

Healthcare utilisation and out-of-pocket expenditure of type 2 diabetes patients with and without comorbidity: A study in primary care in Bhubaneswar, India.

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Abstract

Background: Globally, non-communicable diseases (NCD) demand a higher healthcare expenditure. Amongst the NCDs, diabetes mellitus, is often associated with multiple, co-existing chronic conditions. In low- and middle-income countries where most of the healthcare expenditure is borne out of pocket, diabetes management may pose a significant financial stress.

Methods: A cross-sectional study was conducted in 17 urban primary healthcare facilities of Bhubaneswar to assess the healthcare utilisation and out-of-pocket expenditure among type 2 diabetes patients attending these facilities. Healthcare utilisation was determined by the number of visits to healthcare facilities in the last six months, and out-of-pocket expenditure was assessed by outpatient consultation fees, medicines, travels to health care facilities and diagnostic tests. Total out-of-pocket expenditure was defined as the sum of these costs.

Results: The median number of visits in 6 months for diabetes patients with any comorbidity was 4 and 5 for diabetes patients with more than 4 comorbidities. Among the comorbid conditions, depression, stroke, auditory impairment and acid peptic disease were associated with higher healthcare utilisation. The total out-of-pocket expense was 2.3 times higher among diabetes patients with any comorbid condition compared to patients with diabetes only. The total median expenditure was higher for diabetes patients having stroke, heart diseases, kidney diseases and cancer compared to other comorbid conditions. The association of comorbidity in diabetes patients with health care utilization and out-of-pocket expenditure is statistically significant after adjustment for sociodemographic characteristics and diabetes duration.

Conclusion: Considerable expenditure is incurred by diabetes patients attending primary healthcare facilities for the management of diabetes and other chronic conditions. This is a significant burden for diabetes patients below the poverty line and with limited or no insurance cover. There is a need to increase the coverage of insurance schemes to address the chronic conditions management expenditure of outpatients.

Background

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder associated with morbidity, disability, and premature mortality. Diabetes Mellitus (DM) patients frequently suffer from complications and related or unrelated comorbidities.^{1,2} The debilitating nature of DM is associated with significant direct and indirect costs for treatment, managing complications and comorbidities. The increased use of healthcare resources with the presence of comorbidities is well established.³ Struijs et al., for example, have inferred that different comorbid conditions have different effects on healthcare utilization and that non-vascular comorbidities are as important utilization drivers as vascular comorbidity for patients with diabetes, while DM patients without comorbidity use less care compared to those with comorbidity.⁴.

Among low- and middle-income countries (LMIC) like India, where almost two-thirds of healthcare financing is out-of-pocket, DM patients face an enormous cost burden. The absence of any cover or

minimal insurance policies further amplify their costs and jeopardize their access to the necessary healthcare.⁵ Bhojani et al concluded in their study in a poor urban neighborhood in South India that the out-of-pocket spending on chronic conditions doubled the number of people living below the poverty line in one month, with further deepening of their poverty.⁶ Attaei et al. observed a decline in adherence to medicines with an increase in out-of-pocket expenses, and improved adherence with low out-of-pocket expenditures and enhanced insurance coverage including medicine costs.⁷ With a rapidly increasing number of DM patients in India, the burden of DM on total healthcare expenditure is likely to increase and, potentially, will have important consequences for the sustainability of healthcare.⁸ This poses a challenge to the strengthening of the Indian healthcare system and the government's plan to achieve universal health coverage by 2022.⁹

The Rashtriya Swasthya Bima Yojana (RSBY) or National Health Insurance Programme launched by the Indian Ministry of Labor and Employment (currently under the purview of the Department of Health and Family Welfare)¹⁰ to provide insurance coverage for inpatient care to 'Below Poverty Line' families and the unorganized labor force does not cover outpatient care expenses. Prior studies have also mentioned that not including expenditure on medicines, laboratory testing and outpatient visits has limited the role of RSBY in mitigating financial risk among the beneficiaries.¹¹

While exhaustive studies from Europe have been carried out on the expenditures for DM care and comorbidities, there is a paucity of data from the Indian subcontinent on the expenditure pattern of DM patients with comorbid conditions, especially in the primary care setting.

Therefore, there is a need to explore the costs related to DM care at the primary care level. The present study provides an overview of the healthcare utilisation and out-of-pocket expenditure of T2DM patients attending primary health care facilities in Bhubaneswar, India. We examined the impact of comorbidity on healthcare utilisation and costs borne by T2DM patients and the effects of different comorbidities on health care utilisation and out-of-pocket expenditures.

