 2005 with a strategy to improve skills of service providers, strengthen the health systems and community participation ². Health financing is one among the six "building blocks" of health systems which is expected to provide health services without any additional financial burden to the beneficiary ³. The Indian health system is a "mixed health fi-

nancing" system wherein health services are financed through revenue generated by taxes and out of pocket expenditure ⁴. It has been already documented that health care financing is mostly done by out-of-pocket payments by individual households in India ⁵. Around 71.13% was financed by households for seeking health services which is a large portion ⁵. India has high burden of maternal and child morbidity and mortality along with additional burden of communicable and non-communicable diseases ⁶. Inability to pay for the cost of health care acts as a barrier to access and may be a determinant of maternal and neonatal morbidity and mortality ⁷. Infancy is a very crucial

period of life and contributes significantly to child mortality. Birth of a child and care during infancy may be a burden over the households. Some households may find it difficult to meet the costs of care during infancy.

Several studies examined out of pocket payment for healthcare in India; very few of them reported data of age specific morbidities, their patterns, and health seeking and expenditure in rural community. However, literature suggests that for neonates mean out-of-pocket expenditure was Rs. 547.5 and Rs. 4993 for non-hospitalisation and hospitalisation illnesses, but no such evidence is available for illnesses during infancy⁸. The study was planned to minimise the knowledge gap related to expenses for illnesses during infancy. The objectives of the current study were to assess the household expenditures on illnesses during infancy in a rural community and factors influencing the household expenditures on illnesses during infancy.

METHODS

The current study was conducted in rural area of Pondicherry district during May 2013 to June 2013 as a cross sectional community based study.

Selection criteria: We followed multistage sampling. In first phase, one commune was selected from five communes of the Pondicherry district by using simple random sampling method by lottery technique. The selected commune Bahour has 14 villages. In second phase, four villages from this commune were selected using simple random sampling by lottery technique. The four selected villages were Kirumampakkam, Koravelimedu, Manapattu, and Murthikuppam. The total population of four villages was 12839. Third stage comprises of selection of households with a child born during 1st April 2012 to 31st March 2013. This information was collected from the sub centres, primary health centres and anganwadis to minimise chances of omitting an infant born during above mentioned period. Households reporting history of illnesses among infants and had experienced illness in last three months were included to minimize recall bias. Households where infant death occurred during 1st April 2012 to 31st March 2013 were excluded.

Sample size: Birth rate for rural Pondicherry was 16.2/1000 population (SRS 2012) and considering the total population, approximately 208 births population are expected in the study area. Prevalence of morbidity among infants reported as 62.4% in south India⁹. The estimated sample size was 133 for 95% CI using Open EPI software. However the records at Bahour PHC reported total number of births to be 218 which exceeded the ex-

pected number of births. Investigator visited all households having births, but could contact only 187(85.78%) households. 22 (10.09%) households were locked even after two visits & 9 (4.01%) had migrated.

Data collection: House-to-house survey was undertaken by the authors using a pre tested semi structured questionnaire with questions about demographic characteristics, episodes and nature of illness, healthcare facility visited and healthcare expenditure for data collection. The questionnaire was developed in English. Almost all the households spoke Tamil in the study area so the questionnaire was translated to Tamil. The questionnaire was validated by English-Tamil-English translation to assess appropriateness of study instrument and pretested in field by the investigators. We calculated direct expenditure which consisted user fees, drug costs, informal payments and payment for laboratory tests. Loss of income, loss of savings was considered as indirect expenditures.

Statistical analysis: MS Excel 2007 was used for data entry. Data was analyzed using statistics package SPSS 17.0 version for windows. Descriptive data was represented as mean \pm SD for numeric variables, percentages and proportions for categorical variables. Appropriate tests of significance were used depending on nature & distribution of variables like Mann-Whitney and Kruskal-Wallis test. Value of $p < 0.05$ was considered statistically significant.

