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Daly Approach to the Burden of Diseases in Odisha: Causes and Concerns

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Abstract:
This paper makes an attempt to estimate the burden of diseases at the local level, in the twin city of Odisha using the DALY approach. The DALY approach to quantify the Burden of Diseases (BOD) in a population is a summary measure of not only the loss of time due to premature mortality but also the disability caused non-fatal outcomes. On an average a person in the state was found to lose 46 months due to the burden of diseases. While the burden of communicable diseases was found to be low and declining, that of the non-communicable diseases was found to be increasing. High prevalence of CDs like TB, parasitic and vector borne diseases existing alongside the increasing burden of NCDs like cancer and CVDs puts a heavy burden on the healthcare cost in the state. This is due to the government's negligence of the rural healthcare sector and concentration of healthcare units in the urban areas. Re-emergence of some previously controlled CDs was also observed. Differences in the BODs were also found in terms of age, gender and income group of the population. The state should strengthen its primary healthcare to control outbreak of diseases and also to divert the overload of patients in the urban areas.

Keywords: Burden of Diseases, DALY, Health status, Non-communicable diseases

1. Introduction
The health status of the population is quantified with its health indicators like mortality rate, Life expectancy at birth etc. The DALY approach to quantify the Burden of Diseases (BOD) in a population has the added advantage in that it throws light not only on the quantitative burden of diseases but also the transitional changes in the pattern of diseases. This raises the concern if the improvement in the quantity of life as quantified with declining birth and death rate is accompanied by an enhancement in the quality of life of the population. The shifting of the disease pattern from epidemical towards the non-communicable diseases (NCDs) as has being observed worldwide intensifies this concern. This paper is an attempt to study this aspect of health status of the population in the twin city of Odisha.

Study of the health status of the population using the DALY measure at the local level has been performed in several studies. The study of BoD in Lambeth and Southwark of London finds a total DALY loss of 13515 and 13244 per 1lakh population respectively in 2005. This translates into an estimated 13.5% and 13.2% of healthy life years lost in these two bouroughs in 2005. Gender and disease specific differences were also marked. While women had higher losses of life years in Lambeth, the case was reversed in Southwark where the losses among men were higher. Similarly, there was more loss of healthy life years among the men for accidents while among women it was for musculoskeletal diseases. When both the losses due to YLL and YLD was combined, mental disorders, circulatory disease and neoplasms were found to be high in descending order in both these bouroughs (Dodhia and Philips, 2008). Similar study in Shilin County of China (Zhou, Cai et al, 2011) using the DALY approach finds the YLL for respiratory diseases to be high among the population (both males and females), the other diseases being unintentional injuries, CVDs, intentional injuries and Malignant neoplasms. For YLD, the diseases in decreasing order of severity were found to be neuropsychiatric conditions, intentional injuries, respiratory diseases, unintentional diseases and CVDs. Neuropsychiatric conditions were found to have the highest DALY. Study (Murray and Lopez, 1997) finds that worldwide, Communicable diseases in Group I like lower respiratory infections (Pneumonia), Perinatal conditions, diarrheal diseases, measles and TB accounts for 50% of the 10 leading cause of BOD in 1990. The study has also projected a doubling of mortality due to NCDs (Group II) and a fall in deaths due to communicable diseases Group I by 2020.

1.1. Objectives
The objectives of the paper are as follows:
 i. To identify the total burden of diseases in urban Odisha.
 ii. To identify the diseases requiring priorities in intervention by the concerned authorities.
 iii. To find the differences in disease pattern based on socio-economic features like income and age group etc if any.

1.2. Hypothesis
To achieve the above stated objectives, the following hypotheses were laid in the study.
    i.   There is a change in the pattern of diseases from Communicable to Non-communicable diseases.
    ii. The diseases requiring urgent priorities are not being adequately addressed.
    iii. The pattern of diseases burden differs among the advantaged and disadvantaged group based on income.
    iv. The lack of promotive health care awareness underlies the factors behind many preventable diseases.

