



MUHS

वेदा प्रा. मनीषा कोठेकर
संचालक

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक
MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
विभागीय केंद्र, नागपुर Regional Centre, Nagpur
शासकीय वैद्यकीय महाविद्यालय, हनुमान नगर नागपुर - ४४० ००३
Govt. Medical College, Hanuman Nagar, Nagpur - 440 003
Phone & Fax : 0712-2752929
E-mail Id : rc_nagpur@muhs.ac.in

Ref.No.MUHS/MET,Nagpur/171/2019

Date: 29/06/2019

To,
Dr. Tapasya Karemore
VSPM's Dental College,
Hingna, Nagpur.

Subject : Letter of Participation as a Faculty in the "Advance Course in Research Methodology " June, 2019.

Dear Dr. Tapasya Karemore

Thank you for your esteemed presence & sharing knowledge for "Advance Course in Research Methodology " as a faculty on 24th to 29th June, 2019 organised by "Dept. of Tribal Health , Maharashtra University of Health Sciences, Regional Centre, Nagpur at Govt. Dental College, Nagpur.

We are sure the participants have benefitted from your experience & expertise & will be able to apply the learning in their teaching endeavours.

Thanking you & looking forward to your continued contribution.

Yours Sincerely

Vda. Prof. Maneesha Kothekar
Director
MUHS Regional Centre,
Nagpur.



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

Institute of Medical Education Technology and Teachers' Training, Nashik

Certificate No.

157

CERTIFICATE OF COMPLETION

awarded to

Dr. /Mr./Smt.

NEELAM PANDE

from

V. S. P. M. Dental College, Nagpur

for having completed the

Advanced Certificate Course in Health Sciences Education Technology

He/ She has successfully carried out an Educational Innovation Project titled

Assessment of U. G. Dental Students by Structured Oral Examination in Prosthodontics

as a part of this course held from April 2018 to September 2018..

Payal K Bansal

Dr. Payal K Bansal
HOD, IMETT
MUHS, Nashik

Dr. Kalidas Chavan

Dr. Kalidas Chavan
Registrar
MUHS, Nashik

Prof. Dr. Mohan Khamgaonkar

Prof. Dr. Mohan Khamgaonkar
Pro Vice Chancellor,
MUHS, Nashik

Prof. Dr. Deelip Mhaisekar

Prof. Dr. Deelip Mhaisekar
Vice Chancellor
MUHS, Nashik

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CamScanner



**BASIC WORKSHOP IN HEALTH
SCIENCES EDUCATION TECHNOLOGY
SGPN'S NANDED RURAL DENTAL COLLEGE
& RESEARCH CENTER, NANDED**



CERTIFICATE

This is to certify that Dr. Apeksha Dhole
from VSPM DC & RC, NAGPUR has participated as a Resource
faculty in the basic workshop in Health Sciences Education Technology, Conducted
by Nanded Rural Dental College & Research Center, Nanded from 27th to 29th March 2019.

MUHS, Nashik has approved this workshop vide letter No. MUHS/METT/37/2017
dated 23/08/2017.

Dr. Anil B. Warkar
MEU Convener
GMC, Akola

Dr. Suresh Kumar Kasagani
Principal
NRDC&RC, Nanded



Medical Education Technology Unit
 NKP SALVE INSTITUTE OF MEDICAL SCIENCES & RESEARCH CENTRE, NAGPUR
MAHARASHTRA STATE LEVEL CONFERENCE
RESEARCH IN MEDICAL EDUCATION TECHNOLOGY
OPPORTUNITIES AND CHALLENGES



Certificate of Poster Presentation

This certifies that

Dr. *Chaitanya S. Makade*

from *WSPM's Dental College, A. K. S. Nagpur*

Has presented a poster entitled

A model competition as a tool to enhance teaching learning for final BDS students - student teacher perspective

at the MAHARASHTRA STATE LEVEL CONFERENCE ON

RESEARCH IN MEDICAL EDUCATION TECHNOLOGY:

OPPORTUNITIES AND CHALLENGES

Organised by

Medical Education Technology Unit, NKP SIMS & RC, NAGPUR

on 13th January 2012

CERTIFICATE

CERTIFICATE

Dasgupta
 Dr. S. Dasgupta
 DEAN

Suresh Chari
 Dr. Suresh Chari

Shubhada Gade
 Dr. Shubhada Gade
 Coordinator, Semesters



Datta Meghe Institute of Medical Sciences (Deemed University)

MABC Accredited Grade 'A'

Grade 'A' - HEP Ministry Government of India

School for Health Professions Education & Research

Sawangi (Meghe), Waranan (M.S.)



