

Enhancing medical undergraduate training in India: Insights into the prevention and management of noncommunicable diseases

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ABSTRACT

Introduction: Noncommunicable diseases (NCDs) are becoming significant global health challenges, especially in developing countries like India. Addressing the rising burden of NCDs necessitates systemic changes in healthcare systems, with a particular focus on the training of healthcare providers (HCPs). Integrating NCD prevention and management strategies into medical education are essential for effectively combating this growing public health issue in India.

Methodology: A qualitative inquiry was conducted to explore the perspectives of key informants on NCD prevention and management training among medical undergraduates in India. Data were collected through in-depth interviews with stakeholders, including medical educators, healthcare professionals, and policymakers, and analyzed thematically to identify key insights.

Results: Findings reveal an urgent need to incorporate NCD prevention and management into the medical curriculum in response to the rising prevalence of multimorbidity in India. Participants emphasized the necessity of curricular or co-curricular components dedicated to NCD prevention. In addition, the study highlighted the importance of creating a supportive environment and fostering a positive climate for NCD prevention and management. Capacity building for medical educators emerged as a critical requirement to ensure they possess the skills and expertise needed to effectively deliver NCD-related training.

Conclusion: Given the escalating burden of NCDs in India, there is a pressing need to integrate NCD prevention and management into medical education. Curriculum reform, enabling environments, and capacity-building for medical educators are vital to preparing future HCPs to manage and prevent NCDs at the community level.

Keywords: Medical curriculum, medical teachers, noncommunicable diseases, risk factor

Introduction

Noncommunicable diseases (NCDs) are sweeping the entire globe, in particular developing countries such as India, which is grappling with the dual burden of infectious and NCDs.^[1] India contributes to more than two-third of mortality due to NCDs in South East Asian Region, with more than one in two deaths (60%) due to NCDs.^[2] Changes in the demography, economy, and environment are responsible for this shift.^[3] NCDs are linked to common

preventable risk factors such as tobacco use, unhealthy diet, and low physical activity.^[2] These risk factors do not inevitably lead to increase in NCDs, but it is the failure to

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How to cite this article: Chauhan A, Mahapatra P, Chokshi M, Mokashi T, Pati S. Enhancing medical undergraduate training in India: Insights into the prevention and management of noncommunicable diseases. *Int J Non-Commun Dis* 2025;10:25-32.

Submitted: 21-Dec-2024 **Revised:** 20-Jan-2025
Accepted: 01-Feb-2025 **Published:** 29-Mar-2025

Access this article online	
Website: https://journals.lww.com/ijn	Quick Response Code
DOI: 10.4103/jncd.jncd_117_24	

intervene effectively that leads to NCDs.^[4] As risk factors associated behavior modification can prevent most of the NCDs, their management assumes paramount importance.

The National Program for Prevention and Control of NCDs (NP-NCDs) in India focuses on reducing the major modifiable risk factors of NCDs.^[5] The patient assumes paramount importance in NCDs as the prevention and management of NCDs require behavior and lifestyle modifications.^[6] Simple advice to manage health problems or health promotion can be effective in reducing NCDs.^[6] One of the ways to achieve this is to ensure health education of the healthcare providers (HCPs).^[4] Improvements in education can be a major force for enhancing health outcomes over time especially for NCDs.^[1] Health professional needs to be a good communicator to bring about the effective behavior change among patients.^[7] Good communication helps to build an effective therapeutic relationship, which in turn helps in keeping the patient in treatment, improve adherence to treatment and follow-up.^[7] Thus, the physician's role in improving the health status of population is imperative. However, a major challenge is to have a critical mass of human resources trained in the specific delivery of healthcare.^[8]

Different studies observed that healthcare professionals feel that the education they have received in their formative phase lacks the necessary training and that they do not feel prepared to execute such a role on the ground.^[1,6] Knowledge both on healthcare delivery on the ground and healthcare promotion to reduce exposure to major risk factors is important.^[1] Pati *et al.* in their study, observed that the present medical curriculum lacks health promotion components during formative training.^[1,6] They also quoted Indian studies, which cite most undergraduates feel less prepared and competent to counsel patients.^[1,2,6] Thus, training of HCP to understand the risk factors for NCDs is imperative.

