

**ORIGINAL RESEARCH**

# Assessment of implementation of NPNCD in Ayushman Arogya mandir subcenters of Kashmir: A cross-sectional study

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## ABSTRACT

**Background:** Non-communicable diseases (NCDs) are a leading cause of morbidity and mortality worldwide, demanding strengthened health systems for early detection and management. In India, the National Programme for Prevention and Control of Noncommunicable Diseases (NPNCD) is being implemented through various grassroots initiatives, including Ayushman Arogya Mandir (AAM) subcenters. Kashmir, with its unique geographical and administrative composition, presents an ideal setting to assess the implementation of the NPNCD at the subcenter level. **Methods:** A facility-based cross-sectional study was conducted across 125 AAM subcenters in three purposively selected districts of Kashmir (Bandipora, Srinagar, and Shopian). Midlevel Health Providers (MLHPs) were interviewed using a pretested, structured questionnaire. Data on screening for hypertension, diabetes, oral lesions, cervical lesions, and breast cancer were collected and analyzed. Associations between service delivery and variables such as training status, logistic availability, and drug supplies were examined using the Chi-square test, with statistical significance set at  $p \leq 0.05$ . **Results:** A total of 191,345 individuals were screened for hypertension and diabetes; 7.6% screened positive for hypertension and 3.9% for diabetes. A smaller proportion (0.46%) of 87,984 individuals were screened positive for breast cancer, 1.14% for cervical lesions, and 0.07% for oral lesions. While MLHPs and FMPHWs were universally available, only 27.2% of subcenters had stadiometers, and 56.8% had adequate Information, Education, and Communication (IEC) material. Subcenters that had better logistical support and drug supplies demonstrated superior service delivery ( $p < 0.01$ ). **Conclusion:** Despite high human resource availability, certain gaps persist in logistics, training, and supplies, influencing service delivery for NPNCD. Strengthening these components—particularly in subcenters lacking adequate training and equipment—may lead to more robust NCD screening and management outcomes in Kashmir.

**Keywords:** Non-communicable diseases, Ayushman Arogya Mandir, Kashmir, Cross-sectional study, NPNCD implementation

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## INTRODUCTION

Non-communicable diseases (NCDs) are a substantial global health challenge, contributing to over 70% of deaths worldwide according to recent estimates [1]. The number of NCDs affecting the Indian population shows an increasing trend because of the fast pace of urbanization combined with epidemiological transformations and lifestyle modifications [2]. Indian authorities have launched multiple programs as part of their efforts to manage the escalating noncommunicable disease threat through implementing the National Programme for Prevention and Control of Noncommunicable Diseases. The program functions through grassroots-level treatment

and management of hypertension and diabetes together with cardiovascular diseases and cancers [3].

The Ayushman Arogya Mandirs represent primary healthcare subcenters which operate as part of the Ayushman Bharat program. The facilities function as basic healthcare centers which welcome community members through preventive and promotive while providing curative medical services [4]. These subcenters achieve their goals in NCD prevention through trained healthcare personnel who work with the appropriate facilities and supplied medications and detection-focused community interventions [5].

The health infrastructure across the Union Territory of Jammu and Kashmir encounters special geographical

conditions due to hilly regions together with fragmented rural residents and harsh environmental variations [6]. The delivery of NCD services together with healthcare facilities' accessibility and essential logistics availability differs substantially from district to district. State health authorities demonstrate commitment to primary healthcare development yet they lack detailed information about how NPNC activities function at the Ayushman Arogya Mandir subcenters in Kashmir [7].

The substantial death rates and sickness caused by NCDs demand periodic evaluations of primary healthcare execution. The assessments enable healthcare officials to recognize training and logistical gaps together with supply shortages and insufficient coverage which affect the success of NCD control activities [8]. The evaluations provide evidence-based data about screening scope along with human resource availability and essential equipment matters to create focused policy directions and resource strategies.

This study, therefore, seeks to assess the implementation of the NPNC at the AAM subcenters in Kashmir Division. Specifically, it examines the availability of trained Midlevel Health Providers (MLHPs) and other healthcare personnel, the logistics (such as stadiometers and IEC materials) critical for screening, and the service delivery for diabetes, hypertension, cervical, breast, and oral cancers. The findings will enable stakeholders to understand the current status of primary-level NCD services and, more importantly, guide improvements for more efficient screening and referral pathways.

