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Original Research Article

Knowledge, attitude, and practice towards national health programs among MBBS students in a tertiary care centre of north India: a cross-sectional study

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ABSTRACT

Background: National health programmes (NHPs) are pivotal to India's public health strategy, and medical graduates are expected to understand and implement them effectively. However, undergraduate training may not uniformly equip students with the necessary competencies. This study aimed to assess the knowledge, attitude, and practice (KAP) regarding NHPs among MBBS students at different academic levels.

Methods: A cross-sectional, questionnaire-based study was conducted among 489 MBBS students (3rd year, final year, and interns) in three months from March 2025 to May 2025 at a tertiary care medical college in north India. A self-designed, structured and validated KAP questionnaire covering 10 knowledge items, 10 attitude statements, and 10 practice-related questions was administered. Descriptive statistics for comparative analysis, and results were visualised through line graphs and box plots.

Results: Knowledge and practice scores improved with academic progression, with final-year students scoring the highest (mean knowledge score: 4.82 ± 1.75 ; practice: 6.73 ± 2.47). Attitude scores remained uniformly positive across all groups (mean range: 1.99-2.09). Third-year students had the lowest knowledge and practice scores. Analyses revealed the presence of low outliers in all three domains, more prominent in junior batches. Overall, awareness of programs like Ayushman Bharat, NTEP, and eSanjeevani was relatively high, while misconceptions remained regarding schemes like PM-JAY and ABDM.

Conclusions: While attitudes toward NHPs were consistently favourable, knowledge and practice varied by academic year. The study underscored the need to integrate program-based learning and community engagement activities earlier in the undergraduate curriculum to strengthen public health readiness among future doctors.

Keywords: Ayushman Bharat, eSanjeevani, KAP study, MBBS students, National health programmes, NTEP, Public health education

INTRODUCTION

India's healthcare system is built upon a wide range of National Health Programmes (NHPs) that aim to address the country's pressing health challenges, including tuberculosis, leprosy, maternal and child mortality, "non-communicable diseases (NCDs)", and HIV/AIDS. These

programmes, administered by the "Ministry of Health and Family Welfare (MoHFW)", form the backbone of public health delivery and are aligned with the goals of "universal health coverage (UHC)" and "sustainable development goals (SDGs)".^{1,2} Over the years, NHPs implemented under the National Health Mission (NHM) have contributed significantly to increased life expectancy,

reductions in child mortality, and improved access to preventive care.³

One such initiative is the National Tuberculosis Elimination Programme (NTEP), which has recently seen renewed momentum through the TB Mukht Bharat Abhiyan. Launched in 2024, this campaign mobilised community participation and introduced innovations such as nucleic acid amplification testing (NAAT), portable x-rays, and nutritional and logistical support schemes like Ni-kshay Poshan, Ni-kshay Mitra, and Ni-kshay Vahaan.¹⁻⁴ In order to improve adherence to drug-resistant TB treatment, a new six-month BPALM regimen that is entirely oral was also implemented.³ India's intensified efforts reflect a bold ambition: to eliminate TB by 2025, five years ahead of the global deadline.⁵ These achievements were reviewed during a strategic ministerial meeting in May 2025, where states were urged to scale up diagnostics and outreach to achieve a national TB incidence of <47/lakh and mortality <3/lakh.⁴

The National Programme for Prevention and Control of Non-Communicable Diseases (NPCDCS) is addressing the surge in chronic illnesses. As of 2022, the infrastructure included 696 district NCD cells, 707 NCD clinics, and 193 cardiac care units, all integrated within the public health system.⁵ These centres provide screening, diagnosis, and management services for hypertension, diabetes, cardiovascular disease, and cancer, especially at district and sub-district levels.⁵

Additionally, the reproductive, maternal, newborn, child and adolescent health (RMNCH+A) strategy adopts a lifecycle approach to improve survival and health outcomes among women, infants, and adolescents. By strengthening prenatal care, institutional deliveries, skilled birth attendance, immunisation, and adolescent-friendly health services, it focuses on important treatments across five thematic areas: reproductive health, maternal health, newborn health, child health, and adolescent health.⁶ The strategy has also been instrumental in rolling out district-level dashboards and gap analyses to guide evidence-based planning.⁷

