Benefit Incidence of Public Expenditure in Health: a study of Karnataka[*]

Abstract

Affordable and quality healthcare is indispensable for a decent quality of life. It has been observed that healthcare is expensive and more or less inaccessible for the poorer section of society. In that case, government should take the onus of providing affordable and quality healthcare to masses. However, whether the public health services are reaching to needy is questionable. This depends on the demand and utilization of health services by people belonging to different economic sections in the society. Distribution of public spending as pro-poor or pro-rich has policy implications. In this paper we are attempting to analyse the distribution of public health spending in Karnataka state, by analysing the Budget and Reproductive and Child Health (RCH) round-III data. The analysis highlights the commitment of authorities to provide health services to the poorer section of society.

Key words: Benefit Incidence, Pro-Poor, Development and Recurrent Expenditure

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1. Introduction: The prime objective of health care system is to meet the healthcare needs of people in most efficient and effective manner. Aligned with the objectives of National Rural Health Mission (NRHM), Karnataka has implemented the activities of mission for attaining the goals of National Population Policy (NPP) and Millennium Development Goals (MDGs). Karnataka has also recognized the immeasurable value of enhancing health and wellbeing of its people. Health indicators in state are much better positioned when compared with national average. Total Fertility Rate (TFR) is 2.0 in Karnataka less than national average 2.58[1]. Likewise, Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR) and Sex Ratio (SR) in Karnataka is 35/1000, 178 and 968 per '000 male respectively better than national average of 44, 212, 940 respectively[2, 3]. In terms of health infrastructure too state is much better than other states. Healthcare financing plays significant role in sustaining the gain in health outcomes. Considering the rising cost of medical care and high Out of Pocket (OOP) health spending, a greater attention needs to be paid for equitable health financing. It is essential on the part of government to play multifaceted role of financing source, financing agent and service provider. Health insurance schemes, prepayment schemes, selection of cost effective strategies including use of generic drugs, central purchasing and better management of infrastructure, equipments and transport would enhance both the quality and coverage of healthcare[4]. It would also help in accessing the healthcare services by the poorest strata of society at affordable prices. Government is committed to increase its outlay on health to benefit people at disadvantageous position in social and economic hierarchy. This paper attempts to investigate the distributional incidence of public spending on health for different groups of interest.

Public spending can be in terms of public transfers, taxes, subsidies or policy change with respect to prices of services provided by public institutional bodies. Benefit incidence tells us who benefits from the services, transfers, subsidies or a policy change while estimating the size of benefits received by people.

In health sector, it has been noticed that public healthcare facilities which cater to people from lower economic strata mostly, are highly subsidized (NSSO). Benefit incidence here, attempts to estimate the distributional benefit of public spending on health among different economic strata in Karnataka state.

Addressing the needs of the poor people regarding access to healthcare is critical objective of most of governments. Measuring benefits of government expenditures across income, race and other characteristics of individuals is an extensive empirical exercise. The poor often have limited access to services because of their compromised economic status. Hence, the government is expected to target the provision of these services to the poor. But how does one ascertain the extent to which either the increased allocation or the existing allocation is reaching the poor?[5] Benefit incidence analysis (BIA)

is a tool that addresses this question. It brings together elements of the supply of and demand for public services and can provide valuable information on inefficiencies and inequities in government allocation of resources for social services and on the utilization of these services.

The literature on benefit incidence previously had three distinct periods. In the early literature or pre-1975, benefits are allocated to households either on a per capita basis or in proportion to the income of the household. Both allocation mechanisms yield obvious conclusions about benefit incidence. There is also a preoccupation in the early literature with allocating the entire budget including the benefits of so-called pure public goods, such as defence. Aaron and McGuire (1970)[6] attempted to reduce the inherent arbitrariness of the allocation of pure public good benefits to households by deriving benefit measures based on a specific utility function. The parameters of their utility function suggest a strong pro-rich distribution of benefits, at least in developed countries.[7]

We believe the approach adopted by the social scientists since 1975 has great potential for informing policy choices on the transfer of resources within programs to target benefits to the poor more accurately. Nonetheless, researchers studying the benefits derived from public spending in developing countries may need to pay extra attention to (i) expenditures made through off-budget programs such as public enterprises, (ii) benefit shifting especially for agricultural programs, (iii) differential public service quality, especially between urban and rural areas, (iv) the effects of benefits on inter- and intra-family transfers, and (v) the effects of benefits on urban-rural migration.

