

Issues in Measuring GDP of Health Care Service in India in the Standard National Accounts Framework

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Abstract

The National Accounts Statistics provides a comprehensive estimate of national income (NI) as well as other macro-economic parameters for proper evaluation of the performance of an economy. These estimates also help in formulating future development policy planning of a country. During the last two decades it has been observed in both developed and developing countries that the growth of the service sector becomes much higher than that of the other two sectors (primary, and secondary). Some economists argued that the output of the service sector is overestimated and thus showing such a robust growth rate. One may also argue that this happens due to application of the same techniques for measuring both goods and services. Outputs of the Service sector have some special characteristics of its own, e.g. they are intangible and heterogeneous and thus make distinct differences from that of goods sector outputs. Among the service sectors, estimation of the health service sector output is more critical because, in addition to intangibility and heterogeneity characteristics, risk and uncertainty factors are always associated with it. However, Health is the prime source of generating human capital. As a result a different estimation technique deemed necessary for proper estimation of the quality adjusted output of the service sector, specially for the health care service. The present study evaluates and critically examines the existing methods of output estimation of the health care services, especially in India, and tries to suggest possible alternatives which can be internationally comparable.

Key Words: Health, Health output, Quality Adjusted Life Years, GVA, NI, GDP, Human capital

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I. Introduction

The terms 'National Income' (NI) or 'Gross Domestic Product' (GDP) have become a common terminology both to the economists and other personalities to indicate the economic performance of a country when occasion demanded. The terms simply indicate the aggregate incomes of all the individuals in an economy or the money- value of the total products derived directly from the production of goods and services within the geographical boundaries of the national economy in a given time period (usually one year) without duplication. Although it cannot provide information on how development is distributed among the population and thus fails to reflect the inequality and deprivational aspects of development, yet it established itself as a prominent indicator to give an bird's eye view of a country's economic development and thus continued to be in wider use.

For the proper understanding of the needs and setting the priorities of development plans, an economy is divided into three sectors- primary sector, secondary sector and tertiary sector (called service sector). All these sectors are complementary to one another and make composite national economic activities. GDP is the aggregated output produced in these three sectors expressed in monetary terms. Generally, the outputs produced in primary and secondary sectors are physical goods and tertiary sector (or service sector) produces services. The total output of an economy (GDP) is therefore constitutes of both goods and services produced in different sectors of the economy. The characteristics of goods and services are different both in terms of output and mode of consumption. This implies that the measurement technique for estimating outputs of goods and services should not be the same or identical. On the other hand, services are also of various kinds within the service sector itself and for that the measurement procedures are also likely to be different for estimating output of some services. But in India, to measure the GDP some sectors follow the production approach to measure their output while some others' output is estimated through the income approach irrespective of the nature and characteristics of the output.

It is being observed during the past two decades that the service sector has emerged as the largest and fastest-growing sector in the global economy, providing more than 60 per cent of global output, and, in many countries, an even larger share of employment. In India, it accounts for more than 50 percent of the GDP (R.Banga, 2005). Some economists (Nagaraj, 2009) argued that the output of services is overestimated due to inadequate availability of reliable data and use of faulty methodology. Measurement of services is, in general, difficult due to its complex domain and varied characteristics (Sherwood, 1994). The problems like, quantification, identification, intangibility, asymmetric information etc. comes on the way of estimation. Both goods and services are assessed by their qualitative and quantitative dimensions. There are techniques available for assessing quality of a good but there is no such technique available in case of assessing quality of services.

This paper deals with the existing process of estimating health care service in India and tries to identify its limitations therein and also made some possible alternative suggestions for improving the measuring techniques.

II. Some basic concepts of health and health (or medical) related issues

a. Health

The widely accepted definition of health is given by WHO (1948) in the preamble to its constitution, which is as follows:

“Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity”. But in 1978 (Health for All, Sr. No.2) this statement has been amplified by WHO to include the ability to lead a “socially and economically productive life”.

