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RESEARCH ARTICLE

DISEASE BURDEN AND OUT-OF POCKET HEALTH CARE COSTS IN KBK DISTRICTS OF ODISHA: EVIDENCE FROM THE NSSO 75TH ROUND

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ABSTRACT

Introduction: Even though India has made significant economic advances, Odisha especially the KBK region—still suffers from high illness rates and weak health outcomes, driven by pervasive poverty, insufficient healthcare infrastructure, and social disadvantages. This study seeks to examine the prevalence and key determinants of morbidity in Odisha, with special emphasis on the KBK region, using data from a large-scale national survey. **Methods:** This study used data from the 75th round of the National Sample Survey (NSS) on Household Social Consumption: Health, which included 19,083 individuals from Odisha, with 4,183 belonging to the KBK region. Participants provided self-reported information on morbidities based on a 15-day recall period, classified into infectious diseases, non-communicable diseases (NCDs), disability, and other conditions. All prevalence rates are expressed per 1,000 populations. To identify socio-economic and demographic factors affecting monthly household health expenditure, multiple linear regression analysis was employed. **Results:** Morbidity prevalence in Odisha exceeded the national average, with the KBK region bearing a heavier burden of infectious diseases, while non-communicable diseases (NCDs) were more prevalent in other parts of the state. Among those reporting morbidity, females, urban residents, and lower-income households constituted a larger share. The regression analysis revealed that household size, income level, education, caste (specifically OBC), and the age of the household head had a significant impact on monthly health expenditure. In contrast, gender, religion, and marital status did not show a statistically significant effect. Hospitalization costs were highest for NCDs, followed by disability and then infectious diseases. **Conclusion:** The elevated morbidity rates, particularly the persistence of infectious diseases in the KBK region despite epidemiological transitions seen in other areas, highlight enduring health inequities rooted in socio-economic vulnerabilities. Targeted efforts to enhance healthcare access, strengthen disease prevention, and promote social upliftment are essential to narrowing health disparities and improving health outcomes for Odisha's underserved populations.

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INTRODUCTION

Despite India's impressive economic performance after the introduction of economic reforms in the 1990s, progress in advancing the health status of Indians has been slow and uneven. But most surprisingly, the state of Odisha has been lagging behind others in achieving the goal of "health for all "and still the healthcare services are most backward and inadequate in this region. The recent economic survey report (2014) based on headcount ratio revealed that around one-third of Odisha's population are poor. Predominantly, the people of Odisha live in rural area with inadequate access to resources. Odisha is uniquely populated by nearly 40 percent of its population as Scheduled Tribes (22.85%) and Scheduled Caste (17.13%) (RGI, 2011) and the majority of them are underprivileged and lag behind almost all socio-economic and health indicators. Despite significant investment in the health sector in the last two decades in the state, the health conditions of the people show a marginal improvement. Odisha is one of the most backward states in India and still 32.6 percent of its population lives below poverty line (Odisha Economic Survey 2017-18). Apart from mass poverty, low per capita income, large scale unemployment, illiteracy, and poor social and economic access like shelter and quality of housing, sanitation, electricity and road connectivity and so on are creating more serious problems in achieving the above stated goal (Human Development Report India, 2017). Regarding the various health indicators like Infant Mortality Rate (40), Maternal Mortality Rate (180) and Under five Mortality Rate (49), etc. (ORGI, 2017 and 2018) and burden of diseases like premature death (69%), morbidity (31%), Communicable, maternal, neonatal, and nutritional diseases (36.9%), Non-communicable diseases (52.1%) and Injuries (11.1%) respectively, Odisha being the worst performer state in India (ICMR, 2016).