In a further analysis of benefit incidence, Gertler and Glewwe (1990)[8] and Gertler *et.al.* (1987)[9] estimated demand curves for various social services. Demand curves for particular population subgroups can be used to calculate changes in welfare based measures (or compensating variation) of social services benefits. Studies using welfare-based measures of benefits for a wide range of public functions can yield valuable information to policy makers and help target the limited resources for redistribution towards those public services of maximum benefit to the poor. However, these studies do not, to date, offer benefit measures on the broad range of government services that more traditional benefit incidence studies have to offer.[10]

Households incur out-of-pocket expenses to obtain in-kind subsidies embodied in healthcare services and these should be incorporated in the benefit incidence analysis. Some can be considered as the transactions costs (such as transport expenses) while others add to the benefits that is obtained from the service (such as user-charges). Benefit incidence refers only to the distribution of public subsidy; it is often useful to incorporate into the analysis household spending on the service to obtain a full account of the service involved.

The rest of the paper is organized as follow: next section describes process of benefit incidence analysis; section 3 explains data sources, sections 4, 5 and 6 explain methodology, estimation and assumptions and limitations of study respectively, section 7 describes findings and discussion.

2. Benefit Incidence Analysis: Process

Following information is essential for the estimation of the incidence of public spending on the services:-

1. Government spending from the budget report by department of finance.
2. Public utilization of resources.
3. The socio-economic characteristics of the population using the service.

The data used in the benefit analysis is typically reported on an aggregate basis.

The process in which the analysis can be carried out is mentioned below:-

Obtain the average unit cost of providing a public service by dividing the government spending and the total number of users of the service. Total state budget financing figures for health may be used to obtain total public spending on service which includes recurrent and capital financing. Total number of beneficiaries of the services is estimated from household survey.

Date Requirements

- Information on public expenditure to estimate the value of benefits
- Individual or household level data from household survey on usage of service
- Socio-economic characteristics of user of service

3. Data Source

Information on public expenditure is obtained from budget documents of the government to estimate value of benefits. Present analysis uses PBA report[11] (CBPS, PBA Health 2012) data to estimate total public spending on healthcare. Number of beneficiaries is estimated from DLHS-III[12] data for Karnataka State and extrapolated for the population figure of census 2001.

Quintile wise distribution of population accessing healthcare in public health facilities is estimated from District Level Household and Facility Survey (DLSH-III). Study has used DLHS round-III data for this analysis. DLHS-III data was collected in 2007-08. DLHS-III surveyed a total of 29,062 households, 27,864 ever-married women and 6,452 unmarried women in Karnataka. Information was collected at various levels and at different dimensions.

Wealth index was constructed based on the methodology proposed by Filmer and Primchet[1] as a proxy of income/consumption quintile. Wealth index score was categorized into five categories ranging from the poorest to the richest. Wealth index was constructed based on the information on nature of housing, access to basic amenities and possession of durable goods. Based on the Principle Component Analysis (PCA), factor loading to amenities, assets and durables was derived and used for the computation of the wealth index. Households were categorized from lowest (poorest) to highest (richest) at state level.

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[1] Filmer D, Pritchett LH. 2001. Estimating wealth effect without expenditure data – or tears: an application to educational enrollments in states of India. Demography 38: 115–32.

This categorization is used as a proxy for income/consumption quintile to ascertain the benefit incidence across income/wealth classes of public spending/expenditure on healthcare.

4. Methodology

Four basic steps BIA incorporate are as follow:

- Ranking all individuals from the poorest to the richest by chosen measure of welfare (in the current analysis wealth index)
- Identify which individual used each type of publically provided services (net of cost recovery in terms of user fees or charges)
- Calculate the average unit cost of providing the service
- Multiplying the utilization figure by government's unit cost of provision. This gives the amount of public spending on services going to each group.

5. Estimation

$$X_j = \Sigma\ E_{ij}\ (S_i /E_i)$$

`Where   j = 1, 2, 3, 4, 5, i =1, 2

X_j is the benefit analysis in local currency accrued to wealth group *j* from (net) government spending denoted as *S*, also measured in local currency; *E_{ij}* represents number of total beneficiaries in level i from group *j* where each group is a quintile; and *S_i/ E_i is* the unit cost of providing *healthcare at level i*. Groups are typically ordered from lowest to highest with respect to the classifying variable.