The National AIDS Control Programme (NACP), now in its fifth phase, emphasises a comprehensive and decentralised approach toward HIV prevention, care, and support. It involves offering free antiretroviral therapy (ART), integrating HIV services into general healthcare systems, and implementing tailored interventions for high-risk populations.⁸ Notably, for the previous ten years, the initiative has helped to significantly reduce the number of new HIV infections and AIDS-related fatalities.⁸

The National Leprosy Eradication Programme (NLEP) continues to operate in endemic districts with an emphasis on early detection, multidrug therapy, and disability prevention. It integrates community awareness, contact tracing, and stigma-reduction initiatives, and leverages

Accredited Social Health Activists (ASHAs) for active surveillance.⁹ Despite achieving elimination at the national level (defined as <1 case per 10,000 population), certain states continue to report new cases, warranting continued programmatic vigilance.¹⁰

Establishing a strong digital health ecosystem in India is the goal of the "Ayushman Bharat Digital Mission (ABDM)". It enables easy access to longitudinal health records that are compatible with both public and private healthcare providers by assigning each person a unique "Ayushman Bharat Health Account (ABHA)" ID. Core components include the "Health Facility Registry (HFR)", "Healthcare Professionals Registry (HPR)", and "Personal Health Records (PHR)" platform, which collectively enhance transparency, accountability, and citizen empowerment in healthcare access.¹¹

Despite these advances, the effectiveness of these programmes ultimately depends on the operational readiness and engagement of India's future medical workforce. MBBS students are essential in bridging the gap between public health delivery and policy creation, especially those in their clinical years.⁹ However, evidence suggests a concerning gap in their preparedness. Multiple studies across India report that undergraduate students lack familiarity with programme objectives, eligibility criteria, and operational guidelines.¹²⁻¹⁴ Factors such as insufficient exposure to community-based care, minimal involvement in outreach initiatives, and lack of structured training in public health contribute to this disconnect.¹⁵

Additionally, poor engagement with pharmacovigilance, digital health, and programme-based research further highlights the need for curricular realignment.¹⁶⁻¹⁸ This CheckKAP checklist emphasises the importance of methodological rigour and transparency in reporting KAP studies, especially in public health education research.¹⁹

A tertiary care teaching hospital in North India is the site of this study, which attempts to evaluate MBBS students' knowledge, attitude, and practice (KAP) on important national health programs in the context of these gaps. By evaluating differences across clinical years and identifying areas for educational improvement, this study seeks to inform curriculum planning and strengthen student preparedness for future roles in public health leadership.

In doing so, it contributes to the larger goal of enabling more effective, community-responsive implementation of India's flagship health programmes.

Objectives

The primary objective of this study was to assess the level of knowledge, attitude, and practice (KAP) regarding key national health programs among undergraduate MBBS students in a tertiary care teaching institution in north India.

METHODS

Study design and data collection

Third-year, final-year, and intern MBBS students at Moti Lal Nehru Medical College in north India participated in a descriptive cross-sectional study in three months from March 2025 to May 2025. The associated hospital with it serves a sizable patient population under several national health programs (NHPs). A structured, self-administered questionnaire, after validation, was used: a Google form containing four sections (demographics and KAP) was disseminated. There are ten questions in each of the knowledge, attitude, and practice sections. The institutional ethics committee (IEC) of the participating medical college provided ethical clearance before implementation. All respondents were made aware of the study's goals and purpose, and participation was entirely voluntary. The questionnaire was accompanied by a brief participant information page that provided the following explanation: anonymity and confidentiality assurances, the freedom to resign at any time without consequence, and the academic goal of the study. With inclusion criteria-MBBS students in the 3rd year, final year, or compulsory rotatory internship who provided informed consent and completed the questionnaire, and exclusion criteria-students from 1st or 2nd year, and incomplete or duplicate responses. A convenience sampling technique was used. Students who agreed to study were sent a questionnaire through Google forms, and 20 minutes were given to send

back a response. A total 4 weeks was taken to conduct the study (June 2025).

