

Utilization of Janani Shishu Suraksha Karyakram and estimation of out of pocket expenditure: A prospective follow-up study among mothers and newborns in Chittoor

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ABSTRACT

Introduction: Janani Shishu Suraksha Karyakram (JSSK) is a flagship program of India to reduce out of pocket expenditure (OOPE) of the families during childbirth and neonatal sicknesses. **Objectives:** To assess the utilization of JSSK while availing services for childbirth and newborn care in a secondary care hospital in Southern India; estimate the OOPE in services covered by JSSK and identify the associated factors with OOPE. **Methods:** 228 mothers who delivered in the previous 2 days, were recruited from a secondary-level government hospital in Chittoor. Expenditure incurred under various components of JSSK was asked during the recruitment and subsequently through telephonic interviews. **Results:** All components of JSSK, except transport, were fully utilized by the families. 138 mothers (60.5%, 95% CI: 54.0, 67.0), and all sick children (n = 138, 100%) who visited government hospital, incurred OOPE in the form of transport cost. The median expenditure of transport (from home to hospital and hospital to home) of the mothers was 250 INR (IQR: 100-513 INR). Transport expenditure was greater for the rural families (300 INR) than the urban families (100 INR) ($p < 0.05$). In multiple logistic regression, nuclear families were associated with high OOPE (AOR- 2.0, 95% CI: 1.1- 3.7). Though education of the mother showed high association (AOR- 2.7, 95% CI: 1.0- 7.8), it was not statistically significant ($p = 0.05$). **Conclusion:** The families utilize most of the components of JSSK, except transport. Family-centric counselling of the beneficiaries during antenatal check-ups and home visits by the healthcare workers can reduce transport-related OOPE.

Keywords: Childbirth, health expenditure, India, newborn

Introduction

Financial risk protection is one of the key areas to achieve universal health coverage under the sustainable development goals.^[1] Out of pocket expenditure (OOPE) is often considered as a financial risk that poses families to financial burden which in

turn becomes a major obstacle in utilising health services.^[2,3] The World Health Organization defined OOPE as “direct payments made by individuals to health care providers at the time of service use”.^[4] OOPE is a major public health challenge and leads to poverty, impoverishment, and indebtedness of a family.^[2,5]

Globally, one out of five families experiences OOPE in the present days. It is estimated that almost 90 million families were pushed to below poverty line due to out-of-pocket health

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expenditure in 2015.^[6] The statistics in India is more worrisome as over three out of five families face OOPE as evident from the same report. OOPE prevails in all socio-economic groups, but considerably higher in the rural areas.^[7,8] A study with national sample survey in India in 2014 showed that the average OOPE for all diseases is 19,210 Indian Rupee (INR) and ranges between 5473 INR for diarrhoea and 25,003 INR for injuries.^[9] The study also pointed out that, although the OOPE is high in the private sectors, service utilization in the government sectors incurs OOPE in variable range.

OOPE is reported to be an important barrier in utilising healthcare services during pregnancy and childbirth. OOPE on maternal healthcare often depends upon the health condition, income of the family, family structure, and services available in the vicinity.^[10] The Government of India has introduced various schemes to reduce maternal and child mortality. One such initiative was Janani Sishu Suraksha Yojana (JSSY) that launched in 2011. To promote institutional delivery, the program offered free and cashless services in terms of delivery, drugs, diagnostics, diet, and transport for obstetric women (up to 3 days for normal delivery and 7 days for caesarean section) and infants (up to 30 days of age).^[11,12] With the launch of JSSY, a considerable increase in institutional deliveries was reported from different parts of the country.^[9,13] Despite the provision for free services, the families often meet with OOPE during institutional deliveries.^[9] Considerable awareness development at individual-, family-, and community-level to improve the JSSK utilisation.^[14] In this background, we aimed to assess the utilisation of JSSK by families while availing services for childbirth and newborn care in a secondary-care hospital in Chittoor district of Andhra Pradesh, India; estimate the OOPE incurred in different services covered by JSSK and identify the factors associated with OOPE while availing services in the government set-up. The study specifically looked at the OOPE incurred to the families while availing the services in the government facilities to identify the areas where improvement is needed to strengthen the delivery of various components of JSSK.

