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Catastrophic burden and impoverishment effect of WASH diseases: A ground analysis of Bhadohi district Uttar Pradesh, India

Jyoti Pandey and Rajiv Kumar Bhatt

Abstract

In the absence of proper sanitation, people suffered from high levels of infectious diseases leading to high incidences of morbidity and mortality. This directly affected the ability of a country to maintain an efficient economy and implied great personal suffering among infected individuals and their families. This paper aims to estimate the catastrophic expenditure of households in terms of direct and indirect losses which a person has to face due to the illness of WASH diseases; the severity of the scenario is answered by finding out the impoverishment effect. We used the primary data survey for the objective outlined. Descriptive and analytical research types are used. The survey is done with the questionnaire formulated precisely, taking care of the inclusion of all the variables and probable outcomes. A total of 300 households is covered under this study. In order to pursue the objectives outlined, multistage random sampling of households is used. In this study, the cost of illness approach is followed for accessing economic impact. The study brought out the attention that a significant portion of the total consumption expenditure is going lost for the treatment of water and sanitation related diseases. The infectious and water vector-borne disease can be checked by providing sufficient required sanitation facility, and that 2.02% loss in income can be gained if the mechanisms of the pathogen is checked.

Keywords: Water, sanitation, impoverishment, catastrophic expenditure

Introduction

Contaminated water source, untreated solid waste and inadequate sanitation are the three challenging problems which causes ruinous effect on health of the most developing countries. People suffered from high levels of infectious diseases in the absence of good sanitation, leading to high rates of morbidity and mortality. This had a direct impact on a country's ability to sustain an efficient economy and implied significant personal suffering among sick persons and their families. Inadequate sanitation, such as improper disposal of human excreta, open defecation, a lack of infrastructure (sewerage, drainage/sullage), and a lack of hygiene management, pose a serious threat to people's health. Sanitation and health studies is done prior from 80s. Poor sanitation and unsafe drinking water causes a wide range of adverse impacts on Human health [6, 9, 12, 15, 21, 25, 29].

All of these illnesses mean that a lot of these people are burdened with healthcare costs that either come out of pocket or from government / third party providers. This is money that could be spent elsewhere, but is instead spent to treat preventable diseases, which turns in to catastrophic burden and this has a negative welfare impact in terms of impoverished effect [36, 7] Household need to take loan or debt to avoid this catastrophic expenditure [2] which forces them in poverty trap. Money does not only lose because of this explained direct healthcare cost but it is also lost indirectly from loss of productivity. When these people or their families become ill, they must take time off from work to cure. Providing better health facility is the prime objective of every government for its citizen. Simply providing improved sanitation could eliminate these losses, reduce the financial burden of the government and allow people to thrive.

However, it is well understood that utilizing total household expenditure as a measure of household resources has limitations, given that low-income households may have minimal OOP for health care due to the fact that the great majority of resources are spent on food and basic survival.

As a result, if households are unable to satisfy catastrophic health payments, the cost of OOP payments for health care may be underestimated. Estimating catastrophic health expenditure if health care expenditures exceed the set threshold of household non-food expenditure is a partial approach [34]. Household non-food expenditures is also known as “non-discretionary expenditure” [36]. Or “capacity to pay” [40]. Difference between total household expenditure and food expenditure is termed as “capacity to pay” [10].

When households that are seen as not being poor are forced into poverty as a result of OOP health payments, this is known as impoverishment. [34]. Shahrawat and Rao [28] discovered that 5% of Indian households had catastrophic health costs, and that the impact of OOP health payments on poverty was greater for people who were below the poverty line than for people who were above it. Narci *et al.* (2015) [22] reports on an increase in disaster and economic death in Turkey as a result of O.O.P. health-care expenses between 2004 and 2010. Financial catastrophe of the household can be protected by government health financing. In a survey of 59 nations, researchers found a negative relationship between the level of public health spending and the magnitude of catastrophic expenditure [41]. Additionally, reducing households' reliance on O.O.P. support for healthcare finance helps to shield households from financial ruin brought on by disease. The three prerequisites for catastrophic health expenditure were high healthcare costs, a low health insurance participation rate, and a poor population [40].

