Prevalence of diabetes, hypertension, and the socio-demographic predictors of the type of facility utilized for related services in rural Telangana

M. Abdul Wassey, Ashish Giri, Aakash Raikwar*, Vishal Dogra

Department of Clinical Domain, Piramal Swasthya Management, and Research Institute, Hyderabad, Telangana, India

Received: 22 August 2020
Accepted: 07 October 2020

*Correspondence:
Dr. Aakash Raikwar,
E-mail: akashraikwar94@gmail.com

ABSTRACT

Background: Diabetes mellitus and hypertension are chronic conditions that, on one hand demand early detection, screening, and treatment and on the other, require longitudinal follow-up for their successful management. Piramal Swasthya’s Arogyaseva program uses two contrasting methods (MMU and static clinic) to deliver diabetes and hypertension-related care. The MMU provides doorstep delivery of care, while the static clinic is located by the highway, is equipped with a telemedicine center, and has slightly higher diagnostic and therapeutic capabilities. The study aims to find the prevalence of diabetes and hypertension, and determine the association between the sociodemographic factors and the type of facility utilized for these conditions.

Methods: This cross-sectional study is a secondary data analysis of the aggregated data of patients who availed health services at the Mobile Medical Unit and the static clinic. The data was analyzed to find out the prevalence of diabetes and hypertension, and Binary logistic regression was used to determine socio-demographic predictors of the type of health facility used for diabetes and hypertension-related care.

Results: Overall hypertension and diabetes prevalence was 24% and 7%, respectively. Women (aOR 1.3; 95% CI 1.122–1.510), illiterate (aOR 2.61; 95% CI 2.021–3.392), hypertensives (aOR 3.28; 95% CI 2.807–3.846) and the elderly (aOR 1.43; 95% CI 1.204–1.721) were significantly more likely to utilize MMU based outreach facility compared to their respective baseline counterparts.

Conclusions: The mobile medical unit can play a significant role in delivering hypertension and diabetes-related care, especially to women and the elderly.

Keywords: Diabetes mellitus, Hypertension, Mobile medical unit, Non-communicable disease, Rural health

INTRODUCTION

Non-Communicable Diseases (NCDs) are the leading cause of deaths worldwide. It is estimated that at the current rate, 15 million people aged between 30 and 70 will continue to die due to NCDs each year. Even among the non-communicable diseases, the prevalence of chronic conditions like Diabetes Mellitus (DM), Hypertension (HTN) and stroke is of even greater concern. They are known to have a huge impact on morbidity and mortality, life expectancy, and quality of life, as well as individual and national income. According to estimates, 463 million people currently have DM, and over a billion people are currently living with HTN worldwide. At the current rate, the number of individuals with DM and HTN is expected to reach 552 million and 1.56 billion by 2025 and 2030, respectively. The number of people with diabetes in India has increased from 26 million in 1990 to 65 million in 2016, and over 200 million Indians are currently estimated to be suffering from hypertension. Telangana despite being one of the well-performing states in health, has a higher
prevalence of hypertension and diabetes than its national average.\textsuperscript{7,9}

Management and control of both DM and HTN are challenging. Both of them are chronic conditions that demand early detection, screening, and treatment, along with longitudinal follow-up and care coordination for their successful management.\textsuperscript{10,11} The existing institutional arrangements in the public health sector only partially addresses the requirement.\textsuperscript{10,11}

Much like the other developing nations, the Indian healthcare systems is primarily focused on providing acute, episodic care and have limited capacity to provide longitudinal care.\textsuperscript{10,11} In order to better address NCDs, the current healthcare systems will not only need more resources but will need to be redesigned.\textsuperscript{11} It will have to reorient itself to be more responsive and take into consideration the additional barriers imposed by age-related mobility, gender norms, associated cost, availability of transport, drugs, and doctors emerge as a huge deterrent for successful management.\textsuperscript{12-14}

The Piramal Swasthya’s Arogyaseva program is one such initiative. The program is unique as it uses two different methods of health service delivery (MMU and static clinic) to provide free comprehensive primary health care services with a special focus on diabetes and hypertension to the residents of Medak district in Telangana. While the MMU reaches out to the community and delivers care close to home, the static clinic is located by the national highway, has a wider range of medicines, diagnostics, facility for specialist telemedicine consultation, and also serves as a referral center for the MMU.

