

## Original Research Article

# Profile of mortality among beneficiaries of public health assurance schemes in Karnataka: a retrospective study

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## ABSTRACT

**Background:** The burden of non-communicable diseases (NCDs) that can potentially be dealt at tertiary care is increasing in developing countries including India which increase the out of pocket expenditure. Different health assurance schemes have been implemented in the state of Karnataka to provide access to quality tertiary medical care to all. The current study was undertaken to study the profile of mortality under these schemes as no information was available till date.

**Methods:** Data of beneficiaries availing treatment in empanelled tertiary care hospitals under health assurance schemes was collected from Suvarna Arogya Suraksha Trust (SAST) online data base from April 2015 to March 2016 on 20 August 2016. Statistical analysis was done by data collection using Microsoft EXCEL 2010 and SPSS-20 version.

**Results:** Majority of the beneficiaries (91.9%) were treated under Vajpayee Arogyashree Scheme. Deaths were more in beneficiaries of Mysore division with significant high mortality in burn patients. Nearly 63.2% of the beneficiaries were males and were in the age group of 15-60 years and higher hospital mortality was seen among infants (6.8%). Age less than one year, longer cardio pulmonary bypass time and longer aortic cross-clamp time are significantly ( $p < 0.001$ ) associated with hospital mortality in surgeries of congenital heart disease.

**Conclusions:** Mortality in beneficiaries of health assurance schemes was more in infants, females, burn cases and in Mysore division.

**Keywords:** Aortic cross clamp time, Cardiopulmonary bypass time, Health assurance, Karnataka, Mortality, Pulmonary arterial hypertension, Suvarna arogya suraksha trust

## INTRODUCTION

India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO. NCDs contribute to around 5.87 million deaths that account for 60% of all deaths in India.<sup>1</sup> Diseases like this often require tertiary care, whose demand is rising in India due to rapid epidemiological transition, increased life expectancy and lifestyle changes. Out-of-pocket

(OOP) payment is the major health financing mechanisms across most of Asia and other developing countries, often posing an enormous burden on underprivileged households.<sup>2</sup>

To meet the need for tertiary care to people with low incomes and to reduce out of pocket expenditure, Karnataka State in India has rolled-out social assurance program that provide full free tertiary care to households

of below line. The Vajpayee Arogyashree Scheme (VAS) was launched in February 2010 in Karnataka, to provide below poverty line (BPL) families access to quality medical care for treatment of catastrophic illness involving hospitalization, surgery and therapies through an empaneled network of Super specialty health care hospitals. Initially the scheme has been taken up in all the districts of Gulbarga and Belgaum Division. Further it is extended to Bangalore and Mysore Division during July 2012 thus covering the entire state.<sup>3</sup>

In January 2015, the Government of Karnataka launched Rajiv Arogya Bhagya (RAB) Health Assurance Scheme to meet the need for tertiary care to Above poverty line (APL) card holders who are willing to make co-payment (30% payment by beneficiary for general ward) and Jyothi Sanjeevini Scheme (JSS) to Government employees, wherein the scheme provides cashless treatment to all the Government Employees and their dependents through an empaneled network of hospitals for tertiary care.

“Suvarna Arogya Suraksha Trust” (SAST) a “Special purpose Vehicle” established by Government of Karnataka, operating the above schemes the poverty. Information on mortality profile provides the basis for patient care and helps the SAST mortality audit cell for improving overall hospital services and timely corrective measures to avoid preventable deaths. So far no research has been undertaken to understand mortality profile among beneficiaries under these schemes. So, this study was undertaken to delineate the pattern of mortality among beneficiaries who have undergone different tertiary procedures/surgeries in empaneled hospitals for covered conditions under different public health assurance schemes.