Validation and reliability

The questionnaire underwent content validation by public health and pharmacology experts. For internal consistency, a pilot test was conducted among 20 students (excluded from the final analysis). Cronbach's alpha (α) had been calculated independently for each KAP domain to determine the internal consistency of the structured questionnaire. The alpha coefficients obtained were: knowledge section: $\alpha=0.81$, attitude section: $\alpha=0.85$, practice section: $\alpha=0.78$. These values indicate acceptable to excellent internal consistency, suggesting that the items within each domain reliably measure the underlying construct. According to established psychometric standards, alpha values above 0.70 are considered acceptable for health and education-related research, with values above 0.80 representing strong reliability.¹⁴

Statistical analysis

IBM SPSS Statistics version 26 and Microsoft Excel were employed to analyse the data. For KAP scores, descriptive statistics like means, frequencies, percentages, and standard deviations (SD) were calculated. The results were shown in tabular style, as well as frequencies and percentages. Results were given both overall and academic year-wise.

Table 1: KAP scoring summary table.

Domain	Question type	Scoring criteria	Score range	Interpretation
Knowledge	Objective (Correct/Incorrect)	Correct = 1, incorrect/don't know = 0	0 to Max (e.g., 10)	Higher score = better knowledge
Attitude	5-point Likert scale	1 = strongly disagree to 5 = strongly agree	Mean of all items (1-5)	Higher mean = more favourable attitude
Practice	Yes/No/Maybe	Yes = 1, no/maybe = 0	0 to Max (e.g., 10)	Higher score = greater program exposure

RESULTS

Knowledge section

A total of 489 MBBS students responded to ten structured questions assessing their knowledge of major national health programmes (NHPs). The overall mean knowledge score was 6.3 ± 2.4 out of 10, corresponding to a 63% average accuracy rate. High levels of awareness were observed for programs such as the National Tuberculosis Elimination Programme (NTEP) and eSanjeevani telemedicine services, where correct response rates exceeded 80%. Specifically, 85.4% of respondents correctly identified the national target for TB elimination by 2025, and 78.8% acknowledged that free antiretroviral therapy is provided under the National AIDS Control

Programme (NACP). Conversely, knowledge was limited regarding policy details of newer digital initiatives. Only 35.4% and 36.4% of participants, respectively, correctly identified the falsehood of age restrictions under PM-JAY and the notion of automatic enrolment under the Ayushman Bharat Digital Mission (ABDM). These findings suggest variable awareness, with particular deficits in understanding recent digital health reforms and eligibility policies.

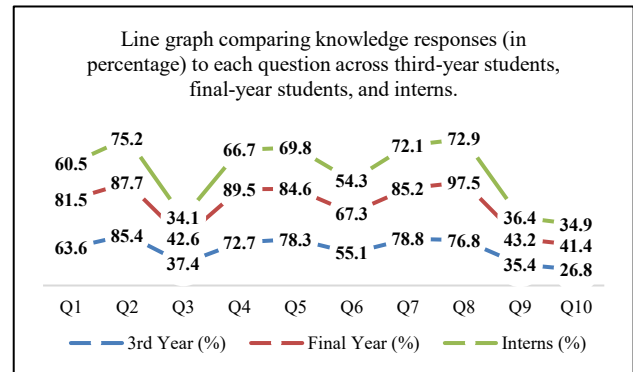
Knowledge performance differed significantly by academic year. Final-year students had the highest mean score (7.2 ± 1.94), followed by 3rd-year students (6.1 ± 2.27) and interns (5.8 ± 2.74). This trend may reflect the timing and extent of curricular exposure to public health content during undergraduate training.

Table 2: Demographic profile of study participants.

Variables	N (%)
Total participants	503
Responses included after cleaning	489
Age group	
19-20 years	33 (6.7)
21-22 years	137 (28.0)
23-24 years	177 (36.2)
Mean age (23-24 group)	23.6 years
Gender	
Male	263 (53.8)
Female	226 (46.2)
Academic year	
Third-year students	198 (40.5)
Final-year students	162 (33.1)
Interns	129 (26.4)
Follows MOHFW on social media	
Yes	157 (32.1)
No	332 (67.9)

Final-year students demonstrated superior performance across most items, including NACP (97.5%), eSanjeevani (89.5%), and NTEP (87.7%). Third-year students showed

strong performance on foundational items such as TB elimination (85.4%) and Ayushman Bharat insurance coverage (63.6%), while interns consistently scored lower across all items, particularly in questions related to RMNCH+A misconceptions (34.1%) and ABDM (34.9%).