Sanitation and Health is the most studied topic in the literature, but most of them are epidemiological studies. Quantifying health impacts is well documented in the literature specially in African and Asian countries in the global level as Water sanitation and hygiene is the one of the goals of SDG but any regional level study is absent, because sanitation is a broader concept and it consumes a lot of time and fund if the economic and social aspect will be taken in to focus. This study is an effort to access the economic loss due to the inadequate sanitation and how it escalates the poverty, no specific study has been done yet for vector born and water borne disease and how it's affecting the poverty headcount in our knowledge. Studies are found to be done for non-communicable disease because it has a visible and major economic loss in terms of costly treatment but chances of morbidity of infectious disease or communicable diseases are much higher than this and it can be tackled by establishing proper check post to break the pathogen transmission mechanism.

Methodology

In the view of the given objectives, the present research work is carried out with the help of primary data. To collect the Primary data Survey method was adopted. Through conducting extensive literature survey researcher prepared Survey Schedule with closed ended and open ended both type of questions.

Type of Research

Descriptive and analytical both Research type is used. In the descriptive research survey is done with the questionnaire formulated precisely with taking care of inclusion of all the variables and probable outcomes.

Sampling design

Total 300 Household is covered under this study. In order to pursue the objectives outlined, multistage random sampling of households is used. All 6 blocks are taken in the study. Information of all village and household block wise list is prepared by population census 2011 and imported it in to Excel Sheet. Randomly mark the villages in the list and after that the randomly 10 household from each village is selected.

In this study Cost of illness approach is followed for accessing economic impact. The cost-of-illness approach (COI) recapitulates the economic burden of a disease by adding up all direct and indirect costs caused by the disease over a specified period of time. The direct costs include personal treatment costs (e.g., for inpatient and outpatient treatment), nonmedical care costs (e.g., for transportation and other in between). The indirect costs include the loss of income of individuals afflicted with the disease and cost of care providing.

Disease Information

Listing of disease is done by followed the guideline of WHO. Vector borne diseases are malaria, dengue, Schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and Onchocerciasis. Which take place because of, poor domestic sanitation and waste water management. Water borne diseases which includes Diarrhea cholera, typhoid, amoebic and bacillary dysentery and other diarrheal diseases, hepatitis A, Skin disease.

Outcome Variables

Economic loss is calculated by adding up direct and indirect monetary losses both. Direct loss is Out of Pocket expenditure (OOPE) of the household and indirect loss is captured by cost of care providing and days lost due to illness. OOPE was considered as being catastrophic if the share of OOPE in household expenditure is greater than 10%. Catastrophic Expenditure is calculated on the capacity to pay basis. Additionally, reducing households' reliance on O.O.P. support for healthcare finance helps to shield households from financial ruin brought on by disease. The three prerequisites for catastrophic health expenditure were high healthcare costs, a low health insurance participation rate, and a poor population.

Data Analysis

On a household level, a descriptive analysis is performed to understand the type and occurrence of disease, socio demographic conditions. Calculations are done for catastrophic expenditure and Impoverishment effect with the help of out-of-pocket payments annually.

Out of pocket expenditure = Doctor's fee + Conveyance charges +medicine charges +Bed Charges +special diet+ miscellaneous expenditure

Annual Economic loss per Household= $(\sum (DL+IL))/N$

DL=Direct loss, IL= Indirect loss, N= Number of Household

Annual Economic loss per Head= $(\sum (DL+IL))/n$

DL= Direct loss, IL= Indirect loss, n=Number of family members

Catastrophic Expenditure**Capacity to pay (CTP) = Total consumption expenditure - Food consumption expenditure**

Capacity to pay for the i th household will be

$$CTP_i = EXP_i - FCE_i$$

A part of the population is considered catastrophically headed if OOP health costs as a percentage of TCE surpass the established limit. While the catastrophic payment gap quantifies the typical level of OOP health spending as a percentage of TCE that is above the threshold level.