HCP's clinical training begins in the medical school and continues within a healthcare delivery setting.^[6] Changes with respect to NCD risk factors in the community are not possible without corresponding changes in the environment and culture of the healthcare delivery systems in which HCP trains.^[6] Therefore, any changes in the healthcare delivery system with the goal of creating a healthy lifestyle and reducing NCD risk factors in the community will have to address not only practicing HCPs but also HCPs in training.^[1] To address these issues, a qualitative inquiry was conducted with the aim of understanding the perspectives of key informants on

NCD prevention and management training among medical undergraduates in India.

Methodology

A qualitative inquiry was conducted in Odisha and Delhi states of India between October 2022 and July 2023 to explore the status of NCDs in the current Indian context. The study aimed to gather comprehensive insights into the existing landscape of NCDs through key informant interviews across various sectors.

Study design and setting

The study adopted a qualitative research design to capture in-depth perspectives from key stakeholders. The study was conducted in Odisha and Delhi to account for regional variation in health systems and NCD burdens. Odisha represents a more rural and socioeconomically diverse population, while Delhi serves as a metropolitan area with a more developed healthcare infrastructure. This comparative approach allowed for a richer understanding of NCDs in both urban and rural contexts.

Participant selection

Key informants were selected from five sectors based on their specialized knowledge, experience, and role in policymaking related to NCDs. The sectors included:

- Health system: For example, health policy experts, government health officials
- Academia: It includes faculty from medical education units, clinical subjects such as medicine and psychiatry, and community-focused disciplines such as community medicine and family medicine
- Practitioners: For example, doctors, nurses, HCPs involved in NCD management
- Research institutes: For example, NCD-focused research organizations
- Development sector: For example, nongovernmental organizations working on public health.

Out of the 21 invited informants, 17 consented to participate in the interviews. Participants were primarily selected for their expertise and policymaking capabilities in NCD-related fields. Informed consent was obtained from all participants after that they were briefed on the study objectives and procedures. The sample size was determined through an iterative approach, with interviews continuing until data saturation was reached.

Data collection

A semi-structured, open-ended interview guide was developed through a consultative and iterative process,

ensuring alignment with the study objectives. The guide was field-tested through a mock interview with 2–3 medical graduates, allowing for the refinement of the questions. An iterative approach was employed during data collection, with feedback from 3 to 4 initial interviews used to refine probes and ensure deeper insights were obtained. This process continued until data saturation was reached after 17 interviews.

The interviews were conducted virtually by PM, a faculty member at a medical college with experience in teaching undergraduate medical students. Each interview lasted between 20 and 30 min and was digitally recorded. Transcription was carried out by PM and AC, with translation into English done as needed. The interviews were transcribed verbatim, and the data were managed securely.

Data analysis

The data were analyzed thematically using an inductive approach. The initial codes were generated based on recurring patterns and themes identified from the transcripts. MAXQDA Analytics Pro 2022 software (VERBI GmbH, Berlin, Germany) was used to facilitate the coding process. The coding and thematic analysis were reviewed by SP to ensure consistency and reliability in the interpretation.

To enhance the credibility of the findings, member checking was conducted by debriefing three participants with preliminary findings. The feedback was incorporated into the final analysis to confirm the accuracy and interpretation of the data.

Adherence to reporting guidelines

The study adhered to the consolidated criteria for reporting qualitative research (COREQ) guidelines, ensuring a transparent and systematic approach to data collection, analysis, and reporting.^[9] COREQ checklist is available as shown in Supplementary File 1.

Results

A total of 17 key-informants were interviewed, with ages ranging from 31 to 64 years. The participant group consisted of 12 males and 5 females, with work experience ranging from 3 to 30 years. The distribution of participants across various sectors was as follows: 2 from the health system, 7 academicians (4 from medical education units and 3 from clinical and preclinical departments), 5 clinical practitioners (including rheumatologists, pulmonologists,

oncologists, psychiatrists), 1 from a research institute, and 2 from the development sector [Figure 1]. The major thematic areas that emerged were as follows [Figure 2].

