

Comparative effectiveness of non-print media and live CME

Kuldeep Singh¹, Vishesh Thanvi¹, Sanjeev Misra², Suman Bhansali³, J S Bajaj⁴,
Department of Pediatrics¹, Director², All India Institute of Medical Sciences, Jodhpur,
Professor Community Medicine, Dr S N Medical College, Jodhpur³,
Emeritus Professor, National Academy of Medical Sciences, New Delhi⁴

ABSTRACT

Continuing Medical Education is an integral ingredient of professional development of health care providers. The educational activity can be delivered by different modes. Here we share our experience of using Digital Video Disc (DVD) of a CME on Sleep Medicine as an alternative and cost effective mode.

Objective: To assess improvement in knowledge and competencies in terms of comparative effectiveness of a model CME program using validated non-print medium for medical education.

Methods: Recorded and validated DVD of talks delivered at NAMS-AIIMS Regional Symposium on Sleep Medicine was played to the participants in presence of one of the content experts. Video scripts of talk were also distributed to the participants. The assessment of participants and program evaluation of this CME was compared to the previously held live CME.

Results: Eighty nine participants completed both pre and post test. Mean score increased from 9.91 ± 3.5 to 14.09 ± 2.85 . Pass percentage based on an arbitrary cut off of 50%, increased from 8.3 to 43.8 ($p < 0.001$). Among the live CME group, mean score improved from 12.1 ± 4.6 to 18.3 ± 3.8 . Comparative analysis between live and DVD based CME showed improvement in scores of 6.17 and 4.18 respectively while pass percentage of 84.7 and 43.8 post CME among two modes were significant. The program evaluation showed identical level of satisfaction in all parameters except they were less satisfied vis-a-vis '*organizers made use of any critical comments I made*' since all locally available resource persons were not present. Activity could be completed at just half the cost of live CME.

Correspondence : Dr Kuldeep Singh, Additional Professor & Head, Department of Pediatrics, All India Institute of Medical Sciences, Jodhpur-342005 Email: kulpra@hotmail.com

Conclusions: The educational background and selection process of UG students between two medical institutes were strikingly different. While student at one Institute were selected by highly competitive exam at All India level, the students at other institute were selected through state level competitive examination. In spite of that, results showed comparative impact on knowledge and competencies among the participants and hence proves this to be a cost-effective mode of delivery of educational assignment.

Keywords: Live CME, face-to-face CME, effectiveness of educational activity.

Background :

Sleep disorders are now being increasingly recognized for all ages as important contributor for morbidities globally. The situation seems to be similar in India as shown by recent published evidences from Indian experts (1). The studies have shown that sleep disturbances may result not only into behavioural and psychological disorders but also metabolic, neurological and physical disability. Time has come that Medical Professionals be apprised of vast developments in the field of sleep medicine and also to create awareness among general public through these trained professionals. With this aim NAMS Regional Symposium on Sleep Medicine with specific learning objectives was held during NAMSCON 2013 at AIIMS, Jodhpur on 25th October 2013. Pre- and post-assessment of 59 participants showed significant gain in knowledge regarding basic sleep physiology, clinical presentations and management of sleep related disorders with mean scores increasing from 12.1 ± 4.6 to 18.3 ± 3.8 (p value <0.001). The

pass percentage, based on arbitrary cut-off scores of 50%, increased to 84.7 % from a low of 33.9 % pre-intervention. Evaluation of the program provided data indicating high satisfaction index above 71.8 % in all parameter with highest satisfaction shown toward “*time provision for clarifications and creation of conducive environment*” (87%) (2).

It was observed that a course on Sleep Medicine, which not only involves basic science but also clinical and para-clinical subjects, can very well serve as a module for integrated teaching. Integration, horizontal as well as vertical, is now being considered important for contextual learning for students by Medical Council of India (MCI). This has therefore been incorporated into ‘*Vision 2015*’ document of MCI and initiatives are being taken for faculty development through ‘**Curriculum Implementation Support Program (CISP)**’ for sensitizing all medical faculty members in these new elements of curriculum.

With the success of Regional Symposium on Sleep Medicine it was felt

that the same program should be repeated in other Institutions. However, the cost of travel of experts, their precious time, arrangement at local site, aligning the timing of student's availability with that of experts appears to be very high.