For calculating the headcount of catastrophic expenditure (H), The formula below uses T_i as the OOP health expenditures for household i , X_i as the total expenditure for household i , and $f(x)$ as food expenditure. A household is said to have incurred catastrophic payments if

$$H = \frac{T_i}{X_i} > Z$$

$$H = \frac{T_i}{X_i - f(x)} > Z$$

$$\text{Poverty Headcount with total consumption expenditure} = \frac{\text{Total Household expenditure}}{\text{Number of household members}} < 1330 \text{ rupees}$$

$$\text{Poverty Headcount with total consumption expenditure} - \text{OOP} = \frac{\text{Total Household expenditure} - \text{OOP}}{\text{Number of household members}} < 1330 \text{ rupees}$$

$$\text{Poverty Headcount with total Expenditure} - \text{TEL} = \frac{\text{Total Household expenditure} - \text{TEL}}{\text{Number of household members}} < 1330 \text{ rupees}$$

Information of Survey Schedule and Survey

- The survey is done in the month of November 2019-february 2020. Required and sufficient time has been given to every survey schedule for getting complete responses.
- Pilot survey was done on 50 households. There was problem with some question formatting which were the reason for not getting appropriate answers, the survey schedule got reviewed thrice and rechecked.
- If household is using personal vehicle the cost of other respondent who are using public transport for going to the same hospital of same village is placed as conveyance charges.
- Cost of care providing is only quantified when person who is taking care is taking off from the work and if they are daily wage earner, there is no opportunity cost calculated.
- Cost of days lost that is how many days lost multiplied by how much earning in one day is only taken into analysis in cases of daily wage workers the average wage was decided as per their responses of wage per day. If a person who is falling sick is a regular salaried employee, this cost is not included in the study because they are not losing any money in real term, the opportunity cost is not taken. The intangible pressure is not quantified

The incidence (I) of catastrophic payments can be expressed by head count. It is obtained by the proportion of households that incurred catastrophic payments and is estimated by the formula below

$$I = \frac{1}{N} \sum_{i=1}^N E_i$$

Where H is incidence of catastrophic expenditure is number of Household and E is household having catastrophic expenditure.

Threshold is taken as 10%

For the sensitivity analysis 5%, 15%, and 20% threshold is taken

Impoverishment Effect

MPCE is 880 rupees in Rural Uttar Pradesh, (Planning commission 2011) Value is deflated with the inflation for 2019-20 and it became 1330 rupees.

- For the morbidity information it's needed a lot of patience and time to get information of all family member and assumed that whatever the respondent is saying is accurate. Sometimes the responses were in the form of aggregate out of pocket expenditure for one last year. Then approximate expenditure on each variable cost was asked indirectly, like the distance of hospital and time for reaching there, whether it is private treatment or government treatment and sometimes the approximate cost was calculated by the other sample's responses.

Survey Area

The district of Bhadohi is Uttar Pradesh's 65th district. It was formed in 1995 as a separate body from the state district of Varanasi. It is situated in the south-western part of the state between 25° 12' and 25° 32' north latitudes and 82° 12' and 82° 42' east longitudes. The districts of Jaunpur, Allahabad, Mirzapur and Varanasi are on four sides. The Jaunpur district borders on the north, and Varanasi embraces on the east. The Mirzapur district has its southern border and Allahabad is on the east. For administrative purposes, the district has been split into three tehsils, namely Aurai, Bhadohi and Gyanpur (a subdivision of the city). There are six development blocks namely Suriyawan, Deegh, Abholi, Bhadohi, Aurai and Gyanpur.

Results

Table 1: Socio-demographic & economic characteristics of the Respondent

Variables		Frequency	%
Gender of the Respondent	Male	255	85
	Female	45	15
Age of the Respondent	18-60	272	90.67
	Above 60	28	9.33
Relation with Head	Self	262	87.3
	Spouse of Head	36	12
	Spouse of married child	2	0.7
Principal occupation	Salaried/wage employees	100	33.3
	Agriculture labour	33	11
	Daily wage earner other than agriculture labour	81	27
	Own business	35	11.7
	Farmer	51	17
Education	Illiterate	126	42
	Primary/Upper Primary	41	13.7
	Secondary/Higher secondary	86	28.7
	Graduate/Post Graduate	47	15.7
	Total	300	100
Category	General	53	17.7
	OBC	199	66.3
	SC	48	16.0
	ST	0	0
Economic status	APL	194	64.7
	BPL	106	35.3
	Total	300	100
Type of family	Joint	70	23.3
	Nuclear	230	76.7
	Total	300	100