Evolving policies and perspectives on chronic disease management

Physicians observed that chronic diseases, particularly noncommunicable diseases (NCDs), were on the rise and becoming an increasing burden on the healthcare system [Table 1]. While many were aware of national policies on NCDs and the establishment of wellness clinics, the majority felt that undergraduate training was more focused on treating acute health events. They suggested that the curriculum should be more oriented toward the holistic management and prevention of chronic illnesses. One participant noted,

“The government is now placing a strong emphasis on the prevention of NCDs, which is a significant shift in healthcare priorities. One of the key initiatives is the establishment of wellness clinics, where patients are educated about the risk factors associated with chronic diseases. These clinics play a crucial role in promoting lifestyle modifications, such as changes in diet, exercise, and smoking cessation, to prevent the onset of NCDs. It’s an essential step toward reducing the burden of these diseases on both individuals and the healthcare system.” (P-3).

Many participants expressed that early clinical exposure had helped them appreciate the importance of addressing NCD risk factors, though some felt this realization came only late in their careers. A few mentioned personal experiences with family members suffering from chronic illnesses, which highlighted the need for preventive measures. Most participants agreed that the current curriculum’s focus on early clinical exposure was better suited for addressing NCD prevention.

“In the beginning, we didn’t fully grasp the importance of NCD prevention. It wasn’t until our final year, when we started seeing patients and could directly relate the information we had learned to their illnesses, that we truly understood its significance. By then, we could see the long-term impact of chronic diseases and how preventing them could have made a difference. This realization came late in our education, but it shaped our understanding of NCDs and their prevention.” (P-1).

Curricular gaps in noncommunicable disease prevention

Faculties shared their perspectives on the exposure of medical students to NCD risk factors during preclinical training. They acknowledged that while students were introduced to the basic concepts of NCDs, prevention

Table 1: Thematic divisions into positive and negative subthemes

Themes	Sub-themes	
	Positive	Negative
Changing policies and perspectives	Holistic management	Acute health events
	Preventive aspects	Minimal representation
	Early clinical exposure	Assessments
Curriculum	Role plays	Modest presence
	Small group discussions	Less mention
	Wellness clinics	Patient centric
	National programs	Understanding
	Vertical and horizontal integration	NCD research exposure
Current clinical practice	Screening	Unstructured
	Risk factor approach	Family based counseling
	Life style modifications	Lack of time in OPD
Training NCD prevention to medical students	In depth understanding	Limited knowledge
	Risk factor-based screening	Unsupervised training
		Overburdened physicians
NCD preventive training in community settings	Case study	Lack of applicability
	Community medicine	Disorganized
	Risk factor screening	Unstructured
	Individual counseling	
	Community based implementation	
Capacity building of faculties and students	Faculty development	Workshops and seminars
	Program	Nonformal training
	Information updates	Skill based approach
	Government sites for information	Textbook learning
	NCD risk reduction	
Creating an enabling environment	Clinical postings	Mere treatment aspect
	Allied health workers	Assistance for counseling
	Community centric learning	Unsupervised student visits
	NCD clinics and wellness centers	

NCD - Noncommunicable diseases, OPD - Outpatient department

strategies were given limited emphasis in the MBBS curriculum. Faculties felt that the curriculum lacked a structured focus on equipping students with essential counseling skills needed to address lifestyle modifications and preventive measures effectively. They observed that students often struggled to translate theoretical knowledge into practical skills, particularly in patient counseling for NCD prevention. To bridge this gap, some faculties employed innovative teaching methods, such as role-plays in small group settings, to simulate real-world scenarios and emphasize the importance of addressing NCD risk factors. These sessions allowed students to practice engaging with patients and develop a deeper understanding of early intervention strategies.

