

# Annals of the National Academy of Medical Sciences (India)

## Research in Medical Education

Guest Editor

**J.S. Bajaj**



**Vol 51, No 1 & 2**  
**January-June, 2015**  
**ISSN 0379 - 038X**



# **Annals of the National Academy of Medical Sciences (India)**

-: A quarterly Journal :-

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Foreign	\$ 30.00
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Single Copy	Rs. 150.00

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## Prologue

Following NAMSCON 2013 at AIIMS Jodhpur and the success of the Regional Symposium on Sleep Medicine, there was a major effort in the form of CME program, based on sleep medicine at the SN Medical College, Jodhpur to validate its efficacy and also using CD with presentations to survey sleep education research. Not only this, the Academic Council encouraged and enthused the motivated faculty to embark on Medical Education Research. It culminated in many lateral activities related to research at AIIMS Jodhpur. The current issue is on “Research in Medical Education” and we hope to fulfill the role of Academy as a research institution.

The decision of the Council to print 4000 copies of this issue is a major step not only in updating but also enthusing all Fellows, Members including those who secure their membership after passing the special board examination conducted by National Board of Examinations. The wide reach of the Annals amongst all of them will surely encourage additional research in medical education. If this happens, the Academy could have established its rightful place as a leader in enhancing the quality of research in medical education.



Emeritus Editor

## Editorial

I deem it a great privilege to have been assigned the task of serving as the Editor of the Annals of the National Academy of Medical Sciences, 2015. I thank the Council for the confidence that has been reposed in me. I am deeply conscious of the fact that I enter the footsteps of stalwarts like Col. Sangham Lal, Lt. Gen. C.C. Kapila, Dr. R.K. Sanyal, Dr. Somnath Roy and Dr. K.N. Sharma. Dr. J.N. Pande and Dr. Kusum Verma made significant contributions during the last ten years. In addition, I must acknowledge the contributions of Prof. J.S. Bajaj who initiated the concept of theme-related issues of the Annals like *Non- alcoholic Fatty Liver Disease, Diabetes Mellitus and Sleep Medicine*. While themes were well chosen, the major effort was to provide opportunity to the specialists to publish their work and emphasize the current status of research in India. While doing so he only permitted himself to be called as Emeritus Editor. Likewise the present issue is on a theme which is novel and contemporary. With the approval of the Council, he planned present issue to show new areas of research not only in the progress of medicine but also in our conceptual visualization of progress of research in medical education. Prof. Bajaj convinced the Council the role of the Academy in encouraging development not only in the *Technology of education but also of Technology in education*. All the articles of this issue are related to one or other aspect of these challenges.

The present issue is based entirely on the conceptual planning, selection of material, formatting and reviewing all articles by the Emeritus Editor Prof. J.S. Bajaj ably assisted by Dr. Kuldeep Singh, Senior Publication Advisor who has spared no efforts to maintain the standards of publication. The Annals of the National Academy of Medical Sciences is now having its new Editorial Office under the leadership of Emeritus Editor Prof. J.S. Bajaj at New Delhi with close collaboration and interaction with myself and Dr. Kuldeep Singh. The administrative office of the Annals will remain at its present location at New Delhi and the publication office shall be located in the NAMS Centre for Research in Medical Education at All-India Institute of Medical Sciences, Jodhpur under Dr. Kuldeep Singh who remains as Coordinator.

We promise to bring out the next issues of the Annals not only on theme based subjects but will also accommodate peer reviewed high quality research, innovations and scholarly work in biomedical field by the Fellows and Members of the Academy. However, we seek your blessings and constructive criticism and relevant comments so that we improve the Annals over the years.

My role in this issue is of a collaborator under the able guidance of Emeritus Editor and I hope to be worthy of the confidence reposed in me by the Council of the National Academy of Medical Sciences.



Sanjeev Misra  
Editor

## **Evolving Paradigm between CME program and Continuing Professional Development**

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### **Preamble\* :**

There is a growing concern regarding a perceived decline in the quality of research in biomedical sciences; a similar concern may be shared by scientists belonging to diverse disciplines. To a certain extent, it is a healthy sign when there is an attempt at looking inwards for self-criticism. The objective, presumably, to identify lacunae and deficiencies, if any, and to take remedial measures before it is too late. If used excessively, such a tool can build up morbid fears due to self-condemnation. As for most things in science, the essential prerequisite is rational critique of the prevailing situation in biomedical research. Indeed, the word rational itself has strong scientific connotations, as it is derived from the Greek word "*ratio*". It is generally understood to indicate "the mean between the extremes". The rational approach therefore in the context of present theme focused on excellence and accountability in science must also meticulously avoid the extremes of self-glorification on the one hand and self-condemnation on the other. By implication, we must also observe the necessary caution of not accepting *prima facie* the unsubstantiated claim of an all-round decline in the quality of research, nor should we succumb to the temptation

of endorsing the anecdotal, mostly self-glorifying, narration of high quality scientific achievements in the country in the recent past.

Resounding words of Pandit Jawaharlal Nehru enthused the audience when he said at the Inaugural function of the Indian Academy of Medical Sciences on 19 December, 1961 : "***I hope the Academy would lay stress on the pursuit of research work and simultaneously ensure that high standards were maintained. Research is an inseparable part of any systematic pursuit of knowledge and, therefore, it is imperative that the quality should be absolutely first class.***"

Two years later, we were baptized by the solemn direction of Dr. S. Radhakrishnan, President of India on 08 December, 1963 at the 1st Convocation of the Indian Academy when he exhorted and enthused the Fellows : "***But in the choice of your Fellows, be careful, be vigilant, take care of the great reputation which you should enjoy among the sister Academies of the world.....***".

The Message by Dr. Radhakrishnan to attain self-sufficiency in securing the national integrity and national boundaries may not have reached

\* ***Quantitatively and qualitatively reposing the expression of scientific policy in India.***

the desired targets. Immense efforts are essential to reach the objectives.

Since then the Academy has grown in stature as well as in its major contributions to the national issues dealing with medical education including dental, nursing and para-professional education. *Indeed, it covers all issues that constitute social determinants of health.* Thus, it is the only organization, perhaps, anywhere in the world which has such a wide range of objectives being served by galaxy of Fellows presenting more than 61 disciplines, providing large pool of talent to respond to the national needs through scientific methods of inquiry and research.

Two major achievements since we last met in Jodhpur include : 1) connectivity of the National Academy of Medical Sciences with National Knowledge Network. As of today we are proudly a part of National Knowledge Network which projects us amongst other premier bio-medical institutions in the country, thus offering a vast range of possibilities to channelize and reinforce all academic activities to achieve the objectives for which the Academy was established; 2) The 2nd major achievement during the year is the formal incorporation of NAMS-AIIMS Collegium in the academic framework of the Academy thus not only synergizing our efforts but also potentiating the academic outcomes. The Collegium was formally constituted on 08 February, 2013 in a meeting convened by the Chairman, Academic Council of the Academy and attended by the Directors of six AIIMS : Prof. Sandeep Kumar, Director, AIIMS, Bhopal ; Prof. A.K. Mahapatra, Director,

AIIMS, Bhubaneswar; Prof. Sanjeev Misra, Director, AIIMS, Jodhpur, Prof. G.K. Singh, Director, AIIMS, Patna ; Prof. Nitin M. Nagarkar, Director, AIIMS, Raipur ; and Prof. Raj Kumar, Director, AIIMS, Rishikesh. Dr. Sanjeev Misra, Director, AIIMS, Jodhpur was requested to act as the Convener. A set of academic activities was prioritized in the context of the 12th Five-Year Plan (2012-2017). It is a matter of pleasure that National / Regional Symposia dealing with the subjects of '**A multidisciplinary approach to Spina Bifida**' at AIIMS, Rishikesh; '**Ethics in Clinical Research**' at AIIMS, Bhubaneswar; '**Regional Symposium on Sleep Medicine**' at AIIMS, Jodhpur; '**Acute Ischemic Stroke : Basics to Advances**' at AIIMS, Rishikesh; and '**Developing a Pre Hospital Response to Disasters and Medical Emergencies**' at AIIMS, Patna was held.

Given the short span of time, these are major achievements of coordination of planning, organization, programme development, evaluation and feedback. We congratulate the six AIIMS for the faith reposed in the Academy and assure them that the Academy will encourage, enhance and clarify their academic achievements.

#### **Parametric Reference Framework :**

Unlike pure sciences, medical science has always been considered to be a blend of art, science and philosophy. Indeed, the science of Ayurveda carries with it the connotations of both human endeavour as well as divine

enlightenment. Nevertheless, within this semantic constraint, it is still possible to grasp the basic definition of science in order to recognize the content and quality of scientific research within the sphere of biomedicine. It seems that it was around the beginning of the seventeenth century that the word *science* appeared for the first time in the usage of English language. At that time it was considered synonymous with *knowledge*. Subsequently it acquired the connotation of *accurate* and *systematized* knowledge. Still later, valid experiment as the source of scientific knowledge assumed critical importance. This was the age of Copernican revolution. In a way, there is a discernible commonness between Copernicus's observations regarding the planetary motions in the macrocosmos, and William Harvey's demonstration of the circulation of blood within the human organism. Both focused on motion, a *circular motion*, and more importantly both demonstrated the need of rigorous control of experimental observations so as to draw meaningful conclusions in relation to spatial and temporal dimensions of such movements, whether of planets or of plasma. William Harvey's lecture at the Royal College of Physicians, London on April 17, 1616 not only revolutionized the history and methods of scientific research in medicine, but also rejuvenated the mental attitude of men towards seeking scientific truth at a time when their minds had been bonded for several centuries in slavish submission to what Aristotle had taught and generations of medical teachers had followed. The view propounded by Harvey was so revolutionary, as was that of Copernicus regarding astronomy, but its publication

was delayed for twelve years and even then the inferences were only partly accepted and that, too, with considerable skepticism.

Thus, both biomedical science as well as science in general requires generation of new and accurate knowledge, irrespective of the process through which such knowledge is derived. Indeed it is as much of science if it is derived by deductive logic as in Euclid or if developed through the use of precise observation and rigorous experimental condition as demonstrated by Harvey and Bacon. There is a remarkable synthesis reflected in the expression of J.B.S. Haldane who, following intensive training in western philosophy and natural sciences, also had first-hand exposure to logic and science in India. As is well known, during his later years, he became an Indian citizen. According to Haldane, the definition of science must include the following dimensions :

*“First, it is the free activity of man's divine faculties of reason and imagination. Secondly, it is the answer of the few to the demands of the many for wealth, comfort and victory. Third, it is man's gradual conquest, first of space and time, then of matter as such, then of his own body and those of other living beings, and finally the subjugation of the dark and evil elements in his own soul”.*

It is worth noting the key references by Haldane to “man's divine faculties”, and his gradual conquest of “his own body and those of other living beings”, thus establishing the conceptual

proximity to “human and divine” in Ayurveda.