The average age of respondents was 42 years (SD = 12.3), Majority of them were males (71%), 76.7 of them were living in nuclear families with average family size of 5 (SD = 2.53). 11.7 percent of the participants had intermediate (12th grade), 42 percent are illiterate, 13.7 percent are primary and Upper Primary, 28.7 percent are secondary (10th grade)/Higher secondary, 15.7 percent are graduate/Postgraduate. In principal occupation of the family,33.3 percent of the respondents are regular salaried employees,11 percent are agriculture labour,27.7 percent are daily wage earner other than agriculture labour,11.7 percent have their business, 17 percent are farmer, average annual household income of Indian National Rupee 24644.56 (SD = 27157).67.4 percent family belongs to APL Category. Population of general is 17.7 percent and OBC is 66.3 percent, no ST population brought out in the survey.

Table 2: Number of Household member suffered from different WASH disease and Number of episodes

Illness	No of household members	Percentage	Total Number of Episodes
Skin infection	74	11.6	102
Urinary tract infection	32	5.02	33
Typhoid	65	10.2	69
Pneumonia	22	3.4	22
Dengue	66	10.36	66
Malaria	102	16.0	102
Typhoid & malaria	98	15.3	98
Dysentery	54	8.4	57
Diarrhea	28	4.3	29
Cholera	4	0.62	4
Lymphatic Filariasis	0	0	0
Anemia	2	0.3	2
Respiratory tract infection (cough/cold)	90	14.1	90
Total	637	100	674

Source: Calculated by Researcher from Survey Data

Table shows that 15.3% population had malaria and typhoid together. 11.6% population suffered from skin infection and 8.4% population has reported having Dysentery. Diarrhea cases were only 4.3%, 16% population suffered from malaria which is highest among all. Only two anemic women found in the survey. Urinary Tract Infection is also found in survey which is 5.02% of the total disease suffered. Many water and sanitation diseases were absent like Hepatitis A, Schistosomiasis Trachoma etc.

Table 3: Direct and indirect monetary loss because of diseases

	Items	N	Sum	Mean
Direct loss	Doctor's fees	258	32640	126.51
	Conveyance charge	258	30402	117.84
	Spending on special diet	258	403900	1565.50
	Medicine charges	258	224560	870.38
	Cost of Hospitalization	258	5520	21.39
	Miscellaneous	258	90060	349.06
Indirect loss	Cost of care providing	258	76922.00	298.15
	Cost of Productive days loss	258	49720.00	193.46

Source: Calculated by Researcher from Survey Data

Table represents different categories of calculating OOP. Doctors' fees are average 126 rupees per household, along with 117 rupees on conveyance charges, 1565 rupees on special diet, 870 rupees on medicine charges, 21 rupees on hospitalization charge and 21 rupees on other miscellaneous items like food cost of the care giver etc.

Table 4: Monetary loss in terms of OOP and total monetary loss of sick household and sick person

Type of monetary loss	N	Sum	Mean
Monetary loss in terms of OOP per household	258	787082	3050.70
Monetary loss in terms of OOP per head	637	787082	1235.60
Total monetary loss per household	258	1013304	3927.5
Total Monetary loss per head	637	1013304	1590

Source: Calculated by Researcher from Survey Data

Total monetary loss the total monetary loss per capita is 1590 rupees without mortality effect. The household who has morbid cases were reported 258 out of 300, and total 637 family members were infected with WASH diseases out of 1525 in the survey. We have calculated losses for the household having morbid cases and infected persons in terms of OOP expenditure and total monetary losses which includes DL and IL both separately. Monetary loss in terms of OOP per household is 3050 rupees and in terms of total monetary loss amount increases to 3927.5 rupees. Per head monetary loss is 1235.60 rupees in terms of OOP and 1590 rupees per head in terms of total monetary loss.