The above-mentioned health indicators are not same in all over the state and it is more severe in the inlands (south western and KBK Region-Kalahandi, Balangir and Koraput) region of Odisha. The KBK districts, in the southwest, have an inadequate economic infrastructure, low spread of medical facilities, and widespread poverty. Maternal mortality and under-five mortality continue to be at a higher level in this region (Prusty et al. 2015). A very high levels of mortality rates in Odisha remains a grave concern for the policy makers. Studies conducted in the past such as Gumber et al (2012), Gumber &Berman (2013) Sinimole, (2017), Yadav et al. (2021) Ghosh &Arokiasamy (2010) and Pandey et. al. (2017)provide limited descriptive insights about the influence of background characteristics such as sex, place of residence, age, education, economic status, caste and religion. On the other hand, most of the studies conducted in Odisha investigated on a particular disease or health issues with a micro focus. This study seeks to provide a macro picture of morbidity pattern in Odisha in general and KBK region in particular based on recent NSSO survey. Also, it investigates the ways in which different self-reported morbidities are associated with selected background factors such as sex, place of residence, level of education, age, monthly per capita consumer expenditure (MPCE), household size, marital status, etc. Morbidity pattern is often considered as a proxy measure to understand the health status of a given population (Dilip 2002; Duraisamy 1998; Murray and Chen 1992).

Related Study: Globally, multimorbidity prevalence is estimated at 37.2%, with South America (45.7%) and North America (43.1%) showing the highest rates, driven by older age and female sex, while Africa's lower prevalence may reflect undiagnosed cases (Chowdhury et al., 2023). Specific global studies highlight long-term morbidities, such as aerodigestive issues in esophageal atresia survivors (e.g., 50% GERD prevalence) and gastrointestinal morbidity in twins conceived via assisted reproductive technologies (34.9% for IVF), with congenital heart disease and perinatal complications as key determinants (Ebbott et al., 2025; Snir et al., 2025). United States incidence of traumatic brain injury morbidity increased by 100% for individuals aged 65 years, associated with specific products such as floors (Xiao et al., 2023). Study Reports Gender and Parental Support Related to NCD Risk Factors Among Adolescents in Turkey: COMPLETE Author Information. In Turkey, 85.5% of adolescents had insufficient fruit consumption. Of which 52.4% of adults had NCDs such as hypertension (32.8%) with age, gender and smoking factors being associated with NCDs (Haidari et al., 2024) in Lebanon At the national level, around 20% of Indians are faced with multimorbidity, with eastern parts of the country, including Odisha, experiencing notable burdens (Varanasi et al., 2024). Based on the region, 24.1% of a cohort of older adults experienced multimorbidity and 20.4% of a separate cohort experienced multimorbidity, mainly urban residence, education and wealth (Chauhan et al., 2022) The odds of HIV testing among adults (12.6% of men who were more than 29 years old) are affected by education and risky behaviors (Dutta & Murmu, 2024). Morbidity prevalence in adolescent girls is 64.8%, associated with caste and unhygienic practices (Sachan et al., 2012). Singh (2017) indicates that the incidence of illness is more among the rural women and care is most needed from the scheduled castes in North East India. In rural Tamil Nadu, the prevalence of major health conditions is 22.3%, aggravated by low health literacy and distrust in public health care (Dodd et al., 2016). Multimorbidity prevalence is 28.3% among primary care patients in Odisha, and determinants are older age, female sex and higher socioeconomic status, with healthcare utilization also reported to increase (Pati et al., 2015). In a study from rural Odisha (Bargarh district) 57% elderly had multimorbidity (mainly arthritis and hypertension driven by age and lifestyle) (Banjare et al. 2014). In coincidence with findings on diarrhea in children in Ethiopia (18.7%, associated with un-treated water (Mengistu et al., 2024)) as well as postpartum morbidity in Uganda (13.6%, associated with increased cortisol levels (Authaire et al., 2024)), these findings highlight the need for targeted interventions in Odisha that address vulnerability associated with socio-economic status, health literacy, and environmental exposure to reduce morbidity burdens.

MATERIALS AND METHODS

The study has used 75th round of NSS data to examine the morbidity patterns and its different socio-economic background characteristics in KBK region of Odisha. The 75th round of NSSO was titled as "Household Social Consumption: Health". The morbidity information was collected from a total of 19083 individuals from Odisha and out of which 4183 individuals from KBK region in the 75st rounds of NSS. The reference period of morbidity information was 15 days preceding the survey. The present study has classified the Self-reported morbidities into four different broad categories i.e. infectious diseases, non-communicable diseases (NCDs), disability and other disease.