It was, therefore, decided to use the validated learning resource materials recorded in the form of DVD at Regional Symposium to be used as instructional material for the proposed similar CME program in a sister institution, with the comparable group of medical students as target audience. The assessment and evaluation of the proposed CME Symposium shall be compared with the data obtained in a comparable group of target audience during Regional Symposium on Sleep Medicine at AIIMS held earlier.

This data and its analysis will help us in designing future innovative Continuing Medical Education program for many other relevant topics and themes in a cost-effective way.

Aims and Objectives:

1. To assess improvement in knowledge and competencies in terms of comparative effectiveness of a model CME program using validated non-print medium for medical education.
2. To enhance knowledge of sleep physiology and raise awareness of the spectrum of sleep disorders that physicians may see in their patients and to enhance participants' understanding of the

association of increasing prevalence of sleep disorders with various co-morbidities in children and adults; consequences of sleep disorders; specific disease states associated with such disorders and the treatments available.

Methodology:

The educational activity was based on a DVD on sleep medicine prepared at an earlier symposium held during NAMSCON 2013. Resource person's presentations during NAMS Regional Symposium were recorded through two High Definition Video cameras and DVD was prepared. Validated DVD of this Symposium was independently reviewed by two content experts and one of the authors (JSB). Following a tele-conference meeting, mutually agreed alterations were incorporated in to the DVD which was further edited. The Edited DVD was again previewed by one of the content expert a day before the final CME was scheduled. A telephone meeting with the author (JSB) was made with resource person and strategy for audio-video presentations discussed with him. AV arrangements were made at the venue for CME program at the medical college under guidance of their Academic Coordinator and co-author (SB). All the participants who were registered for the CME were given pre-tested and validated questionnaire consisting of 30 multiple choice items having a single correct response. The students were explained the purpose of CME and the study. They were

asked not to disclose their identity, if they so prefer. Random coding was done and students were asked to remember their code. Those who attended all sessions and were present at conclusion were again given a post-test consisting of 30 questions, different from pretest but having similar difficulty level.

The presentation narratives of each speaker was transcribed and edited and constituted the hand book of Learning Resource Material (LRM) as a supplementary to the DVD presentations in the CME program. One of the content experts acted as the main resource person for the CME Program. He interacted with the participants and clarified many of their doubts during all video presentations. All participants were seated in 3 rows around central horse shoe table. There was adequate visibility of AV aids and most of the participants were also able to see each other and the resource person.

Following tools were used for the program

evaluation:

(i) Program Evaluation Questionnaire

a. CME committee of National Academy of Medical Sciences prepared a pre-tested questionnaire based on the Likert scale.

b. This included following:

- i. Demographic details
- ii. Part A about symposium planning, utility of working method and format of symposium
- iii. Part B concerned with gain in knowledge, skills and some additional information needed for further improvement in such activities

(ii) Satisfaction Index was calculated based on data from Part A questionnaire.

Formula for Satisfaction Index :

$$S I = \frac{\{(a \times 1) + (b \times 2) + (c \times 4) + (d \times 5)\} \times 20}{N}$$

Where,

a, b, c, d are number of total responses for

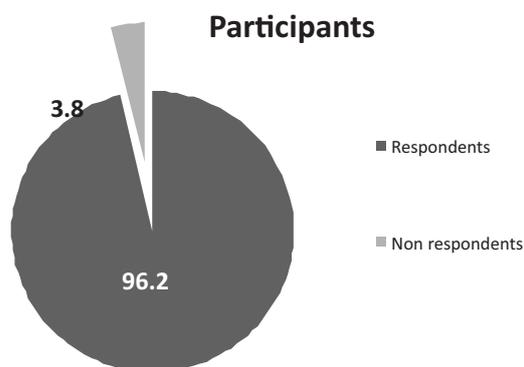


Figure 1:

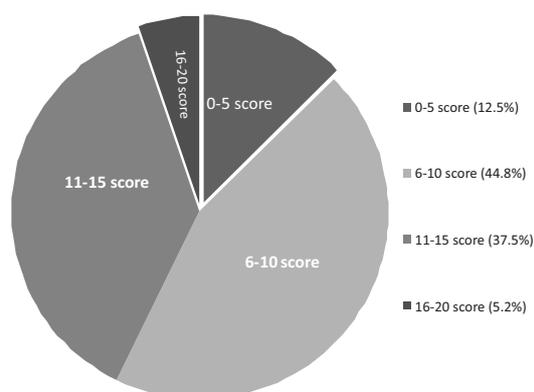


Figure : 2

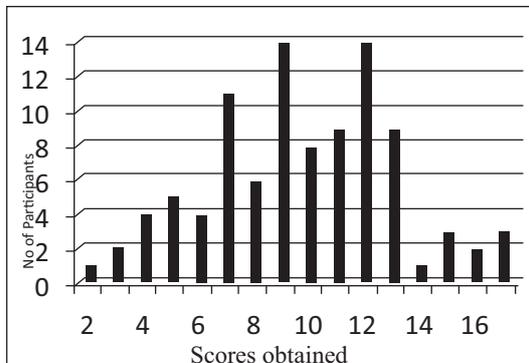


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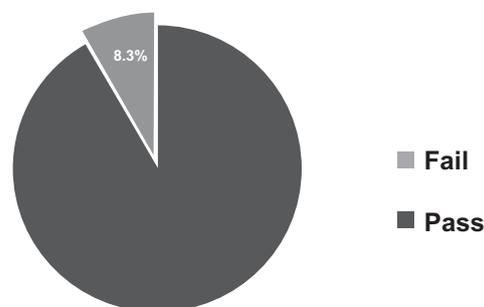


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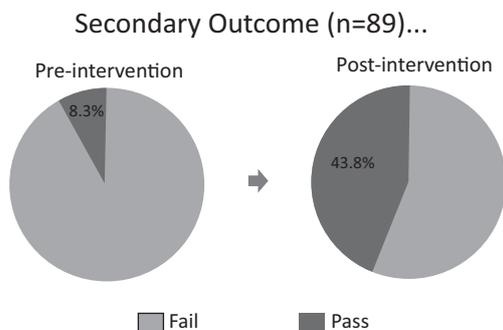


Figure 5: Percentage of participants securing above 50% score

used to describe data. Paired t test was used for quantitative data and McNemar's test was used to compare paired categorical data. SPSS 17.0 software was used for data analysis.

Results

A total of 108 participants attended the program and were given pre-structured questionnaire. One hundred and four participants returned the form with response rate of 96.2 % at start of sessions (**Figure 1**). Mean score was 9.69 ± 3.4 , Median score: 10 (7, 12) and score ranged from 2-17. Only 5.2 % of participants passed the pre-test (**Figure 2**).

The frequency distribution is shown in **Figure 3, 4 and 5**.

Post test conducted at the end of CME was attended by 95 students only as shown in **Table 1**. Only 89 students participated in both pre and post tests.

Table 2 shows comparison of score between pre and post intervention. There is significant improvement of passing

the Co-efficient 1, 2, 4 and 5
 n= number of total participants
(iii) Qualitative evaluation based on individual responses of data from Part B. Confidentiality of all the information was assured and writing their names was optional. Descriptive frequencies were

Table 1

	Pre intervention N (%)	Post intervention N (%)
Total participants	108	95
Respondents	104 (96.2)	89 (93 %)
Non Respondents	4 (3.7 %)	6 (7 %)

Table 2

Score	Pre intervention Score (n=89)	Post intervention Score (n=89)
Mean	9.91± 3.5	14.09 ± 2.85
Median	10 (7, 12)	14 (12, 15)
Range	2-17	8-22

Table 3

	Pre-Intervention	Post -Intervention	P value
Pass	8 (8.3%)	39 (43.8%)	<0.001

Table 4: Comparison of Base line scores between Live CME and Video CME

Pre-Intervention	Live CME (n=59)	Video CME (n=89)	P value
Pass n (%)	20 (33.9)	8 (8.9)	< 0.001

Table 5. Primary Outcome:

	Live CME Mean (SD)	Video CME Mean (SD)	P value
Increase in scores after intervention	6.17 (5.14)	4.18 (3.02)	0.009 2 [95%CI (0.52; 3.4)]

Table 6: Secondary Outcome Post intervention secondary outcome between two CME methods

	Live CME	Video CME	P value
Pass n (%)	50 (84.7)	39 (43.8)	< 0.001

Table 7 (Satisfaction Index between 2 groups)

S No	Parameter	Satisfaction Index NAMSCON (A X 20)/B	Satisfaction index CME-SNMC
1	I received precise information in advance on the aims of the symposium.	84.91	80.5
2	The goals of the symposium appeared to me to be of immediate interest for my academic activities.	84.91	80
3	The content of the symposium dealt with issues I generally encounter in my academic assignments.	71.80	75
4	Considering my other professional commitments, the symposium scheduling was appropriate.	75.40	74
5	I found the documents provided of acceptable quality.	85.90	86
6	Time was provided to seek clarification on issues included in the background documentation.	87.21	82
7	The working methods used during the symposium encouraged me to take an active interest in the session themes.	83.27	85
8	The pace of presentation of the subject content was appropriate.	80.00	78
9	The general atmosphere of the symposium was conducive to serious work.	87.87	81.5
10	The organisers gave me opportunity for critical comment.	80.33	81.5
11	The organisers made use of any critical comments I made during the symposium.	85.57	68