EDUCATIONAL RESEARCH INTERNATIONAL CONCLAVE 2017

ERICON-2017

(CME Code-MMC/MAC/2017/C-0069982)

Certificate

This is to certify that

Dr. Chetana Makade

has participated as a Delegate and has presented Poster Entitled
Early exposure of 3rd BDS students to magnification in Regenerative dentistry
in ERICON -2017 conducted on 18th - 19th February 2017 organized by

School for Health Professions Education & Research, Datta Meghe (Meghe), Waranan.
(Datta Meghe has granted Three Credits for the Conclave)

Dr. Dilip Gode

Organizing Chairman
ERICON-2017

Vec-Chairman, DMMMS (DU)

Dr. Sunita Yagha

Organizing Secretary
ERICON-2017 Registrar
Director, SHETA, DMMMS (DU)

Dr. A. Anjanwar

Registrar
DMMMS (DU),
Sawangi (M), Waranan

Dr. Arun Pawade

(AMC Observer)
MAC/MAB (observer:2017)

MUHS



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
Institute of Medical Education Technology & Teachers' Training
Regional Centre, 3rd Floor, Civil Hospital Building, Aurdhh Camp, Pune 27.

Certificate No.

27

CERTIFICATE OF COMPLETION

awarded to

Dr. Chetana S. Makade

from

VSPM Dental College and Research Centre, Nagpur

for having completed the

"Advanced Certificate Course in Health Sciences Education Technology"

He / She has successfully carried out an Educational Innovation Project titled
Clinical evaluation of cavity preparations in III BDS students

with and without use of magnifying loupes.

as a part of this course from January 2015 to June 2016

Payal K Bansal

Dr. Payal K Bansal
Head, IMETT, &
MUHS Regional Centre, Pune

Dr. Kashinath D. Garkat

Dr. Kashinath D. Garkat
Registrar
MUHS, Nashik

Dr. Prof. Deelip Mhaisarkar

Dr. Prof. Deelip Mhaisarkar
Vice-Chancellor
MUHS, Nashik



ALL INDIA INSTITUTE OF MEDICAL SCIENCES NAGPUR
(AN INSTITUTE OF NATIONAL IMPORTANCE)

Ref.No.2019/49

Centre For Medical Education Technologies

Conference cum workshop - "Demystifying Self Directed Learning"
Certificate

This is to certify that Dr. Chetana. S. Makade has participated as delegate in the Conference cum Workshop on "Demystifying Self Directed Learning" on 1st December 2019, organized by Centre of Medical Technologies, All India Institute of Medical Sciences, Nagpur.
She also presented a poster titled "Project assignment - an attempt at self directed learning" in the scientific session.

T.S. Lengyel
Coordinator
CMET

Vibha Bhat
Director
14/12/19
AIMS NAGPUR



CERTIFICATE *of* APPRECIATION

The Organising Committee expresses its grateful thanks to

Dr Tapasya Karemore

for contributing as facilitator in the

Workshop 8
Inter-professional Education: Guide for Implementation.

held at the

International Medical University, Kuala Lumpur, Malaysia

on

5 August 2019

Professor Toh Chooi Gait
Chairperson, Local Organising Committee
SEAADE 2019
International Medical University

Professor Seow Liang Lin
Chairperson, Scientific Committee
SEAADE 2019
International Medical University



NKP Salve Institute of Medical Sciences & Research Centre, Nagpur
MEDICAL EDUCATION TECHNOLOGY UNIT



Leading Tomorrow

Nurturing Tomorrow's Academic Leaders Today

MET Unit NKPSIMS Initiative - 2 Months Certificate Course

Certificate

This is to certify that **Dr. Tapasya Karemore** Dept of Oral Medicine & Radiology of VSPM DC, Nagpur was FACULTY for leadership program "Leading Tomorrow" from 25th Jan 2019 to 25th March 2019, with three full day contact sessions, two half day small group discussion, two months online discussion and final assignment presentation.

The Sessions conducted were :

Self Discovery | Setting Goals & Decision Making | Leadership Types and Styles
Delegation, Empowerment & Team building | Assertive communication, Motivation and Handling Different People
Conflict & Change Management | Case Studies | Educational Scholarship

Dr Kajal Mitra
Dean
NKPSIMS

Dr Suresh Chari
Pilot Faculty
Director Research & MET

Dr. Hedgewar Smruti Rugna Seva Mandal's



DENTAL COLLEGE & HOSPITAL , HINGOLI



&

MET CELL, MUHS

**HEALTH SCIENCES EDUCATION TECHNOLOGY (HSET) WORKSHOP
(MUHS RECOGNIZED)**

This is to certify that Dr.**RPHIT.....MRHABIL.....**.....
has contributed to HSET workshop as resource person on
4th , 5th , 6th Oct, 2017 in
Dr. Hedgewar Smruti Rugna Seva Mandal's
Dental College & Hospital, Hingoli

B. T. Khurana

B. T. Khurana
Chairman

Dr. D. M. Dhamankar

Dr. D. M. Dhamankar
Dean

Place : Hingoli
Date : 6/10/17



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
Institute of Medical Education Technology & Teachers' Training

Regional Centre, 3rd Floor, Civil Hospital Building, Aundh Camp, Pune 27.

Certificate No.