The MMU makes at least one fixed, predetermined visit per month to 23 different villages of the catchment area with its team of health professionals comprising of a medical doctor, pharmacist, lab technician, nurse, pilot, and equipped with basic laboratory and a pharmacy-related service. The static clinic has a similar human resource structure with a telemedicine technician as the only addition. It in a few ways, is similar to the government Primary Healthcare Center (PHC). Both MMU and Clinic are equipped with computer-based electronic health records that capture data regarding socio-demographic details, morbidity, clinical examination, lab investigation, and drug prescribed for each beneficiary.

Given that the two-service delivery system provides similar care but use contrasting approach, we seek to study and understand the socio-demographic factors that influence the type of healthcare facility utilisation (MMU or static clinic), specifically for DM and HTN.

An understanding of this would help in tailoring the service delivery method to reach a distinct target audience and thereby maximize utilisation and improve health outcomes.

METHODS

This cross-sectional study was a secondary data analysis of routine program data of patients who had availed NCD related health services at the Mobile Medical Unit (MMU) and the static clinic of the Arogyaseva program aggregated over a period of last five months (February 2019 to June 2019). The Arogyaseva program is set in Digwad village panchayat, which is situated in Medak district of Telangana. The program has a mobile medical unit that visits 23 villages in and around Digwad to provide primary healthcare with a special focus on NCDs, in a way that is accessible and affordable. The program also has a Static clinic with a facility for specialist telemedicine consultation and a slightly wider range of diagnostics and medicines.

The collected beneficiary data consisted of beneficiary details such as age, sex, location, income level, education level, etc., personal history (lifestyle, diet, tobacco and alcohol usage, family history of disease), visit type, visit number along with details regarding vital health parameters (height, weight, Body-Mass Index (BMI), systolic and diastolic Blood Pressure (BP)), information about results of laboratory procedures (random blood sugar) and the clinical diagnosis prepared by a physician. All beneficiaries who were above 18 years of age, had visited the MMU or the static clinic between February 2019 – June 2019 and had essential data fields (visit type, visit date age, gender, marital status, education, economic status, BP, RBS, BMI and diagnosis) were included for the study. Analysis of the socio-demographic profile and the prevalence of diabetes and hypertension is done considering only the new registrations. While the association between the type of facility utilized and socio-demographic factors, is calculated using both the new registrations and the repeat visits of patients who are diagnosed with hypertension and diabetes.

The aggregated data received was cleaned to remove outliers, duplicates, empty fields, and normalized. This data was analyzed to form the socio-demographic profile and prevalence of diabetes and hypertension. Binary logistic regression is used to determine socio-demographic predictors of the type of health facility used for diabetes and hypertension-related care.

These analyses are done using IBM SPSS\textsuperscript{#} version 25 software.

\#IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

RESULTS

Socio-demographic profile

In the study reference period (February 2019 to June 2019), 1822 beneficiaries made 7035 visits at the Arogyaseva program. 2794 (40\%) of these visits are made
to the MMU (outreach facility), and the remaining 4241 (60%) were at the static clinic. 55% of the individuals utilizing services at the outreach facility were women, 47% of visits were made by beneficiaries above the age of 50 years, 83% visits were made by illiterate, and 32% visits were made by overweight compared to 52%, 27%, 66%, and 35% at the static clinic respectively.

Table 1: Type of healthcare facility used.

| Variables       | New n=1822 (26) | Repeat n=5213 (74) | Grand Total n=7035 (100) |
|-----------------|-----------------|--------------------|--------------------------|
| Facility utilized | n, (%)          | n, (%)             | n, (%)                   |
| MMU             | 868 (48)        | 1926 (37)          | 2794 (40)                |
| Static Clinic   | 954 (52)        | 3287 (63)          | 4241 (60)                |

Table 2: Sociodemographic profile of the sample.