1.3. The Sample Economy
The sample units consist of the patients who have been categorized on the basis of their choice of health care providers whether public or private. Within each broad category, a further division has been made as out-patients and in-patients. These units have been selected at random. The private health care providers include clinics and nursing homes and corporate hospitals. The responses of the patients have been recorded on the structured questionnaires. Only when the patients are found to be incapable of responding either due to the seriousness of the disease or due to the on-going treatment, the attendants have been requested to cooperate in furnishing the required information. As a measure of precaution, data were compiled after due verification of the information furnished by the respondents and collected on the questionnaire. The following is a brief description of the profile of the consumers of health care.
Socio-economic status of the patients is the dominant demand size determinant of health care accessibility and utilisation. While social status of the patients is evaluated on the basis of their gender, religion, age group and family type (nuclear or joint), their economic status is assessed on the basis of their own income, household income, number of dependents and occupation of the patient or the head of the household if the patient is not the head. These factors have direct or indirect effects on the health care seeking behaviour of the patients. In the total sample units, there are 59 per cent males and 41 per cent females. These seekers of health care are found to be normally distributed over the age groups. The mean age group is 21-40 years and it is the age group at which the distribution of patients both males and females is heavily concentrated and thereafter it tapers down on both sides of the distribution. Of the total male and female patients, at mean age group, 25 per cent males and 26 per cent of the females seeking health care services concentrate. The characteristic feature of the mean age group is that it is the most productive age group and so persons falling under this age group should have shown the least need for health care services. Since they are in need of the health care services, it is attributed on the basis of the data collected to their failure to take precautions due to work pressures leading to more sickness. Of the total patients studied, 82 per cent are Hindu and the remaining 18 per cent are from other religions like Muslim, Christian and Persian, each having almost equal percentage (6 per cent) in the distribution. On the basis of marital status of the sample units, 41 per cent are married males, 29 per cent are unmarried males, 17 per cent are married females and the remaining 13 per cent are unmarried females. Of the total patients included in the sample, 19 per cent are illiterates, 25 per cent are under/up to matriculates, 32 per cent are graduates, 18 per cent are post-graduates and 6 per cent are with technical qualifications. One of the peculiarities of this distribution is that of the 19 per cent illiterate sample units, 14 per cent belong to the lowest annual income class of 0-2 lakh. About 69 per cent of the sample units live in nuclear families and the rest 31 per cent are in joint family. This affects the choice of health care services in two ways. In joint family, it is not the decision of the patient but the overall decision that determines the choice of health care services. Secondly, larger the number of dependents in a family, normally lower is the capacity to spend on health care. This holds particularly for joint families with relatively large dependents and having low income. The families belonging to high income class are free from such constraint irrespective of the household size.
The households of the patients under study are seen to have pursued varied occupations like service, pension, renting, business and cultivation. In certain cases, there has been overlapping of occupations, one household pursuing more than one occupation. In this case, the concerned household is placed under that occupation classification from which it earns substantially higher income. Whatever may be the source of earning income, each patient is of the opinion that it is the consideration of income that determines his/her choice for health care services.
Location of the household is a significant determinant of deciding the providers of health care. Normally households of the patients feel it convenient to approach the physicians available in the close proximity if the required service is available with him/her. It meets two objectives- one minimising the travel cost and the other maximising the convenience of attending the patient.

1.4. Methodology: The Daly's Approach to Bods
 'Burden of Disease (BoD)', measures the burden in terms of mortality and morbidity of diseases in the region. Disability of the individuals plays a vital role in the determination of the populations' health status. The variation in the causes of disability and mortality in the overall population makes it necessary to judge the overall health status from its disability index as well and not only from its statistics of mortality. An indicator of the BoD helps in setting priorities of health services for preventive and curative purposes and also to identify the vulnerable groups so as to target appropriate health interventions. The commonly used measures of BoD like mortality or incidence answers the burden of diseases in quantity and so are less analytical than qualitative measures which analyses the losses in healthy years due to these adverse health conditions. A low incidence disease may cause disability and death resulting in a high burden of disease while some commonly prevalent diseases may put fewer burdens in terms of years of life lost to death and disability. One such important measure which has been widely used in many studies is the Disability Adjusted Life Years (DALY).
It is a summary indicator which measures the health of the population in terms of 'Health Gap', i.e., the number of years of 'full health', lost relative to some set/accepted standard of health or an 'ideal', health status. It is measured on a scale with a disability weight of 0 indicating a condition of perfect health (with no disability) while a weight of 1 would be indicative of death. The 'health

gap', can be given as HG = C + g (B) where HG= Health Gap, B=time lived in sub-optimal health with some disability while g (B) assigns weights to the state of health condition during the time B (Sub-optimal health). Here a weight of 1 would indicate a state of health with disability equivalent to death.

C=measures the lost years to premature death (or mortality).

The DALY measure was introduced in a study of Global Burden of Disease in 1990. It has a two dimensional measurement of the state of health- one in terms of years of life lost to premature death or mortality while the other is in terms of healthy years of life lost to disease/injury. Thus one DALY represents one year of health life lost while the BoD measures the gap between the current health status of the population relative to an ideal situation where everyone lives into old age without any disease or disability.

Calculation of DALY:

The DALY measure is thus the sum of two dimensions given as

DALY = YLL + YLD   ….eqn (i)

DALY=Disability Adjusted Life in Years.

YLL=Years of life lost due to premature death

YLD=Years of life lost due to disability

The YLL would be larger with decrease in age at which the death occurs. While the YLDs would be larger with the severity of the disability or the length of duration of this disability. The calculation of the number of years lost to premature death i.e. YLL is calculated by counting up to the 'maximum' life span which is taken as 80 years for the males and 82.5 years for the females (based on the life expectancy in Japan which is the highest in the world). Thus it represents the maximum number of years one would have survived in the absence of premature death. For instance, a man who dies at 40 years due to a car accident would lose 40.64 years of his life (refer to standard life Expectancy Appendix 1) due to premature death.

Calculation of YLDs i.e., the years of life lost to disability is measured in terms of years and severity. In this calculation the sequelae or the multiple disabling effect of a disease or injury is taken into account. For example, diabetes has sequelae of diabetic foot, neuropathy, retinopathy or amputation. To find the total burden of the disability, the duration of time lived with each of these disabling sequelae, in both treated and untreated states and weighted for their severity in the population is measured. To enable this calculation, we use the average disability weights for the various diseases adapted from the WHO web page on GBDS. The severity weights multiplied with the number of years /average time of sufferance from the disease gives the value of YLDs. For instance, a person who suffers from knee injury at the age of 40 is diagnosed with incurability and remains so for the rest years of his life. But however an operation recovers him at the age of 50 years. So the YLD in this case would be (50-40) years x 0.1=10x0.1=1 year. In terms of the YLDs, the man's health condition is only 0.9 of the total of '1' of the perfect health for the 10 years period.