**Figure 1: line graph comparing knowledge responses (in percentage) to each question across third-year students, final-year students, and interns.**

A visual comparison is presented in Figures 1 and detailed percentage distributions are provided in Tables 3 and 4.

Table 3: Distribution of responses to knowledge-based questions on national health programmes among MBBS students (overall) (n=489).

Knowledge questions	True (%)	False (%)	Don't know (%)
Ayushman Bharat provides ₹5 lakh coverage	68.7	9.2	22.1
India aims to eliminate TB by 2025	83.4	9.2	7.4
RMNCH+A covers only maternal and child health	38.2	50.3	11.5
eSanjeevani is a government telemedicine platform	76.7	2.5	20.9
NLEP is still active in endemic districts	78.1	8.0	13.9
NMHP supports district hospital funding	58.9	12.9	28.2
NACP offers free ART to HIV patients	75.4	9.4	15.2
JSY promotes institutional deliveries	82.6	3.5	13.9
PM-JAY is only for people above 60 (Incorrect statement)	38.2	34.4	27.3
All citizens are automatically enrolled in ABDM (incorrect statement)	33.1	38.7	28.2

Table 4: Summary of knowledge scores by year of study.

Year of study	Number of students	Mean knowledge score	SD	Min score	Max score	Low outliers (count)
3rd Year	198	6.10	2.27	0	10	4
Final Year	162	7.20	1.94	3	10	0
Internship	129	5.80	2.74	0	10	0

Attitude section

The analysis of student attitudes toward national health programs revealed an overall favourable perception across all years of study. Attitudes had been rated on a five-point Likert scale, where lower scores (1 = strongly disagree, 5 = strongly agree) indicated more positive responses. Analysis of student attitudes (Table 5 and Figure 6)

revealed that a large proportion agreed or strongly agreed that national health programs (NHPs) address key public health problems (84.2%) and improve access for underserved populations (79.4%). The effectiveness of digital platforms in enhancing NHP delivery was acknowledged by 88.4% of participants. Approximately 70.7% of students expressed willingness to volunteer in outreach activities related to NHPs, and 70.1% reported confidence in explaining these programs to patients.

Table 5: Attitude of MBBS students toward national health programs (n=489).

Statement	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
National health programs address India's key public health problems	37.0	47.2	13.1	1.8	0.8
National health programs improve access for underserved populations	30.7	48.7	17.6	2.5	0.6
Digital platforms make national health programs more effective	39.3	49.1	9.8	1.2	0.6
MBBS students should volunteer in outreach activities for NHPs	33.7	47.0	14.5	2.9	1.8
I feel confident explaining national health programs to patients	24.3	45.8	25.8	3.3	0.8
Curriculum gives enough exposure to national health programs	21.5	47.6	22.7	7.2	1.0
National health programs build clinical and public health skills	25.8	55.2	15.5	3.1	0.4
Primary health centres implement government schemes efficiently	20.2	40.9	26.0	11.5	1.4
I want formal training in national health programs	19.9	44.3	30.1	4.7	1.0
I am interested in a public health career	21.7	38.9	31.5	6.3	1.6

Table 6: Summary of attitude scores by year of study.

Year of study	Number of students	Average score	Standard deviation	Minimum score	Maximum score
3 rd year	198	2.08	0.55	1.0	5.0
Final year	162	1.99	0.55	1.0	3.7
Internship	129	2.09	0.57	1.0	3.6

However, only 69.1% agreed that the undergraduate curriculum provided sufficient exposure to NHPs. While 81.0% believed that NHPs help build clinical and public health skills, confidence in the efficiency of primary health centres (PHCs) remained lower, with only 61.1% agreeing or strongly agreeing. Interest in formal training on NHPs was noted in 64.2% of respondents, whereas 60.6% showed interest in pursuing a career in public health. These results reflect generally favourable attitudes but suggest areas for curricular and institutional strengthening.