Warren Weaver's descriptive narration provides the requisite complimentary to J.B.S. Haldane's views :

“Science is obvious, therefore, that not only in biomedical sciences but also in science in general, there must be a blend of diverse but inter-related elements such as a genuine spirit of enquiry, and unsuppressed urge for the adventure of human spirit, the acute powers of observation, and the rigorous discipline of mind. Nevertheless, there are two additional critical dimensions of biomedical scientific research. Firstly, its *relevance* to the contemporary needs of the society. Secondly, its conformation to the highest principles of *biomedical ethics*, especially, when such research involves human experimentation as in clinical trials of drugs and devices.”

### **Health Research :**

The Department of Health Research (DHR) was created on 5th October 2007 with the vision of promoting and coordinating basic, applied, clinical and operational research in areas related to medicine, health, bio-medicine and medical profession and education through development of infrastructure, human resource and skills in cutting-edge areas. At the same time, the Indian Council for Medical Research (ICMR) has its own network of 31 National Institutes and also a strong and vibrant culture of extramural research in medical colleges and other institutes.

The strategies for health research in the 12th Five-Year Plan should be the following:

*Address national health priorities:* The key outcome of the efforts of DHR would be to generate intellectual capital, which may have a public health impact. DHR would, therefore, prioritize its research to find cost-effective solutions for health priorities and health system issues facing the country, namely:

1. Maternal and child nutrition, health and survival;
2. High fertility in parts of the country;
3. Low child sex ratio and discrimination against the girl child;
4. Prevention, early detection, treatment, rehabilitation to reduce burden of diseases—communicable, non-communicable (including mental illnesses) and injuries (especially road traffic related), congenital malformation and disorders of sex development;
5. Sustainable health financing aimed at reducing household's out-of-pocket expenditure;
6. HIS covering universal vital registration, community based monitoring, disease surveillance and hospital based information systems for prevention, treatment and teaching;
7. Measures to address social determinants of health and inequity, particularly among marginalized populations;
8. Suggest and regularly update Standard Treatment Guidelines which are both necessary and cost-effective for wider adoption;

9. Public Health systems and their strengthening; and
10. Health regulation, particularly on ethical issues in research.

*Build Research Coordination Framework:* Though DHR is the empowered Department on medical and health research, many organisations are engaged in research on related topics, namely the Ministry of Environment and Forest, Departments of Health and Family Welfare, AYUSH, AIDS control, Space, Science and Technology, Biotechnology, Agricultural Research; agencies like ICAR, DSIR, CSIR, NDMA, DRDO and the National Knowledge Network. DHR would play a lead role in research involving human health, bringing all the concerned organisations on one platform to facilitate mutual discussion, resource pooling and prioritisation, and avoid duplication, to find innovative solutions to national priorities in a timely manner. It would also take the lead in suggesting institutional structures, like mutual representation in each others' decision making and scientific bodies, and 'coordinating structures' so that consultation and collaboration become a norm rather than an exception. Efficient mechanisms for selection, promotion, development, assessment and evaluation of affordable technologies would be established. DHR would bring together basic, translational and clinical investigators, networks, professional societies and industry to facilitate development of programmes and research projects. DHR would establish a

mechanism for coordination between academia and the industry, with a preference for multi-disciplinary approaches.

The National Health Policy of 2002, utilizing the new name of AYUSH incorporating *Ayurveda*, *Yoga*, *Unani*, *Siddha*, and *Homeopathy*, noted its importance and its popularity among the underserved, remote and tribal areas.

A detailed review of the current status was undertaken during the deliberations of the Steering Committee on Health constituted by the Planning Commission, Government of India, for formulating the 12th Five-Year Plan (2012-17). The tremendous progress made in the integration of AYUSH in the health care delivery system in the country is reflected in co-location of 8366 out of 23391 units (35.77%) at Primary Health Centres, 2945 out of 4510 (65.3%) at Community Health Centres and 424 out of 604 units (70.2%) at District Hospitals under National Rural Health Mission. In nutshell, Indian Systems of Medicine indicate the need for integrated delivery of health services.

Policy of National Academy of Medical Sciences (India) has transformed from reaching few to multiple modalities and reaching many by harnessing the educational technology.

## Optimizing the Effectiveness of CME Program: NAMS Experience

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Emeritus Professor, National Academy of Medical Sciences, New Delhi<sup>3</sup>

### ABSTRACT

Planning organisation and delivery of educational program(s), culminating in purposeful learning require strong basis of principles of adult learning along with a sound knowledge and requisite skills in both psychology as well as technology of medical education. Assessing effectiveness of a CME program is as important as the organization of learning activities and delivery of academic program as these may provide further directions for enhancing the efficacy of the CME delivery system.

**Objective:** (i) The purpose of this study was to investigate the effectiveness of well planned and conducted CME program in terms of enhancing knowledge and competence of the participants. (ii) To explore if the gain in knowledge and competence, if any, can be attributed to the interactive design of the educational process.

**Methods:** The study was conducted during NAMS-AIIMS Regional Symposium on Sleep Medicine at AIIMS, Jodhpur as part of NAMSCON 2013. After explaining the objectives of the study to the participants and assurance of confidentiality, a validated and pre-tested questionnaire consisting of 30 multiple choice, single response questions, was administered to 103 participants. Following intervention consisting of didactic lectures by experts in different aspects of sleep medicine, interactive sessions and problem triggered sessions consisting of clinical data, participants were re-administered post test questions which were, however, different from pre-test but had similar difficulty level.

**Result:** The response rate of participants was 89%. Pre-intervention scores were  $11.76 \pm 4.4$ , with only 26 % of participants achieving an arbitrary pass score of 50 %. Comparison of paired score of participants who attempted both pre and post tests (n=59) showed improvement from  $12.1 \pm 4.6$  to  $18.3 \pm 3.8$  which was significant ( $p < 0.05$ ). 84.7 % of participants secured above pre decided 50% score. The mean increase in the score was 6.2 with 95% CIs 4.8; 7.5 ( $P < 0.001$ ). Higher gain in

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knowledge and competencies is attributed to intense interactive involvement of participants during the problem triggered sessions, feedback provided during interaction and system of reward and incentive introduced at time of sessions. The study concludes that well designed educational intervention based on the principles of adult learning brings positive gain in the knowledge and enhances competence of the participants.

*Key words* : Pre-post test, retrospective post-pre test, program evaluation, evaluation of educational intervention.

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### **Introduction:**

Medical Education is a soft science and is continuously evolving with a paradigm shift mostly being brought about newer technological advances. As medical professionals it is our responsibility to the society that we keep on updating our knowledge, skills and attitude in accordance with the changing needs and corresponding newer developments in our field of practice. The task requires not only individual efforts and motivation but also relates to the way the information is presented. A meeting provides us an opportunity not only of gaining knowledge but also for sharing our experiences with others. Continuing Medical Education (CME) provides us such an opportunity to enhance our knowledge. A carefully designed and planned educational activity not only optimizes the resource utilization but can also be a cost-effective strategy to disseminate additional medical information to widely targeted group of Health Professionals. Any educational activity demands intrinsic adult learning principles and using critical triangle of educational objectives, learning activities and evaluation with learner as a central

character (1). The most widely used model for evaluating any educational program is based on Kirkpatrick's four levels of learning evaluation (2).

The idea behind the model is for an organization to have meaningful evaluation of learning in the organization. The degree of difficulty increases as one move through the levels. These levels are: Level 1- Reaction, Level 2- Learning, Level 3- Behavior and Level 4 – Organizational results. The first two levels can be evaluated shortly after the program. There has been extensive research on using conventional pre-post test assessment versus post then pre evaluation (3, 4). However, a carefully designed pre test and post test can bring about more information both in enhanced cognition and acquisition of skills. In the present study, we share our experience of a CME program focused on Sleep Medicine as part of a National Conference. The study evaluates effectiveness of CME at Level 2 of Kirkpatrick's model of Learning.

### **Aims of the Study:**

1. The purpose of this study was to

investigate the effectiveness of well planned, organized and conducted CME program in terms of enhancing knowledge and competence of the participants.

2. To explore if the gain in knowledge and competence, if any, can be attributed to the interactive design of the educational process.

### **Method**

The study was conducted during a Regional Symposium on Sleep Medicine at a Medical institute in Western India. Symposium consisted of 12 didactic lectures by most of them being well recognized experts in sleep Medicine. Opportunity was also provided to the newly initiated experts also. Following intervention consisting of the didactic lectures by experts in different aspects of sleep medicine, interactive sessions and problem triggered sessions consisting of clinical data, participants were re-administered post-test multiple choice single response questions taken from question bank ensuring similar difficulty level. Each participant was given a randomized code number through lottery, they were given liberty to identify themselves, if they so desire.

The questionnaire which was pre-structured and pretested consisting of 30 test items was filled by the participants before the start of the study.

The intervention was in the form of well planned and jointly discussed didactic lectures with audio-visual aids as a part of sleep symposium (nine hours)

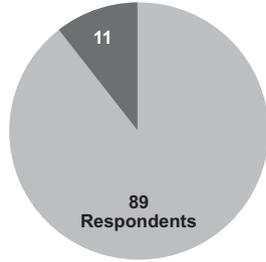
delivered by experts in the field of Sleep medicine. The objectives of this sleep symposium were outlined to the participants.

The participants were actively involved through interactive sessions, problem triggers and incentives for best participant.

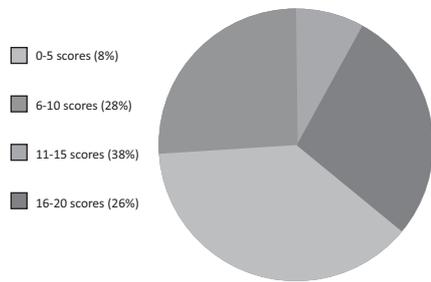
A post test consisting of 30 test items of different questions with four options but of similar difficulty levels were re-administered to the participants at the end of the symposium.

The primary outcome of this study was improvement in the score obtained by the participants and secondary outcome measure was increase in the number of participants passing the post intervention questionnaire with an arbitrary cut-off score of 50%.

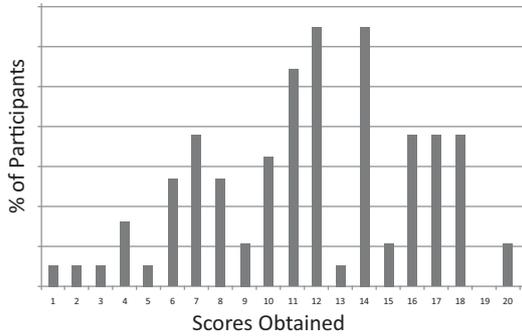
Statistical analysis was carried out using SPSS ver 17.0. Descriptive frequencies were used to describe the data; Paired t test was used for quantitative data while McNemar's test was used to compare the paired categorical data. P value < 0.05 was considered as significant. Participants were explained the purpose of study and were assured of confidentiality of the data and their identification by coding the entire questionnaire. The entire CME program including interactive sessions was captured through high definition video coverage.