The WHO definition of health has been criticized by arguing that health cannot be a ‘state’ condition and it must be seen as a process of continuous adjustment to the changing demands of living and of the changing meaning we give to life. It is therefore a dynamic concept. It helps people live well, work well and enjoy themselves. The WHO definition of health is therefore considered by many as an idealistic goal than a realistic proposition. It refers to a situation that may exist in some individuals but not in everyone all the time; it is not observed in groups of human beings and in communities (WHO, 1981, Tech. Rep. Ser. No. 667). Some consider it irrelevant to everyday demands, as nobody qualifies as healthy with respect to perfect biological, psychological and social functioning. This means, if we accept WHO definition then we are all sick. However, the concept of health as defined by WHO is broad and positive in its implications. The WHO definition is multidimensional which envisages three specific dimensions - physical, mental and social. Physical dimension imply the notion of perfect functioning of the body. Mental health is a state of balance between the individual and the surrounding world. Social dimension has been defined as the “quantity and quality of an individual’s interpersonal ties and the extent of improvement with the community”. Actually, it sets out the standard of ‘positive’ health, it symbolizes the aspiration of people and represent an overall objective or goal towards which nations are striving for.

While, the common saying is that ‘care is better than cure’, and one cannot deny that fact that all the dimensions of health (physical, mental and social) need care to carry out their respective functions perfectly. Health care consists of prevention of diseases, treatment and management of illness and the preservation of mental and physical well-being through services by the medical, nursing and other allied health related activities. According to WHO health care embraces all goods and services design to promote health, including preventive, curative, and palliative intervention whether direct to individual or to populations.

b. Characteristics of Health Care (or medical) service

Health care services have some unique characteristics of its own which are distinctly different from other services. Some of the characteristics of Health Care service are given below:

- Other than preventive care, the demand for health care services arises when normal functioning of human organism fails due to the presence of diseases. This kind of unpredictability of demand can not be observed in other services except public welfare services like, police services, national defence services, and fire services. It is unpredictable when an individual will be attacked by a disease. Hence, the demand for health care service is sporadic and irregular.
- The outcome of Health Care service is not deterministic. Risk of disability, patient's survival treatment and health recovery remains, to a greater extent, always be uncertain. Hence, consumption of this service never implies that the consumer (patient) will get desired utility or satisfaction from the service.
- The service is guided by the objective of customer's welfare but the customer (patient) can not test the product before consuming it. Here doctors or physicians act as a main intermediate agent of the service producing units. The quality of medical product and physician's efficiency is affected by the producer-customer relation.
- Asymmetric information are more than that of other services because in the health service a patient is not always aware exactly what disease happened to him/her or the degree of severity he/she is facing and the kind of treatment is required for that.
- The market for health care service is not perfectly competitive. Here the entry to the profession is restricted by licensing. So the supply is limited, and that makes in some cases, its market as monopoly in nature.
- The price of the goods and other services are determined by the market mechanism and/or profit maximization motive but medical-service-prices are in many cases influenced by the modalities of social welfare, as a result, extensive price discrimination is observed in this service.

III. Measurement of health (or medical) care service output

While measuring output of the goods sector, it is not needed to consider the qualitative aspects of the factor separately because price of the product is quality adjusted. But difficulty arises in measuring service output due to the intangibility and heterogeneity nature of services where it is difficult to quantify the volume of output as well as to identify their characteristics. The problem is more complicated in case of measuring the value of output of the health sector which is complex in nature (as output varies according to the disease groups, way of treatment etc.), and where no market mechanism holds and in many cases the services are provided at economically insignificant (subsidised) prices or at free of cost by the government and/or various non-profit institutions serving households (NPISHs).

Few countries like European Union, OECD, UK have made attempts to measure the output of health care service through the direct method (output approach). In Eurostat Handbook of Price and Volume Measure of National Accounts (2001) health output is defined as “the quantity of health care received by patients, adjusted to allow for the qualities of service provided, for each type of health care”. Here it is stated that the quantities should be weighted together using data on the costs or prices of the health care provided and the quantity of health care received by patients should be measured in terms of complete treatments.

According to Health Division of OECD (2009) Health care output is the number of complete treatments with specified bundles of characteristics so as to capture quality change and new products. A complete treatment refers to the pathway that an individual takes through heterogeneous institutions in the health industry in order to receive full and final treatment for a disease or condition.

Thus, both Eurostat Handbook and OECD have mentioned to measure health care output through complete treatment whereas UK give emphasis to measure health service output by the value weighted method considering the marginal social valuation of two qualitative aspects (health gain and patient’s experience) of the patients treated as weight instead of determining the output only by applying the cost weighted method.

So it would be worthy to mention the methods of measuring health care service output in different parts of the world which are given below –

(a) Methodology according to SNA (2008)

In the System of National Accounts (SNA) a uniform method is used to measure the value of outputs of goods and services. To compute the total production of an economy these two types of outputs are also treated as uniform entity while measuring marketed output, output used for own final use and non marketed outputs.