Based on the 5-point Likert scale (Tables 5 and 6), where higher scores reflect stronger agreement, interns (2.09 ± 0.57) and third-year students (2.08 ± 0.55) showed slightly more favourable attitudes toward national health programs compared to final-year students (1.99 ± 0.55). However, the overall low mean scores across all groups suggest that most students expressed only modest agreement regarding the importance, accessibility, and clinical relevance of programs such as Ayushman Bharat, RMNCH+A, and eSanjeevani.

Practice section

The analysis of MBBS students' practical exposure to national health programs, as presented in Table 7 indicates a mixed pattern of engagement. A substantial proportion of students reported witnessing Ayushman Bharat implementation (70.1%), pharmacovigilance reporting (71.8%), and the use of fixed-dose combinations (70.9%), suggesting familiarity with core treatment protocols under government schemes. Additionally, 84.5% had attended institutional observances of national health days such as World TB Day and AIDS day. However, only about half had participated in health camps or outreach activities (50.7%) and drug distribution campaigns (54.2%), reflecting limited direct involvement in public health fieldwork. Engagement with updates from MOHFW or WHO India (48.5%) and participation in community-based surveys (43.1%) were also suboptimal. Notably, only 28.8% had observed the use of eSanjeevani, pointing to low exposure to digital health tools. While 55.7% were aware of the essential medicines list (EML) adherence in public facilities.

Table 7: Practice of MBBS students regarding national health programs (n=489).

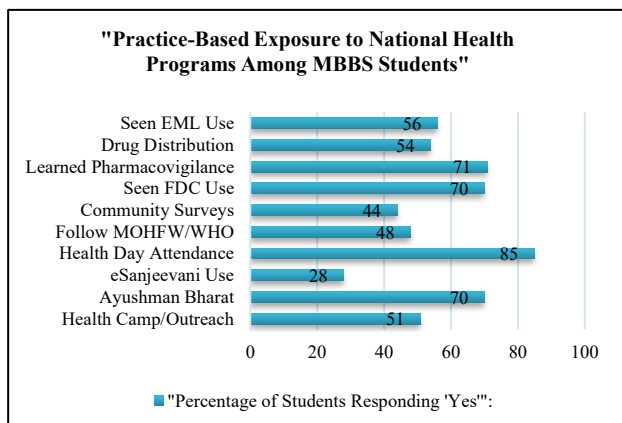
Practice Statement	Yes (%)	No (%)	Maybe (%)
Have you ever participated in a health camp or NHP-related outreach activity?	50.7	41.5	7.8
Have you seen any patients receive treatment under Ayushman Bharat during your postings?	70.1	22.7	7.2
Have you ever used or seen the use of eSanjeevani in a clinical setting?	28.8	60.3	10.8
Have you attended any health day observances (e.g., World TB Day, AIDS Day) organized by your institution?	84.5	9.8	5.7
Do you follow any updates from the Ministry of Health and Family Welfare (MOHFW) or WHO India on NHPs?	48.5	33.7	17.8
Have you participated in community-based surveys or screening programs (e.g., NCDs, anaemia, leprosy)?	43.1	45.4	11.5
Have you observed the use of fixed-dose combinations (FDCs) as recommended in national programs (e.g., DOTS under NTEP)?	70.9	17.4	11.7
Have you learned about pharmacovigilance reporting for adverse drug reactions in the context of national programs?	71.8	17.2	11.0
Have you participated in any drug distribution campaign (e.g., deworming, vitamin A, IFA supplementation)?	54.2	39.1	6.7
Have you seen government health facilities follow the essential medicines list (EML) for drug availability?	55.7	26.2	18.0

Table 8: Year-wise summary of practice scores among MBBS students (n=489).

Year of study	Number of students	Mean practice score $\pm$ SD	Minimum score	Maximum score
3 rd year	198	5.63 $\pm$ 2.38	0.0	10.0
Final year	162	7.09 $\pm$ 2.23	1.5	10.0
Internship	129	6.43 $\pm$ 2.42	0.0	10.0

Table 9: KAP score comparison by year of study (n=489).