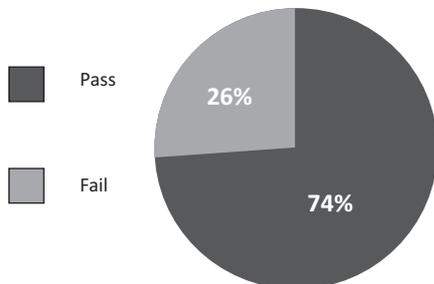
**Figure 1:** Pie Distribution of responses (Pre Intervention)



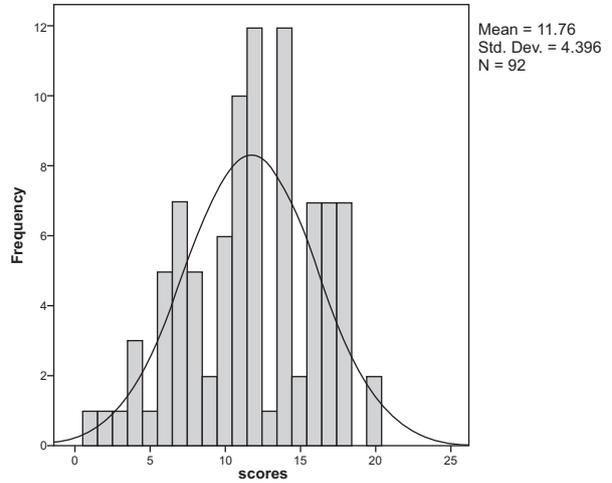
**Figure 2:** Pie Distribution of Scores Obtained (Pre Intervention)



**Figure 3:** Frequencies of scores distribution



**Figure 5:** Pass percentage of students (pre-intervention)



**Figure 4:** Frequency distribution curve of scores (pre-intervention)

**Table 1: Comparison of Pre and post test among participants (Only 59 participants completed both pre as well as post test).**

	Pre intervention N (%)	Post intervention N (%)
<b>Total participants</b>	<b>103</b>	<b>103</b>
<b>Respondents</b>	<b>92 (89)</b>	<b>61 (59)</b>
<b>Non Respondents</b>	<b>11 (11)</b>	<b>42 (41)</b>

**Table 2: Comparison of scores between pre and post intervention.**

Scores	Pre intervention scores (n=59)	Post intervention scores (n=59)
<b>Mean</b>	<b>12.1± 4.6</b>	<b>18.3± 3.8</b>
<b>Median</b>	<b>12 (9, 16)</b>	<b>18 (16, 20)</b>
<b>Range</b>	<b>1-20</b>	<b>11-26</b>

**Results:**

A total of 103 participants were given pre-structured questionnaire (total score-30). Only 92 participants returned the questionnaire (response rate- 89%) (**Figure 1**). Pre-intervention scores were  $11.76 \pm 4.4$ , Median score: 12(8, 15.7) range: 1-20. The distribution of scores is shown in **Figure 2**. Frequency distribution of pre-intervention score is shown in **Figure 3 and 4**. Only 26 % of participants scored pass with an arbitrary cut-off of 50 % in pre-intervention group (**Figure 5**). Summary of the participants during pre & post test is depicted in **Table 1**. Comparison of scores of participants who attempted both pre and post tests showed improvement from  $12.1 \pm 4.6$  to  $18.3 \pm 3.8$  (**Table 2**).

All the 59 participants scored more than 11 with 80% of them securing arbitrary score of 50% (**Table 3 & Fig 6**).

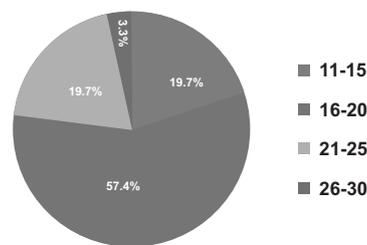
The difference between pre and post intervention was significant ( $p < 0.05$ ). There was a statistical significant increase in the scores obtained in the post intervention questionnaire as compared to pre intervention questionnaire. The mean increase in the scores after the intervention was 6.2 with 95% CIs 4.8; 7.5 ( $P < 0.001$ )

The study also showed, as secondary outcome, significant improvement in passing among the cohort of 59 participants from 33.9 % to 84.7 % ( $p < 0.001$ ) when arbitrary cut-off is set at 50 % which was highly significant.

The intensity of participation of students was evident by higher level of quality of questioning during the sessions.

**Table 3: Posthoc analysis of scores**

Score Distribution	Pre Intervention n(%)	Post Intervention n(%)	P value
1-10	20 (33.9%)	0	< 0.05
11-15	21 (35.6%)	12 (20.3%)	
16-20	18 (30.5%)	35 (57.4%)	
> 20	0	14 (23%)	



**Figure 6: Pre-intervention scores**

**Discussion:**

According to Kirkpatrick's model of evaluation for learning, level 1 and 2 can be carried out immediately after the educational activity (2). While level 1, i.e., reaction can be evaluated by taking feedback and survey, level 2 requires additional methods to explore participants gain in knowledge and comprehension. There are various tools for assessing improvement in knowledge. While Rockwell has emphasized importance of post then pre evaluation for assessing such changes (3), Nimon *et al* debated the utility of such a tool (4). Pre-post test are a conventional tool and if carefully designed, can yield better results in cognitive improvement. It can also be used to assess improvement over a period

of time. Gallagher *et al* in their study using pre-post test found effectiveness of a brief intervention program on knowledge of nursing staff in critical care (5). Present study also showed significant improvement in passing among the cohort of 59 participants from 33.9 % to 84.7 % ( $p < 0.001$ ).

Educationists have also used many modalities to optimize the learning during educational intervention. This may consist of using case scenarios; interactive sessions and problem based learning rather than only didactic teaching. In present study, apart from didactic sessions of 15- 25 minutes, questions were invited from participants and also 2 interactive sessions were used with problem triggers sessions for focusing on individual problems for lateral thinking. In a study by Bell *et al*, it was observed that reinforcement of knowledge gain is as important as learning activity (6). The improvement in knowledge of the study group may be related to these activities during the time specific educational intervention.

As part of the Accreditation Council for Continuing Medical Education (ACCME)'s new criteria which requires CME providers to assess the impact of their interventions, Weiner SJ *et al* conducted a pilot assessment of two workshops and one pre-course (7). They found positive change in knowledge of participants but concluded that effect size measurement of sessions provides quantitative information about their impact on learning. However, they were

concerned about the methodological and logistical challenges that may preclude feasibility of tracking learning and retention following a national meeting. Davis *et al* observed several major issues in primary study design and in the systematic review process of CME studies and suggested a standard nomenclature, a rigorous process of searching, and a common format on which to base the development and description of future studies of CME interventions (8, 9). We observed that with careful planning and conduction, the problem of design may be obviated. With evolution of Medical Education technology and faculty development program, one may embark on standardized assessment of all of our educational programs and processes. Jerardi observed interactivity improves participants' learning (9). Limitation of our study was that it was restricted to one symposium only. But we have to maintain caution while conducting more such activities for longitudinal gain in knowledge and are also prepared for similar logistics challenges.

#### **Acknowledgement:**

Dr Kuldeep Singh acknowledges the experimental design and guidance provided by Professor J S Bajaj for this Research Project and financial support for the research project to National Academy of Medical Sciences (India), New Delhi

#### **Contributions:**

1. JSB- Conceptualized the theme for CME, defined specific learning

objectives, planned and organized the academic activity and initiated the discussion on problem triggers based on clinical and laboratory data.

2. KS- was involved in executive functions mostly focused at co-ordinating the symposium and participating in data analyses and its collective interpretation.

3. NG- was mostly responsible for tabulation of data and made purposeful suggestion for its expeditious analysis.

4. SM- coordinated team efforts, rendered critical and purposeful advise leading to meaningful conclusions.

Finally, each one of them critically read the manuscript and the final outcome is a result of their joint efforts.

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## **Effect of personality development program for medical and nursing students: A pilot study**

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### **ABSTRACT**

**Background:** Personal development is an ongoing but complex process and it is crucial for the medical educator to recognize the trait and design the training for optimal development of students. Though importance of human personality is widely recognized for functional efficiency of an individual and organization, but its recognition is grossly missing from medical curriculum.

**Aim:** To organize and evaluate the 'Personality Development Program' for medical and nursing students.

**Methods:** First year medical and nursing students were recruited through total enumeration method. 'Personality development program' was conducted by a trained psychologist and it was evaluated through 'partially open ended anonymous structured feedback'.

**Results:** Majority of the students found this program relevant, comprehensive and purposeful. Again majority had perceived some improvement in their confidence and level of communication, interpersonal relationships, planned time schedule, emotional confidence, and better stress management. They have also narrated shortcomings of the program along with some constructive suggestions.

**Conclusion:** This preliminary attempt for personality development was highly appreciated by the students as well as their supervisors as a means to professional development. It further emphasizes the vital need of ongoing programs both for enhancing personality and professionalism.

*Key words:* Personality development, enhancement, medical and nursing students

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## **Introduction**

The real purpose of the education is to equip students with the potential to meet challenges in life. The Medical Council of India is also emphasizing to produce more competent and skilled medical personnel (1). Becoming a good doctor or nurse not only needs acquiring medical knowledge and mastering clinical skills but also learning professional attitude, emotional stability, and interpersonal as well as communication skills(2-4). The importance of human personality on the overall efficiency of an individual and organization has been widely recognized(5).

Students' personality development is really a felt need in our newly built tertiary care medical institution. There is a definite and vital role of professionalism based on personality development programs especially in their early adjustment, understanding about medical stream, and more importantly helping them to grow more effectively in all the spheres of life and to actualize their inherent potentials. Despite these facts, this area remained seriously under recognized and under addressed. It has given us an impetus to organize and evaluate the 'personality development program' for our medical and nursing students.

## **Methodology**

During September 2012 and September 2013 our institution has organized a 'Personality development

program' for medical and nursing students at their first entry. In this program first year students from MBBS and BSc Nursing curricula streams were recruited through total enumeration method. Study was approved by the college authorities and informed consent was taken from all the participants.

It was aimed to help our students understand the concept of all round development of personality and to make them aware of various methods, approaches and applications of personality development. Key resource faculty was RG (an author in this manuscript), a psychologist with vast experience of organizing such programs in academic as well as in corporate settings along with two resource facilitator from respective clinical and pre-clinical departments.

Program consisted of following five sessions, each of three hours, and one session per day (**Table-1**)

Each session included a brief presentation on the topic, its relevance and applications, followed by lively and interesting interactive activities between medical and nursing students and facilitator. Only one session was conducted every day. Resource person was coordinating every session in smaller groups and motivating everyone for active participation. Empathy was the key word which was emphasized to be developed as a professional attribute.

**Table-1: Program details**

Session	Program details
Session-1	Personality (types and development) Attitude Self introduction
Session-2	Emotional intelligence Conflict management Empathy
Session-3	Motivation and motivators Goals Persistence
Session-4	Time management Leadership
Session-5	Team building Interpersonal relationship Self actualization

Program evaluation was done through 'partially open ended anonymous structured feedback' from all the participants in which both program content as well as outcomes were thoroughly evaluated. Program content was assessed on following parameters: relevance, understandability, comprehensibility, flow, utility of program, activities/ areas which were most liked and least liked, and suggestions for improvement in existing program. Outcomes were evaluated through following parameters: participant's ability to conduct themselves better, having better interpersonal relationships, developing and complying with a comprehensive schedule, having better control of their emotions while dealing with the patients, applying stress management techniques, facilitate learning, enhancing their confidence,

inculcating positive attitude in newly introduced patients, and better adaptation in new situations related to patient management and care. Finally establishment of communication with the parents or relatives of young patients such as pediatric age group.