Statistical analysis: Prevalence of morbidity was calculated per 1000 population. The following formula was used to calculate morbidity prevalence.

$$Mi=\frac{Ai}{Pi}*1000$$

Where,

Ai= No. of ailing persons

Pi= Total number of persons alive in the sample households

In this study all the eight districts were clubbed into KBK region. The districts are Subarnapur, Balangir, Nuapada, Kalahandi, Rayagada, Nabarangpur, Koraput and Malkangiri respectively. Further this chapter has used multiple linear regression analysis for determining the factors responsible for the Monthly Total Health Expenditure of the households in the study area. Multiple Linear Regression: Monthly Total Health Expenditure

$$Y_i = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16} + \beta_{17} X_{17} + \beta_{18} X_{18} + \beta_{19} X_{19} + \beta_{20} X_{20} + \beta_{21} X_{21} + \epsilon_i$$

Y_i= Monthly Total Health Expenditure

α_0=Constant

β_i= Socio-economic and demographic Characteristics

RESULTS AND DISCUSSION

Prevalence of morbidity by gender and place of residence in different regions of Odisha: The self-reported morbidity prevalence in Odisha remained higher than the national average in all the regions except the Coastal region in the 75st round (table-1). However, the prevalence by morbidity categories (Table-1) indicated that infectious diseases and other types of morbidities, that have not been categorized under the boarder head was substantially higher in Odisha as compared to all India. Morbidity prevalence was more or less similar among males and females in coastal region but it was substantially higher among the females as compared to males in all the regions. Further morbidity prevalence was higher in urban area in all the regions.

Table 1: Trends of morbidity prevalence by gender and place of residences in the regions of Odisha, 2017-18 (per '000 populations)

	Sex		Place of residence		Total
	Male	Female	Rural	Urban	
Northern	105.4	134.3	116	135.3	119.4
Costal	74.8	69	65.9	100.5	71.9
Southern	87.1	93.9	85.5	120.4	90.5
KBK region	73.9	103.3	85.8	108.7	88.6
Odisha	88.1	96.5	87.3	117.5	92.2
India	67	83.2	68.1	90.8	74.8

Source: Authors estimation

Table-2 represents the percentage wise distribution of Morbidity in KBK and Non-KBK Region of Odisha. Regarding the percentage distribution of Morbidity prevalence in KBK and Non-KBK districts and Odisha as a whole, it is found that KBK region is having highest percentage of infectious communicable diseases such as all types of fever, malaria, diphtheria, TB, Diarrhea, jaundice and STD and other categories of diseases such as Ear and injuries as compared to Non-KBK districts and Odisha. In case of non-communicable diseases such as cancer, cardiovascular, Eye, Psychiatric and Neurological, Obstetric and Gastro-urinary, gastro-Intestinal, and Musculo-skeletal the percentage is lowest as compared to Non-KBK and Odisha.

Table 2. Percentage-wise Prevalence of Morbidity

Types of Diseases	***ICD***	***NCD***	***OTHERS***	***TOTAL***
Region				
KBK	51.44	31.329	17.28	100
NON-KBK	37.01	47.86	15.13	100
ODISHA	40.1	44.31	15.59	100
INDIA	39.81	46.24	13.95	100

Source: Authors estimation

Prevalence of different types of morbidity by socio-economic and demographic characteristics in the regions of Odisha: In 2017-18, infectious disease followed similar pattern as the previous round but with a substantial increase in disease prevalence. In addition, female population, young population aged less than 15, Urban Population, Muslim and poorer group of population also reported a higher prevalence of infectious disease. On the other hand, infectious disease was higher in northern region as compared to other regions across various socio-economic and demographic profile. Regarding outpatient expenditure, the aged population, male gender, urban area, rich income category, highly educated people, and other sections of caste and religion spend more as compared to its counterpart. Interestingly, NCDs in southern region and specifically KBK region were low as compared to other two regions in 75th round of NSS. NCDs was high among the urban population, those with higher education, older people, those from the general or upper caste, widowed, and the rich population in KBK Region of Odisha.

