Effectiveness of Field Visit in Community Medicine: A Randomized Control Trial

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ABSTRACT

Background: The community medicine is a major subject in undergraduate curriculum in India. Though much is said about methods and technologies to improve teaching in the subject, the scientific proof of field visits being better than class room teaching for understanding concepts like primary health care lacks. A randomized controlled trial, can give better idea of effectiveness of the intervention i.e. actual field visit to the heart of primary health care services-primary health center.

Method: Double- blind block randomization trial with two arm parallel design. The intervention group and control group were subjected to a semi-structured questionnaire following intervention. Logistic regression for Odds ratio adjusted for sex and attendance calculated.

Results: Crude and adjusted odds ratio highly significant in favour of intervention group. However, on sub component analysis for adjusted odds ratio for both variables, data management at PHC was having odds ratio <1. Adjusted odds were significantly high, specially for functions of medical officer and staffing pattern of PHC.

Conclusion: The randomization clearly suggests that field visit of primary health center helps students understand and realize concepts of primary health care better than classroom teaching. Replication of such studies with larger sample size may help.

Key words: Community Medicine, field visit, primary health care, block randomization, Adjusted odds ratio.

INTRODUCTION

Community medicine is taught in undergraduate students from 1st to 7th semester as per MCI norms. [1]The subject is taught by lectures in classrooms, field studies, case studies, demonstrations and practicals in the medical colleges.[2] But the method of teaching differs in this subject from other subjects in undergraduate medical curriculum is field visit. To make students aware of real field situations and practical issues of certain topics, community medicine department arranges visits of students. The places to be visited may differ depending upon vehicle availability, student strength, distance of visit place from medical college, administrative issues etc. Usually, places

where students realize the practical importance of such theoretical aspects, which can affect or which do affect health of public or community directly are visited. So, primary health centre, milk dairy, water treatment plant, sewage treatment plant, family planning centers etc. are visited with students.

It is assumed that such visits help improve understanding of theoretical concepts of concerned visit places. However, this assumption is not put to scientific evaluation till date. Hence, a randomized control trial is planned to investigate the effectiveness of field visit in importing knowledge about topic.

Community medicine, in its core, is concerned about health of people.[3] The basic or elementary health care is provided at PHCs in rural areas. [4] Knowledge of theoretical concepts of primary health care can be delivered in classrooms.[5] The way in which this service is provided i.e. PHC, can be described in classroom, which may include- Population norms of PHC & SC, staffing pattern of PHC, functions of MO, functions of MPHWs, activities at PHC, family planning services, data collection, compilation & distribution, management of minor ailments, provision of essential drugs etc.[6] Do field visit of PHC, help bring students nearer to this understanding or improve their concept of primary health care? This is what RCT tried to find out.

MATERIAL & METHOD

The study conducted with an objective to check equality between intervention and control arm. Taking desired power of the study as 80%., sample size for each arm was calculated using following formula[7] sample size (n) = $2(Z\alpha\text{-}Z_{1\text{-}\beta})^2 pq/(p1\text{-}p2)^2$ where type I error (α) was 0.05, type II error (β) was 0.2, Prevalence in control arm (p1) was 50%, prevalence in intervention arm (p2) was 80%, p= p1+p2/2, and q=1-p. Considering non response rate of 20%, total sample size for each arm was found to be 46. In the study, sample size of 50 students on each arm is taken. Here, the p1=50% rate of success in control arm, is assumed on the basis of WHO guideline (By S.K. Lwanga and S. Lameshow (1991))for assumption of prevalence in a population where it is not estimated.

Random allocation: Block randomization with Two-arm parallel design was planned.[8]

Restricted randomization was carried out as number of students available for study is finite. Total 100 students were enrolled for the study. Total 100 chits labeled either A or B was placed in an envelope. All were shuffled with envelop closed. The students were allocated as cases/ test students if the chit withdrawn was A. After withdrawal of each chit envelope was shaken to shuffle the chits.