Analysis was done using the SPSS version 15.0 for Windows (Chicago, Illinois, USA). Frequencies with percentages were calculated for nominal and ordinal variables.

## Results

Total participants were 172, of them 119 were MBBS first year and 53 BSc Nursing first year students. We expected their concern about confidentiality especially in receiving genuine feedback; no identifiable information was obtained.

### *Program evaluation*

As shown in **Table-2**, majority of the students found the content relevant, comprehensive, easy to understand, well paced, useful, and possibly purposeful in their future professional practice. Program had good balance between presentation, discussion and active participation aiming it relevant and purposeful activities. Findings were comparable among medical and nursing students.

### *Outcome evaluation*

After this program, most of the students started conducting themselves

better and developed better interpersonal relationships, time-table, emotional regulation, stress management, self evaluation, leadership skills, team approach, adaptability, confidence to some extent and empathy to the patients. Similarly majority of students met other personal learning goals with the help of this program and established an

environment conducive to facilitate learning & knowledge and appropriate skills to some extent and felt improvement in their academic performance. Outcome findings were also comparable among medical and nursing students. Details are mentioned in **Table-2**.

**Table-2: Feedback for personality development program (N=172)**

Variable	Frequency (%)		
	Disagree	Okay	Agree
<b><i>Program Evaluation</i></b>			
Program content was relevant	4 (2.3)	46 (26.7)	117 (68)
Program content was comprehensive	3 (1.7)	63 (36.6)	102 (59.3)
Program content was easy to understand	24 (14)	146(84.9)	170 (98.8)
Program was well paced	5 (2.9)	62 (36)	100 (58.1)
Breaks were sufficient	2 (1.2)	55 (32)	115 (66.9)
Has good mix between listening and activities	6 (3.5)	28 (16.3)	138 (80.2)
Activities were useful learning experiences	2 (1.2)	36 (20.9)	134 (77.9)
<b><i>Outcome Evaluation</i></b>	<b>Not achieved</b>	<b>To some extent</b>	<b>Fully achieved</b>
Conducting myself better	4 (2.3)	121 (70.3)	45 (26.2)
Developed better inter personal relationships	6 (3.5)	94 (54.7)	71 (41.3)
Developed a comprehensive timetable/ schedule	41 (23.8)	86 (50)	43 (25)
Following timetable/schedule prepared for myself	38 (22.1)	101 (58.7)	29 (16.9)
Having better control over my emotions	20 (11.6)	82 (47.7)	67 (39)
Applying appropriate techniques for stress management	20 (11.6)	85 (49.4)	64 (37.2)
Established a climate to facilitate learning & knowledge	7 (4.1)	100 (58.1)	62 (36)
Confidence level is enhanced	8 (4.7)	88 (51.2)	73 (42.4)
Became a better team member	10 (5.8)	96 (55.8)	64 (37.2)
Having a positive attitude about the life	3 (1.7)	47 (27.3)	119 (69.2)
Ready to adapt better with condition posed to me	7 (4.1)	68 (39.5)	96 (55.8)
Better self evaluation	4 (2.3)	66 (38.4)	98 (57)
Understood the importance of effective leadership	4 (2.3)	64 (37.2)	102 (59.3)
Met other personal learning goals	5 (2.9)	94 (54.7)	69 (40.1)

Greater proportion of students liked the activities, interactive sessions, trainer's approach, social skills and teamwork applications. Some of the students reported insufficient time duration (for each session as well as program), lack of individual approach (specifically to each student separately), and shorter breaks as major shortcomings of this program. Many students also gave several suggestions to improve forthcoming programs like to increase number of sessions and program duration, interactive activities; to put emphasis more on professionally oriented approaches, communication, and active participation by each student. They have suggested to include some areas in coming programs like social affairs, teen issues, friend selection, hobbies, college life, ideologies, body language, yoga and meditation. Majority expressed the need for such activities on regular basis to motivate them constantly for sustaining the personality development and actualizing their potentials to become better professionals.

### **Discussion**

Personality is often defined as an organized combination of attributes, motives, values, thoughts, feelings, and behaviours unique to each individual. Effective Personality Development Programs can carve them better in dealing with the challenges of day to day life more effectively. It further helps them to actualize their potentials. As skills like problem solving, logical thinking, leadership and communication are very

important for every day dealings (6). Like others, in our institution too, students are coming from all over the India with different socio-cultural and educational background and commonly they are not matured and prepared to face challenges in day to day life and also less equipped to deal with the challenges of a professional course.

Therefore effective and enriching education is of vital importance for holistic development of our students. Positive approach, healthy environment and regular interactions among children, parents, teachers and society enhance their personality growth and prepare them to face challenges in day to day life (6).

It has been argued that health professional students may show their dissatisfaction towards a course of studies due to certain personality traits. It is a matter of intense research to identify those traits which may help in selecting medical or nursing students (7). However, personality assessment is not practised during entry into professional course in India. Therefore, institutes offering professional course have to adopt methodology in their curriculum to not only develop professional skills but also prepare students to cope up with demands of the course and its application later in their life, and culmination as a better professional. When students would be more aware about their capabilities, strengths and weaknesses, there would be more scope to improve upon themselves and lesser risk of substance abuse, depression, and suicidal behaviours in

future. The program will better prepare them for skills necessary for optimal training toward skills and competencies as required by a medical professional. Hence this personality development program was an attempt for holistic growth of future physicians.

In index study majority of the medical as well as nursing students found this program relevant, comprehensive and useful. Again majority had perceived some improvement in their confidence, interpersonal relationships, time schedule, emotional regulation, and stress management. Greater proportion of students appreciated interactive activities and trainer's approach. They have also narrated shortcomings of the program and have given several suggestions to improve forthcoming programs by increasing number of sessions and program duration, interactive professional activities, and active participation by all. They have also expressed vital need of ongoing programs for personality development.

Mittal *et al* (8) have reported the importance of foundation program for 2nd year medical student. In view of lack of available literature on personality development, we could not compare our findings. Therefore generalizability of our findings needs caution and replication in wider population samples.

Our institution has appreciated the positive effects of this program for medical and nursing students. We are in path to devise an ongoing program for professional development. It will help our

students in understanding various methods, approaches and applications of personality development as required to become a good professional. It will also aid in their complete physical, social, cognitive, emotional, intellectual and spiritual development. With such organized ongoing efforts our institute will be able to contribute competent future medical professionals with ability to cope up with unforeseen situations and demands.

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## **Comparative effectiveness of non-print media and live CME**

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### **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  $9.91 \pm 3.5$  to  $14.09 \pm 2.85$ . 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  $12.1 \pm 4.6$  to  $18.3 \pm 3.8$ . 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.

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**Conclusions:** The educational background and selection process of UG students between two medical institutes were strikingly different. While students 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 contributors for morbidities globally. The situation seems to be almost 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 disabilities. It is time that Medical Professionals be apprised of vast developments in the field of sleep medicine and to create awareness among the masses 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  $12.1 \pm 4.6$  to  $18.3 \pm 3.8$  (p value  $<0.001$ ). The pass percentage,

based on arbitrary cut-off scores of 50%, increased from a pre-intervention low scores of 33.9 % to 84.7 % . Evaluation of the program provided data indicating high satisfaction index above 71.8 % in all parameters 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, arrangements at local site, aligning the timing of student's availability with that of experts appeared 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 experts a day before the final CME was scheduled. A telephonic 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 questionnaire 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

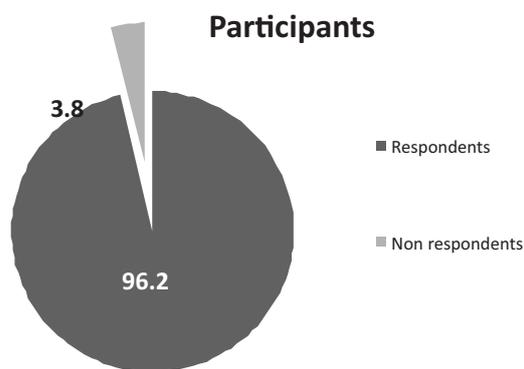


Figure 1: Response

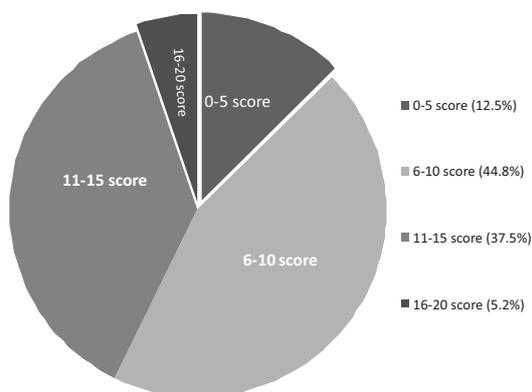


Figure 2: Pre-intervention scores

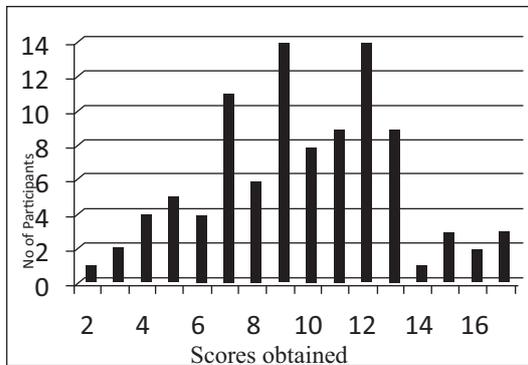


Figure : 3

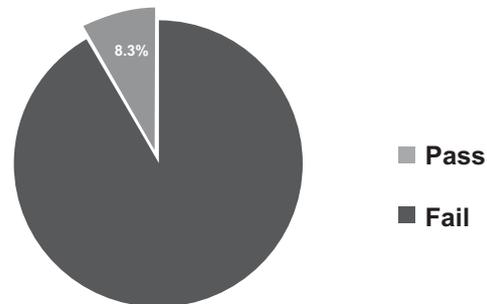


Figure 4: Pre-intervention pass %

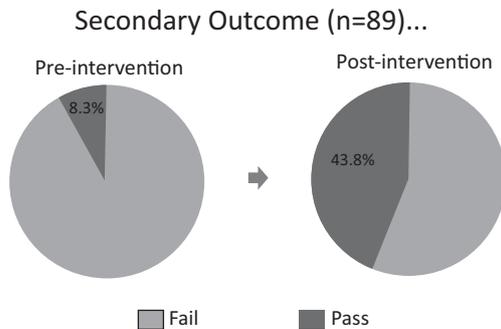


Figure 5: Percentage of participants securing above 50% score

optional. Descriptive frequencies were 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  $9.69 \pm 3.4$ , 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.

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

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: Video CME scores**

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: Effect of intervention**

	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 Indices between 2 groups**

S No	Parameter	Satisfaction index NAMSCON	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 disorders 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 <sup>st</sup> 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 one 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.

There is significant improvement of passing percentage (**Table 3**).

**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 the questions asked were quite interesting and are summarized in **Table 8**. The students' reflection appears to be mature and enthusiastic despite being in early years of medical school. 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) observed 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 noted 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 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 the same 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.