Ethical approval: Ethical approval was obtained from the Institutional Human Ethical Committee of MGMC and RI, Pondicherry (Ref. No. UG/2013/13) after approval of the proposal by Indian Council of Medical Research

RESULTS

A total of 187 rural households were surveyed and 121 infants experienced at least one episode of illness in last three months.

Socio-demographic characteristics: Majority of the households 120 (99.2%) were Hindu by religion. 64 (53.9%) of households belong to the scheduled castes, and 54 (44.6%) belong to most backward class. More than half (59.5%) of the households were nuclear families. There were 5.16 persons per household. We studied 62 (51.2%) male infants and 59 (49.8%) female infants. The mean age of infants was 9.72 ± 3.18 months. Mean age of the mothers of infant was 25.07 ± 3.23 years. Out of 121 respondents, 77 (63.3%) mothers had completed their schooling till 10th standard, followed by 5 (20.7%) mothers who had completed schooling till 12th standard, while only 1 (0.8%) was illiterate. By oc-

cupation, most of the mothers were 110 (90.9%) were housewives. More than two third of the households i.e. 85 (70.3%) belong to middle socio-economic status, followed by poor 24 (19.8%) as per B. G. Prasad Socio-economic Classification (Modified as per July 2013, All India Wholesale Price Index). Only 2(1.7%) household belong to upper high socioeconomic status. Mean monthly income of the households was Rs. 7699.83 ± 8447.83. Minimum income was Rs. 900 and maximum was Rs. 71,000.

Illnesses during infancy

In this study, more than half of the infants 72 (59.5%) experienced two episodes of illness in last three months, 34 (28.1%) experienced one episode of illness in last three months whereas 15 (12.4%) had experienced three episodes of illnesses. Total episodes of illnesses among infants were 223, an average 1.84 episodes of illnesses per infant in three months.

Table 1: Distribution of direct, indirect and total costs for episodes for illnesses during infancy

Type of expenditure	Mean ± SD	Median (IQR)
Total direct expenditure	566.61 ± 1634.57	300 (200-300)
Direct expenditure for hospitalisation	1383.33 ± 608.18	600 (300-2500)
Direct expenditure for non hospitalisation	508.81± 1627.09	300 (200-350)
Total indirect expenditure	236.74 ± 279.51	200 (50-350)
Indirect expenditure for hospitalisation	716.67 ± 686.47	300 (300-1300)
Indirect expenditure for non hospitalisation	216.56 ±231. 49	150 (50-135)
Total expenditure (Direct + Indirect)	582.35 ± 1399.35	400 (200-600)
Total expenditure for hospitalisation	2100 ± 1594.71	1800 (750-3725)
Total expenditure for non hospitalisation	755.78 ± 1716.03	375 (190-550)

Table 2: Socioeconomic variables influencing household expenditure on illnesses during infancy

Variable	Mean ± SD	Median (IQR)	p value
Sex of the infant			
Male	845.16 ± 730.56	800 (400-1100)	0.259 ‡
Female	1290.48 ± 1768.58	550 (325-932)	
Education of mother †			
<10 th	1110.00 ±1421.75	610 (350-1007)	0.609‡
>10 th	984.17 ±1122.92	635 (377-1165)	
Type of family			
Nuclear	857.29 ±1978.91	550 (302-807)	0.004*‡
Joint	1390.82 ±2131.98	800 (400-1285)	
Caste			
MBC	675.55 ±573.32	550 (260-1007)	0.054‡
OBC	333.33 ±236.29	250 (150-600)	
SC	1443.67 ±2725.59	710 (400-1200)	
Socioeconomic status			
Class I	1955.00 ±4150.31	505 (110-900)	0.055‡
Class II	505.00 ±558.61	605 (380-1037)	
Class III	910.77 ±970.84	630 (400-1100)	
Class IV	953.81 ±2216.16	550 (260-800)	
Class V	1223.33 ±1147.17	880 (627.50-1425)	

† Illiterate mother N=1 excluded from analysis; * p<0.05; ‡Mann-Whitney test and ¶ Kruskal- Wallis test was applied.