Lastly on a population basis the YLL= N x L   …..eqn (ii)

Where N= Number of Deaths in the Population

       L= Standard Life Expectancy at the age when the death occurs in years

The YLDs on a population basis is given as:

YLD=I x D_w x L   ……eqn (iii)

Where I= the number of incidental cases due to the disease

       D_W=the disability weights assigned to the disease

       L= average duration of the case until remission or death (in years).

The DALY score for the sample was calculated. The diseases were first sorted in terms of the category and sequelae according to the International Classification of Diseases, 10(ICD 10) of the WHO. The disability weights were taken from the website of the WHO which gives the age specific disability weights for the untreated and treated form of the sequelae of diseases as given in the Global Burden of Disease Study. However, in some cases where the age specific data was not available the disability weights was taken from the Global Burden of Disease update of 2004, WHO, giving the average disability weights(ADW) for diseases and conditions including cancers and injuries adapted from the WHO (Donev, Kragelj et al.,).

Thus to assign the weight the disease classification and its sequelae was identified. Then the weights were taken based on the age-group of the patient. It is to be mentioned here that though the table gives both the untreated and treated form of weights, here the treated weights has been taken as the patients in the sample are under treatment when the data was collected. However, in a few cases where the patients discontinued the treatment due to several reasons, the untreated weights would have been appropriate. However due to lack of adequate information about the health status of the patient after the forced discharge, this study was not done. Where the disability weight of the identified disease was not directly given, its broad classification was used. For instance, the Disability weight of Typhoid was not available. However, its average weight under the Diarrhoeal disease was taken. The duration of the diseases was all converted in terms of years. The YLL and YLD was calculated for each patient in the sample using the above stated methodology.

1.5. Finding of the Current Study

The DALY score in the state was found to be 387910.2 per 1 lakh person. This means that on an average a person in the state losses 46 months due to BOD. Further it was segregated in terms of communicable, non-communicable diseases as well as other maternal, nutritional and other forms of diseases. The DALY score for communicable diseases is 12,260.25 per 1 lakh persons, 353116.1 for non-communicable diseases and 22533.88 for these other forms of diseases. Thus a person loss 2 months on an average due to the burden of communicable diseases, 42 months due to burden of NCDs and 3 months due to other forms of diseases in his lifetime. There is a clear reflection of the epidemiological transition in case of Odisha. While the burden of Communicable diseases is low and

declining, that of NCDs is on the increase. The other forms of diseases include the maternity related issues, nutritional aspects related diseases such as malnutrition, injury and fractures, sprains etc. Further analyses of each of these categories of diseases were made.

As far as the communicable diseases are concerned it is seen that while the incidence of some major communicable diseases has been eradicated/reduced like Leprosy, polio, Measles etc., some other major Communicable diseases have re-emerged over the years. There is a high prevalence of the morbidity of dengue, TB, Parasitic and vector borne diseases like Jaundice etc. The most epidemical over the years is seen to be the infectional diseases of the digestive tract caused by roundworms (under Trichuriasis category). There have been more cases of outpatients and inpatients due to Massive dysentery syndrome related to the above stated classification. This may be caused due to lack of portable drinking water, sanitation, hygienic food, regular diet intake, promotive healthcare practices etc. Table 1 shows the DALY score of the communicable diseases among the patients. The highest DALY score is found to be the cases of Trichuriasis which is the disorders caused by the roundworm infections of the digestive tract. This is found to be 91.837% followed by Tuberculosis which has a DALY score of 5.9%. The third in place of high incidence of communicable diseases is Dengue which is 1.383%. Malaria and Diarrhea whose DALY as percentage of the total DALY of communicable diseases is found to be 0.266 and 0.265 respectively occupies almost similar rank with very negligible differences in their DALY percentages.

Table 2 gives the DALY score of the major NCDs in decreasing order. The table reflects that the DALY score for cancer is the highest followed by brain and nerves related issues and heart diseases. On the other side of the scale are skin diseases, lung related problems and bone related issues. The main identified diseases in case of the highest 6 DALY score of NCDs are given below in Table 3.

Cancer has been identified as the most occurring among the NCDs. It is taking an epidemical form in its spread in the state. In most cases late identification is identified as the major cause of mortality due to the disease. Over this the extreme pain of treatment along with the high cost are the main deterring factors for deliberate neglect in treatment leaving the patient at the mercy of chance. Similarly, there has been a rapid spread of heart and brain related diseases along with mental disorders. The extreme stressful environment, neglect of promotive healthcare, irregular food habit, social factors like size of the family, number of dependents, position of the patient in the family, the economic conditions etc. play an important role not only as a determining factor of the disease but also its treatment and cure. Most cases of mental disorders go unreported due to the social stigma associated with the disease. In most cases ignorance and lack of timely identification seemed to worsened the disease leading to its late/no recovery. Beside these, lung infections like Upper respiratory infections, Pneumonia, Pertussis, and Asthma are on a severe rise. This is mainly due to the unhygienic condition, environmental pollution etc. However, in many cases the hereditary/genetic factors are also behind the occurrence of these diseases. Among the other types of NCDs which is on an increase are identified as migraine, diabetes mellitus, amputation, cirrhosis of the liver etc.

Lastly among the other forms of diseases are included maternity related issues, nutritional deficiencies related diseases, injury etc. Table 4 gives the total DALY score of these other forms of health related issues. Here the highest DALY score is found to be of fractures related issues followed by low back pain and open wound. On the other side of this category are issues related to Abortion, Maternal Hemorrhage and Injury.