#### **Acknowledgment :**

Dr Kuldeep Singh acknowledges the experimental design and guidance for the research project to Professor J S Bajaj and financial support for this research project to National Academy of Medical Sciences (India), New Delhi.

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## **Exploring the scope of sleep medicine in current medical teaching and utility of CD Based Learning Resource Material**

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### **ABSTRACT**

**Background:** Only recently health professionals have started recognizing sleep disorders as one of the commonest cause of morbidity. Only in the last 50 years have scientists and physicians attempted a systematic study of the physiology and disorders of sleep. The situation is changing in India too. About a decade ago the sleep medicine started developing but remained in the domain of Pulmonary Medicine. Through various societies, meetings, workshops it has now percolated to physiologists, neurologists, psychiatrists and allied specialists. However, there is still a gap in the awareness about sleep and its disorders among health professionals. Limited information is available regarding sleep education in current medical curriculum in India and globally.

**Aims:** (i) To find out the existence of a course or module on sleep medicine in any of Government medical colleges in India. (ii) To explore feasibility of using Learning Resource Material (LRM) on CDs for Continuing Medical Education.

**Methods:** As an outcome of Sleep Symposium held at National Academy of Medical Sciences (India) conference at AIIMS, Jodhpur, a survey was carried out among 100 Government Medical Colleges in India along with Resource Material consisting of didactic teaching material distributed through Compact Disc (CD) to explore utility of the method.

**Results:** Response rate from medical colleges was 41 %. Ninety five percent of medical colleges denied of having any structured course or module on sleep medicine. Fifty percent felt that such module should be included for both UG and PG while 70 % agreed for PG only. Regarding cost effective delivery methods for the content of such a module, majority responded in favour for an online or DVD based with one of the content experts as a resource person with his physical presence. All respondent were highly satisfied by the content of CD.

**Conclusion:** Sleep education is almost non-existent in most of medical schools in India. Survey elicited average response from academic community. However, sleep education has been perceived by 70 % participants to be included in PG curriculum. The content of PowerPoint presentations was considered highly satisfying and using multi-modal technology for sleep education is regarded to be an effective delivery method by majority. It can be concluded that there is felt but unmet need of a course on sleep medicine in our existing medical curriculum using information technology.

*Key words:* Sleep module, CD based CME, Continuing Education, sleep education

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## Introduction

The sleep related problems are now being increasingly recognized in India. The first ever pan-African and Asian sleep-problem study has revealed that prevalence of sleep problems in the developing world are starting to mirror those seen in developed nations. Some 16.6 % of people in the developing countries surveyed reported experiencing insomnia and other severe sleep disturbances - not far off the 20 % rate recorded among adults in developed countries like Canada and the United States.

A study by Panda *et al* in 2012 reported prevalence of insomnia in 9% of the general population with about 30% reporting occasional insomnia (1). A higher prevalence of sleep disorders related to initiation and maintenance of sleep (28%) was reported in an urban population from north India. However, there is a lack of awareness both among health professionals and general public (2).

National Academy of Medical Sciences (India) organized a Regional Symposium on Sleep Medicine as part of its annual conference, NAMSCON 2013, held at All India Institute of Medical Sciences, Jodhpur on 25th October 2013. There was an enthusiastic response from the UG students in learning the newer concepts in sleep medicine and its scope in dealing with co-morbidities. The program evaluation showed high level of satisfaction to all parameters of

symposium (3). It was also felt that sleep medicine as a course can also prove to be a module aptly suitable for integrated teaching being promulgated by Medical Council of India as part of the Vision 2015 for implementing curricular changes for a competent medical graduate.

With the intention to explore the existence of a module on sleep in any of the Government medical colleges in India and also to find feasibility of distributing Learning Resource Material (LRM) in a cost effective manner through Compact Disc (CD) the present study was undertaken. This survey was also expected to be an enquiry to provide evidences for other suitable methods for effective CME.

## Aims of the study

1. To explore existence of teaching on Sleep Medicine during medical training in Undergraduate or Post-graduate course.
2. To collect evidence for feasibility of CME through CD or other cost effective mode(s)

## Methods

The content for Learning Resource Material was kindly provided by the National Academy of Medical Sciences (India) to be used for distribution through CD. The study was designed by one of the authors (JSB). The package content consisted of single CD with the instructions to use the CD, educational

objectives, and outline of the program, PowerPoint presentations of 12 content experts and the slide by slide text script of the talk delivered during the Live CME at NAMSCON 2013.

A list of MCI recognized government medical colleges and institutes were procured. Random selection of the colleges was done to include 100 medical colleges. A covering letter explaining the objectives of the study, the CDs with written instructions were sent by speed post to the Principals/Directors of the selected medical institutes with a request for a review of the content by them or their designated faculty member in their institute or college. The same content was also made available at shared google drive and linked to an online survey (*Lime Surveys*) to expedite the process. The contents can be accessed at <https://drive.google.com/folderview?id=0B-S E C H D v L O M V R 0 V D e l N F X 3 J H U z Q &usp=sharing>. As an incentive, the colleges were also offered to access the video DVD at a subsidized cost if they found the content of CD useful. Moreover, they were also provided a link for preview of symposium on Sleep Medicine at the website of National Academy of Medical Sciences (India) at <http://nams-india.in/namscon2013> with a link to *live video*. Email and telephone were used for reminding for survey completion and for clarifications.

The data obtained through surveys was entered into Microsoft® MS Excel sheet. The satisfaction indices (SI) of

responses were calculated by the formula:

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

Where,

a,b,c,d are number of total responses for the Co-efficient 1, 2, 4 and 5

N=number of total responses.

The analysis was performed using SPSS Software Ver 17.0.

### Results:

The survey was completed by 41 colleges and response sent either by post or through email/online. The majority of the respondents were from North India. Ninety five percent of respondent denied that there is any structured teaching for sleep medicine. However, 2 colleges confirmed having teaching in Sleep during UG/PG. But on telephonic clarification one college verified that the teaching is limited to a part of lecture during psychiatry classes and there is no separate instruction on sleep.

The responses of colleges are summarized in **Table 1**. The majority of responding colleges were from North India. The striking part of the study highlights almost non-existence of structured sleep medicine teaching both during undergraduate and post-graduate courses in the medical schools in India. The opportunity and scope the teaching module on sleep will offer is being stressed by the response of solo institute. On enquiring if “*you think that such an instructional module on Sleep Medicine needs to be included in UG and/or PG*”,

**Table 1: Summary of responses from medical colleges**

Parameter	Response	Percentage	Remarks
Response rate*	41/ 100	41%	Gujarat-9; Maharashtra-4; Rajasthan-10; UT- 3; Punjab- 2; UP-4; MP- 2; Karnataka-1; TN- 1; Chandigarh-1, Himachal (Shimla)-1, Bihar-1, Delhi-2
Does your Institute conducts any structured course or module, in any form, on "Sleep Medicine" in any of the departments/specialty:	Yes: 2 No: 39	Yes: 4.8 % No: 95.1 %	The respondent from one of the college (personal communication) confirmed having no separate lectures, but is taught as part of Psychiatry. The second college responded that Sleep Medicine is taught to UGs and PGs in the departments of Physiology, Internal Medicine, Pulmonary Medicine, ENT, Dental surgery and Psychiatry.
If Yes, topics and contents	Only 1	2.4%	<p>Topics covered for UGs include:</p> <ul style="list-style-type: none"> <li>(a) Types of sleep (REM and NREM)</li> <li>(b) Brain areas controlling sleep</li> <li>(c) Stages of sleep and the normal sleep cycle</li> <li>(d) EEG correlates of the different stages of sleep</li> <li>(e) Specific sleep disorders like sleep disordered breathing; parasomnias, narcolepsy etc are covered in brief.</li> </ul> <p>PG residents (physiology, pulmonary medicine and psychiatry) study sleep in greater detail to include aspects like neurophysiological correlates, neural circuits, sleep deprivation, polysomnography and sleep disordered breathing. Sleep disordered breathing is also covered in detail in departments of Dental Surgery and ENT.</p> <p>For UGs, the format of teaching is large group (using AV aids). For PGs, the format is via seminars and small group discussions and hands-on training in polysomnography and management of sleep-related disorders.</p> <p>College also frequently organizes CME events and guest lectures by eminent workers on sleep related topics.</p>

\*Some colleges had more than 1 respondent; 15 responses were received through email/web

**Table 2: Utility and content of sleep module**

Parameter	Response	Percentage	
Do you think that such an instructional module on Sleep Medicine needs to be included in the UG: Yes/No PG: Yes/No Both: Yes/No	Yes Yes Yes	50% 70% 50%	
What should be the additional content, if any of such an instructional module	Yes, needed	40%	Details of methodology of polysomnography and its interpretation and modalities like actigraphy. Pathophysiology of sleep in other disorders like Heart Failure, obstructive airway diseases and psychiatric disorders may be included. Case based discussion, awareness program, quiz on topics. Module should be short and crisp. UG curriculum is already ' <i>too crowded</i> '. Practical guidelines for managing patients of OSA on mechanical modes.

**Table 3: Satisfaction index for parameters**

Parameter	Satisfaction index	Remarks
What, is your opinion, regarding the best delivery method(s) for a CME which may also be cost effective: <ol style="list-style-type: none"> <li>Live CMEs with invited experts</li> <li>Showing Recorded DVDs with video script and availability of one resource faculty to be conducted in a single day of 6-8 hours duration.</li> <li>Recorded DVDs with video script distributed to student</li> <li>Online CME</li> <li>Other Mode (specify)</li> </ol>	64 %  85%  72%  80%	Online using Skype, or any other <i>Anymeeting</i> like softwares. I think a combination of <b>c</b> and <b>d</b>
The learning objectives of the academic activity on Sleep Medicine appeared to me to be of immediate interest for my academic activities.	85%	
The content of the academic programme on Sleep Medicine dealt with issues I generally encounter in my academic assignments.	76%	✓
I found the transcripts provided of acceptable quality.	80%	
Email response to seek clarification on issues included in the DVD/CD shall facilitate learning.	84%	✓
The methods used in the CD encouraged me to take an active interest.	78%	
The Power Point Presentation of the subject content was of acceptable quality and relevant to the learning objectives.	74%	Some presentations need to be improved. Use more figures than text. Huge information that leads to sleep
Additional Information		Quality of presentations can be improved upon. There should be a link between the individual presentations and repetitions must be avoided. Power point presentation should be more precise & illustrative.

half agreed for either UG or both but 70 % suggested for post-graduates only (**Table 2**). The additional comments were, the contents should be crisp and short and should include patho-physiology of sleep in other disorders like heart failure, obstructive airway diseases and psychiatric disorders with use of case based learning. There was concern among the experts that our MBBS curriculum is already burdened with cognitive overloading.

There was high level of satisfaction with the contents of CD; using recorded DVD in presence of a content expert was perceived as highly satisfying followed by online mode. Suggestions for using more than one method were also desired to be productive and effective (**Table 3**). It was strongly desired that experts should be cautious in designing the content of such a mode in using more creativity in presentations avoiding text overcrowding and including illustrations profusely.