6. Assumptions and Limitations

- DLHS-III provides the information about access to healthcare when any member falls sick. Information on access to secondary healthcare is ambiguous. Hence data on access to secondary and tertiary healthcare is clubbed together.
- It is assumed that as per DLHS-III, those who had responded to access healthcare would eventually access the healthcare in respective health facilities.
- Unit cost is assumed to be uniform for the respective level of healthcare.
- No distinction is made regarding rural-urban divide.
- Expenditure on administration and other overheads are not included while considering the total public health spending. Only expenditure on primary, secondary and tertiary (development and recurring expenditure) is considered while estimating total public health spending.
- Cost recovery in terms of user charges collected constitutes a little amount hence not considered while estimating unit cost.
- Total number of beneficiaries is estimated based on the population figure of census of 2001.

7. Findings and Discussions

Public spending on healthcare is estimated through the budget document of state. 2007-08. Budget data from PBA (CBPS, PBA-Health 2012) is used to estimate the average cost of providing service. While estimating the average cost of providing the service both capital and recurrent cost is taken into account. In the present paper we are provided two estimates i.e. one based on total health spending (development and recurrent) and one based on recurrent spending only. As the recent practices confine the analysis to recurrent spending thus avoiding the difficulties encountered in estimating the flow of services/benefits from capital expenditures. But when capital budgets are large, they can have a profound effect on the benefit incidence of public spending.

Average cost is estimated by dividing the total public expenditure on healthcare by total number of beneficiaries.

Total number of beneficiaries is estimated from the population figures of 2001 census. As per 2001 census 5,28,50,562 was the population of Karnataka state. Total number of households in Karnataka was 1,03,62,855 as per 2001 census and average household size was 5.1 in Karnataka. Considering that 42.9 percent of households in DLHS-III sought treatment in public health facilities total number of beneficiaries in Karnataka state is 2,26,72,891 (44,45,665 households) . Based on the estimated figure of total beneficiaries, average unit cost of providing the public healthcare services is estimated for primary healthcare and secondary /tertiary healthcare.

Expenditure on public healthcare is estimated at three different level of healthcare namely: primary, secondary and tertiary sector (development and recurrent expenditure). Administrative and other expenditure are not included. Data on secondary and territory care is clubbed for further analysis based on the assumption mentioned above.

To estimate the economic class wise analysis of accessing healthcare in public health facilities District Level Household and Facility Survey data is used. District Level Household and Facility Survey (DLSH-III) collected the data from 29,062 households in Karnataka state in 2007-08 regarding their demographic, socio-economic, health seeking behaviour and Reproductive and child health related issues. DLHS-III was used to estimate the health seeking behaviour among population in Karnataka. Wealth Index based on PCA was used to categorize the population into five categories ranging from the poorest to the richest. To construct wealth index thirty variables related to structure of house, access to basic amenities and possession of durable goods are used. Household data are used to analyse the health seeking behaviour. Question "When members of your household get sick, where they mainly go for treatment?" is used to estimate the health seeking behaviour. Table 1 shows the distribution of sample by wealth categories and source of treatment. It was noticed that in Karnataka, 42.9 percent of households seek treatment in a public health facility when any member of household falls sick. Few observations emerged from the table 1 are: (1) fifty-two percent of the poorest access

healthcare in public health facilities, (2) From the poorest to the richest wealth class, the percentage of households accessing healthcare at public health facilities declines and (3) Even in the richest wealth quintile 23.8% households seek treatment in Public health facilities. This may be attributed to the preference of even the richer households to seek tertiary care in public health facilities as has been citied in various studies regarding health seeking behaviour in India.[13]

Table 2 shows the distribution of households by wealth quintile and level of healthcare. In general, the majority of those who access treatment in public health facilities mostly belong to the poorest, the poor and the medium socio-economic status, this being truer for the primary health care. Here public health facilities include government hospitals, PHC, CHS, SC, UHC, AYUSH hospitals, Anganwadi/ICDC centre, government mobile clinic and other public health facilities.

Table 2 shows that out of 12,470 households who access healthcare in public health facilities, 71.7 percent availed primary healthcare and rest secondary or tertiary healthcare. From the poorest to the richest wealth class the percentage of households availing primary healthcare declines. Mere 8.4 percent in the richest wealth quintile availed primary healthcare in public health facilities.