In addition, faculties introduced students to national programs and wellness clinics, aiming to highlight the critical role of public health initiatives in combating NCDs. Despite these efforts, they noted that the overall representation of NCD prevention in the curriculum remained modest, with limited opportunities for students

to develop hands-on skills in screening and counseling. The faculties strongly felt that integrating more robust training in counseling techniques and preventive measures into the curriculum was essential to prepare future physicians for tackling the growing burden of NCDs effectively.

"In our time, NCDs were hardly a focus in medical education. Their representation in textbooks was minimal, often just a brief mention in the last paragraph, signaling their perceived insignificance. Preventive aspects were almost entirely neglected, leaving students with little awareness of their importance. It's only now that the curriculum has started to give NCD prevention the attention it deserves." (P-2).

Sharing their experiences from their 1st year in medical college, some junior physicians recalled their struggle to understand diseases when introduced to clinical terms without patient exposure. They appreciated that the new curriculum adopts a more holistic approach, teaching disease conditions through vertical and horizontal integration, which bridges this gap. Faculty acknowledged

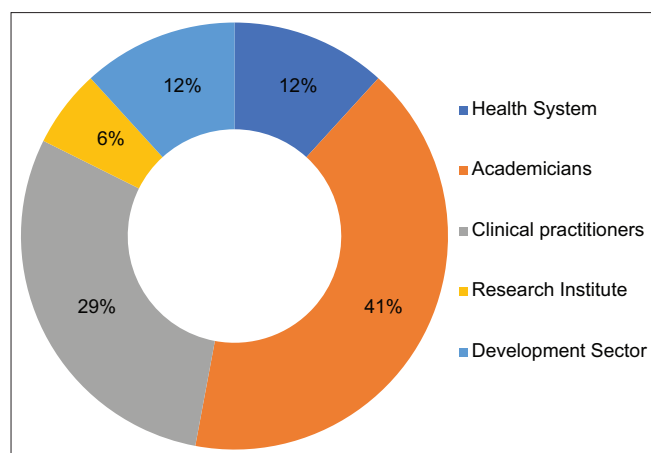


Figure 1: Interviewee characteristics

that the curriculum effectively highlights common NCD risk factors and emphasizes the need for early intervention. It also allows students to choose electives, enabling them to gain expertise and engage in research on NCD prevention. However, despite these advancements, practical training in preventive aspects remains insufficient. Students often lack hands-on experience in structured screening and counseling, as the curriculum still places greater emphasis on treatment over prevention. In addition, the limited time and resources in clinical settings hinder the reinforcement of these preventive concepts, preventing their full realization in practice.

"In my first year of medical college, understanding diseases was tough with clinical terms introduced without patient exposure. The new curriculum bridges this gap through integrated teaching, highlighting NCD risk factors and early interventions. Students can explore electives and research on NCD prevention. However, practical training in screening and counselling remains limited, and the focus is still more on treatment than prevention, as there are no exams emphasizing the preventive aspects." (p-4).

Current clinical practice and clinical prevention

Many clinicians recognized the importance of screening family members and assessing risk factors when diagnosing an NCD. However, they often lacked a systematic approach, typically performing only basic metabolic screening and gathering family history. Although family-based counseling was acknowledged as beneficial, it was seldom implemented in practice. Clinicians pointed out that in outpatient settings, consultations were predominantly focused on prescribing medications, with limited attention to lifestyle modifications. Advice on diet, weight loss, and exercise was often generalized and superficial rather than personalized and comprehensive.