There was a strong felt need for including sleep in our current medical curriculum. Seventy percent feel that it should be included in both UG and PG while only 50 percent wish to include in UG only since they perceive that our MBBS curriculum is already '*too crowded*'.

### **Discussion:**

In the present study the response rate was 41 % which appears to be a balanced and satisfactory reaction from

academia. In a survey by Rowe and Ilic for exploring knowledge transfer among academicians, elicited only 37 % response rate (4). They tried to improve the response rate by using strategies suggested by a Cochrane review (5). Further studies and a recent Cochrane review also confirm response rates may be improved by using the following strategies: monetary and non-monetary incentives, larger incentives, up front monetary incentives, postal surveys, pre-contact with a phone-call from a peer, personalized packages, sending mail on Friday, and using registered mail. Mail pre-contact may also improve response rates and have low costs (6). For this study the novelty used was a relatively new idea, telephonic pre-contact, use of email reminders and augmentation by an online response collection.

The survey indicated that sleep medicine is conspicuous by its absence or thin existence in current medical curriculum in India. The similar concerns were expressed by Bajaj and Kumar when they mentioned that '*the topic does not find place in teaching in India*' (7).

However, even if the lukewarm responses by medical schools are to be accounted toward sleep medicine, they amount to an untapped opportunity which exists for exploiting such module using modern technology.

The situation is no different globally. In a study by Mindell *et al*, surveys were sent to 409 medical schools across 12 countries (Australia, India,

Indonesia, Japan, Malaysia, New Zealand, Singapore, South Korea, Thailand, United States, Canada and Viet Nam). The response rate was 25.9%, ranging from 0% in some countries (India) to 100% in other countries (New Zealand and Singapore). Overall, the average amount of time spent on sleep education is just under 2.5 h, with 27% responding that their medical school provides no sleep education. Three countries (Indonesia, Malaysia, and Viet Nam) provide no education, and only Australia and the United States/Canada provide more than 3 h of education. Pediatric topics were covered for a mere 17 min compared to over 2 h on adult-related topics (8). The two most common barriers identified by the respondents, were insufficient time (32%) and lack of qualified staff (24%). Other barriers included lack of resources (17%), low priority (17%) and not relevant (7%). Among the Saudi Arabian 3rd and 4th Year medical students more than 80% had rated their knowledge in sleep medicine as below average. Only 4.6% of the respondents correctly answered  $\geq 60\%$  of the questions (9).

The present study confirms that online CME will be best and one of the cost-effective delivery method. Respondents agreed for recorded DVD show in presence of expert to be most satisfying mode for a cost effective delivery. Though various pros and cons of face to face and online or DVD methods have long been a matter of debate (10,11,12), careful designing of content, faculty development for online delivery

technology and using adult learning principles will prove that improved technology may prove beneficial for teaching such a subject as sleep.

#### **Acknowledgment :**

Dr Kuldeep Singh acknowledges the experimental design and guidance for the research project to Professor J S Bajaj and financial support for this research project to National Academy of Medical Sciences (India), New Delhi

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## **Sleep Medicine Education in India: Policy Initiatives of National Academy of Medical Sciences (India)**

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Regional Symposium on Sleep Medicine held at All-India Institute of Medical Sciences, Jodhpur during NAMSCON 2013 provided the opportunity to review the prevalence of sleep disorders in India which is comparable to that reported from rest of the world. But sleep medicine does not find a place in the curriculum of most of the medical colleges in India.

Sleep Medicine is not just a compendium of clinical conditions dealing with etiology, pathogenesis, diagnosis and management. Although sleep clinics were established in the United States and in some countries in Europe in the 1970s, most of these were confined to the diagnosis and management of Obstructive Sleep Apnea. No regulatory requirements of a training or certification were required and till the turn of the 20<sup>th</sup> century, any physician could open a Sleep Clinic and/or a Sleep

Laboratory to provide specialized care for sleep disorders.

The situation was no different, perhaps worse in India. It was in September, 1992 that the International Conference on 'Sleep-Wakefulness' was held at the All-India Institute of Medical Sciences, New Delhi and provided an impetus to the Indian biomedical and clinical scientists who responded collectively to the unmet national needs in the specialty. It was at this conference that the '**Indian Society for Sleep Research**' was born and a classic Monograph "**SLEEP-WAKEFULNESS**" was published on behalf of the organizers of the conference with dynamic leadership of the past President of the National Academy of Medical Sciences, Dr. B. Ramamurthi as President and Dr. V. Mohan Kumar, a distinguished Fellow of the Academy as General Secretary of the newly constituted 'Indian Society for

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*\* The text of the manuscript is based on a publication from the Annals of NAMS issue on 'SLEEP MEDICINE' and was approved as a policy by the Council of NAMS. Prof. J.S. Bajaj and Dr. V. Mohan Kumar were invited by the Asian Sleep Research Society as participants in Panel discussion on Sleep education across the globe and the presentation was made by Dr. V. Mohan Kumar (1).*

Sleep Research'. Long-term plans for the organizational structure and operational framework were nurtured. The second remarkable effort at this conference was the birth of a second organization “**The Asian Sleep Research Society**” with Professor T. Okuma from Japan as President and Dr. V. Mohan Kumar as Vice-President.

With the establishment of Indian Society for Sleep Research and the Asian Sleep Research Society, a mechanism of networking with other International Sleep Research Societies was established. This has now emerged as the World Federation of Sleep Research & Sleep Medicine Societies (WFSRSMS) with a large number of national associations affiliated to this organization. In some countries, there are more than one associations dealing with Sleep Medicine : separate organizations for dealing with biomedical research viz-a-viz associations involved in public health and education for sleep health care. For example, in the US, American Academy of Sleep Medicine (AASM) and National Sleep Foundation (NSF) deal with professional advancement and public interest, respectively.

The Academic Council of NAMS has identified sleep medicine as one of the critical areas where it needs to initiate urgent steps to endorse the proposed national policy and to plan strategies aimed at enhancing educational activities at all levels: community, general practitioners, medical students and allied

health professionals.

Taking cognizance of the rapid advances in the emerging specialty of Sleep Medicine, the National Academy of Medical Sciences planned and organized a Regional Symposium on the subject as a part of the Annual Conference of the Academy at the All-India Institute of Medical Sciences, Jodhpur. The Regional Symposium was aimed :

*'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 the obesity epidemic in children and adults; consequences of sleep disorders; specific disease states associated with such disorders and the treatments available'.*

The symposium not only received highly positive response from the participants, but also showed the need for the positive steps to be taken in this direction (2). Moreover, the academic activity encouraged the Academy to initiate medical education research on various possible aspects of Continuing Medical Education with Sleep Medicine and its disorders as the base. The medical education research articles published in this issue of *Annals* not only demonstrated that a module on Sleep Medicine requires a multidisciplinary approach and integration but also that it can be used to explore multiple way the

educationists may design their Continuing Professional Development programs which are more effective.

#### **Policy Initiative by Academy:**

The sound basis of health policy planning and implementation requires a system approach which includes determinants such as epidemiology, demography, human resources and appropriate technology. While studies of epidemiology and demography as cited above provide significant information for the population in the US, similar studies are lacking in India and in most of the developing countries. The obvious reason is the enormous disease burden due to communicable and non-communicable diseases, leaving little resources for additional undertaking. Nevertheless, there is an urgent need to focus on these emerging issues which are likely to be of concern in the near future. For example, a study by Panda *et al* (2012) reported prevalence of insomnia in 18.3% of the cohort they studied in a south Indian population (3). A higher prevalence of sleep disorders related to initiation and maintenance of sleep (28%) was reported in an urban population from north India. In a large study by Stranges *et al* from the University of Warwick, the researchers examined the sleep quality of 50-year-olds from rural populations in Bangladesh, Ghana, India, Indonesia, Tanzania, South Africa, and Vietnam, as well as from an urban area in Kenya (4). They investigated potential links between sleep problems and social demographics, quality of life, physical health and

psychiatric conditions in 24434 women and 19501 men included in the study. They found that a strong link existed between sleep-related problems and psychiatric conditions like depression and anxiety, similar to that reported from the developed world. The sleep research in India is still evolving. Attempts have been made by scientists to compile the studies reported so far from India (5), how the evolution of sleep medicine has taken place over last few years (6) and experience of large tertiary neuro-medicine center with regards to referral pattern from community have been reported (7).

How do we respond to such problems in a realistic manner and prepare for the emerging issues in the future? A serious concern is lack of human resources which must play a key role in planning, designing and implementing sleep health care programs in contrast to the felt but unmet needs of critical health manpower. The striking fact is that health and medical educators have neither paid any attention to the issues of sleep behavior nor to the morbidity associated with sleep disorders. The lack of trained and skilled human resources for sleep health care is not confined to India alone. A survey in 1990-91 of 37 American medical schools showed that sleep and sleep disorders were 'covered' in less than two hours of total teaching time, on average. A 2002 survey of more than 500 primary care physicians in the US who self-reported their knowledge of sleep disorders as follows : Excellent – 0%; Good – 10%; Fair – 60%; and Poor – 30%.

The link between lack of appropriate educational modules during undergraduate curriculum and the knowledge of practicing physicians is obvious. In a recent study by Mindell *et al*, surveys were sent to 409 medical schools across 12 countries (Australia, India, Indonesia, Japan, Malaysia, New Zealand, Singapore, South Korea, Thailand, United States, Canada and Viet Nam) to find out sleep education in different countries. The response rate was 25.9%, ranging from 0% in some countries (India) to 100% in other countries (New Zealand and Singapore). Overall, the average amount of time spent on sleep education is just under 2.5 h, with 27% responding that their medical school provides no sleep education. Three countries (Indonesia, Malaysia, and Viet Nam) provide no education, and only Australia and the United States/Canada provide more than 3 h of education. Paediatric topics were covered for a mere 17 min compared to over 2 h on adult-related topics (8). Lack of awareness about specific sleep disorders like OSA as a modifiable risk factor for stroke and hypertension among health professionals and medical students based on study conducted as part of pre-test survey for CMEs reveals the reality(9).

In order to ascertain the situation in India, a well designed proforma with critical parameters was sent to 100 Government Medical Colleges in different states of the country. Response rate was 41%. To the question : '*Does your Institute conduct any structured course or module in any form, on Sleep*

*Medicine in any of the departments/ specialty'*, 96% medical institutions have responded "NO" while only one institution has responded in the affirmative (p 30).

Notwithstanding obvious constraints, there is need to initiate urgent action. An outline of a sleep health care programme stated below must keep in view these concerns :-

#### **Goal :**

The goal of a well-designed sleep health care programme must be aimed :

- i) to generate the knowledge and technology required for the prevention and treatment of sleep disorders and associated co-morbidities;
- ii) to devise, through service and psychosocial research, improved strategies for integrating sleep health care into primary health care, in a manner most appropriate to local needs, and taking into consideration socio-economic and other related factors;
- iii) to promote local and national self-reliance in sleep health care by seeking support both from the governmental and non-governmental organizations, assessing the needs and incorporating training programmes for skilled human resources, and such physical, technical and technological facilities that will enable development of infrastructure and implementation of intervention strategies.