Methods

Study design and setting

A cross-sectional interview survey was conducted in all 17 urban primary healthcare centres in Bhubaneswar, the capital city of Odisha with a population of 900,000 inhabitants.¹² According to the National Sample Survey Office's 71st round on social consumption of health, about 72% of outpatient care in Odisha is provided by public healthcare professionals.¹³ The public health care system has a three-tier structure (primary, secondary and tertiary levels). Primary Health Care Centres are involved in delivering primary care while district hospitals and sub-divisional hospitals provide secondary care. Tertiary health care is provided by medical college hospitals. The sampling design for this study was two stages. Firstly, all the 17 primary health centres under Capital Hospital were selected for the study.

Secondly, from each centre diabetes patients were randomly recruited. Details of the sampling design is given in appendix-1.

Study participants

Patients attending a primary healthcare center between September 2014 and February 2015 who had been diagnosed by a physician with T2DM for more than six months according to their personal medical record were eligible to be included in the study. The inclusion criterion of diabetes duration of at least six months was applied because we needed information about healthcare utilisation for diabetes. Patients too ill to participate or with emergency health conditions were excluded from the study. Anonymized details of all patients excluded (age, gender, reason for exclusion) were recorded to compare the characteristics of the participants with the non-participants.

Measurements

The participating patients were interviewed in a separate private room using a predesigned and pretested questionnaire, ***Diabetes Co-morbidity Evaluation Tool in Primary Care (DCET- PC)***. The DCET-PC is derived from "Multimorbidity Assessment Questionnaire for Primary Care", a validated questionnaire which was pretested and the feedback used to adapt the questionnaire for our study.¹⁴ Two graduate nurses trained in patient history-taking and interview techniques carried out the interviews, and 10% of the interviews were done in the presence of the first author. The DCET-PC (Appendix 3) included questions about the existence of comorbid conditions, eliciting information on whether the patient had any of the 15 listed chronic conditions, and socio-demographic details, i.e. age, sex, residence (rural, semi-urban, urban), ethnicity (general, scheduled caste and tribe, other backward classes), religion (Hindu, Muslim, Christian, others), educational level (no education, primary level, secondary, graduate and above), marital status (single, married), annual family income (categorized into five quintiles) and household status (above poverty line, below poverty line). The details of development and domains of the DCET-PC questionnaire were described in our previous paper.¹

We estimated comorbidity as the presence or absence of any comorbidity, which was further categorized into the number of comorbid conditions (zero, one, two, three, four or more chronic conditions). The presence of a pattern of comorbidity combination in one individual patient was derived using simple combination for two more chronic conditions. Healthcare utilisation was operationalized as the reported number of visits to any healthcare facility in the last six months for any reason. Expenditure was measured in Indian Rupees (INR) by asking about expenses incurred in the last six months separately for outpatient consultation fees, medicines (for DM and other diseases separately), travelling to those healthcare facilities, and diagnostic tests (for DM and other diseases separately). Total out-of-pocket expenditure was defined as the sum of these costs and rounded to the nearest absolute number.

Analysis

To estimate the healthcare utilization, median (interquartile ranges) number of visits done by the patient to any healthcare facility during last six months were calculated. Healthcare utilization and out-of-pocket expenditure were further described across the number of comorbid conditions and the prevalence of leading comorbidities. Bivariate comparison was performed using a Kruskal-Wallis test for quantitative data (based on median values) and a chi-square test for categorical data. Furthermore, we calculated the median and interquartile ranges of out-of-pocket expenditure by comorbidity status (Yes/No). The difference in mean out-of-pocket expenditure and healthcare utilization across the comorbidity groups was tested using Kruskal-Wallis test.

Both the outcomes in our study were count data and with less than 5% patients had 'zero' values. Therefore, a Poisson regression model in multilevel mixed effects methods was used with two levels (health center and patient) for multivariate analysis to assess the independent contribution of comorbidity on healthcare utilization and out-of-pocket expenditure. The collinearity between the variables was tested before including them in multivariate analysis. Adjusted risk ratio was calculated for each predictor for estimating health care utilization and expenditure. The details of the model fit statistics, variances across the levels and the intraclass coefficient for each adjusted model is provided in Appendix-2. A p-value of <0.05 was considered statistically significant. Analyses were performed in STATA Corp-12 Tx.