Table 3: Distribution of total household expenditure with type of health facility

Health facility	Mean ± SD	Median(IQR)	p value
Hospitalisation episodes			
Government health facility	1150.00 ±919.23	1150 (500-1800)	0.333‡
Private health facility	2371.42 ± 1692.10	2100 (900-4350)	
Non-hospitalisation episodes § N=202			
Government health facility	259.16 ± 280.80	200 (10-400)	0.0001*‡
Private health facility	754.48 ± 1880.19	500 (350-681.25)	
For all episodes			
Government health facility	277.34 ± 319.32	200 (10-400)	0.0001*‡
Private health facility	854.64 ± 1902.85	500 (350-700)	

§-For computational purposes we exclude households (N=12) who preferred treatment both at government as well as private facility * p<0.05; ‡Mann-Whitney test was applied

More than half of the household sought treatment from private healthcare providers 125 (56.1%) followed by primary health centre 85(38.1%). In all we observed only 9 (4.0%) hospitalisation episodes. Among infants who were advised admission to hospital 7 preferred private hospital for admission. Similarly among illnesses where infants were not hospitalised 118 (55.14%) preferred private healthcare providers. The mean duration of hospitalisation was 6 ± 2.2 days.

Cost of treatment for illnesses: Out of pocket expenditure was seen among 136 (61.0%) episodes of illnesses. Mean direct costs for an episode of hospitalisation was Rs. 1383.33 ± 1608.18 whereas for non-hospitalisation episode of illness mean direct cost was Rs. 508.81 ± 1627.09 . Direct cost on hospitalisation was more than expenditure on non hospitalisation episodes. The indirect costs for hospitalisation and non hospitalisation episodes were Rs. 716.67 ± 686.47 and 216.56 ± 231.49 respectively. Total expenditures incurred on hospitalisation and non hospitalisation episodes were Rs. 2100 ± 1594.71 and Rs. 755.78 ± 1716.03 . Details of median (IQR) expenditure are presented in Table 1.

In current study, mean household expenditure on illnesses for male infant was 845.16 ± 730.56 and for female infants was Rs. 1290.48 ± 1768.58 . However the difference in the mean expenditure was statistically not significant. Mean household expenditure on illnesses for mothers educated up to 10th standard was Rs. 1110.00 ± 1421.75 and mothers educated above 10th standard was Rs. 984.17 ± 1122.92 , but the difference in the mean expenditure was statistically not significant. Statistically significant higher expenditure was observed among joint families compared to nuclear families. Mean household expenditure on illnesses among nuclear families was 857.29 ± 1978.91 and among joint families was Rs. 1390.82 ± 2131.98 . The comparison of household expenditure among different castes and socioeconomic status by modified Prasad's classification were not statistically significant. (Table 2)

Mean total expenditure on hospitalisation and non hospitalisation episodes at government hospitals were Rs. 1150 ± 919.23 and Rs. 259.42 ± 280.80 respectively. The mean total expenditure for illnesses leading hospitalisation and non hospitalisation among private health facility were 2371.42 ± 1692.10 and 754.48 ± 1880.19 respectively. Similar trends were observed for all episodes and treatment seeking at private health facility & government health facility. There was significantly higher spending at private health facility for non hospitalisation episodes and for all episodes compared to government health facility however this difference was not significant for episodes of illnesses leading to hospitalisation. (Table 3)

DISCUSSION

Infancy is a very crucial period and their health status in community is considered as a proxy measure of socio-economic development of a nation⁹. Evidence suggests that infant health is dependent on several factors like health of the mother during antenatal period, birth weight, immunisation, nutritional status and complimentary feeding. However to the best of our knowledge, we did not find a study to explore the details of household expenditure for illnesses among infants in India. As a result our findings were compared with expenditure on illnesses among neonates and under five children.

In this study, majority (61.0%) of households financed for health conditions through out of pocket payments in the three months duration of the study. Our findings related to out of pocket expenditure were lesser than national proportion of 71.3% reported in National health accounts⁵. The difference could be due to a particular age group was included in current study. It is already documented that high out of pocket expenditure leads to impoverishment¹⁰.