*Enabling objectives :*

The enabling objectives for such a sleep health care programme may generally include the following :

- a) to generate awareness and provide technical inputs and manpower resources for integrating sleep health care in the primary health care system.
- b) to provide upgraded facilities at the community health centres and sub-district (Taluka) hospitals.
- c) to initiate and develop prototype of tertiary care facilities at district hospitals and medical colleges for diagnosis and management of sleep disorders and associated co-morbidities.
- d) to innovate cost effective appropriate technologies and ensure a system of quality control.
- e) to collate and disseminate new and relevant information on individual and family sleep behavior as well as sleep disorders especially in children, women, and aged.
- f) to coordinate nationwide education and training program for public, patients as well as of all categories of primary health care providers including community health workers, allied health care professionals and physicians.
- g) to assess current and future needs with regard to the need and supply of skilled human resources, drugs & devices, and procedures for the care and cure of sleep disorders and co-

morbidities.

To summarize the strategic approach, it may be stated that :

***“Health systems planning for, and research into, sleep health care must be adaptable to the wide variations in social, economic, and medical conditions and structures. Community-based primary health care schemes should be linked to specialized levels to optimize the quality of care, depending upon the requirements of the patient and the availability of resources. A group of experts should review alternative strategies including practice of Yoga and make specific proposals for health systems planning, and for the integration of sleep health care into national health services.”***

**\*The views expressed are entirely of Prof. Bajaj and are yet to be discussed and decided at the appropriate Fora of the National Academy of Medical Sciences.**

**Acknowledgment:**

This manuscript is adapted from an article published in Annals of NAMS issue on “Sleep Medicine” (10)

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## Using technology to deliver cost-effective Continuing Professional Development (CPD)

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### ABSTRACT

The work is based on engineering the audio video contents of the didactic presentations at the Regional Symposium on Sleep Medicine delivered to the target audience at NAMSCON 2013. The audio was extracted and then synchronized with Power Points, re-synthesized as **SCORM (Sharable Content Object Reference Model)** compliant packages and integrated with Moodle (**Modular Object-Oriented Dynamic Learning Environment**) as Learning Management System (**LMS**). The preliminary evaluation results showed high satisfaction with the content, its short loading time and smooth playback. These attributes were demonstrated to be effective in enhancing learning. The Moodle as LMS also allows tracking the participants' progress, involving them in social groups and open discussion forum for further enriching the online content and also helps in statistical analysis through its inbuilt web analytics. The technology is not only flexible and economical but also an effective delivery method for Continuing Professional Development Programmes.

*Key words:* Continuing Professional Development, Learning Management System

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## INTRODUCTION

At the World Summit on Medical Education\* held at Edinburgh in 1993, under the aegis of World Federation for Medical Education (WFME), several pertinent recommendations were made regarding Continuing Medical Education. It was emphasized that *'undergraduate medical education and postgraduate medical education, regardless of their duration, are insufficient to ensure life-long competency. Complex social, political, epidemiological and technological changes will always affect professional competence in unpredictable ways. Continuing Medical Education is essential to maintain the competency of new graduates, to influence the practice of older graduates, to remedy practice gaps, and to enable all doctors to respond to the challenges of the professional environment. The content of such educational programme must be responsive to the needs of the practitioners with both professional and public input. These programmes need thoughtful educational planning including objectives, strategies, skills, and assessment' (1).*

As a follow-up of the above mandate, Executive Council of the WFME published \*\* a Report on Continuing Professional Development (CPD) of Medical Doctors as a part of

WFME Global Standards for Quality Improvement. CPD mainly implies self-directed and practice-based learning activities rather than supervised training. As well as promoting personal professional development, CPD aims to maintain and develop competencies (knowledge, skills and attitudes) of the individual doctor, essential for meeting the changing needs of patients and the health care delivery system, responding to the new challenges from the scientific development in medicine, and meeting the evolving requirements of licensing bodies and society (2).

Schostaka J *et al* 2010 (3) based on their report to GMC, UK considered that CPD goes beyond what doctors do and that there is *"no single, singular or correct way of doing CPD"*. In organizational terms:

- flexibility is of vital importance in the development and provision of CPD, as are principles of justification and transparency. Active modes of learning, linking of CPD with learning needs analysis and integration of knowledge with everyday practice were major contributing factors to effective CPD.
- flexibility raised issues for assessing and accrediting and for recording CPD.
- the range of providers of CPD is extensive and diverse.
- the boundary between CPD and quality

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\* Prof. J.S. Bajaj attended the Summit Meeting as a Member of the WFME Executive Council in the capacity of President, South-East Asia Regional Association for Medical Education.

\*\*Prof. J.S. Bajaj was Member of the WFME Executive Council which finalized and approved the Report on Continuing Professional Development in 2003.

assurance can be a grey area.

The multiple use and global standards for using internet were discussed by Ruggeri, Farrington and Brayne in 2013 (4). On the other hand recognizing the importance of Continuing Professional Development in dental education, Kavadella *et al* (2013) detailed the recommendation on development of *e*-modules for dental professional education (5).

The present study is an organized attempt to explore the feasibility of engineering the already prepared symposium content for an effective and economical delivery of academic content over the internet using Moodle as Learning Management System (LMS) and SCORM compliant modules produced by re-synthesizing the audio content and synchronizing with Power Point presentations of the course faculty.

## BACKGROUND

All India Institute of Medical Sciences, Jodhpur hosted the 53rd Annual Conference of National Academy of Medical Sciences (India) from 25-27 October 2013. As a part of the conference, a NAMS Regional Symposium on Sleep Medicine was held on 25th October. The symposium, chaired by Prof J S Bajaj and Prof V Mohan Kumar, was attended by about 200 medical students, Junior and Senior Residents, fellows and members of NAMS and faculty members of AIIMS, Jodhpur and Dr SN Medical College, Jodhpur. There was willing and

enthusiastic participation of medical students from 1st and 2nd year courses of MBBS. It was felt that topic was not only of contemporary relevance but was also a model for integrated teaching involving basic scientists, pharmacologists, clinicians and practitioners of relevant super specialities. *Vision 2015* document of Medical Council of India envisages using integrated teaching, both vertical and horizontal, in all specialities and also optimal use of information technology to deliver it; the outcome of such efforts has not been encouraging so far.

The event of NAMS Symposium not only provided an opportunity to capture the presentations but also provided a framework along with a set of contents which can be tested and experimented with a variety of formats to constitute an effective tool of Continuing Professional Development. The value of live CME was evaluated and proved effective (6). It showed that a well planned educational activity with defined educational objectives delivered through content experts, under a conducive environment, provides high satisfaction to participants in gaining knowledge, improving skills and enhancing competencies. Such activities motivate participants and encourage them to seek additional educational programs and academic assignments for their self development. It was further shown that use of DVD of same academic program in the presence of a single resource person was equally effective and participants had shown similar, although not 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 to clarify their doubts (p 19).

### **AIMS**

1. To seek alternative method and technology for delivery of contents of NAMS Sleep Medicine Symposium
2. To explore utility of web technology as a mode for effective delivery of academic content aimed at Continuing Professional Development.

### **METHODOLOGY**

NAMS Regional Symposium on Sleep Medicine had 12 presentations from content experts dealing with selected aspects of sleep medicine along with 2 interactive problem based sessions. Arrangements were made for audio-video recording of the whole event through High Definition (HD) twin positioned cameras along with a AV Mixer receiving feeds from both cameras as well as from PowerPoint. The mixing equipment was used to produce real time video output. The same AV clips were further edited for enhancing content effectiveness and were uploaded to the NAMSCON website and are presently installed there permanently.

With the increasing use of computer and information technology, systems and learning theories have been formulated for web-based learning. Such a web-based delivery method has been used in the present study. It has been

unequivocally demonstrated that learning management system with web-based technology can provide a great variety of features and is capable of harnessing fully academic courses/assignments, provided pedagogical principles are followed. Prima facie, these appear to be rather inexpensive and effective but their application remains mostly limited in terms of technical design and therefore at times appear more costly. Moreover, considerations such as cost of student time, internet availability and its usage are seldom taken into account. Using multimedia over internet requires technical expertise. The video files are quite large and they require streaming server (as provided by the YouTube) instead of web server to play.

From the raw video captured at the Sleep symposium, the audio were separated by VLC player and were then synchronized with Power Point presentations using trial version of iSpring pro, an add-in to Microsoft Power Point. It has options for integrating with Learning Management System (LMS) which can be quite complex. As described, the LMS are web-based software application platforms used to plan, implement, and assess learning processes related to online and offline training administration and performance management. LMS allows an instructor to create and deliver content, monitor learners' participation, and assess student performance. LMS also allow learners to use interactive features such as threaded discussions, web conferencing, discussion forums, and other methods of

communication.

The multimedia content should also be compliant to SCORM, which is a set of specifications that, when applied to course content, produces small, reusable e-Learning objects. A result of the Department of Defense's Advanced Distributed Learning (ADL) initiative, SCORM-compliant courseware elements are easily merged with other compliant elements to produce a highly modular repository of training materials.

We used the SCORM 4 packaging to produce the multimedia contents. For LMS we selected Moodle which is open source LMS software and is highly customizable and is mostly useful to programmers and education theorists. It was installed on the personal website of KS for experimentation ([drkuldeep.org/namscon](http://drkuldeep.org/namscon)). The installation though easy, nevertheless, the configuration required extensive study of documentation. Plugins were installed for multimedia contents and its use over mobile phones/smartphones. After initial registration, user can operate the account for learning at his/her own pace.

Evaluation was based on structured questionnaire, telephonic interviews, personal discussion and focused group interview with students, residents and faculty.

## RESULTS

The *ad hoc* results are based on

pilot testing with 10 registered users. It is still ongoing and expected to obtain additional responses. In the initial phase, there were 3 females and 7 males as the participants. All participants showed satisfactions with the technology (100%). They did not encounter any problem with registration, logging in, content loading and use of navigation buttons. Since the media player was customizable in size, they did not face any problem while viewing in a web browser of their choice. They were able to play it forward and backward without much time lag. They also liked the web interface and flexibility to choose options for open discussion forum. 20 % faced some problem with their player. On interrogation the errors were due to java virtual machine (JVM) and were rectified on reloading the java program.

As can also be seen from **Table 1**, the cost of the present method is just half the cost of CD based and just 1/20th of cost of DVD based educational program with a single resource person. The technology thus could be relatively inexpensive when the cost is compared to that of organizing a live symposium. However, the most advantageous aspect of this CME would have been live interaction which is face to face. This conforms to the adult learning principles also since learning is maximum when the query is satisfied and feedback is provided immediately. Nevertheless the web based system can also be customized similarly to provide early feedback.

Although considerable knowledge as gained about the Moodle, its flexibility and customizing ability, the awareness of its capability to integrate with portfolio development using Mahara Open source software was also demonstrated. In this way, students can also demonstrate their

learning to peers and can also control the level of their exposure to assessment system. They may allow full accessibility to their mentor, teacher and guide and limited power to their colleagues as per their desire or Institutional regulations (7).