In case of NCD children below 5 years of age, female gender, rural area, middle income, highly educated and widow sections of the population spend more as compared to its other sections. The self-reported morbidityon disability was higher among the less educated, older persons, never married and economically less privileged population. However, in northern region, the prevalence of disability was reported among the rich as well.

The outpatient expenditure in case of Disability is high in the category of children below 15 years, male gender, urban area, poorer income category, highly educated and never married women respectively. Similarly, other morbidities excluding infectious diseases, NCDs and disability has been increasing in recent years. However, in KBK and southern region other morbidities were higher in the 75stround of NSS. Other morbidity is higher in case of children below 5 years of age, among female members, rural area, economically richest people, illiterate and never married women in KBK region of Odisha. Like outpatient expenditure due to infections, NCD and Disability, in others category of morbidity aged population, female gender, urban area, middle income category, illiterate and currently married spend more as compared to its opposite sections.

Table-3: Morbidity prevalence (per 1000) in KBK region by diseases category

	Infect/cd	NCD	Disability	Others
Age				
0-5	9	3	0	112
6-14	36	1	1	33
15-30	8	8	7	41
31-60	10	31	10	33
60+	7	34	122	72
Gender				
Male	9	14	11	41
Female	20	20	16	48
Sector				
Rural	13	15	11	47
Urban	27	30	28	25
Wealth quintile				
Poorest	8	11	9	38
Poorer	37	9	12	67
Middle	9	49	47	34
Richer	7	21	9	18
Richest	4	136	37	73
Caste				
SC/ST	17	13	7	46
Others	11	23	23	42
Religion				
Hindu	14	17	14	40
Muslim	42	25	0	0
Others	3	0	0	253
Education				
Illiterate	10	14	21	57
Up to primary	17	18	12	35
Up to secondary	19	13	5	41
Graduation and above	2	77	0	4
Marital status				
never married	22	10	4	51
currently married	8	21	15	39
widowed/divorced/separated	5	37	90	42

Source: Authors Estimation

Table 4. Average expenditure on outpatient in KBK district

	Infect/cd	NCD	Disability	Others
Age				
0-5	586	1863	-	269
Jun-14	427	66	883	204
15-30	358	238	773	303
31-60	413	751	518	768
60+	591	650	211	1580
Gender				
Male	708	492	408	383
Female	288	811	384	619
Sector				
Rural	426	745	383	494
Urban	434	476	425	794
Wealth quintile				
Poorest	372	599	206	507
Poorer	403	559	765	523
Middle	587	1290	384	1025
Richer	665	929	667	76
Richest	418	519	664	559
Caste				
SC/ST	374	845	289	396
Others	543	541	441	713
Religion				
Hindu	424	678	394	532
Muslim	416	523	-	-
Others	1150	-	-	400
Education				
Illiterate	297	795	301	663
Up to primary	545	842	395	355
Up to secondary	331	314	1035	400
Grauationand above	3980	487	1725	589
Marital status				
never married	408	546	740	265
currently married	480	693	329	791
widowed/divorced/separated	623	912	378	693

Source: Authors Estimation

Treatment as inpatient by Gender and Place of residence in the KBK and non-KBK regions of Odisha: Table-5 depicts the persons treated as inpatient in different regions of Odisha. From the results it is found that the persons treated as inpatients per 1000 population is less in KBK region of Odisha as compared to other parts such as Northern, Coastal, Southern and Odisha as a whole. But the proportion is high i.e. 31 in KBK region as compared to the all India figure which is 28 per thousand populations. Regarding Gender wise proportions of Population as inpatient female category is in a disadvantage position as compared to male category in all the regions of Odisha but it is same for both the categories in case of India. On the other hand, in case of place of residence the urban area of KBK region and Northern Region of Odisha represents higher percentage of Inpatient as compared to other Coastal and Southern region. The percentage is just opposite in case of Odisha where rural area represents higher percentage of inpatient as compared to all India figure.