Ethical considerations

Respondents were informed about the purpose of the study and the information used. We collected their signature or thumb impression on the informed consent form. The data were coded, and the identities of the respondents were kept confidential. The Odisha state research and ethics committee granted ethical approval for the study (letter no. 161/SHRMU dated 16/05/2014).

Results

Participants

We approached 942 T2DM patients, of whom 912 (97%) consented to be interviewed. The reasons cited for not participating were lack of time and unwillingness to answer. Of all respondents, 575 [63%] were male. The highest number of respondents was in the age group 40–69 years (N = 766 [83%]). The mean age of the respondents was 55 years. The mean number of health facility visits was 7.1 [SD: 11.7] and the median was 4 [IQR 3-7]. The mean total healthcare expenditure was INR 2,653 [SD 2,975] and the median was INR 1810 [IQR 1050-3140 INR]. Nearly 84% of patients had comorbidity, 29% had a single comorbidity, 25% had two comorbidities, 17% reported having three, and 14% had four or more comorbidities [Table 1].

Table 1 Basic characteristics of type 2 diabetes patients by co morbidity status (N = 912)

| | Without co morbidity (N=146) % [95% CI] | With co morbidity(N=766) % [95% CI] |
|--|---|---|
| Age group (years) | | |
| 18-29 | 1.3[0.0-3.2] | 0.1[0.0-0.4] |
| 30-39 | 8.7[4.1-13.2] | 6.3[4.5-8.0] |
| 40-49 | 28.7[21.4-35.9] | 20.3[17.4-23.1] |
| 50-59 | 39.3[31.5-47.2] | 33.4[30.1-36.7] |
| 60-69 | 17.3[11.2-23.4] | 29.5[26.2-32.7] |
| >=70 | 4.7[1.3-8.1] | 10.5[8.3-12.6] |
| Gender | | |
| Male | 74.0[66.9-81.1] | 61.0[57.5-64.5] |
| Female | 26.0[18.9-33.1] | 39.0[35.5-42.5] |
| Place of residence | | |
| Urban | 76.0[69.1-82.9] | 78.4[75.5-81.3] |
| Semi Urban | 8.7[4.1-13.2] | 11.4[9.1-13.6] |
| Rural | 15.3[9.5-21.1] | 10.2[8.0-12.4] |
| Ethnicity | | |
| Schedule Caste | 14.7[8.9-20.3] | 31.5[28.2-34.8] |
| Schedule Tribe | 5.3[1.7-8.9] | 13.1[10.7-15.5] |
| Other Backward Caste | 22.7[15.9-29.4] | 12.6[10.2-14.9] |
| Others | 57.3[49.4-65.3] | 42.8[39.3-46.3] |
| Socio-economic status | | |
| Above Poverty Line | 36.2[24.8-47.7] | 70.5[66.4-74.6] |
| Below Poverty Line | 63.8[52.3-75.2] | 29.5[25.4-33.6] |
| Highest Education | | |
| Illiterate | 8.7[4.1-13.2] | 8.4[6.4-10.3] |
| Primary | 22.0[15.3-28.7] | 16.0[13.4-18.6] |
| Secondary | 32.7[25.1-40.2] | 34.8[31.4-38.2] |
| University | 36.7[28.9-44.4] | 40.8[37.3-38.2] |
| Marital Status | | |
| Single | 13.2[10.8-15.6] | 8.7[4.1-13.2] |
| Married | 86.8[84.4-89.2] | 91.3[86.8-95.5] |
| Religion | | |
| Hindu | 92.0[87.6-96.4] | 88.4[86.1-90.6] |
| Other | 8.0[6.6-12.4] | 11.6[9.4-13.9] |
| Family history of diabetes mellitus | | |
| Yes | 10.7[5.7-15.6] | 24.7[21.7-27.8] |
| No | 89.3[84.4-94.3] | 75.3[72.2-78.3] |
| Risk Factor: BMI | | |
| Underweight | 4.7[1.3-8.1] | 2.1[1.1-3.1] |
| Normal | 40.0[32.1-47.9] | 20.0[17.2-22.9] |
| Overweight | 19.3[13.0-25.7] | 19.4[16.5-22.2] |
| Obese | 36.0[28.3-43.7] | 58.5[55.0-62.0] |
| Health facility visits in last 6 months | | |
| Never | 2.0[0.1-4.2] | 1.0[0.3-1.8] |
| 1-2 visits | 26.7[19.5-33.8] | 16.7[14.1-19.4] |
| 3-4 visits | 20.0[13.6-26.4] | 36.4[32.9-39.8] |
| 5-6 visits | 24.7[17.7-31.6] | 20.1[17.2-22.9] |
| 7-8 visits | 15.3[9.5-21.1] | 12.4[10.1-14.8] |
| 9 or more visits | 11.3[6.2-16.4] | 13.3[11.0-15.8] |
| Total expenditure (INR) | | |