Table 5 gives the DALY score per 1 lakh persons according to income group. It is found to be the highest in the 2-4 lakhs income group followed by the lowest income group of 0-2 lakhs. It is found to be the lowest among the higher income group of 8-10 lakhs and 6-8 lakhs income group. On an average it is found that the BODs in the lower and the average income groups from 0-6 lakhs is higher than in the higher income group of 6-10 lakhs. Going by the type of diseases, the burden of NCDs is found to be the highest in the 2-4 lakhs income group followed by 0-2 lakhs income group. Similarly, in the higher income group bracket it is found to be highest in the 6-8 lakhs income group followed by the 8-10 lakhs income group. The thing to be worth marking is that the BODs is the highest in the lowest income groups of 0-2 lakhs at 6213.48 and 6025.77 for 2-4 lakhs while a meager of 11.50 in the average income group of 4-6 lakhs. It is found to be nil in the higher income group. Lack of income and proper precautionary measures seems to be the reason behind such findings. Regarding the BODs in the category of 'other diseases', it is found to be the highest in the average income group of 4-6 lakhs followed by 2-4 lakhs and 0-2 lakhs in a descending order. While it is found to be again nil among the higher income group.

The above table 6 provides the DALY score per 1 lakh persons based on age-group. It shows that the BODs is more concentrated in the age-group of 21-40 years in all the 3 categories of diseases outlined i.e., for communicable, non-communicable and 'other' form of diseases. Overall it can be seen that the burden of NCDs is higher than the burden of Communicable diseases in this productive age-group. The burden of communicable diseases is found to be high among the lower and average age-group while it is found to be nil in the high age group of 60 and above years. The burden of NCDs is found to be low in the lowest age-group while it is more for the higher age-group.

This age and income specific study of the distribution of the burden of diseases in the overall population helps in allocating the resources in the area of concern. In the present scenario of increased expectations of the population for better healthcare services on one hand and the constraint of resources on the other, such approach to study of disease burden helps the policy makers to shift their priorities and interventions in those areas which require more urgent attentions.

2.1. Promotive Health Awareness

Promotive health care is completely different from either curative or preventive health care. Promotive health care is a process which enables the people to increase control over their own health and its determinants and thereby improves their health. Once the society is aware of such requirements for good health, a large number of health related problems could be avoided at individual level. Most of the health issues diagnosed show that it is the result of years of neglect of health by the concerned patients. The sample collected for the purpose is not an exception. In recent time, while advances in health technology has increased the life expectancy, radical change

in life style has increased manifold the chances of related diseases like cancer, diabetes, mental disorders, cardiac problems and others. Many of the current consumption habits have detrimental effects on the health of the population. These consumptions are sinful consumptions. For instance, excess smoking and drinking reduces life expectancy, irregular food habits lead to obesity, excess stress is one of the primary causes of diabetes. Similar such instances are plenty in health economics of bads. It is the promotive health consciousness that could be effective in controlling the health economics of bads. Promotive health measures keep these diseases at minimal level. Once the individuals adopt a casual view due to ignorance or myopia, the situation worsens leading to the onset of lifestyle diseases.

Changing lifestyle of the rich is one of affluence. In this fractile class, many suffer from the lifestyle diseases. Only a few belonging to this class are conscious of maintaining a routine health guide in spite of all professional engagements. On the other extreme, people belonging to lower income bracket either consciously neglect these healthy habits due to reluctance, or accept every odd as an inescapable part of their life, or they do not want to allot time to these promotive health care due to the fear of loss of productivity. Promotive health awareness is as much required for the rich as the poor. It is thus a requirement for all classes of persons.

There are several parameters to assess the promotive health awareness among persons. For the present study, mention may be made of (1) regular exercise/ meditation/ yoga, (2) health enhancing medicines, and (3) health drinks. From among the sample units, 61 per cent are not aware of the benefits of regular exercise/meditation/yoga. The remaining 39 per cent are aware. Of these 39 per cent, 68 per cent do it in some form or other regularly within a routine time, and the rest 32 per cent adopts a casual approach. The latter group is unperturbed if they miss to do it. Regarding the intake of health enhancing medicines, the sample results are not encouraging. Only 44 per cent consume such medicines and the remaining 56 per cent not at all. Of the 44 per cent, 68 per cent take these medicines regularly and the rest 32 per cent consume intermittently. Whether regularly or intermittently, of the 44 per cent who consume such medicines, 80 per cent take these medicines under prescriptions by physicians, 15 per cent on the advice of the druggists and pharmacists, and 5 per cent are self-medicated. The sample results in respect of the consumption of health drinks are more encouraging. Of the total patients in the sample, 76 per cent take it regularly and the rest 24 per cent do not take it at all. Doing exercise or meditation or yoga is a costless process. But the consumption of health enhancing medicines and health drinks is not costless. It imposes a burden on the wallet of the consumer. Patients from lower and lower middle income class households while going for such type of consumption ordinarily make a consideration of their cost. By the sample units, milk is preferred as a convenient health drink. In spite of this, it is beyond the reach of all in the sample.