Annual Expenditure

Expenditure information is taken for 365 days and 30 days recall period both Monthly expenditure is converted into annual expenditure by multiplying 12 and added in annual expenditure for finding out total expenditure of the family. Total expenditure is divided by the number of family member to make it per capita consumption expenditure. We have calculated annual expenditure for total sample selected and annual expenditure for household having morbid cases and infected family members separately.

Table 5: Annual expenditure

Expenditure type	N	Sum	Mean
Total Expenditure per household	300	22545069	75,150.23
Total Expenditure per Head	1525	22545069	14783.65
Non-food Expenditure per household	300	15497757	51,659.19
Non-food expenditure per head	1525	15497757	10,162.46

Source: Calculated by Researcher from Survey Data

Mean value of total expenditure per household is 75150.23 rupees annually and 14783.65 rupees per head. After separating food expenditure from the total expenditure, 51659 rupees is total consumption expenditure per household and 10162.46 for consumption expenditure per head.

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Table 6: Annual expenditure of sick person per head and per household

Expenditure type	N	Sum	Mean
Total Expenditure	258	18776979	72778.98
Total Expenditure per Head	637	18776979	29,477.20
Non-food Expenditure	258	12929155	50307.99
Non-food expenditure per head	637	4283385	6,724.30

Source: Calculated by Researcher from Survey Data

Table is showing the total expenditure in the form of nonfood expenditure and Total expenditure with food and nonfood both type of expenditure per household and per head expenditure of the household who are suffering from disease. Mean value of annual consumption expenditure is 72778.98 rupees per household who is having morbid cases. Mean of annual nonfood consumption expenditure and 50307.99 rupees per household for household who have morbid cases.

$$\text{Total monetary loss \% of total expenditure} = \frac{3927.5}{72778.98} \times 100 = 5.39\%$$

$$\text{Total monetary loss \% of Non food Expenditure} = \frac{3927.5}{50307.99} \times 100 = 7.8\%$$

$$\text{Monetary loss in terms of OOP \% total Expenditure} = \frac{3050.30}{72778.98} \times 100 = 4.1\%$$

$$\text{Monetary Loss in terms of OOP \% of capacity to pay} = \frac{3050.30}{50307.99} \times 100 = 6.06\%$$

Monetary loss in terms of out-of-pocket expenditure is 4.1% of the total annual consumption expenditure and 6.06% if only nonfood item is taken in to calculation. In the same manner monetary loss in terms of total economic loss (direct loss + indirect loss) is 5.39% of total annual consumption expenditure and 7.8% when only nonfood consumption is taken in to calculation

Table 7: Annual income

	N	Sum	Mean
Annual Income per household	300	88720476.46	295734.92
Annual Income per head	1525	88720476.46	58177.36

Source: Calculated by Researcher from Survey Data

Annual income of per household in the survey is 295734.92 rupees and per head is 58177.36 rupees.

Table 8: Annual Income of sick

	N	Sum	Mean
Annual Income per household	258	50054600.00	194010.07
Annual Income per head	637	50054600.00	78578.64

Source: Calculated by Researcher from Survey Data

$$\text{Per household monetary loss per Household} = \frac{\text{Total monetary loss per household}}{\text{Annual Income per household}}$$

$$= \frac{3927.5}{194010.07} \times 100$$

$$= 2.02\%$$

Table 9: Headcount and incidence of catastrophic expenditure in terms of Capacity to pay

Catastrophic expenditure in terms of Capacity to pay	5	10	15	20
Headcount	51	19	11	7
Incidence	17	6.3	3.7	2.3

Source: Calculated by Researcher from Survey Data

With the 10% threshold catastrophic expenditure Headcount is 19. The Incidence of 6.3% household is facing catastrophic payment that is Catastrophic Headcount is 19. For the sensitivity analysis the other threshold is also taken at 5%, 15% and 20%. At 5% Threshold 17% households are coming under catastrophic expenditure, at 15% the value is 3.7 and at 20% threshold value reduced to only 2.3.