The value of market output is determined as the sum of the value of goods or services sold at the economically significant prices, the value of goods or services bartered, the value of goods or services used for payments in kind, the value of goods or services used as intermediate inputs, the value of changes in inventories and the margins charged on the supply of goods and services.

The outputs produced for own final use are valued at the basic prices of similar goods or services sold in the market or by their costs of production if no suitable basic prices are available. For non-market outputs that are the individual or collective goods or services produced by non-profit institutions serving households (NPISHs) or government at free of cost or at subsidized prices provided to the households, will be valued by their costs of production which is the sum of intermediate consumption, compensation of employees, consumption of fixed capital and other taxes, less subsidies on production.

It is mentioned in SNA 2008 that there are three possible methods of compiling volume estimates of the output of non-market goods and services. The first one is to derive a pseudo output price index. The second approach is the ‘output volume method’, recommended for individual services, in particular health and education based on the volume indicator of output which reflects the changes in both quantity and quality. The quantity indicators will be adequately quality adjusted, weighted with the average cost weight. The third one is ‘input method’ which measure changes in output by changes in the weighted sum of volume measures of all the inputs where both quantity and quality factors will be reflected.

To measure the volume of non-market individual services the services rendered to the customer should be measured and the change in volume of the output of the non-market unit can not be reflected by the change in the indicators of outcome. Measuring the changes in the volume of collective services is more difficult than the measuring the change in individual services. It is mentioned that when an input measure is impossible to avoid as a proxy for an output measure, the input measure should be a comprehensive one and should not be confined to labour inputs.

Thus, for measuring the GDP of health care service the above mentioned methodologies will be followed according to the SNA (2008).

(b) Methods followed in UK

In UK, the National Health Service (NHS) output provided by the government for which no market price is available. The methods followed by the Department of Health (DH) of government of UK up to 2004 is cost weighted method where the volume of NHS activity is multiplied by the cost. This cost weighted method is different from the value weighted method where volume of output is multiplied by its marginal value i.e. price. The cost weighted method will be equal to the value weighted method only when marginal value will be equal to the marginal cost.

NHS cost weighted method was based on the volume of different types of NHS procedures (the number of operations, ambulance journeys or GP appointments) and their unit costs. The form of the cost weighted output index (CWOI) is

$$\frac{\sum_j x_{jt+1} c_{jt}}{\sum_j x_{jt} c_{jt}}$$

Where x_{jt} is the volume of output j in period t, c_{jt} is the unit (average) cost of output j. But counting ‘episodes’ or ‘activity’ in the NHS is not an ideal way of measuring the positive gain for patients.

Again, another problem exists with the preventive treatments. The public health value to the population of avoiding illness is higher than the cost of the preventive treatments. In a crude sense, NHS output would be higher if patients were not vaccinated

(for example, against flu) and there were many more episodes of acute illness and hospital admission. That would be a perverse measure.

The Atkinson Report (2005) made recommendations on measuring the output of public services in a way which takes account of quality of different types of activity in proportion to their benefits to users or society rather than the cost of production. It proposed to measure quality as an aspect of health care output. It is suggested by the report of DH (2007) of UK (by the supervision of York/NIESR) to measure the quality of outputs in terms of two broad aspects of quality - **health gain** (which includes safety and effectiveness) and **patient experience** (which includes aspects of responsiveness, user focus, acceptability, access and timeliness). On the measurement of health gain it is mentioned that health gain is controlled by the factors - short term post-treatment survival rate, Quality Adjusted Life Years (QALYs) conditional on post-treatment survival, QALYs if not treated.

According to the value weighted output method output should be measured in terms of the number of patients treated, weighted in proportion to the extent to which the NHS delivers characteristics of output which are valued by individuals (i.e. quality), with the weight attached to each characteristic reflecting the marginal social value of the characteristic.

The value weighted output index (VWOI) is given as

$$\frac{\sum_j x_{jt+1} \sum_k \pi_{kt} q_{kjt+1}}{\sum_j x_{jt} \sum_k \pi_{kt} q_{kjt}}$$

Where, x_{jt} is the volume of output j in period t, q_{kjt} is the amount of characteristic k produced by a unit of j, and π_{kt} is the marginal monetary value of characteristic k. The characteristics valued by patients are – health effects, waiting time, food, cleanliness, respect and dignity etc.

The CWOI is equivalent to the VWOI if and only if (Dawson et al., 2004)

- (a) quality change is zero for all characteristics of all outputs,
- (b) c_{jt} is proportional to the marginal social value of output.