Another way in which health awareness can be evaluated is patients' perception about the onset of the ailment. Of the total patients surveyed, 45 per cent were conscious of their suffering, 53 per cent were feeling they had no disease at all (in fact they had) and 2 per cent were completely unaware of such disease might occur prior to the commencement of the treatment. Health awareness is also judged on the ground of being alert of regular health check-up. Routine health check-ups by persons are essential after a certain age to ascertain if there is any chronic ailment in them like blood pressure, diabetes, sinus, anaemia, obesity or more than one of these. Among the patients included in the sample, 67 per cent suffer only from blood pressure, 10.5 per cent only from diabetes, and the rest are only from sinus, or anaemia and or obesity. In the sample 18 per cent patients reported to have been suffering from a combination of such diseases. It is a matter of concern that patients diagnosed with these health ailments, all do not bother about routine check-up. Only 29 per cent of the patients reported to have gone for routine check-up while 71 per cent are not aware at all. It is further deplorable that of the 29 per cent, who have gone for routine check-up, 20 per cent have done so only incidental upon illness like drowsiness, vomiting or fever, 75 per cent have very casual approach, and 5 per cent have gone for monthly routine health check-ups. A better view of the situation can be made if age-group wise promotive health awareness in the sample is displayed as has been done in Table 7.

Table 7 presents facts about the promotive health awareness among the sample units. One of the significant results is that among the youths (20-40), 53 per cent have elected to go for regular exercise including walking. This is a good symptom indeed. Relatively older persons in the sample belonging to the age groups 40-60 and 60-80 have gone for taking health enhancing medicines regularly. It has been reported by 61 per cent of the sample units belonging to these two categories. The trend of taking health drinks is also encouraging. A maximum of 80 per cent within the age group 0-20 who are children and adolescents regularly take health drinks. This is a healthy sign. Also such trend is visible among the sample units falling under the age groups 20-40, 40-60 and 60-80 in respect of taking health drinks.

Table 8 reflects the promotive health care awareness among the sampled population based on income group. It shows the impact of income on awareness and practice of promotive healthcare. The awareness towards regular exercises as well as the intake of health enhancing medicines is found to be very low among the lowest income group of 0-2 lakhs. It shows a rising trend with income and is found to be the highest in the highest income group. However, though the lowest income group also lags behind in the intake of health drinks, it is found to be high among the other income groups.

Lack of promotive health awareness is one of the major causes of chronic diseases at a later stage. Promotive health care not only helps in enhancing healthy days but also helps in preventing the onset of several chronic diseases. This is becoming more important in light of the increasing incidence of non-communicable diseases following the lifestyle changes. Promotive health care in any form like intake of medicines, health drinks, taking regular exercise, meditation, yoga shows the awareness of the population in taking precautionary measures to avoid the incidence of illness. The above analysis showed that though a certain percentage is conscious of this fact and gives more importance to promotive health care, concern is for the other end of the population who being ignorant neglect this fact.

3.1. Public Expenditure on Health in Odisha

The above analysis raises a question on the health sector spending in Odisha and whether it needs to be restructured. Odisha has one of the highest IMR (of 65 in 2011-12) and MMR in the country. It has lagged behind the target in many of the Millennium Development goals (MDGs) set for these health indicators. The total spending on health includes the spending on Health and Family welfare on both the revenue and capital account.

The total revenue expenditure on H&FW as percentage of the total revenue expenditure on social sector shows a meager increase from 10.57% in 2007-08 to 11.26% in 2009-10 after which it has declined over the years to 10.70% in 2012-13. Total revenue expenditure as percentage of the total social sector expenditure shows a declining trend over the years from 11.32% in 2007-08 to 10.92% in 2012-13(Table 9). However, the capital expenditure on H & FW as percentage of the total expenditure on social sector has increased from 3.17% in 2007-08 to 8.27% in 2012-13 which is due to the additions made to health care infrastructure in the state over the years. In spite of this the indicators of health infrastructure availability remains low in the state.

Here the health institute constitutes the hospitals, PHCs, CHCs under allopathic system of medicine, and comprises hospitals and dispensaries under homeopathy and Ayurvedic system of medicines. Taking this into consideration, the population covered by a health institute is found to be around 13000 in 2003-04 which has further worsened to 14000 in 2010-11. Similarly, the number of health institutions per lakh population has fluctuated between 8 to 7 from 2003-04 to 2010-11. The availability of beds per 1 lakh population in the state which was 38 in 2003-04 has increased meagerly to 40 in 2010-11 (Table 10).

The state has failed to meet the norms of the Indian Public Health Standard (IPHS) as was reflected from its inadequacy of health availability indicators. This is in turn due to the inadequacy in public healthcare spending over the years. The total health expenditure as percentage of the total expenditure (Revenue+Capital) has remained more or less constant over the years with meager variation. It has shown a negligible increase from 3.47% in 2006-07 to 3.68% in 2012-13(Table 11). Of the total expenditure on H&FW, the expenditure on salary is found to be consuming a 'lion's share', which was 73% in 2006-07 and has declined to only 64% in 2012-13. This leaves very little to be invested on addition to infrastructure like building, electricity, water supply etc. Here it is to be worth mentioning that the state also faces severe shortage of health personnel which further worsens the situation as even the existing healthcare facilities remain unutilized. The total expenditure on H&FW is only 0.69% of the GSDP in 2012-13 which in fact has declined from 0.72% of the GSDP in 2009-10.