| | | |
|-----------|-----------------|-----------------|
| Zero | 4.00[1.81-8.62] | 0.65[0.27-1.56] |
| 1-500 | 20.0[14.3-27.2] | 6.7[5.1-8.7] |
| 501-1000 | 24.0[17.8-31.5] | 11.5[9.4-14.0] |
| 1001-2000 | 35.3[28.1-43.3] | 30.6[27.4-34.0] |
| 2001-3000 | 9.3[5.6-15.1] | 19.8[17.1-22.7] |
| > 3000 | 7.3[4.1-12.8] | 30.7[27.5-34.0] |

1000 INR= 14,5 USD (as on 05.07.2018); BMI- Body Mass index; INR- Indian Rupees

Health care utilisation

The median number of visits of T2DM patients without any comorbidity in 6 months was 5 (IQR=5) and 4 (IQR=4) for patients having any comorbidity and 5 (IQR=5) for diabetes patients with four or more comorbidities. [Table 2]. Among DM patients with comorbidity the median number of visits was highest for patients with depression 6 (IQR=4), acid peptic disease (APD) 6 (IQR=5), auditory impairment/deafness 6 (IQR=5), stroke 6 (IQR=17), followed by thyroid disease 4.5 (IQR=5) cancer 4.5 (IQR=5) and visual impairment/blindness 4 (IQR=5) [Table 4].

Table-2 Healthcare utilization by number of comorbidities

| Number of comorbidities | Number of visits to health facility in last 6 months Median [Range] |
|-------------------------------|--|
| Zero | 5(0-55) |
| 1 | 4(0-56) |
| 2 | 4(0-59) |
| 3 | 4(0-46) |
| ≥ 4 | 5(0-57) |
| Total | 4(0-59) |
| Diabetes with any Comorbidity | 4(0-59) |
| Kruskal Wallis, F (P value) | F= 0.707, P= 0.587 |

Out-of-pocket expenditure

We found a linear increase in total expenditure along with costs for medicines on diabetes, medicines for other diseases, and laboratory testing for other diseases with the number of comorbidities, which was statistically significant [Table 3]. No significant association was found between expenditures for travels to hospital and laboratory investigation for diabetes, and the number of comorbid conditions. Patients with any comorbidity spent two times more compared to those having no comorbidity. Diabetes patients with any comorbid condition had a two times higher expenditure for medicines (for diabetes and comorbidity) than patients with only diabetes. Among patients having one chronic condition the median total expenditure ranged from 1,565 INR to 4,220 INR. The total median expenditure was higher for

patients having stroke, heart diseases, kidney diseases and cancer compared to other comorbid conditions [Table 3].

Table-3 Out of pocket expenditure by number of comorbidities.

| Number of comorbidities | Medicine Diabetes | Medicine Other disease | Travel to Hospital | Test Cost for Diabetes | Test Cost for Other diseases | Total Expenditure |
|----------------------------------|-------------------|------------------------|--------------------|------------------------|------------------------------|-------------------|
| Zero | Median 500 | Median 0 | Median 50 | Median 300 | Median 0 | Median 1045 |
| 1 | 600 | 200 | 50 | 331.72 | 0 | 1400 |
| 2 | 800 | 500 | 40 | 300 | 0 | 2000 |
| 3 | 1000 | 500 | 40 | 300 | 200 | 2460 |
| ≥ 4 | 1000 | 1000 | 5 | 400 | 400 | 3110 |
| Diabetes with any comorbidity | 800 | 440 | 40 | 300 | 100 | 2030 |
| Kruskal-Wallis test (F, P value) | | 11.14, <0.001 | 11.31, <0.001 | 0.80, 0.524 | 1.94, 0.102 | 13.42, <0.001 |
| | | | | | | 14.21, <0.001 |

Multivariate analyses

Multivariate adjusted multilevel mixed effect Poisson regression analyses showed a strong positive association of diabetes patients with comorbidities with healthcare utilisation [RR 1.33; 95% CI 1.24-1.43] and out of pocket expenditure. [RR 1.97; 95% CI 1.96-1.98] [Table 4] compared to diabetes patients without comorbidity.