| Variables       | MMU n=868 (48) | Static Clinic n=954 (52) | Grand Total n=1822 (100) |
|-----------------|----------------|--------------------------|--------------------------|
| Gender          | N (%)          | N (%)                    | N (%)                    |
| Female          | 477 (55)       | 499 (52)                 | 976 (54)                 |
| Male            | 391 (45)       | 455 (48)                 | 846 (46)                 |
| Age category    |                |                          |                          |
| <20             | 33 (4)         | 82 (9)                   | 115 (6)                  |
| 20-35           | 179 (21)       | 319 (33)                 | 498 (27)                 |
| 36-50           | 251 (29)       | 290 (30)                 | 541 (30)                 |
| 51-65           | 265 (31)       | 204 (21)                 | 469 (26)                 |
| >65             | 140 (16)       | 59 (6)                   | 199 (11)                 |
| Educational status |            |                          |                          |
| Illiterate      | 717 (83)       | 625 (66)                 | 1342 (74)                |
| 7th Pass        | 38 (4)         | 58 (6)                   | 96 (5)                   |
| 10th            | 59 (7)         | 136 (14)                 | 195 (11)                 |
| Intermediate    | 40 (5)         | 81 (8)                   | 121 (7)                  |
| Graduate        | 14 (2)         | 51 (5)                   | 65 (4)                   |
| Post Graduate   | 0              | 3 (0)                    | 3 (0)                    |
| Marital status  |                |                          |                          |
| Married         | 810 (93)       | 815 (85)                 | 1625 (89)                |
| Unmarried       | 58 (7)         | 139 (15)                 | 197 (11)                 |
| Social status   |                |                          |                          |
| BC              | 544 (63)       | 691 (72)                 | 1235 (68)                |
| OBC             | 2 (0)          | 3 (0)                    | 5 (0)                    |
| OC              | 58 (7)         | 41 (4)                   | 99 (5)                   |
| SC              | 230 (26)       | 207 (22)                 | 437 (24)                 |
| ST              | 34 (4)         | 10 (1)                   | 46 (3)                   |
| Economic status |                |                          |                          |
| APL             | 1 (0)          | 1 (0)                    | 2 (0)                    |
| BPL             | 867 (100)      | 953 (100)                | 1820 (100)               |
| BMI status      |                |                          |                          |
| Normal          | 383 (44)       | 410 (43)                 | 793 (44)                 |
| Underweight     | 206 (24)       | 213 (22)                 | 419 (23)                 |
| Overweight      | 145 (17)       | 143 (15)                 | 288 (16)                 |
| Obese           | 134 (15)       | 188 (20)                 | 322 (18)                 |

Prevalence of hypertension and diabetes mellitus

The overall prevalence of hypertension and diabetes among the persons utilizing services at the Arogyaseva program was 24% and 7%, respectively. 30% of the individuals visiting the MMU were hypertensive, while 4% were diabetic compared to 19% and 11% at the clinic.

Table 3: Prevalence of hypertension and diabetes mellitus.

| Variables       | MMU n=868 (48) | Static Clinic n=954 (52) | Grand Total n=1822 (100) |
|-----------------|----------------|--------------------------|--------------------------|
| Hypertension Status | N (%)          | N (%)                    | N (%)                    |
| Normal          | 245 (28)       | 392 (41)                 | 637 (35)                 |
| Pre- Hypertension | 368 (42)       | 381 (40)                 | 749 (41)                 |
| Stage1 Hypertension | 162 (19)       | 117 (12)                 | 279 (15)                 |
| Stage2 Hypertension | 93 (11)       | 64 (7)                   | 157 (9)                  |
| Diabetes Status | N (%)          | N (%)                    | N (%)                    |
| Diabetic        | 32 (4)         | 104 (11)                 | 136 (7)                  |
| Normal          | 836 (96)       | 850 (89)                 | 1686 (93)                |

BMI: individuals with BMI scores of <18.5= underweight, (18.5-22.9)= normal, (23.0-24.9)= overweight and ≥25= obese.

Hypertension: individuals with systolic and diastolic BP of <120 and <80= normal, (120-139) or (80-89)= pre-hypertensive, (140-159) or (90-99)= stage 1 hypertension and ≥160 or ≥100= stage 2 hypertension.

Diabetes: individuals with RBS reading of <140= normal, (140-200)= pre-diabetic and >200= diabetic

Vulnerable and non vulnerable: the population belonging to schedule tribe and schedule caste and below poverty level were considered as Vulnerable; and rst were included into Non-vulnerable category.