Table-5: Proportion of persons treated as inpatient by gender and place of residences in the regions of Odisha, 2017-18 (per '000 populations)

	Sex		Place of residence		Total		
	Male	Female	Rural	Urban			
Northern	30	35	32	34	33		
Coastal	33	34	35	27	33		
Southern	27	37	33	29	32		
KBK region	28	34	31	34	31		
Odisha	30	35	33	30	33		
India	28	28	26	34	28		

Source: Authors Estimation

In 2017-18, infectious disease followed similar pattern as the previous round but with a substantial increase in the proportion of inpatient. In addition, female population, Aged population above 60 years, Urban Population, graduated population, Widow Group, Hindu and Middle Income group of population reported a higher proportion treatment as inpatient. NCDs was high among female, the urban population, those with higher education, child and older people, those from the Muslim, currently married, and the rich population in KBK Region of Odisha. In case of disability the proportion of population treated as inpatient was higher among the Middle aged, Urban area, richest category, among Muslim population and Other category of Caste, highly educated and widow section of the population. Similarly, other morbidities excluding infectious diseases, NCDs and disability has been increasing in recent years. Proportion treated as inpatient in case of Other morbidity is higher in case of middle aged, among male members, rural area, economically richer category of people, Muslim and Other Caste, illiterate and never married women in KBK region of Odisha.

Table 6. Proportion of persons treated as inpatient by disease category in KBK region of Odisha, 2017-18 (per '000 populations)

	Infect/cd	NCD	Disability	Others
Age				
0-5	18	14	4	7
6-14	4	3	2	2
15-30	9	10	5	3
31-60	12	10	10	8
60+	18	14	7	5
Gender				
Male	10	7	6	6
Female	11	12	6	5
Sector				
Rural	10	9	6	5
Urban	12	11	7	3
Wealth quintile				
Poorest	5	7	5	4
Poorer	25	21	13	7
Middle	44	11	11	7
Richer	9	11	5	10
Richest	41	29	15	2
Caste				
SC/ST	9	7	5	4
Others	13	13	7	6
Religion				
Hindu	10	9	6	5
Muslim	0	182	21	12
Others	9	4	4	1
Education				
Illiterate	13	10	5	7
Up to primary	8	7	8	3
Up to secondary	9	10	6	5
Graduation and above	23	15	10	0
Marital status				
never married	9	7	4	3
currently married	11	12	6	6
widowed/divorced/separated	20	6	36	8

Source: Authors Estimation

In case of inpatient expenditure on communicable diseases, Children below 5 years of age, male gender, urban area, middle class income category, other Caste, Hindu religion, Illiterate category and never married women category have been spending high as compared to others category. Inpatient expenditure in case of NCD, the aged population above 60 years, male gender, urban area, Richest group, Other caste, Muslim religion, graduation and above and currently married section spent more as compared to its counterpart. In case of inpatient expenditure on disability, children below 5 years of age, male gender, urban area, Richest income category, other caste, Muslim religion, Graduation and above and currently married women have spent more as compared to others category. In case of inpatient expenditure on Other morbidity, the population between 31-60 group, male gender, urban area, Richest income group, other caste, education up to secondary and currently married women spent more as compared to its opposite categories.

Table 7. Average expenditure on Hospitalization in KBK district

	Infect/cd	NCD	Disability	Others
Age				
0-5	11197	15501	27338	4477
Jun-14	10778	11759	16171	7240
15-30	7145	8976	8522	7141
31-60	5492	18534	9907	8838
60+	5496	24373	10659	8042
Gender				
Male	8105	19602	14278	9145
Female	6185	12988	7855	6550
Sector				
Rural	6447	13389	8312	7554
Urban	10952	27024	26761	12732
Wealth quintile				
Poorest	5166	11029	7598	5960
Poorer	6324	15112	10101	6206
Middle	10761	7990	9995	8872
Richer	9227	36881	18399	14160
Richest	8750	40824	54517	120500
Caste				
SC/ST	6760	9247	7086	7141
Others	7504	20880	15466	8803
Religion				
Hindu	7117	15102	10786	7713
Muslim		20996	37000	36450
Others	6828	1256	1910	7750
Education				
Illiterate	7196	11964	12255	6464
Up to primary	5695	17096	5967	7412
Up to secondary	9306	17502	10833	11655
Graduation and above	4581	25113	47544	4830
Marital status				
never married	9038	14595	13891	4991
currently married	6347	16194	14564	9463
widowed/divorced/separated	3482	5735	2739	6933
Total	7112	15371	10952	7930