Table-4 Out-of-pocket expenditure and Healthcare Utilization across comorbid condition

| Conditions Combinations | Number of visits in last 6 months | Total expenditure (In INR) |
|--|-----------------------------------|----------------------------|
| | Median (Range) | Median (Range) |
| DM+ Hypertension (n=181) | 4 (0-53) | 2100 (115-25700) |
| DM+ Acid Peptic Disease (n=74) | 6 (0-59) | 1630 (115-25700) |
| DM+ Obesity (n=54) | 4 (0-55) | 870 (0-9100) |
| DM+ Backpain (n=48) | 4 (1-44) | 2000 (450-7200) |
| DM+ Arthritis (n=39) | 3.5 (0-59) | 1715 (550-7200) |
| DM+ Visual impairment/Blindness (n=25) | 4 (2-53) | 1930 (280-5990) |
| DM+ Thyroid (n=22) | 4.5 (2-59) | 1980 (350-10150) |
| DM+ Lung Disease (n=16) | 4 (2-12) | 2030 (410-6900) |
| DM+ Heart Disease (n=13) | 4 (2-52) | 3600 (2600-16100) |
| DM+ Stroke (n=7) | 6 (3-39) | 4220 (800-10150) |
| DM+ Kidney Disease (n=6) | 4 (2-9) | 3167.5 (1740-18100) |
| DM+ Epilepsy (n=6) | 3.5 (1-5) | 1565 (350-2130) |
| DM+ Cancer (n=6) | 4.5 (2-8) | 2685 (1210-6020) |
| DM+ Deafness (n=5) | 6 (2-8) | 2480 (1200-21000) |
| DM+ Depression (n=3) | 6 (4-8) | 1860 (1300-2020) |

DM- Diabetes Mellitus; INR- Indian Rupees

Table 5- Predictors of Healthcare utilization and total out-of-pocket expenditure of diabetes patients (N=912) using multilevel mixed effect Poisson modelling (adjusting for clustering).

| Variables | Categories | Healthcare utilisation | | Total Expenditure | |
|--------------|----------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| | | Unadjusted RR [95%CI] | Adjusted RR# [95%CI] | Unadjusted RR [95%CI] | Adjusted RR# [95%CI] |
| Co-morbidity | Only Diabetes | Reference | Reference | Reference | Reference |
| | DM with Co-morbidity | 1.31[1.22-1.40] * | 1.33[1.24-1.43] * | 2.20[2.19-2.21] * | 1.97[1.96-1.98] * |

#adjusted for patient characteristics (diabetes duration, age, sex, educational status, income, and marital status); *P- value <0.05;

Discussion

The present study assessed the healthcare utilization and out-of-pocket expenditure among patients with type 2 diabetes with and without comorbidities attending primary healthcare centres in India. Our study indicates the substantially larger number of visits to healthcare facilities among T2DM patients with comorbidity compared to those without comorbidity, which is similar to findings of prior studies outside India.^{4,15} We also found that the largest proportion of the total out-of-pocket expenditure went on medicines. Sum et al. also concluded in their study on multimorbidity and out-of-pocket expenditure that the costs of medicines contributed to a substantial share of total expenditure.¹⁶ Another major finding of our study is that T2DM patients with any additional comorbidity had increased total out-of-pocket expenditure along with costs for medicines for diabetes, medicines for other diseases, and laboratory testing for other diseases. This expenditure increased with the number of comorbidities. The other finding is the higher prevalence of diabetes comorbidities among the above poverty line participants, which is contrary to finding from studies in developed countries but similar to findings of studies conducted in India.^{31,32}

Wang et al. found a linear increase in outpatient hospital visits for each successive diabetic complication.³ Similarly, Gruneir et al. inferred that there is increased utilization of all health services with an increase in the number of comorbid conditions.¹⁷ Comparable to other studies, our study confirms the higher number of visits to health facilities in the previous six months among T2DM patients with APD, stroke, deafness and depression. The higher healthcare utilisation of T2DM patients with comorbid depression was also noted by Egede et al. in their study.¹⁸ Calderón-Larrañaga and colleagues found an increased healthcare utilization among diabetes patients with mental and discordant comorbidities.¹⁹