Association between age, gender, education and the type of facility utilized (static clinic and MMU)

Utilisation of services at the outreach facility (MMU) showed a positive association with illiteracy, female gender, being hypertensive and old age (age>50 years) (p<0.0000001). Women, illiterate, hypertensives and the elderly were 1.3 (aOR 1.3; 95% CI 1.122-1.51), 2.61 (aOR 2.61; 95% CI 2.021 - 3.392), 3.28 (aOR 3.28; 95% CI 2.807-3.846) and 1.43 (aOR1.43; 95% CI 1.204-1.721) times more likely to utilize MMU based outreach facility compared to their male, literate, diabetic, young and socially non-vulnerable counterparts.
Table 4: Adjusted Odds Ratio (with Confidence Interval) of the utilisation of MMU concerning other predictor variables.

| Variables             | Adjusted Odds ratio | Significance (P value) | Confidence interval (95%) |
|-----------------------|---------------------|------------------------|---------------------------|
| Gender                |                     |                        |                           |
| Female                | 1.302               | 0.001                  | 1.122–1.510               |
| Male                  | 1.00                |                        |                           |
| Marital status        |                     |                        |                           |
| Unmarried             | 1.725               | 0.261                  | 0.667-4.464               |
| Married               | 1.00                |                        |                           |
| Social status         |                     |                        |                           |
| Vulnerable            | .461                | 0.000                  | 0.376-0.564               |
| Non-vulnerable        | 1.00                |                        |                           |
| Literacy status       |                     |                        |                           |
| Illiterate            | 2.619               | 0.000                  | 2.021-3.392               |
| Literate              | 1.00                |                        |                           |
| Age                   |                     |                        |                           |
| (in years)            |                     |                        |                           |
| ≥51                   | 1.439               | 0.000                  | 1.204-1.721               |
| ≤50                   | 1.00                |                        |                           |
| Diagnosis             |                     |                        |                           |
| Hypertension          | 3.286               | 0.000                  | 2.807-3.846               |
| Diabetes              | 1.00                |                        |                           |

DISCUSSION

The study shows that the prevalence of diabetes and hypertension among the individuals utilising services at the Arogyaseva program was 7% and 24%, respectively. This prevalence finding is higher compared to the findings of other studies in similar settings. Higher prevalence of diabetes and hypertension in this study could be attributed to high share of the elderly population (37% over 50 years of age) in our sample. Several studies show that a higher prevalence of hypertension and diabetes in a sample of older age group, and hypertension is known to be positively associated with old age.

The individuals availing services were predominantly poor, uneducated, and old. Arogyaseva provides free screening, diagnostic, and treatment-related to primary health and NCDs. It is a known fact that the poor and the marginalized are more likely to utilize free health care facilities.

Utilisation of MMU services (community-based) for NCDs was positively associated with being women, illiterate, hypertensive, old, and from a vulnerable social group. The disempowering effect of illiteracy, old age, and female gender are well known. These factors are known to limit mobility, decision-making authority, bargaining capacity, financial independence and the overall position within the family. All of these are known to demand-side barriers to accessing institution-based healthcare.

Community-based service delivery through mobile medical units has been successfully used to breakdown some of these barriers to healthcare and improve utilisation of health services. Especially, for the old, women, poor, and the marginalized. This could be the reason for more women, old and uneducated individuals utilizing healthcare services at the community/ MMU.

In 2010-11 The National Programme for the Healthcare of the Elderly (NPHCE) was launched to provide separate, specialized, and comprehensive healthcare to senior citizens (aged 60 years and above) across the state healthcare system. The program aims to set up geriatric departments in identified regional geriatric centers (RGCs), 10-bedded geriatric units at district hospitals, rehabilitation units at all community health centers, and weekly geriatric clinics by trained medical officers at primary health centres. However, to overcome barriers imposed by limited mobility during old age and the general lack of transport, there is a need to provide services closer to home. Therefore, while PHCs could continue providing primary healthcare services, the use of MMU to provide health services to the elderly with a special focus on NCDs could be explored.

CONCLUSION

The study shows that a significant proportion of the beneficiaries of the Arogyaseva program had diabetes and hypertension. A major proportion of them are old, poor, women, and uneducated. The utilisation of services for diabetes and hypertension by the women, elderly, and the
illiterate was significantly higher at the mobile community-based facility as compared to the men, educated and young individuals who used the static institution-based facility.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of Piramal Swasthya organisation; the reference is IEC study ref: PSMRI/2019/Sep

REFERENCES

1. World Health Organization. (2018). Non-communicable diseases country profiles 2018. World Health Organization. https://apps.who.int/iris/handle/10665/274512. License: CC BY-NC-SA 3.0 IGO

2. Indian Council of Medical Research, Public Health Foundation of India, and Institute for Health Metrics and Evaluation. India: Health of the Nation's States — The India State-Level Disease Burden Initiative. New Delhi, India: ICMR, PHE, and IHME; 2017.