## MATERIALS AND METHODS

### Study Design and Setting

This was a facility-based cross-sectional study conducted in three districts of Kashmir Division, India, namely Bandipora, Srinagar, and Shopian. These districts were selected to represent the north, central, and south zones of Kashmir, respectively.

### Sampling Technique

A multistage sampling approach was adopted. Initially, the Kashmir valley was divided into three geographical zones:

- **North zone:** Districts Bandipora, Baramulla, and Kupwara
- **Central zone:** Districts Budgam, Ganderbal, and Srinagar
- **South zone:** Districts Anantnag, Kulgam, Pulwama, and Shopian

One district from each zone was conveniently selected: Bandipora, Srinagar, and Shopian. In District Bandipora, the field practice block of a tertiary care institute (Hajin) was chosen, and all 30 Ayushman Arogya Mandirs (AAMs) within this block were included. In District Srinagar and District Shopian, all Ayushman Arogya Mandirs were selected, yielding 25 and 70 subcenters, respectively. Thus, a total of 125 AAM subcenters formed the study sample.

### Study Period

Data were collected over 14 months, from April 1, 2023, to June 30, 2024.

### Data Collection

Prior permissions were obtained from the Head of the Department of Community Medicine, Sheri Kashmir Institute of Medical Sciences (SKIMS), and the Chief Medical Officer (CMO) offices of Srinagar and Shopian. In each selected subcenter, Midlevel Health Providers (MLHPs) were interviewed using a pretested, predesigned structured questionnaire. The questionnaire was based on (1) Operational Guidelines for the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) (Revised 2013–2017), and (2) Indian Public Health Standards (IPHS) guidelines for subcenters (Revised 2022). Written informed consent was obtained from each participating MLHP.

### Screening Procedures

MLHPs reported data on the screening of individuals for diabetes, hypertension, oral lesions, breast cancer, and cervical cancer.

- **Diabetes:** Assessed by checking blood glucose levels using a glucometer (strip method).
- **Hypertension:** Measured using digital sphygmomanometers in a sitting position, taking an average of two to three readings.
- **Oral lesions:** Screened using bimanual oral examination (BMOA).
- **Breast cancer:** Screened via clinical breast examination (CBE).
- **Cervical cancer:** Screened via visual inspection with acetic acid (VIA).

Individuals who screened positive for diabetes, hypertension, or suspected cancer were referred to their respective Primary Health Centers (PHCs) for diagnostic confirmation and, if needed, initiation of treatment.

### Data Analysis

Data from the structured questionnaire were coded and entered into Microsoft Excel. Descriptive statistics (percentages, rates, and ratios) were generated to summarize the data. The Chi-square test ( $\chi^2$ ) was used to examine the associations between categorical variables (training status, logistics availability, supplies, and service delivery). A p-value of  $\leq 0.05$  was considered statistically significant. Tables and figures were constructed to illustrate both descriptive and inferential findings.

### Ethical Considerations:

- Permission from relevant administrative and health authorities was obtained.
- Informed consent was sought from each MLHP.
- Data were anonymized and maintained with strict confidentiality.

## RESULTS

### Overall Screening Outcomes

A total of 191,345 individuals were screened for hypertension and diabetes in the selected AAM subcenters. Of these, 7.6% were found to be positive for hypertension and 3.9% for diabetes. Notably, 2.95% of the same cohort were screened positive for both hypertension and diabetes. For breast cancer,

87,984 individuals were screened, yielding a positivity rate of 0.46%. Cervical lesions were assessed in 90,875 individuals, of whom 1.14% were screened positive. Oral lesions were examined in 141,261 individuals, with 0.07% screening positive. Table 1 provides a succinct overview of these findings.

**TABLE 1. DISTRIBUTION OF SCREENED INDIVIDUALS BASED ON DISEASE OUTCOME IN SELECTED SUBCENTERS OF KASHMIR DIVISION**

Disease outcome	Screened (N)	Screened positive (n)	Percentage (%)
Hypertension	191,345	14,527	7.6
Diabetes	191,345	7,399	3.9
Hypertension and diabetes	191,345	5,631	2.95
Oral lesions	141,261	109	0.07
Lesions of cervix	90,875	1,042	1.14
Breast cancer	87,984	405	0.46

### Human Resource and Logistic Availability

All subcenters reported 100% availability of both Midlevel Health Providers (MLHPs) and Female Multipurpose Health Workers (FMPHWs), satisfying a core component of the IPHS guidelines. However, the availability of stadiometers for anthropometric measurements was reported by only 27.2% of centers,

and IEC (Information, Education, and Communication) materials were present in 56.8% of subcenters. Although 76% of subcenters had staff who received formal NCD training, 24% reported no formal training on NPNCN components. These observations are summarized in Table 2.

