

## SHORT ARTICLE

## Leveraging existing virtual platform for training medical officers on Non-Communicable Diseases; an experience from Bihar, India

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### Citation

Leveraging existing virtual platform for training medical officers on Non-Communicable Diseases; an experience from Bihar, India. Gautam A, Sinha P, Bhargava S, Gavvala N, Balasubramaniam S, Agrawal N. Indian J Comm Health. 2016; 28, 4: 364-368.

**Source of Funding:** Boston Scientific **Conflict of Interest:** None declared

### Article Cycle

**Received:** 28/11/2016; **Revision:** 30/11/2016; **Accepted:** 05/12/2016; **Published:** 31/12/2016

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### Abstract

**Background:** The state of Bihar in India has high prevalence of non-communicable diseases (NCDs). A NCDs training program using virtual platform was implemented for medical officers posted at public health facilities from two districts of Bihar. **Aims & Objectives:** The aim of this analysis was to evaluate the effectiveness of a pilot NCDs training program in improving the knowledge of Medical officers using virtual platform. **Material & Methods:** A secondary analysis of pre-post NCDs training data was undertaken. A structured knowledge assessment tool (KAT) was used to assess the knowledge of participants before and after completion of training. Also, post-training participant's feedback was collected using a "Likert scale". **Statistical analysis:** Median pre-post KAT scores were calculated and compared for statistical significance using "Wilcoxon Signed Rank test". The proportions of participants satisfied with training were also calculated. **Results:** The pre-post KAT scores for diabetes, hypertension and CAD were ranked, analysed and found to be statistically significant ( $p < .001$ ). Overall 94% of the participants were satisfied with the virtual training on NCDs. **Conclusion:** This study demonstrated that the NCDs training using virtual platform significantly improved the knowledge of medical officers and was found to be highly acceptable by them.

### Keywords

Non-Communicable Diseases (NCDs); Virtual Training; Medical Officers; Bihar

### Introduction

Bihar, one of the high focus states in India has high prevalence of non-communicable diseases especially diabetes and hypertension.(1) National Family Health Survey-4 (2015-16) revealed that 10 % of men and 6.1% of women (15-49 years) have blood sugar > 140 mg/dL. Similarly, hypertension is present in

9.4% of males and 5.9% of females. In districts of Muzaffarpur and Vaishali these indicators are higher or equivalent to the state average.(2)

Service providers at primary level play a crucial role in early identification, prompt treatment and referral for NCDs. But they are unable to avail opportunities for regular technical updates.(3,4) Moreover, financial factors and time constraints limits

opportunities for continuing medical education and thus there is a need for capacity building of physicians.(5)

In 2012, Government of Bihar established virtual classrooms in the public-sector nursing midwifery institutions which proved to be effective in improving the knowledge and clinical skills of students.(6) With permission and in collaboration with State Health Society (SHS), Bihar; we used this platform to initiate a pilot for training medical officers on NCDs in Vaishali and Muzaffarpur. The objective of this training was to build the health system's capacity to effectively treat and manage NCDs.

### Aims & Objectives

To evaluate the change in knowledge of medical officers and their perception on NCDs training.

### Material & Methods

**NCDs Training Program:** Under this program, Medical officers posted at the Primary Health Centres, Community Health Centres and District Hospitals of the two districts simultaneously received NCDs trainings through virtual platform. The State Nodal Centre, College of Nursing, Indira Gandhi Institute of Medical Sciences (IGIMS) Patna was the instructor or trainer location from where the training was given by experts from the respective field. The medical officers/physicians were present at the trainee locations which were established virtual classroom at (Auxiliary Nurse Midwife) ANM School Vaishali and Muzaffarpur.

The training package focuses on three NCDs: Diabetes, Coronary Artery Disease (CAD) and Hypertension. Training modules were developed by NCDs experts and the content was validated by trainers who were cardiologists and diabetologists. The training content covered all the aspects including epidemiology, risk factors, categories, diagnosis and management. Each of the modules also had a lesson plan to aid trainers for facilitating these trainings. This one day modular training was delivered through presentations which also included two way interactions between participants from the two districts and between participants and the trainers at the nodal centre. The training was done in three parts by three different expert trainers. The duration of each module was of two hours. The objective was to sensitize the medical officers/physicians on NCDs with minimum interference in their routine working hours.