Subjects and Methods

Study design: Prospective follow-up study.

Study setting: The first phase of the study was conducted in a post-natal ward of Government general hospital, in Chittoor town of Andhra Pradesh. The hospital is a secondary-level hospital and serves as a referral centre for rural areas. On average, the hospital conducts 10 deliveries per day out of which 30% by caesarean section. This phase was followed by a second phase where telephonic interviews were conducted while the study participants being at their home.

Study duration: The study was conducted between April and July 2019.

Study participants: Women who had delivered at Government general hospital at Chittoor and admitted in the post-natal ward

were eligible for the study. Women, who had delivered outside and were admitted for post-natal care, were excluded.

Sample size: Assuming 50% of the families incur OOPE towards childbirths and newborn care, we estimated our sample size to be 204 for a 95% confidence interval (CI) for the estimate and a desired precision of 7. By using the formula $n = 4pq/d^2$, where P is the proportion of families incur OOPE, $q = 100 - p$, and $d =$ precision. Assuming a 10% attrition rate, the final sample size need was estimated to be 225.

Data sources: Two investigators visited the post-natal ward daily for about 4 weeks, enlisted the eligible research participants from the register available in the post-natal ward, and recruited them after informed consenting. The data collection was conducted in two phases. In the first phase, the investigators interviewed the recruited participants in the post-natal ward and collected information on the socio-demographic characteristics, antenatal profile, and expenditure details of the current admission of the participants through a pre-tested, semi-structured questionnaire in local language. The investigators verified the antenatal profile with the antenatal card available with the participants. In the second phase, participants were communicated twice over the telephone on day 14 and day 28 of childbirth. In these interviews, investigators asked about the clinical condition of the mother and the baby, healthcare-seeking pattern, and cost of treatment incurred by the family in the preceding two weeks. In case of a non-response over phone, the investigators attempted to contact the participants up to a maximum of two consecutive days. If the investigators still fail to contact, that telephonic visit was censored for that interview. If the participants had any cost-related doubts, they could verify from reliable sources including documents and family members.

Definition of the Variables

Operational definition of outcome variables

Owing to childbirth (delivery) OOPE was defined as the costs incurred by a family towards childbirth and post-natal care (up to 3 days for normal delivery and 7 days for caesarean section) under various heads including user charges, diagnostics, drugs and consumables including provision for blood transfusion, normal and operative deliveries, diet, and transport.^[12] All the costs were measured in Indian Rupee (INR) for the year 2019 (Conversion rate 1\$ =69.17 INR for July 1, 2019).

OOPE due to neonatal sicknesses was defined as the costs incurred by a family towards neonatal sicknesses under various heads including user charges, diagnostics, drugs and consumables including provision for blood transfusion, and transport while availing the government facilities.^[12]

Other variables

Type of family: A 'nuclear family' was defined as a family consisting of a married couple and their dependent children.^[15] All other families were termed as extended families.

Socio-economic Status (SES): SES was determined based on the per-capita monthly income (in INR) as per the ‘Modified BG Prasad Socio-economic Classification’ for 2019.^[16] SES was classified in to five groups including class I (<1050 INR), class II (1051 INR-2101 INR), class III (2102 INR-3503 INR), class IV (3504 INR-7007 INR), and class V (>7008 INR).