Overall the public spending on health in the state is not only low by the stated standard but is also shrinking at the face of the expanding private sector. This leaves the vulnerable population at stake in the matter of accessibility and utilization of this essential commodity i.e., 'health'. Their utilization at the time of need is constrained by their inaccessibility due to several economic and spatial factors. While the economic factors consist of high out-of-pocket payments, the geographical/physical barriers are caused due to the distance of the healthcare units, lack of man-

power as well as other logistic infrastructure even in the existing healthcare centres. The condition is worsened by the skewed distribution of the healthcare units towards the urban areas thus adversely affecting the rural health status. The lack of investment in the primary healthcare increases the load on the urban healthcare facilities besides putting an economic burden on the patients in terms of the involved direct and indirect cost of accessing the healthcare services.

4. Conclusion

There has been an epidemiological transformation in the pattern of diseases in Odisha with a gradual decline in the morbidity and mortality cases from communicable diseases and their increase from NCDs. Along with this the re-emergence of previously controlled communicable diseases has also been observed in the state. Again the life-style changes along with the lack of promotive health awareness either deliberately or forced is worsening the health scenario of the state. The public spending on healthcare is not only low by the state but has also shrinking under the reform measures undertaken in the health sector. This has increased the prevalence of the for-profit private sector which has commercialized the healthcare services. Not only has it raised the overall out-of-pocket payments but this in turn has adversely affected the accessibility and utilization of health care services. Instead of 'need', it is determined by several economic and physical factors. The government needs to not only strengthen the healthcare at the primary and secondary level but also prevent the skewed distribution of the healthcare units biased towards the urban areas. This will help in lessening the load on the tertiary healthcare sector by preventing the migration of patients from the rural areas for the needed care. Thus the government needs to tackle the present onslaught of diseases through a tactically planned 2-way line of action. At the first level it has to create adequate health awareness among the people to adopt promotive measures of healthcare. This would go a long way in reducing the preventable diseases. At the secondary level it has to ensure the accessibility of the healthcare services irrespective of the predetermined economic and social barriers to utilization of healthcare. The need of the hour is not only to put a deliberate check on the spread of diseases but simultaneously to reverse the epidemical surge to improve the health status of the population.

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Annexure

Communicable Diseases	DALY per 1 lakh person	DALY as % of the total DALY of Communicable diseases	Ranking in Descending order of DALY score
Diarrhea	32.54	0.265	5
Measles	16.65	0.135	6
Schistosomiasis (infection caused by larvae in fresh water)	3.94	0.032	8
Dengue	169.64	1.383	3
Trichuriasis (caused by roundworm infection of digestive tract)	11259.47	91.837	1
Parasitic & vector borne diseases	14.652	0.119	7
TB	730.66	5.959	2
Malaria	32.672	0.266	4
Total	12260.25	100	

Table 1: Daly Score of Categorised Communicable Diseases
Source: Author's calculation

Disease classification	DALY per 1 lakh persons	Ranking in Descending order of DALY score
Bone related	10172.64	9
Skin Diseases	261.33	11
Cancer	67117.9	1
Kidney	25152.18	6
Stomach related	18844.56	8
Lungs related	3863.65	10
Mental problems	48711.87	4
Heart related	49393.38	3
Brain and Nerve related	64940.27	2
ENT related	24419.33	7
Others	40238.99	5
Grand Total	353116.1	

Table 2: Categories of Non-Communicable Diseases
Source: Author's calculation

	Type of Diseases	Sequela
1	Cancer	Of stomach, pancreas, uterus, Lymphoma
2	Brain/Nerves related	Injury of nerves, bacterial meningitis, Meningococcaemia, Spinal cord damage due brain injury, Intracranial injury
3	Heart diseases	Ischemic heart diseases, Cerebrovascular diseases, Rheumatic Heart diseases
4	Mental Disorders	Unipolar major depression, Schizophrenia
5	Lungs related diseases	Asthma, Upper Respiratory Infections, Neonatal Pneumonia, Pertisis
6	Other diseases	Migrain, Diabetes Mellitus(Severe), Amputation, Cirrhosis of Liver

Table 3: Types of NCDS with the Highest Daly Score
Source: Author's calculation

Diseases	DALY per 1 lakh person	Ranking in Descending order of DALY score
Iron Deficiency Anaemia	192.21	6
Fractures	15635.09	1
Injury	72	8
Elbow	148	7
Sprains	302.17	5
Maternal Hemorrhage	62	9
Abortion	0	10
Open Wound	432	3
Low Back Pain	5357.073	2
Drug use	333.33	4
Total	22533.88	

Table 4: Categories of Maternity, Nutritional, Injury and Other Health Related Issues
Source: Author's calculation

➢ Type of diseases Income Groups	DALY for communicable diseases	DALY for NCDs	DALY for other type of diseases	Total
0-2 lakhs	6213.448	1,00,234.6	8179.94	1,14,619
2-4 lakhs	6025.77	1,39,123	13,004.28	158153
4-6 lakhs	11.506	665.333	70336.05	71,012
6-8 lakhs	0	31589.47	0	31589.47
8-10 lakhs	0	12535.9	0	12535.9
Total	12250.72	284148.303	91511.27	387910.2

Table 5: Daly per 1 Lakh Persons Based On Income Group
Source: Author's calculation

Age Group	For Communicable Diseases	For NCDs	For others	Total
0-20years	114.30	5607.59	5765.46	11487.35
21-40 years	7617.877	149838.4	13978.56	171434.9
41-60 years	4526.107	129702.9	42.667	134271.7
61-80 years	0	67969.13	2747.2	70716.33
81-100 years	0	0	0	0
Total	12258.28	353118.02	22533.88	387910.2