**Study Design:** This study was a secondary analysis of the data collected before and after conduction of NCDs training. As a part of program implementation, participants were assessed on their knowledge related to three NCDs (diabetes, hypertension and CAD) before and after conduction of the training, using a standardized knowledge assessment tool (KAT). Additionally, post training feedback data was collected to monitor quality of NCDs trainings by understanding the participants' satisfaction level on various aspects of virtual training approach i.e. training content, methodology, technology used etc. **Study site and participants:** These NCDs trainings were conducted at two public sector ANM training institutions at Muzaffarpur and Vaishali districts in Bihar. All service providers (Medical Officers/physicians) posted in the Primary Health Centres, Community Health Centres, Sub-District/District Hospitals and Medical College Hospitals of these two districts were invited to participate in this virtual training program.

**Sample size:** A total of 214 medical officers from two districts received the NCDs training between November - December 2015. All participants who attended the NCD training were invited to participate in pre-post training knowledge assessments. As the participation in the knowledge assessments was purely on voluntary basis, some of the participants either attempted only pre-test or post-test or completely refused to participate. Therefore, out of total 214 participants, 150 undertook the pre-post test for diabetes, 139 for hypertension and 104 for CAD respectively. Additionally, a total of 79% (170 out of 214) participants provided voluntary feedback on their experiences related to the different aspects of the virtual trainings. Verbal consents were taken from the participants before initiating the pre-post knowledge assessments. All the assessments and feedback were undertaken through facilitators present at both the trainee sites. Though sample size was not calculated post hoc power analysis was done.

**Data collection tools and process:** The approval for this secondary analysis of program data was obtained from Institutional Review Board of Johns Hopkins Bloomberg School of Public Health. KAT was used to assess the knowledge of participants before and after NCDs training and it comprised of multiple choice questions related to prevalence, signs and symptoms, diagnosis, management and

complications associated with diabetes, hypertension, and CAD. This tool was developed and validated by the NCD experts. Each MCQ question had only one correct answer and the maximum score across three modules was 34.

Similarly, a user satisfaction feedback form using 5 point “Likert scale” was used to capture level of satisfaction among the participants related to various components of virtual training such as training quality, content relevance, teaching methodology, technology used. A total of 18 question items were included in this feedback form. Additionally two more items were included to capture participant’s opinion on relevance of the training to their current practice and need of similar trainings in the future.

No personal identifiers of any kind were collected from participants throughout the data collection process.

**Statistical Analysis:** Data was analysed using software package ‘IBM SPSS’ Version 24 and Microsoft excel version “2010”. Test of normality (Kolmogorov - Smirnov Test) showed Non-Gaussian distribution of the data. Therefore, Wilcoxon Signed Rank test was used. The maximum allowable alpha error considered was 5%. Proportions of participants who were satisfied with different aspect of virtual training was calculated and compared with non-satisfied participants to understand the level of satisfaction related to various aspects of NCDs training through virtual platform.

## Results

The median pre-test scores of participants for diabetes, hypertension and CAD modules were 5 (IQR 5), 5 (IQR 5) and 6 (IQR 4) respectively. The median post -test scores of participants for diabetes, hypertension and CAD modules were 8 (IQR 4), 7 (IQR 4) and 6 (IQR 3) respectively. The differences in median pre-post scores were statistically significant for each of the module ( $p$  value  $< .001$ ). Upon ranking the mean of post test scores were statistically significantly higher than mean of pre-test scores based on Wilcoxon Signed Rank test ([Table1](#)).

Based on the feedback received from participants, overall 94% (N=141) of the participants were satisfied with the NCD training through virtual technology. The results showed that 92% (N=170) of the participant were satisfied with the training content, 93% (N=169) with training strategy and 86% (N=168) of the participants were satisfied by the

methodology used for conducting this NCD training using virtual platform ([Table 2](#))

Of the participants who attended the trainings, 96% were satisfied with the technical expertise of the trainer and the post-session discussions, 80% accepted that this modular training has added to their knowledge, and 76% would prefer these kinds of training in future. The level of satisfaction among participants on NCD training through virtual platform was 89% as compared to learning via conventional seminars

## Discussion

NCDs are emerging rapidly in developing countries and there is an urgent need to equip India’s health care providers for their prevention and management.(7) Several programs are undertaken by the Government of India for combatting the NCDs, but these have not been able to reduce the burden due to their limited scale of implementation.(8) Building capacity for prevention, screening and diagnosis is critical and creates an urgent need to strengthen our front line health work force.(9)

It was found that training of medical officers in three NCDs namely diabetes, hypertension, and CAD through use of virtual technology was effective in improving their knowledge as there was a statistical difference in the pre and post-test scores for diabetes, hypertension and CAD.