**Table 1: Cost of various modes of delivery utilized on framework of NAMS symposium**

SI No	Method	Cost	Remarks
1	Live*	Rs 1,25,714	Included expert's travel & stay, resource material development, video recording
2	Recorded DVD with a single expert as a resource person*	Rs 72005	Included single resource person's travel, stay, printing etc. Require DVD player and heavy usage of RAM.
3	CDs with Power point presentations with video script**	Rs 7600	Burning presentations on CD and postal dispatch. Require CD Player and use memory
4	Web based using Open Source Learning Management system (LMS) like MOODLE which is SCORM (Sharable Content Object Reference Model) compliant ( <b>The present study</b> )	Rs 3500	Only require internet and web browser. Can work even with slow internet connection and on mobile phones also

Note: Source \*: Unpublished observation on *“To Assess Comparative Effectiveness of a model CME Program using validated non-print methods for Medical Education”*  
 \*\* Unpublished observation on *“Evaluation of the Learning Resource Material based CME on CD”*

In addition, options 1 and 2 are time-selected and available to finite number of participants for a limited time, whereas options 3 & 4 were available anytime and to infinite number of participants forever.

**Table 2: Focused Group Discussion**

Theme	Responses
Utility of method for CPD	Supplement new areas not usually touched in conventional teaching.
Self-directed learning	Best for highly motivated. For others constant guidance, reminders, mailers will be needed. It will also depend on our need and topics. We can use portfolio often if it provide incentive- grades, scores or prizes
Role of faculty in this module	Increased from content expert to a guide/mentor
Suggestion for improvement	Extra text in few presentations needs to be reduced since same information is there in audio form. Topics should be more focused and short. Level of difficulty should be included.

**DISCUSSION:**

With advent of web technology many methods have emerged for the delivery of content over internet (8, 9). These include Adaptive and intelligent Web-based educational systems (AIWES) which aim at providing learners with an environment that reacts intelligently to the learners' needs. The term adaptive refers to the functionality of the system to automatically provide different suggestions, courses, or activities to learners with different characteristics and needs. The term intelligent means that a system uses artificial intelligence techniques in order to support learners or identify their characteristics, needs, and situations (10).

As early as 1980, Keegan (11) described 'Distance education' as instructional activity having separation between educator and learner, process being intermediated by an educational institution. The technology utilized for transferring knowledge with a two way communication between teacher and learner. E-learning (as well as online learning, virtual learning, computer-assisted learning, web-based learning, etc.) is a method of distance education that utilizes electronic and/or technological resources for delivering the educational materials. The prefixes e-, web-, etc. define the means or the tools for transferring information and not the pedagogical principles or the learning outcome. On the part of content designer it calls for application of sound pedagogical principles. If optimally harnessed, e-

learning in the health sciences, particularly for continuing education, can be valuable and offers several advantages over traditional face-to-face teaching. These include the following: flexibility in time and place; adaptation to individual needs; presentation of procedures in different formats; the possibility for interaction and communication at a moment that is relevant for the learner; adaptation of learning materials across countries; and the ease of keeping the material up to date. Based on their project on systematic review of literature, Childs *et al* explored the barriers to e-learning for health professionals and students (12). Barriers to the successful implementation of e-learning include the following: (i) barriers related to the development and provision of e-learning material, such as the initial costs for course development, poor design packages, inadequate technology, resistance to change, need for face-to-face contact, unrealistic time frames, outdated material; and (ii) barriers related to learners participation, such as the alienation, lack of relevant skills, excessive workload and lack of support. They also suggested solutions to these barriers. These barriers may be overcome by more structured strategies and targeted interventions by the organizing institution (5). The face-to-face contact is an important aspect of health professional education with regards to practical procedures. Therefore, rather than having excessive reliance on e-module, the program designer should concentrate on learner's need. Moodle is the most often used open source LMS used for education

worldwide. Another open source Learning Management System, ATutor has also been used successfully in medical education by professionals from Teheran, Iran (13). The Moodle has also been used for teaching ethics by Halkoaho A (14).

While the debate still continues regarding comparative cost analysis while calculating the actual cost of CPD, the need and utility of these programs remains undoubted (15).

#### **CONTRIBUTORS:**

1. Dr Kuldeep Singh conceived the idea, explored the avenues for cost-effective delivery of NAMS Regional Symposium on Sleep Medicine, created his own web space, engineered the content of symposium for its online delivery using various softwares, choosing Moodle as Learning Management system (LMS) and customizing sufficiently to optimize delivery in order to preserve the pedagogical principles and exploiting adult learning theories for individual learning. He also conducted the study to find out the utility of the technology in cost-effective Continuing Professional Development among his colleagues and students
2. Prof J S Bajaj gave guidance on learning objectives for program development, use of data of NAMS Regional Symposium on Sleep Medicine for variety of modes including uploading as YouTube files, recording on DVD, resource material use in CD format for seeking its use as an integrated module.

He provided evaluation methodology and the method of calculation of satisfaction index for program evaluation. Finally, he reviewed the content and participated in writing of the final manuscript.

#### **Acknowledgements:**

Dr. Kuldeep Singh acknowledge the funding for NAMSCON 2013 Sleep Medicine Symposium and CME held at Dr. S N Medical College, Jodhpur to National Academy of Medical Sciences (India), New Delhi

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**Annotation**

## **Poster presentations : New initiative at NAMSCON 2013 at AIIMS Jodhpur**

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Besides updating oneself by attending Continuing Medical Education (CME) activities, it is also important for health professionals to attend the conferences, meetings, workshops and symposia conducted as parts of scientific activities of associations and organizations. These meetings provide biomedical scientists and healthcare professionals a platform to share their research, experiences and innovative ideas with a wider audience. These conferences also provide a good opportunity for facilitating knowledge transfer to diverse groups of people who are governed by adult learning principles. The various academic bodies aimed to promote 'active learning' among the participants and hence use traditional methods of oral, poster and workshops to meet the goal. Obviously the first preference of biomedical scientists is oral presentations which provide them an opportunity to present detail knowledge of their work in didactic form with options of direct questioning, clarifications and in maintaining conversation with the audience. Poster presentations on the other hand tend to provide 'in-depth' information of research work through a

visual portrait. Originally the poster was used as an introduction to a new piece of research before the paper was published. They serve as standalone mode of expressions.

The National Academy of Medical Sciences (India) conferences are typically having a regional or national symposium followed by oral deliberations by fellow experts of their focused research area in form of orations. The academy recognizes outstanding contributions by biomedical scientists' by conferring membership and fellowships of the academy and awarding the young scientists through various awards.

Till 2013 annual meetings there was limited provision of academic expressions through poster presentations depending on logistics of the organizing institute. There wasn't any format or guidelines for the poster presentations. However, in an Academic Council meeting in July 2013, it was suggested by Prof J S Bajaj, Chairman, Academic Council to formally invite posters from delegates so that delegates also become active participants in the conference and will help in consolidating academy as a

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research body and assist biomedical scientists with an alternative mode of dissemination of their research for wider recognition.

Majority of medical scientists prefer the oral mode because of its obvious advantages. The disadvantages of posters are the passive mode, limited audience, repeating presentation to audience, presenter deprived from viewing others' posters.

The static nature of the poster presentation may not be perceived as promoting an environment that is conducive to 'active learning', although it still meets the expressed professional demand for a constant 'in-depth' overview. In itself, active learning consists of strategies that encourage the learner to engage in activities including the analysis, synthesis and evaluation of information.

The current literature on posters is largely limited to discussing the benefits and limitations of the poster as an academic tool and generalized aspects of construction. However, poster offers options of incorporating new technology to enhance its value.

Many innovations have been introduced to circumvent the disadvantages of posters. Posters for longer duration display ensuring the presenter to be present at a pre-selected time with pre-selected period to provide opportunity for inter-personal discussions. Scientists have also experimented with 'Digital Interactive Poster Presentation' (DIPP) (1). Here the poster were invited in digital format also

and were presented with projector along with display in poster arena. This new system allows participation of a larger audience, interactive presentation, and more effective discussion of scientific data. The DIPP permitted presenters to project their poster on a large screen and magnify pre-selected sections (e.g. figures, text, tables) whilst providing a two minute summary of their poster. Whilst this contributed to the special quality of the presentation and ensured author participation; the enhanced illustration of imagery and data did not extend beyond that represented on the poster itself. This has lead researcher to experiment with poster using media. The 'MediaPoster' aimed to combine information technology (IT) with a 'traditional' poster appearance (2)

Idea of using digital frame with video player was to make a poster interesting and suited for demonstrating newer techniques or devices (3).

Foundation for Advancement in Medical Education and Research (FAIMER) uses format of online peer review of poster, gallery walk and then its presentation to a small group followed by projector display to fellows of 3 years along with faculty members as innovative educational project presentation (4, 5).

Though unlike the publications which are peer reviewed, the success of a poster is judged by viewer ship, discussion it generates, leads and collaboration it made. Poster presentations are evolving with digital media, which may affect competence development in this multimodal form of

research communication (6).

In a study by Deonandan among 4th year epidemiology students, the poster experience was on par with, or superior to, a comparable research paper, in terms of both educational appeal and enjoyment. They concluded that “*Mandatory, formal poster presentations are an innovative format for teaching advanced health sciences, and may more accurately reflect the realities of a science career than do more traditional educational formats*” (7). The poster presentations have undoubtedly proved to be the valid form of scientific communication and required flexibility, ingenuity and means to make it more visually appealing to the audience. Their advantages increase many fold since they offer detailed discussion of key areas and immediate feedback for improvement by the interested audience.

The initiative by National Academy of Medical Sciences (India) of introducing poster presentations with guidelines for poster design and presentation will add value to its annual meeting. This also provides Academy to research with ideas of interactive poster, introducing best paper awards and an opportunity to mentor young biomedical scientists with an option of immediate feedback to the presenter.

The experience of the Poster Session at 53rd Annual Conference of the National Academy of Medical Sciences (India) in 2013 was considered satisfactory. A plea was made to make poster, a permanent feature for the future conferences while adding the new innovations which make such poster sessions academically rewarding.

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The Royal Marsden Hospital Bone-Marrow Transplantation Team (1977). Failure of syngeneic bone-marrow graft without preconditioning in post hepatitis marrow aplasia. *Lancet* 2: 242-244.

#### *No author given*

Anonymous (1981). Coffee drinking and cancer of the pancreas (Editorial). *Br Med J* 283: 628

### *Books and Monographs*

#### *Personal author(s)*

Eisen HN (1974). Immunology: An Introduction to Molecular and Cellular Principles of the Immune Response. 5<sup>th</sup> ed. New York: Harper and Row, 406-416.

#### *Editor, compiler, chairman as author*

Dausset J and Colombani J eds. (1973). Histocompatibility Testing 1972 Copenhagen: Munksgaard, 12-18.

#### *Chapter in a book*

Weinstein L and Swartz MN (1974). Pathogenic properties of invading microorganisms. In: Pathologic Physiology: Mechanisms of Disease. Sodeman WA Jr and Sodeman WA (eds), Philadelphia: WB Saunders. 457-472.

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Printed and Published by Honorary Secretary, assisted by Publication Officer, National Academy of Medical Sciences (India), New Delhi. Tel. 011-26589289 & Printed at Kalakalp, 104, First Floor, Adeshwar Tower, Chopasni Road, Jodhpur - 342 003 Tel. : 0291-2640400, Mobile : 09414128128

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