Year of study	Knowledge (mean $\pm$ SD)	Attitude (mean $\pm$ SD)	Practice (mean $\pm$ SD)
3 rd year	6.1 $\pm$ 2.27	2.08 $\pm$ 0.55	5.63 $\pm$ 2.38
Final year	7.2 $\pm$ 1.94	1.99 $\pm$ 0.55	7.09 $\pm$ 2.23
Internship	5.8 $\pm$ 2.74	2.09 $\pm$ 0.57	6.43 $\pm$ 2.42

**Figure 2: Practice- exposure to national health programs among MBBS students.**

The year-wise analysis of practice scores among MBBS students (Tables 7 and 8) reveals that final-year students

had the highest mean practice score (7.09 $\pm$ 2.23), followed by interns (6.43 $\pm$ 2.42) and third-year students (5.63 $\pm$ 2.38). The widest variability in practice scores was observed among third-year students, whereas final-year students showed a more clustered distribution. This trend suggests that exposure to clinical postings and formal teaching in later years contributes to increased practical involvement in national health programs. KAP score comparison by year of study is given in Table 9, and exposure to national health programs among MBBS students is given in Figure 2.

DISCUSSION

This cross-sectional study revealed distinct patterns in MBBS students' knowledge, attitude, and practice (KAP) towards national health programmes (NHPs). The results indicate that knowledge and practice scores improved progressively with academic advancement, peaking among final-year students. This aligns with the anticipated

impact of increased clinical exposure, public health postings, and integration of modules related to major programs such as the National Tuberculosis Elimination Programme (NTEP), Ayushman Bharat, and eSanjeevani telemedicine services.^{1-4,9,12,13} In comparison, third-year students demonstrated comparatively lower scores, suggesting that earlier integration of NHP-related content into the curriculum could bridge this gap.¹⁰

The attitude domain remained consistently positive across all academic years, indicating a baseline receptiveness towards public health engagement. This observation is in concordance with previous research, which attributes such positivity to early sensitisation through institutional awareness activities, faculty-led mentorship, and student participation in health day observances.^{5,13,14,20}

Interestingly, practice scores were highest among final-year students but declined slightly during internship. This may be explained by variability in posting schedules, reduced emphasis on structured community exposure, and competing clinical responsibilities during the internship year. Similar patterns have been documented in studies where structured field-based experiential learning significantly enhanced practical engagement.^{16,17,21}

The knowledge-practice gap identified among junior students underscores a crucial implementation challenge. While knowledge may be imparted through lectures, translating it into real-world application requires curricular redesign to incorporate simulation-based learning, community surveys, and supervised participation in NHP activities.^{18,19,22} Since the ultimate success of public health programs depends equally on awareness and application, integrating experiential training within the MBBS curriculum is essential.⁶

The present study benefited from the use of validated KAP tools with strong internal consistency.^{19,23} However, given its single-institution setting, generalisability may be limited. Nevertheless, the findings have implications for similar academic environments, particularly in north India. Multi-centric studies are recommended to capture region-wise variations and strengthen the evidence base for curricular reforms.²⁴

This study used a cross-sectional design and was limited to a single tertiary institution in north India, which may restrict generalizability. Furthermore, responses were self-reported, introducing the possibility of reporting bias. And it focused on only some national health programmes, not all.²⁵

CONCLUSION

This study highlighted notable academic differences in MBBS students' engagement with national health programmes (NHPs), with final-year students demonstrating the most comprehensive understanding and application. The findings underscore the pivotal role of

clinical exposure and targeted programmatic teaching in shaping public health competencies. However, the relatively modest performance among early-year students signals a curricular gap in early sensitisation. To bridge this, there is a clear need for pedagogical reform, fostering participatory, hands-on approaches from the outset of medical training. Encouraging active involvement through field postings, digital tools like eSanjeevani, and program-linked mentorships could enhance both theoretical knowledge and its practical utility. Regular monitoring of knowledge, attitude, and practice domains through structured evaluations can inform evidence-based curriculum enhancements. By systematically assessing medical students' readiness to engage with national initiatives, this study contributes to the larger goal of aligning undergraduate training with the operational needs of India's evolving public health landscape.

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