Table 8: Additional descriptive information from participants

Parameter	Positive %	Negative %	No response (%)	Salient descriptive comments
Gain in knowledge in respect of clinical management	58.5	1	40	Learnt that sleep disorder can lead to serious diseases and prevention is better. Gained practical information helpful for my clinical years. Valuable information-happy to be a part of this symposium
Attainment of new skills and will you be able to utilize in your practice?	86	1	13	I can now use this information for my immediate application. New skills and methods told by professors are very useful for my future practice.
Improving in competencies in managing such problems	59	3	37	Many ways it has improved our competencies in awareness, knowledge and a wonderful experience. Learnt practical tips. I can spread knowledge.
If you are a PG student, has this helped you in preparation for your exams?	10.6	0	89.3	I am UG student but will help me in exams. Can't say as I am MBBS 1 st year.
What additional topic areas should be included in a symposium in future?	13	5	76	No additional topic. Should start with more basic terms. Sleeplessness in brain diseases. Student behaviour during studies and it's effect on sleep
What topics/subjects to be deleted or under-emphasized if this symposium is to be repeated in future	23	5	71	None- all are best. No need for deletion of any topic. I think epilepsy is too hard to understand at this level. The pharmacological part could be underemphasized. Quality of life needs repetition. Large number of references to be reduced
Is one workshop on this subject sufficient?	62.7	3	34	Subject requires more than 1 workshop. More videos. It's vast field and hence more such workshops
Would you like more workshops in future on this theme	55.3	6.3	38	Yes, definitely looking forward. Yes with more topics related to sleep, dreams and their interpretations. Similar workshop on other themes also. We will surely appreciate and enjoy this type of symposium
Suggest any improvement	26.5	19	34	Seminar great & quite interesting but lengthy. More videos, pictures and cases. Already a good symposium. Live interaction needed. Pace should be slow. Make it short and sweet. Advance information required. Use more simple language. I think it was up to the mark and requires no improvement.
Deficiencies in planning, conduct or any other academic/organizational aspect of workshop	39	7.4	47	No deficiency, very creative, interactive. The symposium was awesome. Good organization. Medical terminologies should have been explained.

percentage (**Table 3**).

Figure 6 shows score distribution for post-test. **Figure 7** shows comparative improvement in scores. **Table 4, 5 and 6** depicts differences between live and DVD based CME. There was a statistically significant increase in the scores obtained in the post intervention questionnaire as compared to pre intervention questionnaire (**Table 3**). The mean increase in the scores post-intervention was 4.2 with 95% CIs 3.5; 4.8 ($P < 0.001$).

Program evaluation showed Satisfaction Index of above 68% and was comparable with that of Live CME group (**Table 7**). The program evaluation showed identical, level of satisfaction in all parameters except they were less satisfied vis-a-vis '*organizers made use of any critical comments I made*' since all locally available resource persons were not present. The individual responses on some of questions asked were quite interesting and are summarized in **Table 8**. The student's reflection appears to be mature and enthusiastic despite being in early medical school years. The expenditure incurred in arranging the CME with single resource person was less than half the cost incurred during live symposium.

Discussion:

Continuing Medical education remains one of the essential and vital activities in today's world for the healthcare professionals to keep themselves updated, maintain and enhance their skills and competencies. Guidelines have been made for designing

and evaluation of CMEs (3). American Board of Medical Specialities (ABMS) and the Accreditation Council for Graduate Medical Education (ACGME) have identified core competencies necessary for training and re-certification. In their report, Office of Continuing medical Education, Winthrop-University Hospital, recognized the increasing challenges for activity directors in creating such CMEs (4). A very recent systematic review report published by ACCME emphasized that "*CME is most effective if it is based on practice-based needs assessment, and is ongoing, interactive, and focused on outcomes that are considered important by physicians*".