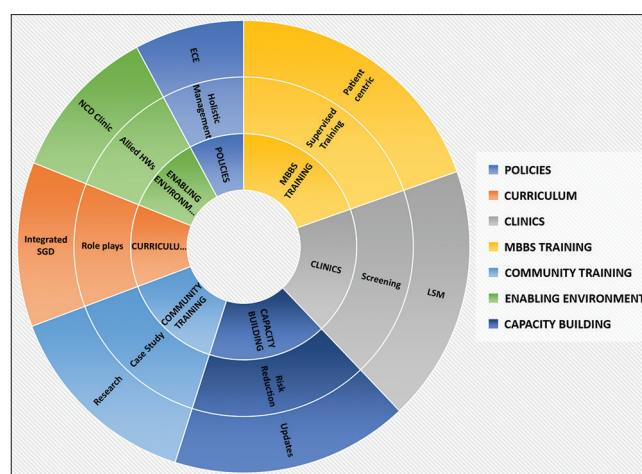


Figure 2: The major thematic areas that emerged after analysis

The faculties in medical colleges are regularly trained through seminars and Continuing Medical Education (CME) programs on NCD prevention, which provide them with the latest knowledge and updates on managing chronic diseases. However, despite these opportunities for professional development, they often do not prioritize the screening of risk factors or engage in counseling patients and their family members. This gap may stem from a lack of structured training in these areas or insufficient emphasis on preventive measures within their clinical practice. As a result, even though faculties are knowledgeable about NCD prevention, they often do not apply this knowledge consistently in real-world settings, particularly when it comes to screening for risk factors and providing personalized, family-centered counseling. (P-14).

"We identify the risk factors from a standard list, but when we counsel patients, it often becomes generic, routine advice rather than personalized counseling. For example, we might say things like, 'You need to stop smoking' or 'You should lose weight.' Our approach lacks depth and fails to focus on prevention in a meaningful way." (P-5).

Training medical students in noncommunicable diseases prevention

The faculty members acknowledged that while medical students generally have some awareness of the risk factors associated with NCDs when they begin their clinical rotations, their understanding is often superficial. They emphasized that students require a more comprehensive and in-depth knowledge of these risk factors, along with proper training in how to screen for them and provide effective counseling to patients. However, all faculty members admitted that structured, supervised training in preventive measures is lacking, with the focus largely remaining on the treatment aspects of NCDs. They noted that this patient-centered approach, which prioritizes

treating individual cases, limits students' ability to understand the broader impact of these diseases within the family and community context. In addition, many clinicians expressed being overwhelmed by their duties in outpatient departments, leaving little time for preventive practices or the ability to teach students the importance of NCD prevention. Consequently, faculty members felt ill-equipped to effectively convey the significance of prevention to both students and patients, hindering the integration of preventive care into clinical practice.

In clinical settings, faculty members often focus on diagnosing and treating immediate health issues due to time constraints, neglecting the importance of NCD prevention. This limits opportunities to teach students about risk factors, lifestyle modifications, and the role of prevention in managing chronic diseases. As a result, the emphasis on treatment over prevention restricts students' understanding of preventive care in clinical practice. (P-14).

Community-based noncommunicable disease preventive training

According to the community medicine faculty, third- and fourth-semester students are assigned to adopt a family for a case study during their community medicine posting. This approach allows students to screen the family for risk factors and chronic illnesses, providing them with a comprehensive understanding of NCDs and their prevention within the family context. It also offers valuable hands-on experience in screening and counseling. However, a key limitation is that students often give less importance to community medicine, with clinical subjects taking precedence in their focus. This diminishes the perceived value of preventive measures and community-based practices, limiting the overall impact of their training in NCD prevention. Furthermore, the new curriculum includes elective options that encourage community-based engagement and research, but students may not always prioritize these opportunities.

When assigned to the Community Medicine department, students engage in field visits and family studies. They are tasked with examining a disease within the family context and presenting it as a clinicopathological case. This approach provides them with a comprehensive understanding of NCDs and their prevention in real-world settings. However, a limitation is that some students may not fully engage with the community-based learning due to their greater focus on clinical subjects, which are often given more precedence in the curriculum. (P-3).

Capacity building for faculties and students

All clinical faculty members expressed a shared concern

that, although they actively participate in workshops and seminars to stay updated on NCDs, they still feel inadequately prepared to effectively assess and counsel patients on risk reduction strategies. Despite possessing a strong foundation of knowledge, they pointed out that this knowledge is not enough to address the complexities of patient counseling in a structured and impactful way. They emphasized the critical need for formal, organized training on systematic screening techniques and counseling approaches that can be applied in clinical practice. Furthermore, faculty acknowledged that they face challenges in imparting this crucial skill set to students, as there is a noticeable gap in their own training when it comes to teaching and assessing NCD prevention. This lack of structured preparation and practice limits their ability to effectively guide students in adopting preventive strategies and teaching them to integrate these approaches into patient care.