High-risk pregnancy: A high-risk pregnancy was identified from the antenatal card of the mother (if available) or if a mother has history of any of the following risk factors:

- In the past pregnancy: Instrumental delivery, eclampsia, post-partum haemorrhage, ≥3 abortions, pre-term delivery, still birth or neonatal death, caesarean section
- In the present pregnancy: Age >40 years, Primigravida <15 years or >35 years, pregnancy after prolonged infertility (10 years), ≥5 pregnancy, height <145 cm, threatened abortion, premature labour, ante-partum haemorrhage, abnormal presentation, intra-uterine growth retardation, multiple pregnancy, hydramnios, and pregnancy-induced hypertension,

Statistical analysis: Data were entered into excel sheet and analyzed by using software SPSS version 20.0. (IBM Corp., Armonk, New York, 2010) Categorical values were expressed in percentage with 95% CI when appropriate. Continuous variables were expressed as mean with standard deviation (SD) or median with interquartile range (IQR) after checking for the normality. The median difference in OOPE was statistically tested by Mann-Whitney U test. Univariate analysis was performed with Chi-square test to find association between OOPE and predictor variables and expressed as odds ratio (OR). Multivariate analysis with binary logistic regression modeling was performed to estimate the adjusted risk of the predictor variables. Variables with *P* value < 0.2 in univariate analysis were considered for the logistic regression model. Risk of OOPE with the predictor variables was expressed as adjusted odds ratio (AOR) with 95% CI. Variables with *P* value < 0.05 were considered as statistically significant in the final model.

Protection of the human participants: Institutional ethics committee clearance was obtained (Ref- IEC09/ AIMSRR/04/2019). Informed consent was obtained from all the participants.

Results

We recruited 228 post-natal women for the study. The mean age (SD) of the participants was 22.3 years (SD 3.4 years). Majority of the mothers were from rural areas (82.9%), Hindu religion (86.8%), and belonged to the extended families (74.0%). [Table 1] The median per capita income was 2500 INR (IQR: 1667–3333 INR). Primiparous women (51.8%) were a little higher than the multiparous. 12.3% (n = 28) participants had high risk in the present pregnancy. [Table 1]

Utilization of JSSK and OOPE

All the entitlements of JSSK were utilized by the mothers completely, except the transport, from home to hospital for childbirth or from hospital to home after delivery [Figure 1]. All the mothers (n = 228) were provided free services including exemption of user charges, diagnostics, drugs and consumables, normal and operative deliveries, and diet. However, total 138 families (60.5%, 95% CI: 54.0, 67.0) incurred OOPE in terms of transport of the mothers. While 133 (58.3%) families hired transport from home to hospital, 16 (7.0%) families hired transport from hospital to home. The median transport cost was 250 INR (IQR: 100-513 INR). The median transport costs for the rural families (INR 300) were higher than the urban families (INR 100). This difference was statistically significant (*p* < 0.05) in Mann-Whitney U test. An inverse pattern between per-capita income and OOPE was noticed, though statistically not significant (*p* < 0.05). [Figure 2] None of the mothers required blood transfusion or transfer to a higher facility.

A total of 163 (71.4%) neonates had at least one episode of sickness during the follow-up period. Out of 163 children with sickness, 25 (15.3%) families visited private facilities and rest 138 (84.7%) families utilized the government facilities. Families who has visited government health facilities (n = 138) had utilized all the entitlements of JSSK including user charges, diagnostics, drugs, and consumables including provision for blood transfusion (n = 4). However, none (n = 0) of the families utilized the free transport facilities [Figure 3]. None of the neonates required a referral to a higher healthcare set-up.

Determinants of OOPE

Univariate followed by multivariate analysis shows that nuclear families are twice at risk of incurring OOPE when compared with the three-generation families [Table 2]. The risk is even higher (AOR: 2.7) for illiterate mothers. Mother ≥ 22 years (AOR: 1.7), low (<10th standard) education of the father (AOR: 1.8), and