Literature also shows that use of modern information technology like online education system in medical education has benefits for learning processes.(10) The advanced technology has been able to change the way educators and trainees interact with each other.(11) It has provided the opportunity to share information and learn collaboratively without having to be physically present in one group.(6) The use of existing virtual platform for improving the NCD knowledge among public sector medical officers proved to be an effective strategy for concurrently training the group virtually over a short duration.

The acceptability of training through virtual platform elicited a positive response from the participants. In this NCD training program 80% of the medical officers accepted that participation in this modular training has added to their knowledge. Overall 94% of the participants were satisfied with the NCD training through virtual technology.

A study done in US to assess the perception of primary health care residents on virtual diabetes educational activity also showed similar results with successful development and implementation. It was well liked by the resident doctors in teaching cognitive skills to manage diabetes. It showed significant improvement in self-assessed knowledge and confidence in diabetes management by residents.(12)

Currently, NCDs specific training is not included at the primary care level in the Human Resources Qualification Standards. There is not a clear system for ensuring Continued Medical Education for existing workforce.(13) The outcome of this pilot training program is promising, follow-up and tracking of these trained providers is required to understand the real impact of the program in improving the patient outcomes and standards of clinical care being delivered at their respective health facilities. This will also serve as guidance for the other states to initiate capacity building of their health care providers by using virtual technology.

### Conclusion

This pilot demonstrated that the virtual training on NCDs significantly improved the knowledge and understanding of medical officers regarding diabetes, hypertension, and CAD. Additionally, the study showed that the use of a virtual training platform was effective in transmitting knowledge and is acceptable to the participants

### Recommendation

Virtual platform can be utilized for training service providers' especially in remote, resource constraint settings where opportunities for regular technical update and learnings are limited. Thus, this can prove to be an effective way in addressing public health training needs especially at primary care level.

### Limitation of the study

The study was a secondary data analysis and used the data which was collected as a part of program implementation. The nature of program data allowed for secondary analysis. As this was a secondary analysis of the program data no sample size calculation was done. However, post hoc power calculation using online software(14) showed a power of more than 90%. Also, the analysis excluded the study participants who refused to be a part of either pre or post or both the assessments. This may have caused a bias in the results as non-

participants may be different from participants. However, this bias could not be avoided as the participation was completely voluntary

### Relevance of the study

Use of virtual technology has been demonstrated earlier as a successful platform for improving knowledge and skills of nurse midwifery students in Bihar. Findings of this secondary analysis provide evidence that use of such platforms can be leveraged effectively for in-service capacity building.

### Authors Contribution

All authors have significantly contributed in conceptualization of this study, data analysis, interpretation and development of this manuscript. All authors read and approved the final version of the manuscript.

### Acknowledgement

We would like to thank all medical officers posted at public health facilities of Muzaffarpur and Vaishali districts for their participation. We express sincere thanks to the State Health Society Bihar, and our technology partner Nichepro for their support in implementing this pilot program. We are also grateful to Meg Bertram, Angela Nash-Mercado and Gilliane McShane for their valuable inputs and support during the development of this manuscript.

### References

1. Barik D, Arokiasamy P. Economic Burden of Non-Communicable Diseases in India. Annual Meeting of Population Association of America, Boston, U.S.A. 2014 [cited 2016 15 May]. Available from: <http://paa2014.princeton.edu/papers/142300>.
2. IIPS. National Family Health Survey (NFHS-4), 2015-2016 State Fact Sheet Bihar, India. Mumbai: International Institute for Population Sciences (IIPS) 2016. p. 3.
3. Peabody JW, Taguiwalo MM, Robalino DA, et al. Improving the Quality of Care in Developing Countries. In: Jamison DT, Breman JG, Measham AR, et al., editors. Disease Control Priorities in Developing Countries. 2nd edition. Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2006. Chapter 70. p. 1293-95 Available from: <http://www.ncbi.nlm.nih.gov/books/NBK11790/> Co-published by Oxford University Press, New York.
4. Pakenham-Walsh N, Bukachi F. Information needs of health care workers in developing countries: a literature review with a focus on Africa. Hum Resour Health. 2009 Apr 8;7:30. doi: 10.1186/1478-4491-7-30. PubMed PMID: 19356239; PubMed Central PMCID: PMC2680393.[PubMed].
5. Panda R, Persai D, Mathur M, Sarkar BK. Perception and practices of physicians in addressing the smokeless tobacco epidemic: findings from two States in India. Asian Pac J Cancer Prev. 2013;14(12):7237-41. PubMed PMID: 24460281.[PubMed].