3. Vorster HH, Venter CS, Wissing MP, Margetts BM, et al. The nutrition and health transition in the North West Province of South Africa: a review of the THUSA (Transition and Health during Urbanisation of South Africans) study. Public Health Nutr. 2005;8(5):480-90.

4. Mohan V, Seedat YK, Pradeepa R. The rising burden of diabetes and hypertension in southeast Asian and African regions: need for effective strategies for prevention and control in primary health care settings. International journal of hypertension. 2013 Mar 14;2013.

5. Saeedi P, Petersohn J, Salpea P, Malanda B, Karuranga S, Unwin N, et al. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. Diabetes Res Clin Pract [Internet]. 2019;157:107843.

6. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. “Global burden of hypertension: analysis of worldwide data.” The Lancet. 2005;365 (9455):217-23.

7. Gupta R, Venkata SC. Hypertension epidemiology in India. Current Opinion in Cardiol. 2019;34(4):7.

8. Arokiasamy P. India’s escalating burden of non-communicable diseases. The Lancet Global Health. Elsevier Ltd. 2018;(6):e1262-3.

9. International Institute for Population Sciences (IIPS) and ICF. 2018.

10. National Family Health Survey (NFHS-4), India, 2015-16: Telangana. Mumbai: IIPS.

11. Access to Early detection, screening and treatment for NCDs, as well as palliative care, are vital for successful management of NCDs. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

12. Allotey P, Reidpath DD, Yasin S, et al. Rethinking health-care systems: a focus on chronicity. The Lancet. 2011;377:450-1.

13. Kumar A, Schwarz D, Acharya B. Designing and implementing an integrated non-communicable disease primary care intervention in rural Nepal BMJ Global Health. 2019;4:e001343.

14. Elias MA, Pati MK, Aivali P. Preparedness for delivering non-communicable disease services in primary care: access to medicines for diabetes and hypertension in a district in south India. BMJ Global Health. 2017 ;2(Suppl 3):e000519.

15. Gabert R, Ng M, Sogarwal. Identifying gaps in the continuum of care for hypertension and diabetes in two Indian communities. BMC Health Serv Res 2017;17:846.

16. Geldsetzer P, Manne-Goeijer J, Theilmann M. Diabetes and Hypertension in India: A Nationally Representative Study of 1.3 Million Adults. JAMA Intern Med. 2018;178(3):363-72.

17. Hui L. Assessment of the role of ageing and non-ageing factors in death from non-communicable diseases based on a cumulative frequency model. Scientific reports. 2017 Aug 15;7(1):1-7.

18. Chaudhuri A. Socio-economic inequity in health care utilization & expenditures in richer states in India. Ind J Med Res. 2012;136(3):368-9.

19. Morgan R, Ayiasi RM, Barman D. Gendered health systems: evidence from low- and middle-income countries. Health Res Policy Sys. 2018;16:58.

20. Fitzpatrick AL, Powe NR, Cooper LS, Ives DG, Robbins JA. Barriers to health care access among the elderly and who perceives them. Am J Public Health. 2004;94(10):1788-94.

21. Edgerley LP, El-Sayed YY, Druzin ML. Use of a community mobile health van to increase early access to prenatal care. Matern Child Health J. 2007;11(3):235-9.

22. Yu SWY, Hill C, Ricks ML. The scope and impact of mobile health clinics in the United States: a literature review. Int J Equity Health. 2017;16:178.

23. Ministry of health and family welfare. The National Programme for the Healthcare of the Elderly (NPHCE). [Cited on February 17,2020]. Available from: https://mohfw.gov.in-major-programmes/other-national-health-programmes/national-programme-health-care-elderlymphce.

24. IndiaSpend “India Is Ageing, But States Use Just 7% Of Central Funds For Elderly Healthcare” (internet). Electronic media April 4, 2018. [cited- 6th January, 2020]. Available from https://www.indiaspend.com/india-is-ageing-but-states-use-just-7-of-central-funds-for-elderly-healthcare-34536/.

Cite this article as: Wassey MA, Giri A, Raikwar A, Dogra V. Prevalence of diabetes, hypertension, and the socio-demographic predictors of the type of facility utilized for related services in rural Telangana. Int J Community Med Public Health 2020;7:4499-503.