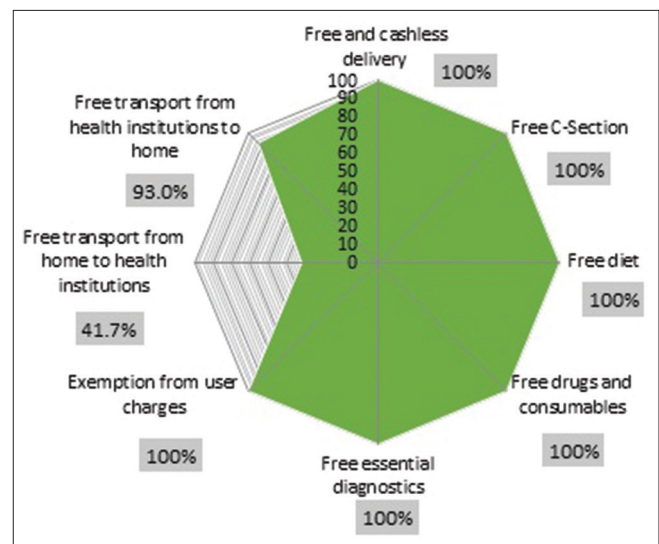


Figure 1: Utilization of JSSK entitlements during childbirth

Table 1: Socio-demographic and ante-natal profile of mothers attending a secondary-level government hospital in Chittoor, Andhra Pradesh

Socio demographic detail			
Variables	Frequency (%)	Variables	Frequency (%)
Age group			
16-20 years	80 (35.0)	Caste	
21-30 years	144 (63.2)	BC	114 (50.0)
31-40 years	4 (1.8)	SC/ST	87 (38.2)
Mothers' education			
Illiterate	28 (12.3)	OC	27 (11.8)
Primary		Type of Family	
Secondary		Extended	169 (74.0)
Graduate and above		Nuclear	59 (26.0)
Mother Occupation		Residence	
Home maker	218 (95.6)	Rural	189 (82.9)
Working	10 (4.4)	Urban	39 (17.1)
Religion			
Hindu	198 (86.8)	Socio-economic status	
Muslim	22 (9.6)	I	21 (9.2)
Christian	8 (3.5)	II	77 (33.8)
		III	87 (38.2)
		IV	36 (15.8)
		V	7 (3.1)
Ante-natal detail and delivery outcomes			
Variables	Frequency (%)	Variables	Frequency (%)
Parity			
Multipara	110 (48.2)	Type of delivery	
Primipara	118 (51.8)	Vaginal	167 (73.2)
Minimum antenatal check ups			
≥4	198 (86.8)	Caesarean	61 (26.8)
≤3	30 (13.2)	Sex of the current child	
High-risk pregnancy			
Yes	28 (12.3)	Female	93 (40.8)
No	200 (87.7)	Male	135 (59.2)
		Awareness on JSSK	
		Aware	29 (12.7)
		Not aware	199 (87.3)

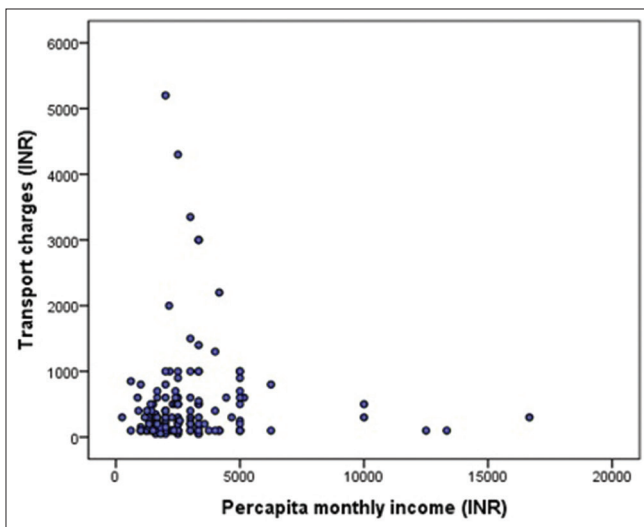


Figure 2: Relation between per-capita income and transport charges

mothers from urban areas (AOR: 1.8) have a higher association of incurring OOPE. Factors like homemaker mothers (OR: 1.6; 95% CI: 0.4,5.6), Hindu religion (OR: 1.6; 95% CI: 0.8,3.5), adequate antenatal check-ups (OR: 1.4; 95% CI: 0.6, 3.0), Only private