Impoverishing Effect of Out-of-Pocket Health Payments

Table 10: Household is shifted Below Poverty line in terms of out-of-pocket payment

Poverty line 29.4 rupees per day	Poverty Incidence before OOP	Poverty Incidence after OOP (B)	Absolute (B) - (A) = (C)
	56	62.7	6.7

Using the 2011-12 poverty estimate line, 56% populations are below poverty line based on total consumption expenditure, this increases to 62.7 when OOP health payments are netted out of total consumption expenditure. Only 6.7% of households are not living in poverty but would be pushed into poverty if OOP health spending were netted from total consumption expenditure.

Table 11: Household is shifted Below Poverty line in terms of total economic loss

Poverty line 1330 rupees	Poverty incidence before total economic loss (A)	Poverty incidence after total economic loss (B)	Absolute change (%)
	56	64.2	8.2

In terms of total economic loss 1.5% increment is seen in household shifted below poverty line, value has increased from 6.7 to 8.2%.

Discussion

Inadequate sanitation, such as improper disposal of human excreta, open defecation, a lack of infrastructure (sewerage, drainage/sullage), and a lack of hygiene management, pose a serious threat to people's health. Sanitation and health studies is done prior from 80s. Poor sanitation and unsafe drinking water causes a wide range of adverse impacts on Human health [6, 9, 12, 15, 21, 25, 29]. Disease like Acute Diarrhea, Typhoid, Cholera Hepatitis A Virus, Hepatitis B Virus disease, intestinal worms, malaria Dengue, Chikungunya, cholera, typhoid, hepatitis, polio, cryptosporidiosis, ascariasis, and schistosomiasis Japanese encephalitis and trachoma etc. are caused by poor sanitation hygiene and water facility [3, 4, 8, 11, 20, 26, 42] and recently COVID-19 diseases which is infectious disease is also required sanitation and hand hygiene as primary way to reduce the rate of outbreak [1, 5, 14, 16, 19, 23, 24, 38, 39].

In the present study monetary loss is categorized in two parts that is, Direct monetary loss and Indirect monetary loss. Loss which is directly paid by the household or by any individual for the service they get. Whereas indirect loss is the loss when sick person's productivity gets reduced due to the disease. For this productivity loss this person's income may decrease after resuming his job. Indirect monetary loss also occurs to other person of the family because he/she was taking care of the sick person, it may be in terms of time loss or income loss. Further direct loss is categorized in six major categories which are Doctor's Fee, Conveyance charge, spending on special diet, Medicine charges, cost of Hospitalization and Miscellaneous charges. Some of them are important to describe here. Doctor's fee Conveyance charge is on an average less because of use of nearby govt. hospitals Doctor's fee in govt. hospital is nil but some of the households are visiting private hospitals for severe diseases where Doctor's charge for their services. Conveyance charges are also low because people are using nearby hospitals for which they don't have to use any conveyance. Share of spending on special diet is larger in the total economic loss. Respondents supplement our knowledge with the information that the weakness after suffering diseases are very much. They are instructed to give the patient milk and egg everyday just to avoid another episode of the disease. The hospitalization cost is low which is showing that the sever prevalence of disease is absent and more than 50 percent of households are using government