One of them observed that “knowledge about the NCD, NCD risk factors, their assessment and empowering the students to intervene, this is not a thrust area in the faculty training programs. The students need to explore updated information on the prevailing health initiatives by the government rather than depending on textbooks alone for information.” (P-8).

Many faculties are not trained adequately. First, we have to correct ourselves, and then we can teach our students. The teachers need to be assess themselves, and at the same time, they have to be motivated. (P-3).

Creating an enabling environment for noncommunicable disease prevention

All the interviewed faculty members recognized that students' attitudes toward NCD prevention are significantly shaped by observing their teachers in clinical settings. They emphasized the need to create a supportive environment in these settings where NCD screening and counseling can be actively practiced. Given the time constraints during patient consultations, faculty members noted that their focus is primarily on treatment, leaving limited opportunity to address prevention. They highlighted the importance of involving allied health workers, such as health educators, counselors, or nursing staff, to assist in NCD screening and counseling. These professionals could routinely engage in preventive activities, providing students with an opportunity to learn by observing real-world prevention efforts. Furthermore, faculty members suggested that students should receive hands-on training under the guidance of faculty, ensuring a structured and supervised approach to NCD prevention. In addition, they proposed establishing dedicated NCD clinics at the college or facilitating student visits to NCD clinics in district hospitals and nearby wellness centers,

which would offer valuable insights into community-based prevention practices and further enhance student learning.

“Faculty members are eager to apply their medical curriculum training on NCDs and prevention but find the clinical environment lacks the support and resources to translate this knowledge into practice. Despite their enthusiasm, the absence of an enabling environment limits their ability to implement NCD prevention effectively and to teach students by example.” (P-17).

Discussion

The medical professional has a very pivotal role in the prevention and control of the NCDs.^[1] Along with the NCDs, Multimorbidity or co-existence of multiple NCDs in the same patient for which multiple risk factors need to be addressed is also posing a rising challenge.^[10] However, the present medical curriculum does not adequately cover the prevention and control of NCDs.^[1] Medical curricula are not adequately designed to demonstrate the link between the living conditions and diseases, and the treatment gets prioritized over disease prevention.^[11] The present study observed faculties perceiving the current medical training being more oriented toward acute health events. Medical teachers suggested a transformative medical curriculum having a convergence of public health and medicine in line with the holistic management of chronic disease.

The present study also highlights the importance of early exposure to clinical settings, as practice is often ahead of teaching and research. Many medical teachers find it difficult to appreciate the importance of NCD risk factors during their early years of medical training. Although the present medical curriculum gives scope for early clinical exposure, physicians need to be trained to incorporate risk reduction training beginning from their entry into the medical education through interprofessional, cross-sectorial, and experiential learning opportunities throughout the curriculum and future professional development.

Most medical teachers expressed that the revised medical curriculum has a holistic approach, and integration is the key as the basic science learning is placed in the context of clinical and professional practice.^[12] Medical curricula around the world have undergone a major evolution in recent years.^[13] India changed its decades old traditional curriculum by the competency-based medical education in 2019.^[1] Moreover, assessment is the backbone of any curriculum. The present competency-based medical

education curriculum lacks valid assessment strategies for health promotion and prevention activities, as reported by various medical teachers. Dongre and Chacko in their review of the current medical curriculum, suggested a need for assessment methods to reach a subject-intended learning outcome.^[14] Chauhan et al. in their study on mapping of NCD risk reduction training in India, observed similar findings related to lack of health promotion in medical curriculum.^[11] This reflects the minimal representation of NCDs in the medical curriculum.