Allocation concealment:

The role numbers of the students were noted at the time of chit withdrawal in a paper with two columns- A & B. The chits were withdrawn by resident doctor of the department who will tell whether chit is A or B. The resident doctor is not aware of the sequence of roll numbers used by the analyzer. None of the student is aware that in which group test or control they are allocated to. Both were subject theory classes on PHC. Investigator is provided the group of students who are selected for intervention, when PHC visit is to take place. The investigator does not know the roll numbers of students for intervention group or control group. The evaluation questionnaire was distributed in all students after visit of intervention group to PHC, followed by visit of control group to PHC.

Analyzer has list of roll numbers and allocation of particular roll number in intervention or control group.

So the study has double blind design.[9]

Follow up: The group of students who were selected for intervention arm was gathered in classroom. They were then taken to visit of primary health centre, Goraj PHC, about 20 km from SBKS MI and RC. A faculty from department of community medicine accompanied students. At PHC, students were explained different components of primary health care. Medical officer and other staff on duty explained their activities. Students were demonstrated vaccine equipments, different kits, medicine stock etc. Students were informed about different registers and online data formats, and how this data is uploaded in forms was demonstrated by data entry operator. Lab technician discussed about biomedical waste management of PHC BMW. Students were appraised about demography and epidemic data related to PHC.

The control arm groups of students were not taken to visit at that time. Like the intervention arm group students, they were taught about primary health care & primary health centre by lectures theoretically.

Outcome Measures: Outcome data was obtained by means of using a structured questionnaire introduced to both groups. Following visit to PHC, the intervention arm & control arm group students were gathered in lecture hall. Students were randomly given seat numbers and questionnaire was introduced to entire batch. The questionnaire included question regarding definition and concept of primary health care, population norms for PHC, staffing pattern of PHC, function of health team, vaccine management, data management at PHC, role of PHC in health care.

The questionnaire was assessed by senior faculty of department of community medicine, unaware of roll numbers of intervention and control arm students.

The interviewer bias was controlled by that. The recall bias was controlled as both groups were subject to control measure i.e. lectures at same time. (Bias can still be accepted as controlled arm students might know, among their friends, who were taken to visit and who were not taken. Hence subject variation exists.)[10]

Statistical Analysis: The questionnaires were assessed and marks obtained were analyzed for both groups. Marks obtained by both groups were analyzed for sub components of questionnaire. Obtaining 50% marks in sub components & in total were used to label pass and fail. The subgroup analysis done here was not planned a priori and hence not powered for any subgroup. Sample size was calculated for main trial. Crude/unadjusted Odds ratio among intervention and control group as well as Adjusted Odds ratio for attendance and sex of the students was calculated. The SPSS 19.0 was used for statistical analysis. Summary statistics used was logistic regression for odds ratio and adjusted odds ratio.

Ethical considerations: Approval by institutional ethics committee of the Institute was obtained.

RESULTS

Results are presented for sex and attendance (%) distribution among both the groups. Before hand the contents of the questionnaire used to evaluate students with sub components are presented for better understanding of tables by the reader.

Table 2 shows sex of the students in intervention and control group. The sex distribution among both arms of the control trial was found not to be heterogeneous as chi-square was not statistically significant.

Attendance of students in last 50 classes was used for estimating retention of the student in the class. This was used as a proxy for regularity of the student, as one of the variable affecting performance in the test. The attendance percentages were sub divided in 4 sub classes or categories. As per norms, at least 75% attendance is compulsory for appearing in university examination. However, there was no significant difference was observed in both groups suggesting homogeneity or comparability of the groups for intervention effect (table 3).

Table 4 shows comparing performance of students in intervention and control trial. The crude Odds ratio was found to be highly significant in favour of intervention group in overall performance. However, the intervention arm group students were having more knowledge as compared to control arm in certain sub components of Primary health care like data management (OR= 13.5), vaccine and cold chain at PHC (OR=7.373) and role of PHC in Health care (OR=3.08)

Table 1: Contents of questionnaire used to evaluate performance of students

Content	Questions
1. Definition and concept of PHC	7
2. Population norms	4
3. Staffing pattern of PHC	6
4. Functions of MO	10
5. Functions of MPHW(M)	4
6. Functions of MPHW(F)	9
7. Vaccine and cold chain at PHC	6
8. Data management	7
9. Role in healthcare delivery	4
Total	57