Table 6: Daly per 1 Lakh Person According To Age Group
Source: Author's calculation

Age Group	Regularly Exercise		Health Enhancing Medicines		Health Drinks	
	Yes	No	Yes	No	Yes	No
1-20	13	87	27	73	80	20
20-40	53	47	34	66	75	25
40-60	47	53	61	39	72	28
60-80	0	100	61	39	78	22
80-100	0	0	0	0	0	0

Table 7: Promotive Health Awareness Age-Group Wise (In %)
Source: Field Survey Data

Income Group	Exercise Regularly		Intake of health enhancing medicines		Intake of health drinks	
	Yes	No	Yes	No	Yes	No
0-2 lakhs	17	83	9	91	41	59
2-4 lakhs	43	57	40	60	86	14
4-6 lakhs	59	41	79	21	97	3
6-8 lakhs	36	64	91	9	100	0
8-10 lakhs	83	17	100	0	100	0

Table 8: Promotive Health Care Awareness Based On Income Group
Source: Field Survey Data

S.N.	Items	2007-08	2008-09	2009-10	2010-11	2011-12(BE)	2012-13(BE)
1	Total of H & FW (Rev+ Cap exp.)	746.6	936.82	1170.86	1272.35	1559.6	1797.68
2	Total H&FW exp. as % of Total exp. on Social Sector	10.57	10.17	11.26	10.01	10.46	10.70
3	Total H & FW (Rev) as % of Total Rev exp. on social sector	11.32	11.13	11.66	10.43	10.62	10.92
4	Total H&FW(cap) exp. as % of Total cap exp. on social sector	3.17	1.61	4.37	3.64	8.37	8.27

Table 9: Public Health Expenditure in Odisha (In Crores)
Note: exp.-Expenditure
Source: Odisha Budget 2012-13 at a Glance, Finance Department, GoO

S.N.	Items	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
01	Population covered under 1 health institute	0.13	0.13	0.14	0.14	0.13	0.13	0.13	0.13
02	Number of health institute per 1 lakh population	8	7	7	7	7	8	8	8
03	Number of beds available per 1 lakh population	38	37	37	36	36	44	44	44

Table 10: Health Infrastructure Availability Indicators
Source: Odisha Budget 2012-13 at a Glance, Finance Department, GoO

S.N.	Items	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
01	Total Health Expn as % of Total Expn	3.47	3.56	3.52	4.03	3.75	3.64	3.68
02	Per Capita Health expn (in Rs)	118.83	188.06	225.33	225.33	382.94	379.76	428.72
03	Total salary in H&FW(Rev+Cap) as % of total H & FW expn(Rev+Cap)	73%	67%	75%	73%	78%	69%	64%
04	Total H&FW expn as % of GSDP	0.60	0.58	0.60	0.72	0.65	0.68	0.69

Table 11: Expenditure on Health
Source: Odisha Budget 2012-13 at a Glance, Finance Department, GoO

APPENDIX 1 Standard Life Expectancy Table. Adapted from WHO

Age	Sex		Age	Sex		Age	Sex	
	Males	Females		Males	Females		Males	Females
0	80,00	82,50	35	45,57	48,38	70	13,58	16,20
1	79,36	81,84	36	44,58	47,41	71	12,89	15,42
2	78,36	80,87	37	43,60	46,44	72	12,21	14,63
3	77,37	79,90	38	42,61	45,47	73	11,53	13,85
4	76,38	78,92	39	41,63	44,50	74	10,85	13,06
5	75,38	77,95	40	40,64	43,53	75	10,17	12,28
6	74,39	76,96	41	39,67	42,57	76	9,62	11,60
7	73,39	75,97	42	38,69	41,61	77	9,80	10,93
8	72,39	74,97	43	37,72	40,64	78	8,53	10,25
9	71,40	73,98	44	36,74	39,68	79	7,99	9,58
10	70,40	72,99	45	35,77	38,72	80	7,45	8,90
11	69,40	72,00	46	34,81	37,77	81	7,01	8,36
12	68,41	71,00	47	33,86	36,83	82	6,56	7,83
13	67,41	70,01	48	32,90	35,88	83	6,12	7,29
14	66,41	69,01	49	31,95	34,94	84	5,68	6,76
15	65,41	68,02	50	30,99	33,99	85	5,24	6,22
16	64,42	67,03	51	30,06	33,07	86	4,90	5,83
17	63,42	66,04	52	29,12	32,14	87	4,56	5,43
18	62,43	65,06	53	28,19	31,22	88	4,22	5,04
19	61,43	64,07	54	27,26	30,29	89	3,88	4,64
20	60,44	63,08	55	26,32	29,37	90	3,54	4,25
21	59,44	62,10	56	25,42	28,46	91	3,30	3,98
22	58,45	61,12	57	24,52	27,55	92	3,05	3,71
23	57,46	60,13	58	23,61	26,65	93	2,80	3,43
24	56,46	59,15	59	22,71	25,74	94	2,56	3,16
25	55,47	58,17	60	21,81	24,83	95	2,31	2,89
26	54,48	57,19	61	20,95	23,95	96	2,14	2,71
27	53,49	56,21	62	20,09	23,07	97	1,97	2,53
28	52,50	55,23	63	19,22	22,20	98	1,80	2,36
29	51,50	54,25	64	18,36	21,32	99	1,63	2,18
30	50,51	53,27	65	17,50	20,44	100	1,46	2,00
31	49,52	52,29	66	16,71	19,59			
32	48,53	51,31	67	15,93	18,74			
33	47,54	50,34	68	15,15	17,90			
34	46,55	49,36	69	14,36	17,05			