hospitals where hospitalization charges are very low or sometimes nil. Medicine charges are a bit high because either govt. hospitals don't have enough medicines or people are buying medicines from private chemists on the recommendation of the doctors they visited in private hospitals. The Indirect Monetary loss is divided in two categories which are Cost of care providing and Cost of productive days loss. Cost of care providing is relatively less because in most of the cases women of the households were taking care of the sick person, the male was needed only when they are needed to visit the doctor. The opportunity cost of women is not included assuming that it comes under the household chores which is not included in GDP of India. Cost of productive loss is relatively low whereas the disease like typhoid and malaria are the disease which took 6-7 days for one episode. In the analysis of productive days loss only those are asked for the economic loss who were employed at that time, the unemployed or person who are looking for job are not included. Sometimes respondent have to wait a long queue for the number of visiting doctor when they fall sick, to avoid this time loss they prefer private hospitals. They responded that for avoiding days loss they take private services where crowd is less and it's nearer to village. In the regular salaried employees, it's become compulsion because they cannot take leave frequently, or they can't be late for work again and again. Therefore, it can be said that you will lose either time or money if any person of your house gets sick. Out of Pocket expenditure is a real problem in the country like India where health system is not in the reach of every citizen equally. (Selvaraj & Karan, 2009) [27]. There are differences in availability and accessibility both. The high economic loss can be seen in the result same as concluded by the other studies((Kastor & Mohanty, 2018; Kumar & Garg, 2014; Tripathy & Prasad, 2020) [17, 18, 32]. Incidence of Catastrophic Expenditure which is taken at 10% threshold is 6.3 and headcount is 19, which means 19 out of 258 infected household has health expenditure above the threshold. This value is higher than estimated value on the district level which is 3.3% combinedly done for the disease like Diabetes Mellitus, Hypertension, Hypothyroidism, Respiratory illness, Cardiovascular diseases, Kidney disorder, Epilepsy, Others mental disorders, bone disorders (Swetha, N. B., Shobha, S., & Sriram, S. 2020) [31]. It is likely that the burden of these diseases is more than anticipated since a considerable part of the population may not seek treatment of communicable disease until its not get very serious.

Study reveals that impoverishment effect of WASH disease is 6.7% in terms of OOPE and 8.2% in terms of total economic loss. 6.7% population compel to trap in poverty trap due to these additional expenses for treatment which a person has to draw from his pocket sometimes because of poor health care system and sometimes unavailability of proper good health care system.

Conclusion

Study brought out the attention that significant portion of the total consumption expenditure is going lost for the treatment of Water and sanitation related disease. Along with this there is time loss also associated with the poor sanitation and unsafe source of drinking water, which could have been used for leisure or other productive ways. Poor sanitation has impoverishment effect. A comparison of the population below poverty line before the economic loss and after

economic loss is resembling the impoverished impact of poor sanitation in the study area. There are ample of research done on OOP, Catastrophic expenditure and poverty because NCD eat major portion of the income because of the high cure cost, water borne and vector borne disease cure cost is not much but the intangible and physical loss is still associated with literal condition of poor being poorer. The infectious and water vector borne disease can be checked by providing sufficient required sanitation facility, and that 2.02% loss in income can be gained if the mechanisms of pathogen is checked. In the district level 2.02% amount is very less but if we compare it in national GDPs 2.02% the amount will be in crores. Despite recent declines in attributable mortality, inadequate sanitation with hygiene remains an important determinant of global disease burden, especially among young children. These estimates contribute to global monitoring such as for the Sustainable Development Goal indicator on mortality from inadequate WASH.

Policy Suggestion

- The Government should be provided safe drinking water to all the citizens in the country as per right to live. Contamination can be in Water source and after water taking out from the source, the water source contamination can be checked by availing the second or third strata of ground water which considered as safe to drink water source should be revisited again and again to check the ground water quality. Now moving to the second probable chance of water being contaminated is when direct hand comes in contact to the water, for this every household member should get aware about the external contamination and apprise them to cover the water pot when they take out water from the hand pump or other water source to the house if house is distant, and water storage pot should be cleaned time to time, handled vessel should be used if they do not have tap water.
- Every household must be connected to drainage and proper road facility.
- Waste segregation should be mandatory on household level.
- Public health care system must be in the reach of every citizen so they can escape from OOP, and this root cause of suffer can be tackled efficiently.

Limitations

1. This study only dealt with the direct and indirect cost of diseases for evaluating economic burden. The social and psychological pressure and other intangible factors particularly women and girls who is exposed directly to violence this may cause psychosocial stress due to the perceived threat of such violence are not covered.
2. One way of assessing the economic impacts of Diseases is to estimate the associated costs of health care – the so-called ‘direct costs’ of ill health. It is important to appreciate, however, that ‘direct costs’ of Diseases do not necessarily indicate the economic burden that Disease impose on households. This is firstly due to the fact that households are not the only party that pays for the costs of health care. Governments, insurance agencies and firms typically account for a significant portion of this amount.

3. There is no opportunity cost analysis, wage loss is taken in to study if household is losing money in real terms.
4. Study is completely based on the response of the respondents

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