As data are not presently available to calculate a value weighted output index of NHS, the researchers proposed an interim approach, that the cost weighted NHS output index should be quality adjusted instead of value weighted output index. The quality adjusted CWOI is

$$\frac{\sum_j x_{jt+1} (q_{jt+1}/q_{jt}) c_{jt}}{\sum_j x_{jt} c_{jt}}$$

Where the symbols have their usual meaning as stated above.

(c) Methods followed in EU

For measuring health care service in the national accounting framework a distinction is made between the terminologies – input (resource used, like capital, labour, intermediate goods), activity (ex. number of procedures, days in hospital, consultations), output (completed treatments as bundle of activities) and outcome (change in health status attributed to health care interventions) in the Eurostat Handbook of Price and Volume Measures of National Accounts (2001). It recommended that in measuring volume focus should be on outputs not on the final outcomes and quality adjusted by counting activities classified by Diagnostic Related Groups (DRG). It is stated that quantities should be weighted by the costs or prices of the health care provided and the quantity of health care received by patients should be measured in terms of complete treatments.

In Eurostat Handbook, the methods for measuring quality-adjusted output volume are ranked in three categories - A (preferred), B (less satisfactory but acceptable), and C (unacceptable) methods. An A method is one which satisfies the following four criteria: (i) provides complete coverage of the product, good or service; (ii) weights outputs by the cost of production; (iii) accounts for quality changes; and (iv) maintains conceptual consistency between the indicator and the national accounts concept, that is the indicator measures outputs rather than activities. If one or more of the criteria is not met, the method becomes a B method or a C method as it moves further away from an A method. The precise definition of A, B and C methods are specific to products and industries. However, the use of inputs as proxies for output volumes is consistently regarded as an unacceptable method for measuring output volumes, i.e. a C method.

(d) Methods followed in OECD countries

For marketed health output the major problems and shortcomings of price measurement mentioned in the System of Health Accounts by OECD (2000) are:

- a) fragmentation of services into units of measurement that are of an input rather than an output type; such as bed days in hospitals, fees for selected procedures that constitute only part of medical treatment;
- b) use of regulated or administrated prices from fee-for-service lists for selected procedures; distorted and volatile price movements are a frequent consequence of physicians performing more procedures to achieve similar medical results in order to obtain increased income under regulated prices, resulting in underestimation of actual price increases;
- c) inadequate treatment of cost-sharing arrangements of, for example, pharmaceuticals;
- d) relatively small baskets for the coverage of core health care services;
- e) inadequate surveys for determining weighting schemes;
- f) inadequate capturing of technological and therapeutical advances and outdated baskets of services;
- g) use of crude output measures such as number of visits to physicians, bed days.

According to the System of Health Accounts by OECD (2000) estimation strategies for non-market health output focused on the following methods:

- (a) the use of input or input price indicators as proxies for output (numbers employed, hours worked; wage indices; with/or without additional exogenous assumptions about labour productivity trends);
- (b) the use of composite indexes (mix of input and output indicators);
- (c) the use of relevant CPI components for the deflation of non-market services.

The steps suggested by the System of Health Accounts by OECD (2000) to measure the health output are

- (a) Bundles of services that together constitute the treatment of an episode of illness can lead to more homogenous units of output has to be considered instead of the fragmentation of services. These bundles of services are more capable of tracking actual cost per treatment which, over time, may consist of a rapidly changing mix of services due to technological advances.
- (b) The cost-per-episode of illness approach has been suggested as an alternative to traditional health care price indexes.
- (c) Consideration of the treatment of an episode of illness as a statistical measurement unit needs various parameters inclusion for standard classification systems and patient information systems:
 - the nature of the patient's underlying disorder (disease or impairment);
 - the severity of cases (with/without complication);
 - the patient's age and gender;
 - the commonly performed interventions, resources and technology used (*e.g.*, type of surgery, physician's consultation, obstetric procedures, laboratory, etc.).
- (d) Diagnosis Related Groups (DRG) systems have been taken as the starting point for improved output indicators of non-market in-patient care in several recent pilot implementations (Australian Bureau of Statistics, 1997). It is required to use prices for similar bundles of services on the basis of corresponding units of output and also for direct price measurement in market services.
- (e) For improving the methodological underpinnings of health care price and volume indices it is needed to consider on the production of hospitals, ambulatory care and medical goods.