Physicians have a major responsibility for promoting lifestyle modification behaviors.^[8] The present study observed that clinical faculties felt less capable while counseling and advising their patients related to lifestyle changes. These findings are in sync with what other researchers have observed in their studies on NCD risk factors and medical curriculum.^[1,6] Medical teachers expressed the need for formal training on counseling and communication with patients. Further, most physicians believe that the prescriptions in the outpatient consultation were more rhetoric with less attention being given on individualized counseling. The reasons could be the fact that the health promotion has never been incorporated into medical training as observed by other researchers, and increased burden of patients.^[15,16] Many clinical faculties admitted about being overburdened to the outpatient consultation. This suggests the involvement of allied health professionals' discipline such as physiotherapy, nursing, dentistry, and nutrition should be solicited for health promotion and prevention activities like NCD risk reduction.

Almost all the interviewed faculties perceived a need for creating an enabling environment to practice NCD screening and counseling. Medical campus needs to be more health promotive and conducive to NCD risk factor learning.^[1] Behavior change interventions are ineffective at individual level unless the environment is promotive. Behavior being multifactorial in causation depends up to the supportive environment.^[2]

Significant risk factors have to be recognized, and cessation programs need to be part of the Comprehensive control strategy. This, however, involves stakeholders to be adequately oriented so that information can be strategically percolated. The best beginning is the medical undergraduate who, by early clinical exposure and adequate patient-centric skill-based approach be trained and made future-ready. Health promotion and community-based practices can be made more

integrative, supervised, and particularly highlighted in the curriculum for a wider vision. Although all efforts are being channelized to ensure an effective curriculum, yet the educators feel less involved and less updated.^[16] This accounts for the major gap between the benefactor and provider in parallelizing the learning forum and creates a need for a conceptual framework based on Indian Settings.

Conclusion

Keeping in view the rising burden of NCDs, especially multimorbidity in India, there is a need to incorporate NCD risk reduction teaching and training in the current medical curriculum either as a curricular or a co-curricular component along with a need to create an enabling environment and conducive climate for NCD risk reduction. Capacity building of medical teachers also required so as to enable them to develop skills and expertise to impart such trainings to their students.

Ethical considerations

This study was conducted in adherence to the ethical guidelines outlined by the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of ICMR-RMRC, Bhubaneswar, India. All participants were informed of the study objectives, procedures, and their rights as participants, and verbal informed consent was obtained before the interviews. Participants were assured of confidentiality and anonymity, and all responses were coded to protect their identities. Data were securely stored and accessible only to the research team. Participants were informed of their right to withdraw from the study at any point without any repercussions.

Interviews were conducted at a time convenient to the participants, and virtual platforms were used to ensure accessibility for all. Participants were not compensated for their involvement, but their contribution to the study was highly valued.

Author contribution

SP conceive the idea, AC drafted the first draft, PM and SP provided technical expertise and contributed to the revision of the manuscript.

Financial support and sponsorship

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication

of this article: This study is funded by ACCESS Health International, Inc.

Conflicts of interest

There are no conflicts of interest.

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Supplementary File 1: Consolidated criteria for reporting qualitative research checklist

COREQ (Consolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	PM
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	MD
Occupation	3	What was their occupation at the time of the study?	Doctor
Gender	4	Was the researcher male or female?	Male
Experience and training	5	What experience or training did the researcher have?	Psychiatry, 18
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	No
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Reasons for re
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Interest
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	phenonmenolo
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	purposive
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	email
Sample size	12	How many participants were in the study?	17
Non-participation	13	How many people refused to participate or dropped out? Reasons?	3, did not cons
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	workplace
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	No
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	demographic,
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	yes
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	no
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	yes
Field notes	20	Were field notes made during and/or after the inter view or focus group?	yes
Duration	21	What was the duration of the inter views or focus group?	20-30 mins
Data saturation	22	Was data saturation discussed?	yes
Transcripts returned	23	Were transcripts returned to participants for comment and/or	yes

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	2
Description of the coding tree	25	Did authors provide a description of the coding tree?	yes
Derivation of themes	26	Were themes identified in advance or derived from the data?	derived from d
Software	27	What software, if applicable, was used to manage the data?	MaxQDA
Participant checking	28	Did participants provide feedback on the findings?	yes
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	yes
Data and findings consistent	30	Was there consistency between the data presented and the findings?	yes
Clarity of major themes	31	Were major themes clearly presented in the findings?	yes
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	yes

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.