**TABLE 2. DISTRIBUTION OF HUMAN RESOURCE AND LOGISTICS**

Variable	Status	Frequency	Percent (%)
MLHP	Present	125	100
FMPHW	Present	125	100
Training status	Present	95	76
IEC material	Present	71	56.8
Stadiometer	Present	34	27.2

### Inter-District Comparisons

Findings across districts revealed variable levels of logistics and service availability. While Srinagar exhibited relatively better logistic preparedness (e.g., availability of stadiometers, IEC materials, and essential drugs), Bandipora showed mixed results, with some subcenters reporting minimal resources. Shopian fell between these two extremes in most

indicators. Chi-square tests indicated a significant association between logistics availability and service delivery ( $p < 0.01$ ), as well as between adequate drug supplies and improved service delivery ( $p < 0.01$ ). However, the association between receiving formal training and improved service delivery was not statistically significant ( $p = 0.316$ ).

**TABLE 3. ASSOCIATION BETWEEN AVAILABILITY OF LOGISTICS, SERVICES, AND SUPPLIES AMONG THE STUDIED DISTRICTS**

**Logistics** ( $p = 0.432$ )

District	Poor (%)	Satisfactory (%)	Good (%)
Bandipora	12.7 (50.0)	15.1 (50.0)	2.2 (0.0)
Shopian	29.7 (41.4)	35.3 (48.6)	5.0 (10.0)
Srinagar	10.6 (36.0)	12.6 (56.0)	1.8 (8.0)

**Services** ( $p < 0.001$ )

District	Poor (%)	Satisfactory (%)	Good (%)
Bandipora	14.2 (60.0)	11.3 (36.7)	4.6 (3.3)
Shopian	33.0 (55.7)	26.3 (37.1)	10.6 (7.1)
Srinagar	11.8 (8.0)	9.4 (40.0)	3.8 (52.0)

**Supplies ( $P < 0.001$ )**

District	Poor (%)	Satisfactory (%)	Good (%)
Bandipora	12.5 (73.3)	10.8 (23.3)	6.7 (3.3)
Shopian	29.1 (42.9)	25.2 (52.9)	15.7 (4.3)
Srinagar	10.4 (0.0)	9.0 (4.0)	5.6 (96.0)

**TABLE 4. ASSOCIATION BETWEEN SERVICES AND TRAINING STATUS, LOGISTICS AVAILABILITY, AND SUPPLIES****(A) Training Status ( $p = 0.316$ )**