(e) Methods followed in India

In India, for National Accounting purpose the entire service sector is classified into a number of broad categories, e.g. a) trade, hotels & restaurants; b) transport, storage & communication; c) banking & insurance; d) real estate, ownership of dwellings & business services; e) public administration & defence and f) other services. Human health service is a sub-category under the 'human health activities including veterinary activities' which in turn one of the twelve sub-categories under the broad category of the "other services". Accounting procedure is used to carry out for all the above broad and sub-categories of the service sector separately for the three institutional sectors, i.e., public sector, private organized sector and private unorganized sector.

The Central Statistical Organisation (CSO) follows the guidelines of the System of National Accounts (SNA) for the computation of the National Accounts Statistics (NAS) of India in order to making the estimates internationally comparable over time. At present, the concepts and methods of compilation of NAS are followed in India has been mostly standardized in the tune of the systems of the SNA 1993 by CSO. Again, according to the NAS Sources and Methods, 2007, the Gross Value Added (GVA) of almost all categories of services are estimated separately for the public sector, private organised sector and private unorganised sector.

Coverage of Health Care Service

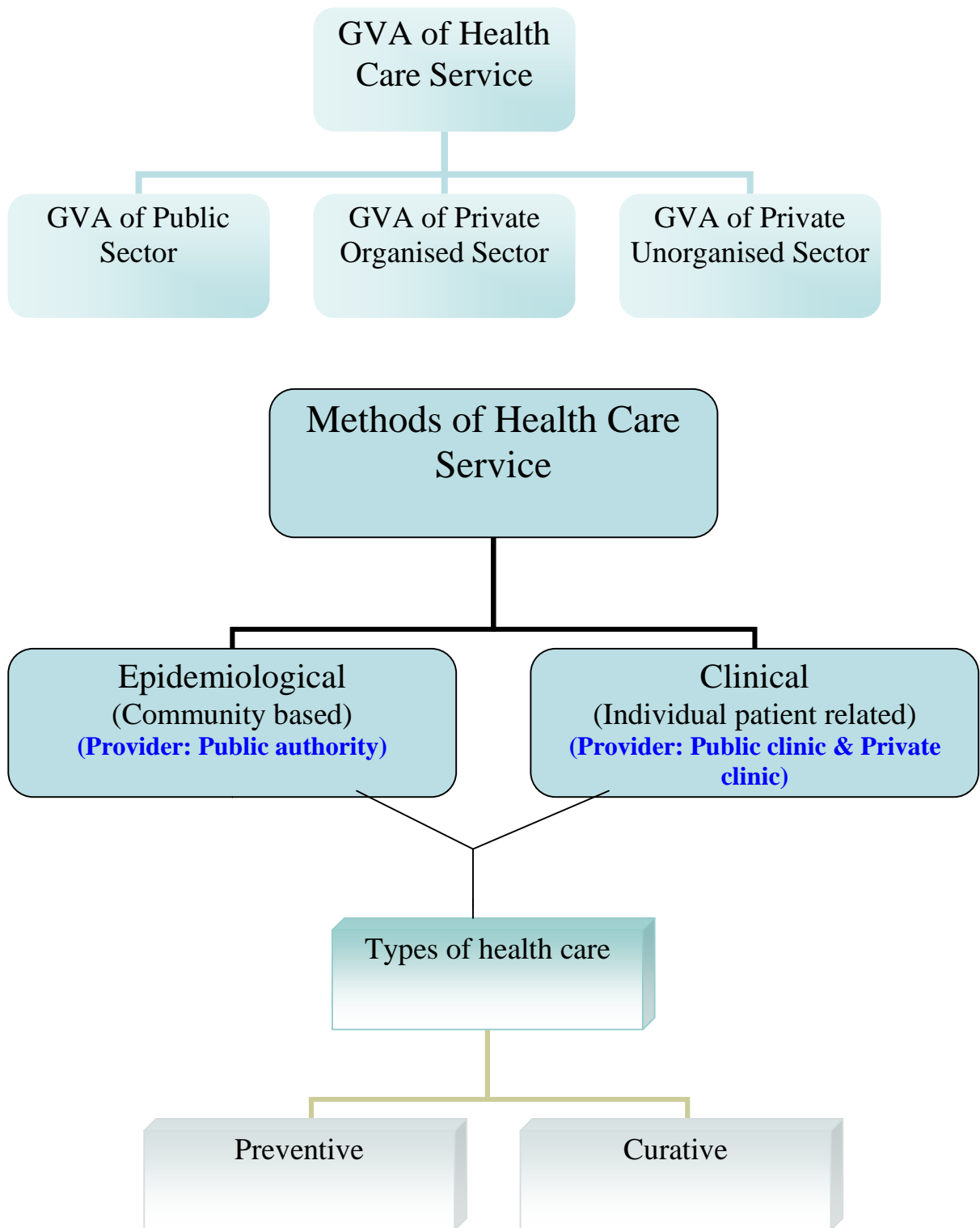
Health care service in India includes the economic activities mentioned in the NIC (National Industrial Classification) 2004 which is similar with the ISIC (International Standard Industrial Classification) Revision 3, under Section N and Division 85 (Health and Social Work) except the social work activities. Thus, the health care service covers –