Source: Authors Estimation

Results of the Econometric Model: From the results of Regression on total health expenditure, it is found that the total health expenditure is determined by various socio-economic and demographic factors. The variables such as Household size, People from OBC category, Middle, Rich and Richest income categories of population, Age of the head of the households are significant at 1 percent level and Graduation and above is significant at 5 percent level. The above variables are positively effecting monthly household health expenditure which clearly shows that as the household size and age of the respondent increases total health expenditure also increases. Other variables such as religion, gender and marital status are not significant for monthly total health expenditure of the household in the study area. Income, Education and social category plays a significant role in determining the health expenditure as a person moves from lower to higher income group, from illiteracy to highly literate category and from low social category to high social strata, the monthly household health expenditure increases.

Table 8. Multiple Regression on Monthly Total Health Expenditure

MTHE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Rural	0	.	.	.	.	.	
Urban	409.647	267.415	1.53	.126	-115.16	934.453	
HHS	244.409	61.101	4.00	0	124.497	364.32	***
Hindu	0	.	.	.	.	.	
Muslim	1102.358	1094.878	1.01	.314	-1046.357	3251.073	
Other	-273.294	733.123	-0.37	.709	-1712.058	1165.471	
SC	0	.	.	.	.	.	
ST	441.689	299.466	1.47	.141	-146.017	1029.396	
OBC	709.349	268.657	2.64	.008	182.105	1236.593	***
Other	601.275	391.883	1.53	.125	-167.802	1370.352	

Poorest	0	.	.	.	.	.	
Poor	304.676	351.5	0.87	.386	-385.147	994.5	
Middle	1029.463	273.988	3.76	0	491.757	1567.168	***
Rich	975.603	342.149	2.85	.004	304.132	1647.075	***
Richest	1692.012	379.158	4.46	0	947.908	2436.116	***
Male	0	.	.	.	.	.	
Female	-115.222	523.627	-0.22	.826	-1142.849	912.405	
AGE	31.691	8.887	3.57	0	14.25	49.132	***
Unmarried	0	.	.	.	.	.	
Married	-762.49	738.161	-1.03	.302	-2211.142	686.162	
Divorced	-287.964	776.484	-0.37	.711	-1811.826	1235.899	
Widow	-1147.585	2385.84	-0.48	.631	-5829.833	3534.662	
Illiterate	0	.	.	.	.	.	
Primary	371.593	252.817	1.47	.142	-124.565	867.751	
Secondary	135.522	389.414	0.35	.728	-628.708	899.752	
Higher Secondary	40.628	526.07	0.08	.938	-991.792	1073.047	
Gradn and above	1324.236	534.56	2.48	.013	275.154	2373.318	**
Constant	-1794.238	782.208	-2.29	.022	-3329.333	-259.143	**

Mean dependent var	1428.584	SD dependent var	3335.117
R-squared	0.109	Number of obs	952
F-test	5.706	Prob > F	0.000
Akaike crit. (AIC)	18078.324	Bayesian crit. (BIC)	18180.354