Based on the analysis of systematic reviews published by various authors it is amply clear that debate regarding effectiveness is over and that research regarding the mechanisms of action by which CME improves physicians' performance is in early stages and needs methodological sophistication (5). Moreover one needs to ask '*What types of CME are most effective?*' Interactive approach is crucial to effective Continuing Medical Education program. Attempts have been made to study factors for designing and implementing effective CME. In a study from Saudi Arabia, Mafinezad found that the effect of educational, cultural, social and economic barriers on the development and implementation of inter-professional education, and also unfamiliarity of educational system with the various aspects of inter-professional education, have made the implementing of these

programs in the curricula of different professions of health sciences difficult (6).

The present study endeavors to explore the impact of pre-recorded CME on DVD delivered in a manner similar to a live CME *sans* live presence of all experts during the academic activity. The results are similar with improvement in knowledge and skills and similar satisfaction between the two activities. This is in contrast to other CMEs where researchers have used comparison between face to face with DVD distributed to student or delivered through web. Maloney compared face to face program with video with a web based program for training physicians for an exercise program and found equivalent results (7). Marinopoulos *et al* (2007) concluded that: a) live media is more effective than print, b) multimedia is more effective than single media interventions; c) multiple exposures are more effective than a single exposure, d) interactive techniques are more effective than didactic techniques, and e) simulation methods are effective for improving psychomotor and procedural skills (8). The present study also found multimedia (Print, audio video) and interactive technique producing same results as live media.

While reviewing impact of CME with Problem based learning (PBL), Al-Azri and Ratnapalan (2014) found that the CME intervention in 7 studies included case-based e-learning and eight other studies were live CME ranging in length from one hour to one-half day. They found

that “*there is limited evidence that PBL in continuing education enhances physicians' performance or improves health outcomes*”. They however recommend that educators should consider multiple factors, including cost effectiveness, when implementing PBL methodology in CME (9). In a resource constrained situations in India, it becomes worthwhile to design cost-effective CMEs and reduce dependency on funding agencies. One can drastically reduce the expenditure incurred on travel of experts. Or in other words reach to a wider health professionals with same the funds.

Conclusions:

The study shows that using DVD as non-print media improves the knowledge and skills of participants and hence is an effective strategy. Though significantly higher improvement occurs using live presentation, the cost of arrangement for DVD based CME was just half of that for live CME and was just one fourth if travel cost is also curtailed. It was noteworthy that educational background and selection process of UG students between two medical institutes were strikingly different. While student at one Institute were selected by highly competitive exam at an All India level, the students at other institute were selected through state level competitive examination. In spite of that, results showed comparative impact on knowledge and competencies among the participants and hence proves this to be a cost-effective mode of delivery of educational assignment.

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References:

1. Bajaj JS (2013). Sleep medicine: Perspective, Potential and Prospects. *Ann Natl Acad Med Sci (India)*. **49** (3 &4): 75-80
2. Singh K, Sharma B, Misra S, Bajaj J S (2013). Determination of Satisfaction Index as a tool in evaluation of CME Program. *Ann Natl Acad Med Sci (India)*. **49** (3&4): 185-193.
3. Institute of Medicine (2001). Crossing the quality Chasm: A new health system for 21st Century. Washington DC: The National Academic Press.
4. Academic Affairs, OCME (2011). Designing and implementing a Needs-based Continuing Medical Education activity: A Resource Guide for Activity Directors, faculty and department CME staff. Winthrop University Hospital. NY
5. Cervero RM, Gaines JK (2014). Effectiveness of Continuing Medical Education: Updated synthesis of Systematic Reviews. Report by Accreditation Council for Continuing Medical Education (ACCME). Chicago IL 60654
6. Mafinezad MK, Ahmady S, Arabshahi S K S , B i d e l i S (2 0 1 3) . Interprofessional Education from the Faculty Members' Perspective: A Qualitative Study. *Res Dev Med Educ*. **2**(1), 25-30
7. Maloney S, Haas R, Keating JL, *et al* (2011). Effectiveness of Web-Based Versus Face-To-Face Delivery of Education in Prescription of Falls-Prevention Exercise to Health Professionals: Randomized Trial. *J Med Internet Res*. **13**(4):e116
8. Marinopoulos SS, Dorman T, Ratanawongsa N, *et al*(2007). Effectiveness of continuing medical education . Evidence report/technology assessment no. 149. Rockville, MD: Agency for Healthcare Research and Quality
9. Al-Azri H, Ratnapalan S (2014). Problem based learning in Continuing Medical Education: Review of randomized controlled trials. *Canadian family Physician*. **60**(2): 157-165