Table 2 : Sex distribution of the students in intervention and control group

Sex	Intervention	Control	Total
Male	24	32	56
Female	26	18	44

(X^2 =2.00, df=1, p=0.5)

Table 3 : Average Attendance(%) of students in intervention and control groups

Attendance(%)[a]	Intervention group	Control group	Total
<=50%	3	7	10
51-75%	9	3	12
76-90%	18	20	38
>90%	20	20	40
Average[b]	84.8%	82.4%	100

(X^2= 8.002, p>0.05); a: Attendance of last 50 theory classes was considered; b: Percentage attendance of group was averaged

Table 4: Comparing performance of students in intervention and control arm

	Intervention (n=50) (%)	Control (n=50) (%)	cOR (95%CI)	aOR for sex (95%CI)	aOR for sex & attendance (95%CI)
Concepts of Primary health care	27(54)	17(34)	2.28 (1.02-5.11)	0.67 (0.22-2.14)	0.67 (0.18-2.48)
Population norms	46(92)	45(90)	1.28 (0.32-5.07)	0.71 (0.1-4.79)	0.84 (0.11-6.29)
Staffing pattern of PHC	35(70)	36(72)	1 (0.42-2.39)	1.77 (0.45-6.96)	2.41 (0.51-1.42)
Functions of MO	42(84)	45(90)	0.58 (0.18-1.93)	2.76 (0.43-7.83)	25.84 (0.62-8.11)
Functions of MPHW(M)	27(54)	23(46)	1.38 (0.63-3.03)	0.86 (0.27-2.75)	0.95 (0.23-3.93)
Functions of MPHW(F)	42(84)	33(66)	2.71 (1.04-7.04)	0.44 (0.11-1.76)	0.43 (0.09-2.2)
Vaccine and cold Chain at PHC	47(94)	34(68)	7.37 (1.99-7.32)	0.12 (0.01-1.05)	0.11 (0.01-1.08)
Data management	45(90)	20(40)	13.5 (4.57-9.89)	0.06 (0.01-0.32)	0.03 (0.03-0.25)
Role in health Care delivery	37(74)	24(48)	3.08 (1.33-7.15)	0.31 (0.09-1.04)	0.14 (0.03-0.87)
Overall questionnaire	36(72)	23(46)	3.02 (1.32-6.93)	0.33 (0.1-1.11)	0.16 (0.03-0.96)

cOR=Crude OR, aOR= Adjusted OR, CI= Confidence Interval

When the analysis was carried out using logistic regression for the variable sex, the intervention group was more aware about (1) Functions of MO and (2) Staffing pattern of PHC. However, on considering 95% confidence interval values, the intervention arm had more success probabilities as compared to control arm in overall and most sub components excluding data management at PHC, suggestive of low performance of male students in that component.

On adding variable of attendance in Block 2 for logistic regression, the results remained almost similar in most of the sub components and in overall performance. However, the Odds ratio improved for 2 sub components i.e. staffing pattern of PHC and Functions of MO.

For overall performance, logistic regression model suggested significant difference between two groups(X^2 =4.085,p=0.043). Negelkerke R^2 indicated that the results can have 10.6% variance. The correct prediction rate was estimated to be 64%.

DISCUSSION

Though this study is first of its kind, studies about teaching method are carried out. In a cross sectional study carried out by Pal R. et al had shown field posting as less preferred and effective method of teaching. However, that study was a cross sectional. However, in that study also, 55% students had marked field posting as a average to above average method of teaching.

In a study by Manzoor I. et al. also, lecture method of teaching was preferred by only 25.8% of students.[11] In their article in The south east asia journal of medical education, Anita Nath and Gopal Ingle [12] also have suggested that didactic lectures be ing older method of teaching community medicine has failed to generate interest in the students about the subject. It requires more field based programs to be incorporated in the curriculum of the subject.