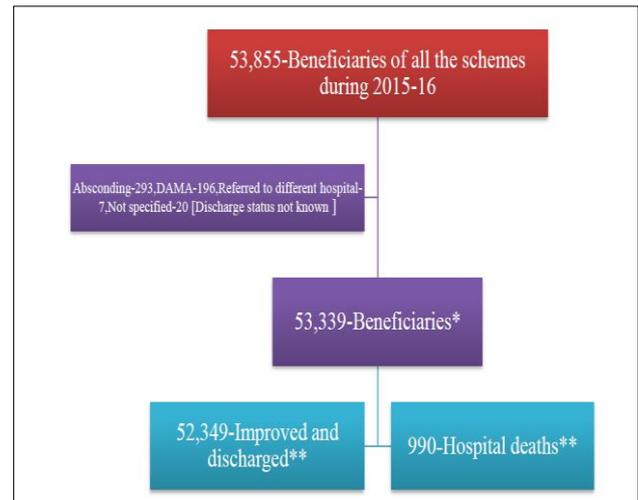
Objective of the study was to study the profile of mortality among beneficiaries of public health assurance schemes in the state of Karnataka.

## METHODS

A cross sectional Study was done in Suvarna Arogya Suraksha trust (SAST), Bangalore, Karnataka, after obtaining ethical clearance from Institutional ethics committee of Rajiv Gandhi Institute of Public Health and Centre for Disease Control at Bangalore. Data of 53,339 beneficiaries, who availed treatment in empaneled tertiary care hospitals under different health assurance schemes, during April 2015 to March 2016 across different districts of Karnataka was collected from online data base of SAST. Beneficiaries whose outcome was improved or died at the time of discharge following procedures or surgeries for conditions covered under public health assurance schemes in empaneled hospitals were included in the study. Beneficiaries whose outcome status written as absconding, discharged against medical advice, referred to different hospitals and not specified following procedures/surgeries for conditions covered under public

health assurance schemes in empaneled hospitals were not included.

Beneficiaries details such as type of public health assurance schemes availed (VAS, RBSK, JSS, RAB) domicile divisions (Bangalore, Mysore, Gulbarga and Belgaum), treated hospital type (government or private), speciality under which treatment received (cardiac, oncology, neurosurgery, genitourinary, burns, poly-trauma and paediatric) type of procedure/surgery performed, age at the time of procedure/surgery and gender of beneficiaries were obtained.



**Figure 1: Flow diagram showing the outcome among beneficiaries for covered conditions under different public health assurance schemes during 2015-16.**

\*Sample size considered for study analysis after excluding the beneficiaries whose discharge status was not known, DAMA= Discharged against medical advice; \*\*Information about socio-demographic details of beneficiaries (includes age, gender and domicile division) under different schemes, treated hospital type and treated specialty area obtained; 53,855-Beneficiaries of all the schemes during 2015-16; 53,339-Beneficiaries\*; 52,349-Improved and discharged\*\*; 990-Hospital deaths\*\*; Absconding-293, DAMA-196, Referred to different hospital-7, Not specified-20 (Discharge status not known).

## Statistical analysis

Data collected was entered and analyzed using Microsoft EXCEL 2010 and SPSS-20 version. Qualitative variables were described by frequency and percentage whereas, quantitative variables by median, inter-quartile range and 95% confidence interval (CI). Pearson's chi-square test was used to test the association between pulmonary arterial hypertension and mortality in surgeries for congenital heart diseases. Z-test was applied for categorical variables where appropriate. Non parametric test- Mann-Whitney test was used to compare the measurable variables. Results are presented in the form of tables wherever necessary. Results are considered statistically significant whenever p value is 0.05.

## RESULTS

### Mortality profile according to the specialities

The hospital mortality in burns speciality (11.2%) was significantly ( $p<0.001$ ) higher compared to others: paediatric (2.7%), cardiac speciality (2.4%), oncology (2.1%), neurosurgery (0.7%) and genitourinary (0.1%) (Table 1).

### Mortality profile according to health assurance schemes

Nearly 1.9% of beneficiaries of VAS, 1.7% RAB, 1.5% JSS and 1.7% RBSK (VAS=Vajpayee Arogyashree Scheme, RAB=Rajiv Arogya Bhagya, JSS=Jyothi Sanjeevini Scheme, RBSK=Rashtriya Bal Swasthya Karyakram) had death as outcome at the time of discharge. Overall hospital mortality among beneficiaries of public health assurance schemes was 1.9%. There was no significant ( $p>0.05$ ) difference in outcome among the beneficiaries of VAS and RAB (Table 1 and Table 2).