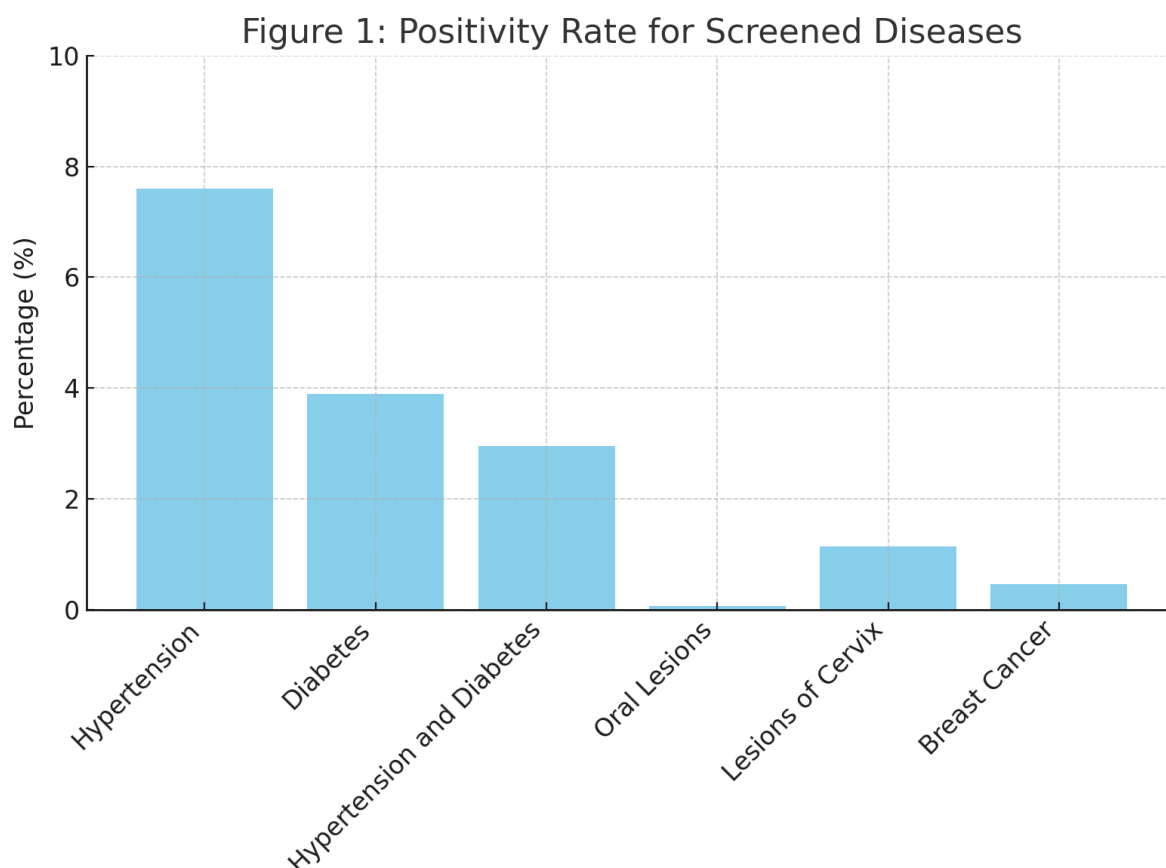
Training Status	Poor (%)	Satisfactory (%)	Good (%)
Did not receive training	14.2 (50.0)	11.3 (43.3)	4.6 (6.7)
Received training	44.8 (46.3)	35.7 (35.8)	14.4 (17.9)

**(B) Logistics Availability ( $p < 0.001$ )**

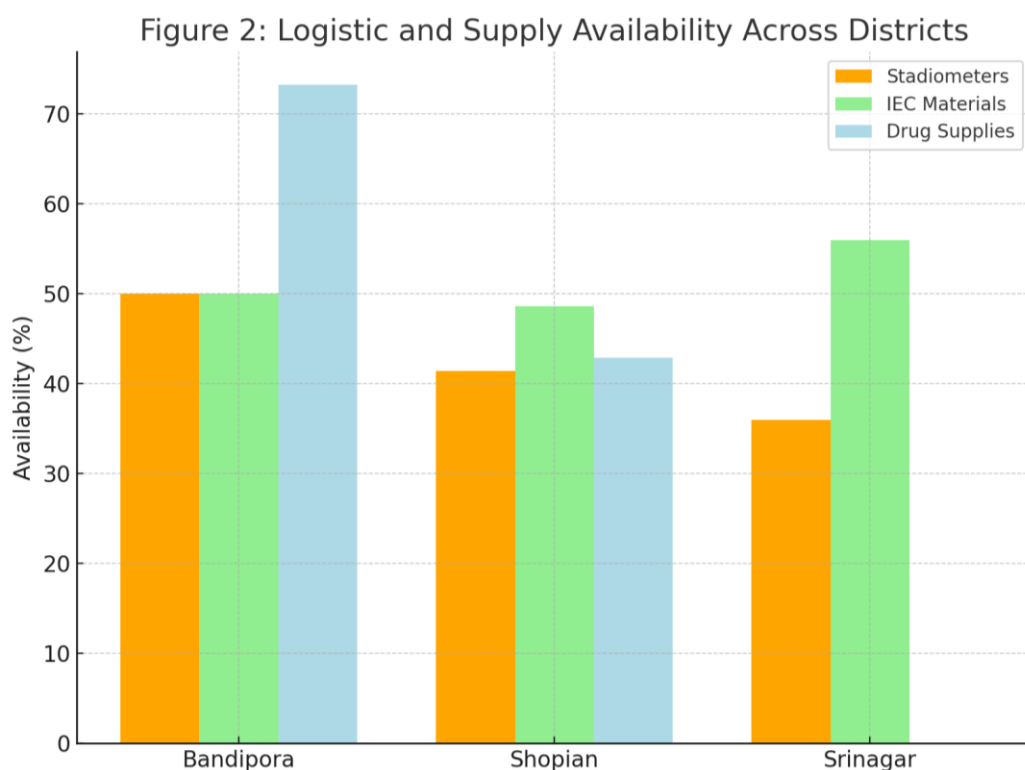
Logistics	Poor (%)	Satisfactory (%)	Good (%)
Poor	14.2 (60.0)	11.3 (36.7)	4.6 (3.3)
Satisfactory	33.0 (55.7)	26.3 (37.1)	10.6 (7.1)
Good	11.8 (8.0)	9.4 (40.0)	3.8 (52.0)