An opinion based study carried out in West Bengal by P K Mandal had also found that students are more positive and responsive to field based study in community medicine as compared to class room teaching.[13]

Same voice is echoed by Dr. Pradeep Kumar ,in his article , suggesting solution to problem of lack of interest of students in subject, that the more emphasis should be placed on field based activities.[14]

In his article in Japanese journal of public health, Kahyo H. has reported that above half of the student respondents supported the educational effect of field visit exposure positively. [15]

In the field of education there are several studies on field visits. One analysis of such studies by Martha L Nabors and others mentions that field trips are a type of experiential learning & helps learning students as a new mode of learning. This also makes students aware of actual world in which they live.[16] In his article on retention of memory following science field trip, D.Knapp has mentioned that potential immediate outcome of science field trip are the retention of knowledge associated with the program and improved attitude toward the site visited during the trip.[17]

Though there are several other studies of cross sectional type or feedback analysis, any randomized controlled trial for the field activity was not found to author. It is expected that this study will help lead other researchers in the field of medical education to carry out more such studies to enrich the subject to move in the direction of evidence based community medicine.

CONCLUSION

The randomized controlled trial is considered to be the gold standard method in research. The results suggest that field visit to primary health center helps improve different aspects, theoretical as well as practical, regarding primary health care in a significantly better way as compared to classroom teaching with lectures. However, when adjusted for sex and attendance rate of both groups of students, all components were better understood by intervention arm students except data management at PHC. Further studies with larger sample size and at multiple locations are recommended to improve reliability and validity of the results.

REFERENCES

1. Medical Council of India: Gazette of India. Regulations on graduate Medical education. part III section 4. ; 17 th May,1997. p.14. Available at http://www.mciindia.org/ RulesandRegulations/GraduateMedicalEducationRegulatio ns1997.aspx. Accessed March 3rd,2019.

2. Vydehi Institute of Medical sciences and Research center .Department of community medicine curriculum ;2000. Available at VIMS website www.vims.ac.in/education. Accessed on March 3rd, 2019.

3. Hogarth J. Glossary for health care terminology, Bureau Régional de l'Europe. Organisation Mondiale de la Santé; 1977:(vol.4).

4. World Health Organization & UNICEF. International Conference on Primary Health Care 1978. Alma-Ata, USSR: WHO; 1978.

5. Pal R, Kar S,Zaman FA, et al. Assessment of impact of small group teaching among students in community medicine. IJCM. 2012 ;37 :170-3.

6. Module for training of Medical officers. Ministry of Health & Family welfare. New Delhi ;1997.

7. PSS Sundar Rao, J. Richard. An Introduction to biostatistics. A Manual for students in Health sciences. New Delhi : Prentice Hall India Pvt. Limited ; 2004. p.196.

8. Thomas D. Koepsell, Noel S. Weiss. Epidemiological Methods. Studying the occurance of illness. Oxford : Oxford Uni. Press ; 2003. P.321-322.

9. Kenneth F Schulz, David A Grimes .Blinding in randomized trials: hiding who got what. The Lancet. 2002;359(9307):696-700.

10. K.Park.Park's textbook of preventive & social medicine, 18th Edition, Jabalpur : Banarsidas Bhanot publishers ; 2005. p.77.

11. Manzoor I, Mukhtar F, Hashmi NR . Medical students' perspective about role-plays as a teaching strategy in community medicine. J Coll Physicians Surg Pak. Apr 2012;22(4):222-5.

12. Anita Nath, Gopal Ingle. From classroom to community: teaching community medicine in India. Country paper. South East asia journal of medical education. 2008; 2: No. 2.

13. P K Mandal , Chitra Chatterjee,G.K. Joardar, et al. Indian Journal of Preventive & Social Medicine. 2010; 41 (1&2) : p. 42-46.

14. Pradeep Kumar. Teaching community medicine to undergraduates, problems and solutions: a loud thinking. National Journal of Community Medicine. Jan – Mar 2013 ;4 (1):1-3.

15. Kahyo H. Educational effect of field visit in the course of preventive medicine and community health-case report of the field visit to Chikuho districts(1981-89). Japanese Journal of public health. 1996; 43(1) : p.68-74.

16. Martha L. Nabors, Linda Carol Edwards, R Kent Murray. Making the case for field trips: what research tells us and what site coordinators have to say.Education.2009; 129(4): 681-687.

17. Knapp D. Memorable Experiences of a Science Field Trip. School Science and Mathematics, 2000; 100:65–72.