APPENDIX 2 Age Specific Disability Weights for Treated forms of Sequelae included in the Global Burden of Diseases

Sequelae	Treated Forms (Age Groups- in Years)				
	0-4	5-14	15-44	45-59	60+
Tuberculosis					
HIV Sero-Negative cases	0.294	0.294	0.264	0.274	0.274
Neonatal Pneumonia	0.280	0.280	0.276	0.276	0.280
Diarrhoeal diseases	0.119	0.094	0.086	0.086	0.088
Pertusis					
Episodes	0.000	0.000	0.000	0.000	0.000
Measles					
Episodes	0.152	0.152	0.152	0.152	0.152
Bacterial Meningitis, meningococcaemia					
Streptococcus Pneumoniae	0.616	0.616	0.613	0.613	0.613
Meningococcaemia without Meningitis					
Motor Deficit	0.334	0.334	0.334	0.337	0.390
Mental Retardation	0.394	0.420	0.451	0.466	0.468
Malaria					
Episodes	0.211	0.195	0.172	0.172	0.172
Schistosomiasis-Infection	0.005	0.005	0.006	0.006	0.006
Dengue					
Dengue Haemorrhagic fever	0.211	0.195	0.172	0.172	0.172
Ascariasis					
High Intensity Infection	0.000	0.000	0.000	0.000	0.000
Trichuriasis					
Massive Dysentery Syndrome	0.138	0.116	0.114	0.114	0.129
Upper Respiratory Syndrome					
Episodes	0.000	0.000	0.000	0.000	0.000
Otitis Media					
Episodes	0.023	0.023	0.023	0.023	0.023
Maternal Haemorrhage					
Episodes	0.000	0.000	0.000	0.000	0.000
Abortion					
Episodes	0.000	0.000	0.000	0.000	0.000
Iron Deficiency Anaemia					
Very severe	0.241	0.244	0.255	0.252	0.252
Cancer-Preterminal					
Stomach	0.217	0.217	0.217	0.217	0.217
Breast	0.086	0.086	0.086	0.086	0.086
Lymphomas and multiple	0.057	0.057	0.057	0.057	0.057
Cancer-Terminal	0.809	0.809	0.809	0.809	0.809

APPENDIX 2 Age Specific Disability Weights for Treated forms of Sequelae included in the Global Burden of Diseases (continued)

Sequelae	Treated Forms (Age Groups- in Years)				
	0-4	5-14	15-44	45-59	60+
Diabetes Mellitus					
Cases	0.033	0.033	0.033	0.033	0.033
Diabetic Foot	0.129	0.129	0.129	0.129	0.129
Amputation	0.068	0.068	0.068	0.068	0.068
Unipolar Major Depression-Episodes	0.302	0.302	0.302	0.302	0.302
Schizophrenia-Cases	0.351	0.351	0.351	0.351	0.351
Drug use					
Dysfunctional and Harmful drug	0.252	0.252	0.250	0.250	0.250
Glaucoma-Blindness	0.600	0.600	0.600	0.600	0.600
Cataracts-Blindness	0.493	0.491	0.488	0.488	0.488
Rheumatic Heart Diseases					
Congestive Heart Failure	0.171	0.171	0.171	0.171	0.171
Ischaemic Heart Diseases					
Acute Myocardial Interaction	0.395	0.395	0.395	0.395	0.395
Asthma-Cases	0.059	0.059	0.059	0.059	0.059
Peptic-Ulcer-Cases	0.003	0.003	0.003	0.003	0.003
Cirrhosis of the Liver					
Symptomatic cases	0.330	0.330	0.330	0.330	0.330
Appendicitis-Episodes	0.463	0.463	0.463	0.463	0.463
Nephritis and Nephrosis					
Acute Glomerulonephritis	0.107	0.107	0.107	0.096	0.096
End Stage Renal diseases	0.107	0.107	0.107	0.096	0.096
Rheumatoid Arthritis-Cases	0.174	0.174	0.174	0.174	0.174
Osteoarthritis					
Hip	0.108	0.108	0.108	0.108	0.108
Knee	0.108	0.108	0.108	0.108	0.108
Fractures					
Pelvis	0.247	0.247	0.247	0.247	0.247
Handbones	0.100	0.100	0.100	0.100	0.100
Femur-Long Term	0.272	0.272	0.272	0.272	0.272
Foot bones	0.077	0.077	0.077	0.077	0.077
Dislocated Shoulder, elbow or hip	0.074	0.074	0.074	0.074	0.074
Sprains	0.064	0.064	0.064	0.064	0.064
Intracranial Injury					
Short Term	0.359	0.359	0.359	0.359	0.359
Long Term	0.359	0.359	0.359	0.359	0.359
Open Wound	0.108	0.108	0.108	0.108	0.108
Amputations					
Foot	0.300	0.300	0.300	0.300	0.300
Injured Nerves	0.064	0.064	0.064	0.064	0.064
Skin Diseases-Cases *	0.056				
Insomnia(Primary)-Cases *	0.100				
Migraine –Cases *	0.029				

Average Disability Weights (ADW) for diseases and conditions from Global Burden of Diseases, 2004 update.