### Mortality profile according to gender

Significantly ( $p<0.01$ ) higher hospital mortality was seen in females (2.1%) compared to males (1.7%). This was as a result of significantly ( $p<0.001$ ) higher mortality due to burns in females (15.6%) compared to males (7.1%) (Table 1 and Table 2).

### Mortality profile according to administrative divisions

The hospital mortality of beneficiaries treated in empaneled hospitals of Bangalore, Mysore, Belgaum and Gulbarga divisions was 1.7%, 2.4%, 1.7% and 1.0% respectively (Table 1). The mortality in Mysore division was significantly ( $<0.001$ ) higher compared to Gulbarga (Table 2). When we further analyzed mortality profile in Mysore and Gulbarga, it was found that mortality in Burns (14.9%), cardiac (2.4%) and oncology (3.6%) was significantly ( $p<0.01$ ) higher in Mysore compared to Gulbarga division (Burns-5.1%, cardiac-1.5% and oncology-1.8%).

**Table 1: Profile of mortality among the beneficiaries of public health assurance schemes from April 2015 to March 2016.**

Characteristics	Variables	Frequency	Percentage
Public health assurance schemes	Vajpayee Arogyashree	49,026	91.9
	Rajiv Arogya Bhagya	2,111	4.0
	Jyothi Sanjeevini	1,566	2.9
	Rashtriya Bal Swasthya Karyakram	636	1.2
	Total	53,339	100.0
Division	Bangalore	22,693	42.5
	Mysore	16,988	31.9
	Belgaum	8,868	16.6
	Gulbarga	4,790	9.0
	Total	53,339	100.0
Hospital type	Government	11,318	21.2
	Private	42,021	78.8
	Total	53,339	100.0
Specialty	Burns	892	1.7
	Cardiac	20,346	38.1
	Genitourinary	11,400	21.4
	Neurosurgery	4,280	8.0
	Oncology	14,753	27.7
	Paediatric	1,620	3.0
	Poly-trauma	48	0.1
	Total	53,339	100.0
Age group (in years)	0 -1	2,162	4.1
	2 -14	3,910	7.3
	15- 49	23,816	44.7
	50 and above	23,451	44.0
	Total	53,339	100.0
Gender	Male	33,716	63.2
	Female	19,623	36.8
	Total	53,339	100.0

**Table 2: Association between treatment outcome at the time of discharge and other variables among beneficiaries of public health assurance schemes.**

Variables	Outcome at the time of discharge		Z test	P value
	Improved and discharged (%)	Died in hospital (%)		
<b>Schemes</b>				
VAS	48,107 (98.1)	919 (1.9)*	1.27	>0.05
RAB	2,075 (98.3)	36 (1.7)*		
JSS	1,542 (98.5)	24 (1.5)		
RKSK	625 (98.3)	11 (1.7)		
<b>Division, n=53,339</b>				
Bangalore	22,307 (98.3)	386 (1.7)	7.542	<0.001
Mysore	16,584 (97.6)	404 (2.4)*		
Belgaum	8,715 (98.3)	153 (1.7)		
Gulbarga	4,743 (99.0)	47 (1.0)*		
<b>Hospital type, n=53,339</b>				
Government	11,131 (98.3)	187 (1.7)*	1.449	> 0.05
Private	41,218 (98.1)	803 (1.9)*		
<b>Speciality, n=53,339</b>				
Burns	792 (88.8)	100 (11.2)*	9.801	<0.001
Cardiac	19,850 (97.6)	496 (2.4)*		
Genitourinary	11,392 (99.9)	8 (0.1)		
Neurosurgery	4,249 (99.3)	31 (0.7)		
Oncology	14,442 (97.9)	311 (2.1)		
Paediatric	1,576 (97.3)	44 (2.7)		
Poly-trauma	48 (100)	0		
<b>Age, n=53,339</b>				
0 - 1	2,014 (93.2)	148 (6.8)*	10.073	<0.001
2-14	3,852 (98.5)	58 (1.5)*		
15 - 49	23,499 (98.7)	317 (1.3)		
50 and above	22,984 (98)	467 (2.0)		
<b>Gender, n=53,339</b>				
Male	33,143 (98.3)	573 (1.7)*	3.225	<0.01
Female	19,206 (97.9)	417 (2.1)*		
<b>Gender, n=52,447**</b>				
Male	32,713 (98.4)	540 (1.6)*	1.694	>0.05
Female	18,844 (98.2)	350 (1.8)*		
<b>Gender, n=892***</b>				
Male	430 (92.9)	33 (7.1)*	4.011	<0.001
Female	362 (84.4)	67 (15.6)*		