Our finding of increased expenditure due to comorbidity among T2DM patients is consistent with the results from previous studies in middle- and low-income countries.^{21,22,23} Thakrar et al. concluded that the presence of an additional comorbid condition further enhances the cost burden among diabetes patients.²⁴ Similarly, Akari et al. analyzed the healthcare costs by calculating the direct and indirect costs of DM with comorbidities among hospitalized patients in a tertiary care hospital and concluded that higher expenses were incurred by diabetes patients with three or more comorbidities and also those with macro-vascular complications.²⁵ Acharya et al. assessed the costs of illness for DM patients with or without complications hospitalized in a tertiary care hospital; they concluded that diabetes patients with renal and cardiac complications incurred greater expenses than those with other chronic complications.²⁶ These studies only investigated the cost of concordant comorbidities and complications associated with diabetes. As our study has considered both concordant and discordant comorbidities, comparability to these studies is limited. Piette and Kerr classified comorbid conditions as concordant or discordant and concluded that concordant conditions resulted in better diabetes care but the clinically dominant

condition may lead to worse diabetes management.²⁷ Other studies from developed countries have also reported findings similar to the present study.^{28,29}

Strengths and Limitations

This is the first study in India assessing the healthcare utilisation and out-of-pocket expenditure among diabetes patients attending primary health care facilities and also taking a wide range of comorbidities into account, i.e. both concordant and discordant comorbid conditions. The findings are generally representative of urban primary care users in India.

Self-reported comorbidity status as reported by the patients is one of our study limitations. Patients who had not been diagnosed or had conditions which were not reported were not included. The exclusion of undiagnosed type 2 diabetes mellitus patients is the other limitation of this study. As it is a cross-sectional study, it shows associations but not causal relations. The lack of glycated haemoglobin (HbA1c) data, which would have helped in studying the impact of glycaemic control and healthcare utilisation and out-of-pocket utilization, is another limitation. Because of the smaller sample size in pattern of comorbidities further detail analysis was not possible.

Impact on policy and research

The draft of India's National Health Policy states that 63 million people have been pushed into poverty due to out-of-pocket expenditure on healthcare. As India progresses towards Universal Health Coverage, the financial burden posed by comorbidity among diabetes patients need to be considered in greater detail. The findings from the ICMR-INDIAB study by Anjana and colleagues confirmed the higher prevalence of diabetes among low socioeconomic sections in urban areas. In the light of the findings of our study, this reiterates the need for a more comprehensive and robust policy to address out-of-pocket expenditures.³⁰

There is a need to assess the components of expenditure incurred and to identify components having the maximum impact on expenses, for example spending by the category of drugs, laboratory investigation or visits to multiple centres to manage their various comorbidities. The indirect expenses like loss of wages and disability adjusted life years (DALY) should also be studied.

The present study indicates higher healthcare utilization among T2DM patients with comorbid depression. With the government of India's thrust to expand the National Mental Health Programme, the provision of mental health counselors at the primary care level could go a long way towards better management. As our study suggests that T2DM patients with comorbidities incur considerable out-of-pocket expenses, even in public primary care facilities, it can be expected that the expenses will be higher in private healthcare facilities. Hence, increased insurance coverage that includes outpatient services would help in alleviating the expenditure burden.

Abbreviations

NCD: Non-communicable disease

T2DM: Type 2 diabetes mellitus

DM: Diabetes mellitus

LMIC: Low and middle income countries

RSBY: Rashtriya Swasthya Bima Yojana

DCET-PC: Diabetes Co-morbidity Evaluation Tool in Primary Care

APD: Acid Peptic Disease

DALY: Disability adjusted life years

Declarations

Ethics approval and consent to participate

Respondents were informed about the purpose of the study and the information used. We collected their signature or thumb impression on the informed consent form. The data were coded, and the identities of the respondents were kept confidential. The Odisha state research and ethics committee granted ethical approval for the study (letter no. 161/SHRMU dated 16/05/2014).

Consent for publication

Not applicable

Availability of data and materials

The data is available with the corresponding author, and can be made available on reasonable request and permission from State human resources management unit, Department of Health and Family Welfare, government of Odisha.

Competing interests

The authors declare they have no competing interests.

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Authors contribution

SP and FGS have designed the study, SS has analyzed the data, MA and JB have interpreted the findings. All the authors have contributed to the writing of the manuscript. All authors read and approved the final manuscript.

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