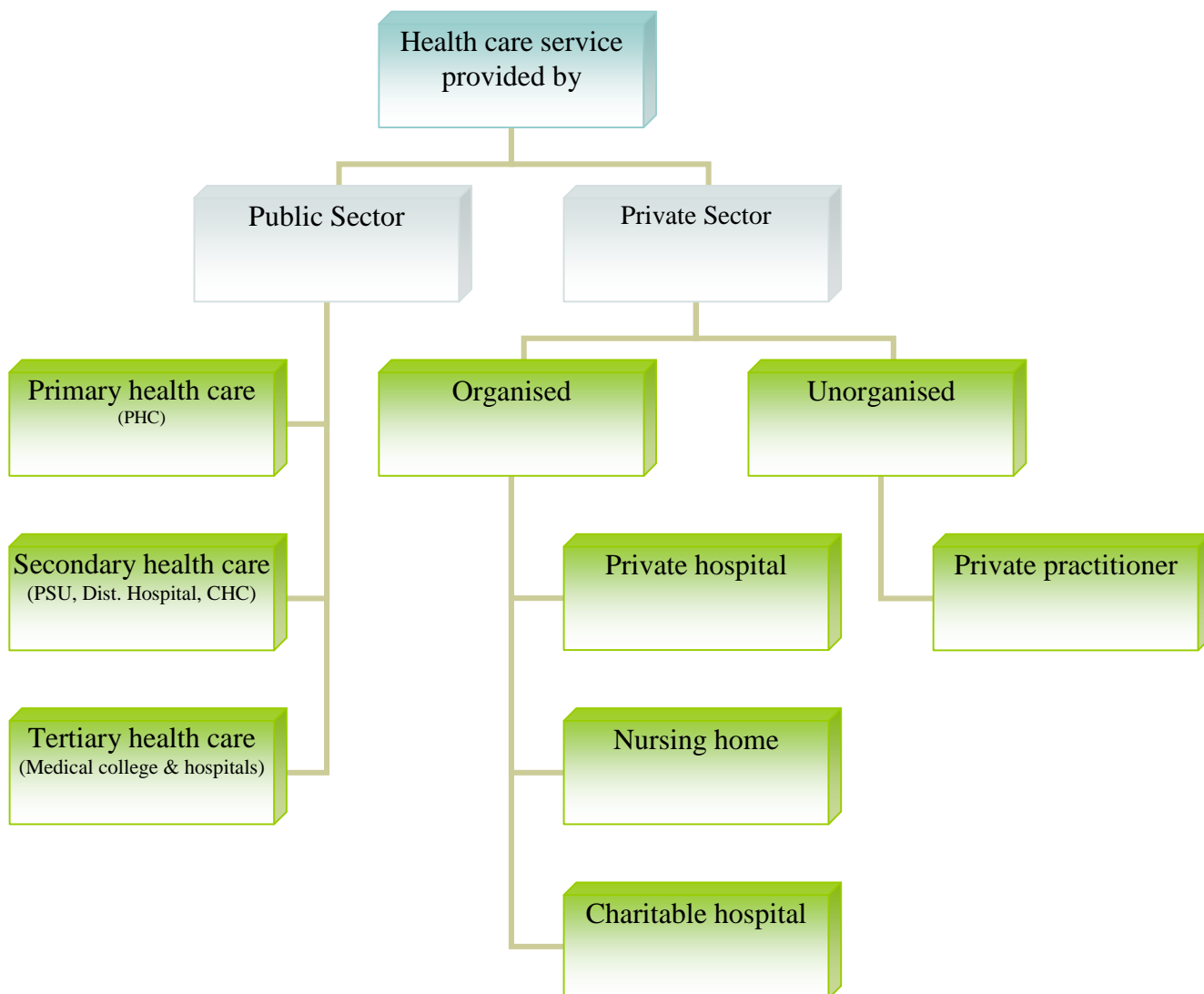
I. Human Health Activities, which consists of