VAS=Vajpayee arogyashree scheme; RAB=Rajiv arogya bhagya; JSS=Jyothi sanjeevini scheme; RBSK=Rashtriya bal swasthya karyakram. \*groups which are compared. \*\* denotes beneficiaries excluding burns victims, \*\*\* burns victims only.

**Table 3: Speciality wise distribution of hospital mortality in Mysore and Gulbarga divisions under public health assurance schemes.**

Speciality	Mysore division		Gulbarga division		Z test score	P value
	Procedures/surgeries	Deaths (%)	Procedures/surgeries	Deaths (%)		
<b>Burns</b>	315	47 (14.9)	59	3 (5.1)	2.802	<0.01
<b>Cardiac</b>	6085	144 (2.4)	1170	18 (1.5)	2.217	<0.01
<b>Oncology</b>	5148	185 (3.6)	759	14 (1.8)	3.284	<0.01
<b>Genitourinary</b>	3669	5 (0.1)	2032	1 (0.01)	-	-
<b>Neurosurgery</b>	1391	15 (1.1)	612	5 (0.8)	0.657	>0.05
<b>Paediatric</b>	350	8 (2.3)	146	6 (4.1)	-0.985	>0.05
<b>Poly-trauma</b>	30	0	12	0	-	-

Higher hospital deaths in burns victims in Mysore division were probably because of 29 cases (25 died) of more than 60% burns availed treatment compared to only

3 (2 died) in Gulbarga division. More than 60% burns victims are less likely to survive (Table 3).

### Mortality profile in paediatric age group

Significant ( $p < 0.001$ ) higher hospital mortality was seen among infants (6.8%) compared to 2-14 (1.5%) age group. This could be due to more surgeries conducted among infants for congenital heart diseases and other malformations which carry high risk of mortality.

### DISCUSSION

The current study is first of its sort in Karnataka, where profile of mortality and associated factors of beneficiaries of different public health assurance schemes has been studied. In this study, the mortality of burns victims in Mysore division (14.9%) was much lower than that reported from Indian studies viz Shanmughakrishnan et al (57.33%), Subrahmanyam (56.5%), Ahuja et al (51.80%), Gupta et al (40%), Shankar et al (41.6%) but little more than to Khan et al study (11.8%).<sup>5-10</sup> In the present study mortality in Mysore division for PCI is lesser compared to other studies conducted in India viz. Subban et al (4.2%) and Rajashekar et al (3.6%).<sup>11,12</sup> Further in-depth study is required to know the exact reason for the differences in mortality following PCI among the divisions. Regarding gender based diversions, this study results were in concordance with other studies in India viz Subrahmanyam et al (females 75% and males 33%), Ahuja et al (females 62.12% and males 38.82%), Shankar et al (females 77% and males 23%) and Khan et al study (females-28.7%, males-4.5%).<sup>6-10</sup> As per Uphadhyay et al study, the four leading chronic diseases in India, as measured by their prevalence, in descending order are cardiovascular diseases, diabetes mellitus, chronic obstructive pulmonary disease and cancer.<sup>13</sup> Our study reports were in concordance with the above reported NCDs prevalence in India.

### Limitations

In the present study, the mortality profile was limited only to mortality occurred in hospitals due to non-availability of the post discharge information of the beneficiaries.

### CONCLUSION

The hospital mortality was more among beneficiaries treated in empaneled hospitals of Mysore division. The mortality was also more among infants and females. Among females it was due to burns.

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