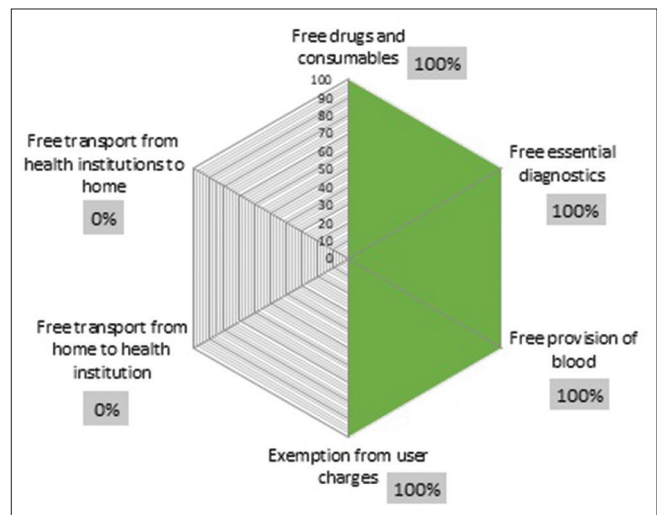


Figure 3: Utilization of JSSK entitlements by sick neonates visiting government hospital (n=138)

antenatal check-ups (OR: 1.1, 95% CI: 0.5, 2.6), multiparity (OR: 1.2; 95% CI: 0.7, 2.0), high-risk pregnancy (OR: 1.7, 95% CI: 0.7, 4.1), unaware about JSSK (OR: 1.5; 95% CI: 0.7, 3.3) did not have any association in univariate analysis.

Table 2: Factors associated with OOPE in multiple logistic regression for mothers attending a secondary-level government hospital in Chittoor, Andhra Pradesh

Associated factors	Frequency				Adjusted OR	
	OOPE incurred (%)		OOPE not incurred (%)		Crude OR	Estimate (95% CI)
	#	%	#	%		
Median age of the mother						
Age ≥22 years	83	65.9	43	34.1	1.7	1.5 (0.9, 2.6)
Age <22 years	55	53.9	47	46.1		
Education of mother						
Illiterate	23	82.1	5	17.9	3.4	2.7 (1.0, 7.8)
Literate	115	57.5	85	42.5		
Education of the father						
<10 th standard	38	70.4	16	29.6	1.8	1.5 (0.8, 3.0)
≥10 th standard	100	57.5	74	42.5		
Type of family						
Nuclear	110	65.1	59	34.9	2.1	2.3 (1.1, 3.7)*
Third generation	28	47.5	31	52.5		
Type of residence						
Urban	28	71.8	11	28.2	1.8	1.9 (0.9, 4.1)
Rural	110	58.2	79	41.8		

*Statistically significant

Discussion

In this present study, we have assessed the utilization pattern of the JSSK program, have estimated the proportion of families encounter with OOPE during childbirth and neonatal illnesses, the various domains where OOPE is encountered and the factors associated with such OOPE. We found that all the components covered by JSSK were completely utilized by JSSK, except transport. Three out of five families are incurring transport costs for childbirth in the government facility, either for transporting the mothers to the hospital for safe confinement, or from hospital to home after childbirth. We noticed a similar finding of incurring transport cost by the families while availing government facilities for neonatal sicknesses. However, all other components of JSSK were utilized by the families who visited the government facilities for treatment. The proportion (84.7%) was more compared to the mothers. The study also identified that mothers with poor education and those who belonged to the nuclear families are more associated with OOPE. Overall, the finding was unique in the sense that we reported OOPE for both mother during childbirth and neonatal sicknesses unlike most the earlier studies^[9,17,18] which described the OOPE during childbirth alone.