- Hospital Activities (includes the activities of general and specialized hospitals, sanatoria, asylums, rehabilitation centres, dental centres and other health institutions that have accommodation facilities, including military base and prison hospitals)
- Medical and dental practice activities (includes consultation and treatment activities of general physicians and medical specialists including dentists)
- Other human health activities (includes all activities for human health other than by hospitals and medical doctors and dentists)

II. Veterinary activities (including clinico-pathological and other diagnostic activities pertaining to animals and birds)

Diagrammatic representation of the structural form of the Indian Health Care Service in the National Accounting framework





Methods of estimation in Public Sector

In public sector health care service is provided by the government through the public authority and public enterprises at free of cost or at subsidized prices and to measure the GVA of this sector input cost approach (i.e. total cost entailed for the production) is followed. The estimates of GVA of this sector are based on the budget documents of Centre and State Governments and the annual accounts of the different public enterprises which are providing health services.

Methods of estimation in Private organised Sector

The estimates of GVA of producers of health services in the private organized sector are based on the studies of the audited annual accounts of the Company Finances statistics, conducted by the Reserve Bank of India on sample basis. The value added at factor cost is measured as gross output less intermediate consumption or as sum of compensation of employees and gross operating surplus.

Besides this another alternative method, the labour input method is followed for estimating the GVA of health services in private corporate sector.

Methods of estimation in Private unorganised Sector

The approach followed for estimating the GVA of health services provided in this sector is the labour input method, in which gross value added per worker (GVAPW) is multiplied by the number of workers to compute the GVA. The estimates of the workforce in the unorganized sector of various services are obtained as residual after subtracting the estimates of the workforce of the public and private corporate sector as available in the annual Employment Market Intelligence (EMI) of the Directorate General of Employment and Training (DGET) from the corresponding estimates of the entire sector obtained through the Population Census and employment and unemployment surveys (EUSs) of the National Sample Survey Organisation (NSSO). On the other hand VAPW are estimated from the enterprise survey of NSSO. The estimates of GVA are prepared separately for rural and urban areas in the base year and for the corresponding years the base year estimate is extrapolated by the annual growth rate observed in consumer expenditure on medical and health services by households.

Method of Estimating GVA at constant prices

To estimate the GVA at constant prices in all the three sectors the GVA at nominal prices is deflated by the consumer price index (CPI). For rural areas CPI of agricultural workers and for urban areas CPI of industrial workers are used for the deflation.

IV. Basic drawbacks inherent in the existing methods of estimation of GDP in Health Care Service in India and some possible suggestions

- The existing methods i.e. input cost method, expenditure method and labour input method, which are presently used to estimate the output of health service sector, give us only some estimation of the expenditure on the health service sector but not the actual health output in quality and quantitative terms. The fundamental objective of measuring output of the health care services should be estimating the

level of health recovery (or gain) of the diseased persons by curative treatment both in quantitative and qualitative terms and in reality how many people who are living at the vulnerable state are successfully guarded against the attack of diseases by the precautionary health care services.

- The existing methods never capture the nature and quality of the services that the patients receive from the service providing units. Assured quality service should be the legitimate demand of the diseased persons. Again, the chance of wrong estimation of GVA of the health care services by the existing methods is always there. Let us consider a situation when the value of intermediate consumption remains constant in both the public and private health care service provider units. Now, an increase in cost of the production of the service due to increase in the prices of factors or by increasing the amount of inputs engaged in that service (like hike in wage, increasing the number of employee etc.). This increase in cost implies that the GVA for that service has increased (because we are estimating GVA by the input cost method) which in turn implies an increase in output of health services, but in reality no change has occurred in terms of service provided. Thus, one of the important drawbacks of the existing method is that it fails to reflect the change in the performance of health service due to the change in input cost entailed for the service. Therefore, estimation of health care output should be imbued some performance indicators of the service provided, which in turn would give us a better estimate of GVA of health care service.
- The non-market output which are provided free of charge or economically insignificant prices to the individuals and community by the government are estimated through the input cost approach i.e. total cost incurred for the production of service output (including intermediate consumption, compensation of employees, consumption of fixed capital and other taxes less subsidies on production) (SNA, 2008). Thus, GVA of health sector will consider only those input costs which are involved in the production of health services provided to the individuals and community. In India, for the health care service, the GVA of the public sector is estimated through budget documents, which includes expenditure on medical care and allied activities - the expenditure on preventive, curative and clinical/hospital services; medical education, training and research; rehabilitation; and construction. But, medical education, training and research; rehabilitation; construction and the like allied activities do not bear any economic justification for the inclusion as input costs of given medical service of such service providers, which leads to an over estimation of GVA of health care services.
- While calculating the gross value added per worker (GVAPW) from the enterprise survey, equal weight is given to different type of workers (not according to the work classification) involve in the same service providing unit. This is over simplification and a biased estimation of GVA. This implies that the services of specialist doctors and the supporting staffs engaged in the health

service provider units are of equal status. In order to make a reliable estimate of GVA it is needed to consider different weightage according to the different working class in a service providing unit. One may calculate different weights for different categories of workers engaged in health service provider units according to their remuneration of their services.