6. Agrawal N, Kumar S, Balasubramaniam SM, Bhargava S, Sinha P, Bakshi B, et al. Effectiveness of virtual classroom training in improving the knowledge and key maternal neonatal health skills of general nurse midwifery students in Bihar, India: A pre- and post-intervention study. *Nurse Education Today* 2016;36:293-7.
7. Woodward C. Strategies for assisting health workers to modify and improve skills: Developing quality health care – a process of change. *Issues in Health service delivery*. Geneva: World Health Organization 2000.
8. Srivastava RK, Bachani D. Burden of NCDs, Policies and Programme for Prevention and Control of NCDs in India. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine* 2011;36:S7-12.
9. Mokdad AH. Global non-communicable disease prevention: Building on success by addressing an emerging health need in developing countries. *Journal of Health Specialities [serial online]* 2016 [cited 2016 Aug 17];4:92-104. Available from: <http://www.thejhs.org/text.asp?2016/4/2/92/179820>
10. Potomkova J, Mihal V, Cihalik C. Web-based instruction and its impact on the learning activity of medical students: a review. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 2006 Nov;150(2):357-61. Review. PubMed PMID: 17426806. [PubMed].
11. TheHindu.com [Internet]. Tech News. Cisco’s ‘Dwara’ to connect educators. [updated March 10 2013; cited 2016 April 10]. Available from: <http://www.thehindu.com/sci-tech/technology/tech-news/article4492072.ece>
12. Sperl-Hillen J, O’Connor P, Ekstrom H, Rush W, Asche S, Fernandes O, et al. Using Simulation Technology to Teach Diabetes Care Management Skills to Resident Physicians. *Journal of Diabetes Science and Technology* 2013;7:1243-54.
13. Talwar KK, Grover A, Thakur JS. Role of Medical Education in Preventing and Control of Noncommunicable Diseases in India? *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine* 2011;36:S63-S6.
14. StatsToDo.comCancer-Pain.org [homepage on the Internet]. Hong Kong: Department of Obstetrics and Gynaecology, Chinese University; c2000-01 [updated 2014; cited 2017 Jan 6]. Available from: <http://www.statstodo.com/index.php>

**Tables**

**TABLE 1 COMPARISON OF PRE AND POST-INTERVENTION MEDIAN SCORE OF PARTICIPANTS ATTENDING VIRTUAL TRAINING ON NCDs**

S.No.	Module Name	Number of participants responded for pre-post-test (N)	Pre Test Median Score (IQR)	Post Test Median Score (IQR)	P value*
1	Diabetes	150	5.0 (5.0)	8.0 (4.0)	< 0.001
2	Hypertension	139	5.0 (5.0)	7.0 (4.0)	< 0.001
3	CAD	104	6.0 (4.0)	6.0 (3.0)	< 0.01

**TABLE 2 PROVIDERS PERCEPTION AND FEEDBACK RELATED TO NCD TRAINING**

PROVIDERS PERCEPTION AND FEEDBACK RELATED TO NCD TRAINING					
S No.	Components of NCD training	Number of Responses received	Number of Provider Satisfied (%)	Number of Provider Neutral (%)	Number of Provider Not Satisfied (%)
1.	Training Content	170	157 (92.35%)	11 (6.47%)	2 (1.18%)
2.	Training Strategy	169	157 (92.90%)	11 (6.51%)	1 (0.59%)
3.	Methodology	168	145 (86.31%)	14 (8.33%)	9 (5.36%)
4.	Technology	169	139 (82.25%)	20 (11.83%)	10 (5.92%)
5.	Teaching Skills	143	135 (94.41%)	8 (5.59%)	0 (0.00%)