**(C) Supplies ( $p < 0.001$ )**

Supplies	Poor (%)	Satisfactory (%)	Good (%)
Poor	24.5 (51.9)	19.6 (42.3)	7.9 (5.8)
Satisfactory	21.2 (60.0)	16.9 (31.1)	6.8 (8.9)
Good	13.2 (17.9)	10.5 (39.3)	4.3 (42.9)

**FIGURE 1: POSITIVITY RATE FOR SCREENED DISEASES**

Bar chart depicting the number (or percentage) of screened individuals who tested positive for each condition (hypertension, diabetes, oral lesions, cervical lesions, and breast cancer).

**FIGURE 2: LOGISTIC AND SUPPLY AVAILABILITY ACROSS DISTRICTS**

Bar chart comparing logistic availability (stadiometers, IEC materials) and drug supplies across the three districts.

## DISCUSSION

The present study evaluated the implementation of the NPNCD in 125 Ayushman Arogya Mandir subcenters in Kashmir. Our findings revealed a noteworthy screening coverage for hypertension and diabetes, reflective of the growing priority to detect these conditions early [1]. In contrast, screening rates and positivity for breast, cervical, and oral cancers remained relatively low, underscoring the need for enhanced cancer-specific interventions at the primary level.

All subcenters demonstrated a major strength in human resource availability through 100% employee presence of MLHPs and FMPHWs. Subcenter staffing meets the necessary guidelines set for the nation by existing standards [2]. The evaluation found substantial deficiencies in critical logistical equipment consisting of stadiometers along with IEC materials since these lack may affect patient measurements and educational materials provision [3]. A lack of appropriate logistics systems negatively impacts patient involvement and preventive measure compliance because well-designed IEC marketing materials are essential for community adoption of screening opportunities [4].

The evaluation results show no consistent relationship between service quality and the participation of health care workers in formal training sessions. The uneven quality of training together with differences in training lengths and potentially inadequate post-training

supportive supervision might have attributed to the result [5]. Better screening and referral results appeared to depend mostly on the existence of sufficient drug supplies and suitable infrastructure. The findings reveal improved delivery of services in subcenters with full drug and equipment availability because these resources serve as essential primary factors in primary healthcare delivery points [6].

An assessment demonstrates that Srinagar enjoys better drug supplies and logistical support when compared to areas outside its urban domain in Bandipora and Shopian districts. The results match previous studies which show differences in health resource distribution between population centers and rural areas and the difficulties of administrative procedures beyond urban areas [7]. Fighting discrimination is essential to deliver balanced healthcare services throughout all areas.

Toward stronger National Program for Prevention and Control of Non-Communicable Diseases implementation at Kashmir subcenters three main measures should be applied: continued training for MLHPs must include practical learning and post-training assistance and a reliable medicine and screening equipment supply chain combined with targeted community awareness programs that address cultural obstacles [8]. Through central health authority coordination between districts the distribution of resources would become more efficient while reducing disparities among population groups.

Data from this study reveals essential guidance for policy makers who want to improve NCD screening together with healthcare executives as well as primary healthcare personnel who work on NCD management. The Ayushman Arogya Mandir subcenters can contribute better to Kashmir's fight against NCD mortality and morbidity by utilizing present personnel and fixing identified drug distribution and logistics along with continuous training cells.

## CONCLUSION

Ayushman Arogya Mandir subcenters in Kashmir have promising human resources availability but encounter difficulties in essential equipment procurement and supplying alongside consistent training practice. The resource management of Srinagar subcenters displays favorable results although Bandipora and Shopian subcenters warrant direct improvement efforts for superior service provision. The management and detection of NCDs will improve through efficient logistics management combined with continuous drug availability and standardized training and supportive supervision programs. The integration of these service gaps at AAM subcenters would make them essential centers for early detection and medical care for NCDs as they work to minimize Kashmir's NCD disease load.

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