- GVA of the health service sector in private organized sector is obtained from RBI's Company Finance Statistics where sampling procedure is followed. But, the sample size is very small (the sampling fraction is about one percent) and sometimes random sampling technique also can not be applied. As a result, how far the estimated GVA of health service activities of that sector is reliable remains questionable.

V. Concluding Remarks

Health service sector which falls under Medical care services is a crucial element of social welfare. In the developed countries a significant per cent of their GDP has already been spending on health care services. But the basic question i.e. what one obtains for this expenditure, remains unanswered because the answer requires measuring the output of the health service sector. Hence, measuring the output of the health care services has become a long standing policy concern of both the developed and developing countries. Generally, national income accounts divide nominal spending growth into changes in prices and changes in quantities. But neither prices nor quantities can be estimated without an accurate measure of the output of health care service sector. At the conceptual level, health care output is clear, i.e. health gain. But in practice, measuring health status is difficult and attributing changes in health status to health care services is even more challenging. Thus, productivity estimation for health care service sector has been tentative.

Measurement of health services output in India relies largely on the use of volume of inputs as a proxy for volume of outputs so it fails to reflect the change in productivity and that implies zero productivity. But the developed countries like UK, Canada, EU are now adopting the output approach in their national accounting system. One can therefore argue that the existing method of national accounting in India will not be internationally comparable.

The methods which followed by the European countries (Euro-stat Handbook, 2001) have some limitations (CSLS research report, 2007), e.g., (i) it considers output to be measured as a whole course of treatment rather than a measure of activities which requires the identification of activities delivered to a patient with a particular condition. One major problem of following this method is that when various institutions are needed to be involved in a single treatment and that will create the problem of co-ordination of activities of different institutions; (ii) it recommends to weight the outputs by cost of production, which may or may not equal the marginal valuation of output; and (iii) for

making quality adjustment, it is assumed that higher cost treatments indicate higher quality and its focus mainly on measuring quality adjusted life expectancy.

Again, like Euro-stat Handbook, 2001, the System of Health Accounts by OECD (2000) also recommended the method of measuring the volume of output by the complete treatments. In the principle, there are some difficulties of complete treatment to implement in the national accounts, e.g. (i) complete would entail collecting data on outputs from a number of health care providers and aggregating them in a meaningful way. Assembling the data required for aggregating health volume output by disease approach is very challenging; (ii) in the SNA, total output of an industry is based on summing up outputs of various service providers (establishments), and therefore the principle of a complete treatment is directly applicable only if the service provider is the same during the whole treatment. There is no simple way to allocate the overall service to the different participating units; (iii) most data retrieval systems do not have the capacity to link the treatment of an individual across institutions to enable measurement of the complete treatment; (iv) the beginning and end point of a treatment pathway is observable in the case of acute health conditions but unclear for chronic health problems or for medical conditions that give rise to long-term care and services provided in nursing homes.

The methods followed to measure the output of health care service in UK are also not applicable in India due to (i) in UK, health care is completely in the domain of public service whereas in India it is a combination of both public (20%) and private (80%) services; (ii) in India the private health care market is monopolistic in nature and the prices of the private health care service are influenced by the three factors – experience of the treating physician, technology and location; and (iii) to apply output approach in India necessitate a such kind of data that are not available at present.

Irrespective of differences in perceptions, health remains to be the key factor for human capital formation. Quantifying the output of health services in terms of health gain is remained to be the major challenge to all countries of the world. It is to be borne in mind while dealing with health service activities that the patient should be the centre of attention. In India, fair and effective polices are needed to enforce both for curative and precautionary health services and continuous monitoring deemed necessary their effective implementation. Special efforts are necessary for generating reliable data on treatment specific health recovery, patient's satisfaction etc. which are directly related to the estimation of health care service output for proper evaluation of the performance of health service sector. This can be treated as a crucial task for the human capital formation as well as human development.

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