*** p<.01, ** p<.05, * p<.1

DISCUSSION

Based on the findings examining morbidity prevalence and determinants in Odisha, several key patterns emerge when contextualized within both national and international research frameworks. The study observed higher morbidity prevalence in Odisha compared to the national average, particularly for infectious diseases in the KBK region, aligns with established global patterns documented across developing nations (Bramhankar and Dhar, 2024; Rashid et al.,2004; Boutayeb, 2010. Multiple international studies support the finding that rural and marginalized populations bear disproportionate disease burdens - a phenomenon consistently observed across Sub-Saharan Africa, South Asia, and Latin America (Avelina et al., 2025; Verhulst et al., 2022; Yaya et al.,2020). The epidemiological transition in India, showing a doubling of morbidity prevalence from 56 per thousand in 1995 to 106 in 2014, reflects broader patterns seen in low-and middle-income countries globally (Bramhankar and Dhar, 2024). However, contradictory evidence exists regarding urban-rural disease patterns. While this study found higher morbidity in urban areas of Odisha's coastal regions, research from other South Asian contexts suggests that rural populations typically experience higher infectious disease burdens due to limited healthcare access and poor sanitation infrastructure (Brief, 2023; Player, 2019; Arora, 2024). The gender disparities observed, with substantially higher morbidity among females across all regions except coastal areas, mirror international findings from developing countries where women face unique health challenges related to reproductive health, nutritional deficiencies, and limited healthcare access (Kayode et al. 2024; Milner et al., 2021). This pattern has been consistently documented across comparable regions in Africa and Asia, with studies showing that gender inequality significantly impacts health outcomes, including higher rates of chronic diseases and maternal health issues (Kayode et al., 2024; Veas et al., 2021). Conversely, some international studies from high-income countries demonstrate contrasting patterns where gender disparities in health outcomes are minimal due to comprehensive healthcare systems and gender equality initiatives (Milner et al., 2021; MacKinnon et al., 2023). The predominance of infectious diseases in the KBK region contradicts typical epidemiological transition theory, which suggests that as regions develop economically, non-communicable diseases should become more prevalent (Upadhyay, 2012; Srivastav et al., 2017; Anjana et al. 2023). Instead, the persistence of high infectious disease rates in KBK districts, including malaria, tuberculosis, and diarrheal diseases (Bindhani, 2024), reflects the complex interplay of socioeconomic factors, environmental conditions, and healthcare accessibility that characterizes many low-resource settings globally. This finding is supported by similar observations from rural areas in Sub-Saharan Africa, Bangladesh, and other South Asian regions, where infectious diseases remain dominant despite overall national development progress (Boutayeb, 2010; Singh et al., 2019). The multimorbidity patterns observed in this study, affecting approximately 20% of adults in India (Puri et al. 2025; Varanasi et al., 2024), align with global trends showing similar prevalence rates across South Asian populations, though this remains lower than the 45.7% prevalence reported in South America (Chowdhury et al., 2023). These contradictory findings highlight the importance of region-specific interventions and suggest that the epidemiological transition may not follow uniform patterns across all developing regions, necessitating tailored public health approaches based on local disease profiles and socioeconomic contexts.

CONCLUSION

The self-reported morbidity prevalence in KBK region is high as compared to other regions of Odisha in the 75st round of NSS. Female and Urban area represents high prevalence of morbidity as compared to its opposite in Odisha in general and KBK in particular. In case of ICD and Others category of diseases, KBK region represents high prevalence as compared to NCD in Non-KBK region of Odisha. Socio-economic and demographic characteristics are important in determining the prevalence of morbidity in the study area. In case of hospitalization, households are spending more on NCD followed by disability, Others and ICD in the study area. From the regression model it is known that Income, Education household size, Age of the Head of the

Household and social category plays a significant role in determining the health expenditure of the people in the study area. To advance toward the goal of "health for all", targeted and contextually tailored public health interventions are urgently required in the KBK region and comparable settings. This includes strengthening primary care infrastructure, health education, and ensuring equitable resource allocation that addresses socioeconomic vulnerabilities. The study calls for an integrated approach combining disease control, poverty alleviation, and social empowerment to break the cycle of poor health outcomes in marginalized Indian populations.

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Data availability: This study uses the data available in the public domain of the Ministry of Statistics and Programme Implementation (MOSPI), Govt of India. Data can be accessed accessed on this link: https://www.mospi.gov.in/unit-level-data-report-nss-75th-round-july-2017-june-2018-schedule-250social-consumption-health.

Declarations: Ethics approval and consent to participate: The data used in this research paper is based on National Sample Survey (NSS) data, which is secondary in nature, and available in the public domain by the Government of India. No personally identifiable information was available to the researchers. The survey was undertaken by the National Sample Survey Office (NSSO) of Ministry of Statistics and Programme Implementation, Govt. of India.

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