The mean direct expenditure which includes consultation charges, medicines and laboratory investigations, hospital stay incurred for an episode of illness were Rs. 1383.33 ± 1608.18 for episodes leading to hospitalisation and non hospitalisation illnesses was Rs. 508.81 ± 1627.09 . These findings are relatively similar to those reported by Srivastava N et al⁸ related to non hospitalisation expenditure, whereas our estimates for episodes leading hospitalisation expenditure were lower.

This current study revealed that mean indirect expenditure for hospitalisation and non hospitalisation episodes were Rs. 716.67 ± 686.47 and 216.56 ± 231.49 respectively. Whereas total expenditures incurred hospitalisation and non hospitalisation episodes were Rs. 2100 ± 1594.71 and Rs. 755.78 ± 1716.039 . The findings from our study were high than those reported by Dongre AR et al¹¹. The possible reasons for differences in estimates of the present study could be due to a particular age group studied in a relatively small study area and altogether different study population in rural area.

In this study, 55.14% preferred private healthcare providers for non hospitalisation episodes. This finding was similar to that reported by Khanam N et al¹² from rural area of central India who reported that 50.13% sought treatment from the private practitioners. However the Khanam N et al¹¹ study included all age groups patients for assessing the health seeking behaviour. Another similar study among care seeking behaviour for sick newborn by Shrivastava N et al⁸ reported that 56.6%

sought treatment from the private health facilities. However a study by Majumdar A et al¹³ documented that 63% consulted a government facility compared to private facility due to proximity to residence (61.1%), comfortable timings (5.6%), and availability of specialists (5.6%) were the reasons for preferring the government facility.

Level of education of mother, sex of the infants, socioeconomic status, and caste were not determinants of household expenditure. The only determinants of household expenditure in current study were preference of private health facility, and type of family. It was evident that significantly higher spending at private health facility for non hospitalisation episodes and for all episodes of illnesses among infants when compared to government health facility. There is need to identify mechanisms to regulate private health sector along with increasing confidence over public health facilities by the patients. Government of India is attempting to regulate the private health sector by implementation of Clinical Establishment (Registration and Regulation) 2010 act which is expected to supplement the existing public health system¹⁴⁻¹⁵. Also Health insurance is an identified alternate mechanism to reduce out of pocket expenditure which is broadly divided into three categories social health insurance, private health insurance and community health insurance¹⁶. To achieve the universal health coverage Government of India and various states initiated health insurance schemes namely Rashtriya Swasthya Bima Yojna, Rajiv Aarogyasri Community Health Insurance scheme, Chief Minister's health insurance scheme in Tamil Nadu etc.¹⁷. With an intention to minimise the cost of delivery and medical treatment of infant till 30 days from birth at public health facility Janani Shishu Suraksha Karyakram (JSSK) was launched in June 2011¹⁸. Evidence documents that 33% reduction in out of pocket expenditure on delivery and sick newborn care at public health facilities¹⁹.

The present study is an attempt to estimate the expenditure related to illnesses during the infancy and minimise the knowledge gap. Although authors included illnesses experienced in three months to minimise the chances of recall bias, but the possibility of recall bias cannot be ruled out. Physical verification of bills, receipts of expenditures for healthcare services was difficult in most of the households. The mothers had tendency to report the expenditure in multiple of ten or hundred instead of actual amount spend. There are chances that over reporting of expenses incurred. This will lead to overestimation of expenses during illnesses.

CONCLUSION

We conclude that in this study settings, more than half of the households in rural Pondicherry are making out of pocket expenditure on illnesses during infancy. Private health care facilities were preferred for treatment during infancy where hospitalisation and non hospitalisation costs were high.