Table 2 also provides socio-economic classification of users of public health services. Based on this analysis, Census 2001 data is used to estimate the total number of beneficiaries accessing healthcare in Public Health Facilities in Karnataka. Findings from DLHS-III regarding the total number of beneficiaries are extrapolated to census data. Table 3 shows the estimated number of beneficiaries of public health spending in Karnataka. Based on the population figure of census 2001 for Karnataka state and percentage of Households accessing healthcare in public health facilities (42.9%) from DLHS-III, total beneficiaries are estimated as 2,26,72,891. Out of these 42.9 percent households, 71.7 percent availed primary healthcare and rest availed secondary or tertiary care as per DLHS-III. Table 4 shows the distribution of estimated beneficiaries assessing healthcare by level of healthcare and wealth quintile. It was observed that number of beneficiaries declines from the poorest to the richest wealth quintile. More poor people access primary healthcare in Public health facilities than the rich. However, regarding secondary and tertiary healthcare not much difference was observed.

Above analysis fulfils the requirement of data related to utilization of public health facilities and socio-economic characteristics of beneficiaries of public health facilities to conduct benefit incidence analysis.

Unit cost of providing the service is ascertained from budget documents of state. As discussed earlier, total budgeted expenditure for three sectors for the year 2007-08 was used to estimate unit cost in primary and secondary/tertiary healthcare sector. Total budgeted expenditure in three sectors was Rs. 73,277 lakhs (primary healthcare Rs. 39,523 Lakhs and secondary and tertiary care Rs. 33,754 Lakhs). These figures include development expenditure in respective healthcare. Based on this information, the average cost of providing health service is Rs. 323.2. Table 5 shows the per capita

public expenditure on health in Karnataka in different sectors based on total expenditure and recurrent expenditure.

Health expenditure includes expenditure on medical care, drug and supplies, institutional build up and medical education, training and research, public health and family welfare

Total health expenditure incurred in three sectors (primary, secondary and tertiary) is included while estimating the per capita public expenditure on health. Table 5 shows that in Karnataka Rs. 323.2 (absolute figures) per capita are spent on the healthcare (development and recurrent expenditure); per capita health expenditure on primary healthcare is Rs. 243.1. Combined secondary and tertiary care sector accounts for Rs 526.1 per capita health expenditure. However, considering recurrent expenditure per capita expenditure in Karnataka in different sectors is Rs. 224.9 (primary sector) and Rs. 302.1 (secondary and tertiary sector).

Multiplying the utilization figure (table 2 or table 4) by government's unit cost of provision (table 5) gives the amount of public spending on services going to each group. Table 6 shows the benefit incidence of health spending to different wealth groups. It is observed that public health spending in Karnataka at Primary level is more pro-poor compared to secondary or tertiary level. Table 6 also shows the incidence of the entire expenditure across all the quintile classes. Aggregate expenditure on health in a particular quintile is taken into consideration. To summarize the expenditure pattern further, the benefit incidence of public spending on health can also be illustrated by a concentration curve graph. A concentration curve of government spending plots the cumulative proportions of households, ranked from the poorest to the richest, on the horizontal axis, against the cumulative proportion of benefits received by the household, plotted on the vertical axis. Figure 1 shows the cumulative distribution. It shows three concentration curves (tier-wise and one total healthcare) and benchmarks, the 45 degree line (purple coloured line labeled line of equality). The graph is an illustration of the structure of benefit derived from government spending.

Benefits from public spending are said to be pro-poor if the concentration curve is above line of equality. This type of concentration curve is concave rather than convex. This implies that authorities follow policies which target the poorer section of society. From the figure it is quite evident that in Karnataka authorities follow the policies which target the poorer section. Concentration curve for primary healthcare is more concave than secondary/tertiary healthcare concentration curve and total healthcare.

Discussions:

The analysis of distribution of public spending on Healthcare shows that public spending on healthcare in Karnataka state is more pro-poor at primary care level which highlights the commitment of authorities to provide affordable healthcare services to needy people particularly the preventive healthcare. However, at secondary or tertiary level the distribution of public spending on healthcare is just pro-poor.

Overall Benefits of public health spending is pro-poor in Karnataka state which shows that authorities follow a policy which targets the poorer section of the society. As it has been experienced that most of the people belonging to the poorer section of the society access healthcare services in the public health facilities it makes sense that benefit of distribution of public spending on healthcare should be pro-poor.

Considering that most of the people belonging to poor economic strata access healthcare in public health facilities, it is essential on the part of financing and implementing authorities to invest more in the public health facilities so that it benefits economically weaker section of the society.