Earlier studies reported that the utilization pattern of the JSSK program is variable for different components. A study from Himachal Pradesh showed that the utilization is highest for tests and diagnostics, user fee and blood transfusion; one out of seven families pays for drugs, while two-thirds pay for consumables.^[9] On contrary, a higher utilization pattern (94%–97%) for different components of JSSK was reported by Chaudhary *et al.*^[19] However, studies reported that the utilization of transport is often low which in turn increases the OOPE during childbirth ranging it between 29.6% and 83.5%.^[9,17,19] From our piece

of research, we found that all the components of JSSK were utilized completely (100%), except the transport where utilization was only 39.5%. Noticeably, our study especially looked at the OOPE among those attending to a government set-up for childbirth. On contrary, most of the other studies cited above were conducted in the communities and OOPE was reported as combined for the government and the private facilities. Our finding also indicates that for all the neonatal sicknesses, the families arranged personal transport to hospital irrespective of their place of visit. Apart from the transport, none of the families required to pay anything for treatment of the neonates. In one study conducted in southern India, Rathod *et al.*^[20] showed that free transport facilities are availed in only 11% of the neonatal sicknesses. Similar to our finding, a cross-sectional study from Odissa reported that all the families incurred cost for the treatment of the neonates.^[17] However, the study did not report the various cost centres.

The average amount of OOPE varied widely between 825 and 3565 INR, which is nearly 3–14 times higher than what we estimated (250 INR) in the present study.^[17-19,21,22] The varying degree of OOPE depends on the facilities available within the healthcare facility, and geographical location. For example, a study from hilly region of northern India showed that average cost of transport of the mothers is 420 INR.^[9] The authors attributed such high cost of such transport to the geographical barriers and unavailability of the health facilities. A study from Haryana reported that unavailability of services like ultrasound increased the OOPE of the families.^[19] We noticed almost eight times reduction of OOPE in the public setting when compared with the state figure of OOPE for normal deliveries in public domains during 2007–2008.^[23] It is noteworthy that our estimate of OOPE is even lower than the least state-level OOPE (INR 381) of Daman and Diu as reported in the same study. Similar

to our finding, Mandal *et al.* reported a low OOPE (275 INR) when the childbirth takes place in primary healthcare.^[21]

Our finding suggests that families where the education of the mother is poor, and mothers belonged to nuclear families, are often at risk of incurring transport charge, the only form of OOPE for those who are availing the government services. Unawareness could be the major reason for not availing the transport services. Studies reported that pregnant women often lack knowledge about the benefits they are entitled to avail during childbirth and for the neonatal sicknesses. Evidence suggests that regular antennal check-ups helps in imparting good knowledge on the entitlements of health programs.^[24] Angadi *et al.* also reported from south Indian settings that nuclear families, and low education of the beneficiaries or their husbands are associated with incurring high OOPE.^[25]

Therefore, the key points that we got from this paper are as follows: service utilization for JSSK is high in this area; though transport often accounts for OOPE which could be due to inadequate information sharing from the healthcare provider side.

Limitations

As the investigators interviewed only the mothers, who are seldom involved with direct payments, we expect to have an under-reporting of the OOPE. However, we allowed them to confirm their responses to verify with their family members who could know about the expenses incurred to minimize the under-reporting. We also faced a similar problem for the expenses incurred due to neonatal sicknesses where mothers could not consistently inform the costs incurred. So, we could not estimate the OOPE for neonatal sicknesses precisely.

Conclusion

Families, who seek care in the government hospital during childbirth and for the neonatal illnesses, mostly utilize the various services covered by the Janani Shishu Suraksha Scheme. The only exception is the transport charges. Family-centric counselling of the beneficiaries and the family members during antenatal check-ups and home visits by the healthcare workers, can reduce the transport-related expenditure. Healthcare providers at primary level shall reinforce and make community aware of the services available under the program to ensure complete utilization. The necessary actions should be taken to continue the JSSK services to the same extent. In addition, we recommend exploring the gaps in using the transport facility.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Key messages

- Service utilization for JSSK is high
- Transport often account for out of pocket expenditure (OOPE)
- Poor knowledge can lead to OOPE

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Conflicts of interest

There are no conflicts of interest.

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