REFERENCES

- Pandve HT, Pandve TK. Primary healthcare system in India: Evolution and challenges. *Int J Health Syst Disaster Manage* 2013;1:125-8 (Online) [cited 2014 Jul 19] Available from: <http://www.ijhdsdm.org/text.asp?2013/1/3/125/129126>
- Government of India. 11th five year plan. (Online) [Cited 2014 Jul 22] Available from http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v2/11v2_ch3.pdf
- World Health Organization: Everybody's business: Strengthening health systems to improve health outcomes: WHO's framework for action. Geneva: WHO Press; 2007.p 21-23
- Nandraj S, Devadasan N, Singh A. Healthcare financing. In: Bhalwar R (ed.) *The Textbook of Public Health And Community Medicine*. 1st ed. AFMC, Pune;2009. P 428
- National Health Accounts Cell. *National Health Accounts India 2004-05*. New Delhi: Ministry of Health and Family Welfare, Government of India; 2009; pp.8-10.
- UNICEF. *The State of the World's Children 2009: Maternal and Newborn Health* Oxford. New York: Oxford University for UNICEF; 2009. (Online) [Cited 2014 August 08] Available from https://www.unicef.org/cotedivoire/SOWC_2009_.pdf
- Selvaraj S, Karan A. Deepening Health Insecurity in India: Evidence from National Sample Surveys since 1980s. *Economic and Political Weekly*. 2009;44(40):55-60.
- Shrivastava N, Awasthi S, Agarwal G. Care-seeking behavior and out-of-pocket expenditure for sick newborns among urban poor in Lucknow, northern India: a prospective follow-up study. [Online] [Accessed on 14 September, 2014]; Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2676263/>.
- Joseph N, Subba S, Naik V, Mahantshetti M, Mallapur M. Morbidity among infants in South India: A longitudinal study. *Indian Journal of Pediatrics* 2010;77(4):p456-58.
- McIntyre D, Thiede M, Dahlgren G, Whitehead M. What are the economic consequences for households of illness and of paying for health care in low- and middle-income country contexts? *Soc Sci Med*. 2006;62:858-65
- Dongre AR, Deshmukh P, Garg B. Health Expenditure and Care Seeking on Acute Child Morbidities in Peri-Urban Wardha: A Prospective Study. *Indian Journal of Paediatrics* 2010; 77(5): p503-7.
- Khanam N, Meshram GD, Athavale AV, Goyal RC, Gupta M, Gaidhane AM. A Cross Sectional Study on Pattern of Health Care Seeking Behavior and Outof-pocket Household Expenditure on Curative Medical Care in Rural Central India. *Natl J Community Med* 2013; 4(1): 70-5.
- Majumdar A, Premarajan KC, Ganesh KS, Veerakumar AM, Ramaswamy G. Rural Urban Differentials of Treatment Seeking Behaviour for Acute Respiratory Infection among Children in Puducherry. *Natl J Community Med* 2014; 5(3):325-8

14. Phadke A. The Indian Medical Association and the Clinical Establishment Act, 2010: irrational opposition to regulation. [Online] [Accessed on 14 September, 2014] Available from: <http://imsear.li.mahidol.ac.th/bitstream/123456789/149564/1/ijme2010v7n4p229.pdf>
15. Srinivasan S. Regulation and the Medical Profession. *Economic & Political Weekly*. 2013 Jan 19;48(3):15.
16. Devadasan N, Nandraj S. Health insurance in India. Planning and Implementing Health Insurance Programs in India: An Operational Guide, Institute of Public Health, Bangalore: New Concept International Systems pvt. Ltd. 2006:1-2.
17. Reddy KS, Selvaraj S, Rao KD, Chokshi M, Kumar P, Arora V, Bhokare S, Ganguly I. A critical assessment of the existing health insurance models in India. *Public Health Foundation of India*. 2011 4:1-15.
18. National Rural Health Mission. Guidelines for Janani-Shishu Suraksha Karyakram (JSSK). New Delhi: Government of India, Ministry of Health and Family Welfare, Maternal Health Division; 2011. p. 1-40.
19. Tripathi N, Saini SK, Prinja S. Impact of Janani Shishu Suraksha Karyakram on out-of-pocket expenditure among urban slum dwellers in Northern India. *Indian paediatrics*. 2014;51(6):475-7.