Acknowledgement:

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Table 1: Wealth Class and Source of Treatment

Characteristics	Households as per DLHS-III	Accessing healthcare at public health facility	Not accessing healthcare at public health facility	Percentage accessing health care in Public health facilities	Distribution of those accessing healthcare in Public Health Facility by Wealth classes
poorest	5,598	2,913	2,685	52.0	23.3
poor	6,027	2,995	3,032	49.7	24
Medium	5,813	2,783	3,030	47.9	22.3
Rich	5,811	2,396	3,415	41.2	19.2
Richest	5,813	1,383	4,430	23.8	11.1
Total	**29,062**	**12,470**	**16,592**	**42.9**	**100.0**

Source: District level Household and Facility Survey (DLHS-III) 2007-08

Table 2: Wealth quintile wise distribution of level of healthcare

Level of Healthcare	Wealth Quintile					Total
	Poorest	Poor	Medium	Rich	Richest	
Primary	2,267 (25.4)	2,246 (25.1)	2,017 (22.6)	1,660 (18.6)	752 (8.4)	8,942
Secondary and Tertiary[*]	646 (18.3)	749 (21.2)	766 (21.7)	736 (20.9)	631 (17.9)	3,528
Total	**2,913 (23.4)**	**2,995 (24.0)**	**2,783 (22.3)**	**2,396 (19.2)**	**1,383 (11.1)**	**12,470**

[*]**Secondary and Tertiary healthcare level is clubbed, figures in bracket shows the percentage distribution**
Source: DLHS-III 2007-08

Table 3: Estimation of beneficiaries of public health spending

Characteristics	Number	Percent
Total Population (Census 2001)	5,28,50,562	100.0
Estimated number of total beneficiaries (based on DLHS-III)	2,26,72,891	42.9
Estimated number of total beneficiaries of Primary Healthcare (Based on DLHS-III)	1,62,56,463	71.7
Estimated number of total beneficiaries of Secondary and tertiary Healthcare (DLSH-III)	64,16,428	28.3

Source: Census 2001, DLHS-III 2007-08

Table 4: Estimated Beneficiaries[*] Accessing Healthcare in Public Health Facilities by Wealth Quintile and level of facility

Level	Primary Healthcare	Secondary and Tertiary Healthcare	Total
Q1 (Poorest)	41,21,382	11,74,890	52,96,273
Q2 (poor)	40,83,205	13,62,218	54,45,423
Q3 (Medium)	36,66,885	13,93,136	50,60,021
Q4 (Rich)	30,17,863	13,38,575	43,56,437
Q5 (Richest)	13,67,128	11,47,609	25,14,738

Total	1,62,56,463	64,16,428	2,26,72,891

To estimated number of beneficiaries in respective wealth class by level of healthcare refer to Table 2

Table 5: Per Capita Public Expenditure[*] on Health in Karnataka   (In Rupees)

Health Sector	Per capita expenditure (development and recurrent)	Per capita expenditure (recurrent)
Primary Health Sector	243.1	224.9
Secondary and tertiary Health Sector	526.1	302.1
Total	**323.2**	**246.8**

[*]Per capita expenditure figures are arrived at by dividing total expenditure in respective sector by estimated number of total beneficiaries in respective sector (refer to table 3)

Table 6: Benefit Incidence of Spending Accrued to the Wealth Group

(In Rupees)

Level	Total Expenditure (Development and Recurrent)			Recurrent Expenditure		
	Primary Healthcare	Secondary and Tertiary Healthcare	Total (Per capita)[*]	Primary Healthcare	Secondary and Tertiary Healthcare	Total (Per capita)[*]
Q1 (Poorest)	10,020[#] (61.6)	6,181 (96.3)	17,117 (75.5)	9,270 (57.0)	3,550 (55.3)	13,069 (57.6)
Q2 (poor)	9,927 (61.1)	7,166 (111.7)	17,599 (77.6)	9,184 (56.5)	4,115 (64.1)	13,437 (59.3)
Q3 (Medium)	8,915 (54.8)	7,329 (114.2)	16,354 (72.1)	8,248 (50.7)	4,209 (65.6)	12,486 (55.1)
Q4 (Rich)	7,337 (45.1)	7,042 (109.7)	14,080 (62.1)	6,788 (41.8)	4,044 (63.0)	10,750 (47.4)
Q5 (Richest)	3,324 (20.4)	6,037 (94.1)	8,127 (35.8)	3,075 (18.9)	3,467 (54.0)	6,206 (27.4)
Total	39,523 (243.1)	33,754 (526.1)	73,277 (323.2)	36,564 (224.9)	19,385 (302.1)	55,949 (246.8)

[#] Figures are in Lakhs [*]Figures in brackets show per capita distribution of benefit of public spending in rupees

Figure 1: Concentration curve showing the incidence of public spending on health in Karnataka