71

CERTIFICATE OF COMPLETION

awarded to

Dr. Rohit Mohari

from

V.S.P.M. Dental College & Research Centre, Nagpur

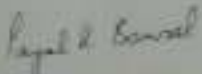
for having completed the

"Advanced Certificate Course in Health Sciences Education Technology"

He / She has successfully carried out an Educational Innovation Project titled

Effectiveness of structured Mentorship Module in Adaptation
of Institutional Environment for First Year BDS students.

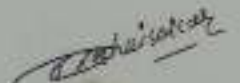
as a part of this course from July 2016 to Dec. 2016



Dr. Payal K. Bansal
Head, IMETT &
MUHS Regional Centre, Nagpur



Dr. Kalidas Chavan
Offg. Registrar
MUHS, Nashik



Dr. Prof. Deelip Mhaisekar
Vice-Chancellor
MUHS, Nashik

Sakshi Shikshan Sanstha's Murtizapur Reg. No. Mah/8471



Dr. Rajesh R. Kambe Dental College & Hospital

Website : www.rrkdental.org

E-mail : dr.rrkdental@gmail.com

Ref. No. : RRKDC&H/ (96) /2018

Date : 05/09/2018

Dear sir ,

I take this opportunity to thanks Dr. Rohit Moharil for effectively conducting the training programme as a **RESOURCE PERSON** on Basic Workshop in Health Sciences Education Technology (HSET) of MUHS at our institute from 4th September to 6th September.

Thanking you,

Principal

Dr. Rajesh R. Kambe
Dental College & Hospital
Kamheri, Sarap, Akola

FAIMER

Foundation for Advancement of International Medical Education and Research



GSMC - FAIMER REGIONAL INSTITUTE

Seth GS Medical College and KEM Hospital, Mumbai - 400 012

2017 - 2019

This is to certify that
Dr. Rohit B. Moharil

is awarded "GSMC - FAIMER Regional Institute Fellowship" in Medical Education
and has successfully completed his educational research project

Dr. William Burdick
Director

FAIMER Regional Institute, Philadelphia

Dr. Praveen B Iyer / Dr. Henal R Shah
Co-Directors

GSMC-FAIMER Regional Institute, Mumbai



**BASIC WORKSHOP IN HEALTH
SCIENCES EDUCATION TECHNOLOGY
SGPN'S NANDED RURAL DENTAL COLLEGE
& RESEARCH CENTER, NANDED**

CERTIFICATE

This is to certify that Dr. Rohit Moharil
from _____ has participated as a Resource
faculty in the basic workshop in Health Sciences Education Technology, Conducted
by Nanded Rural Dental College & Research Center, Nanded from 27th to 29th March 2019.

MUHS, Nashik has approved this workshop vide letter No. MUHS/METT/37/2017
dated 23/08/2017.

Dr. Anil B. Warkar
MEU Convener
GMC, Akola

Dr. Suresh Kumar Kasagani
Principal
NRDC&RC, Nanded



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

Dindori Road, Mhasrul, Nashik - 422004
Tel : (0253) 2539292, Fax : (0253) 2539295
Website : www.muhs.ac.in, E-mail : registrar@muhs.ac.in

Institute of Medical Education Technology and Teachers' Training

This is to certify that

Dr./Mr./Smt. ROHIT BALWANT MOHARIL

has participated as a Delegate in

Basic Workshop in Research Methodology

held from 07-Aug-2019 to 09-Aug-2019

Organised by
Nagpur Regional Office, MUHS, Nagpur

Approved vide letter no. MUHS/IMETTT/179/2019, dated 31-Jul-2019

Certificate Barcode :



Registrar
MUHS, Nashik

Date : 23-Oct-2019 Time : 10:10:35AM



**Dental Education Technology Unit
(PRIDE)**



VSPM's DENTAL COLLEGE AND RESEARCH CENTRE, NAGPUR
MSDC/CDE/1587/2013-2014 dated, 04/01/2014 6 CDE Points

Certificate Of Participation

This certificate is awarded to

Dr. Surekha Rathod (Problem Based Learning)

For winning Third Prize

in E-Poster Presentation at Maharashtra State level Conference on

"21st Century Dental Education: The Right Perspective" held on 11th January 2014

(Dr. Usha Radke)
Dean

(Dr. Ramakrishna Shenoi)
Vice Dean

(Dr. Mukta Motwani)
Organizing Chairperson

(Dr. Surekha Rathod)
Organizing Secretary



NCHPE 18

2nd MUHS State Level HSET Research Conference 2018-2019

15th, 16th & 17th November 2018



Theme : Competency driven Health Professions Education: Initiatives within and beyond classroom

Certificate

This is to certify that

Dr. Surekha Rathod

has presented a paper titled

Development and effectiveness of basic surgical skill module for interns

in the 18th National Conference on Health Professions Education (NCHPE 18) &

2nd MUHS State Level Health Science Education Technology Research Conference 2018-19

organized by

Medical Education Unit, NKP Salve Institute of Medical Sciences and Research Centre & Lata Mangeshkar Hospital, Nagpur.

Dr. Kalidas Chavan
Registrar
MUHS Nashik

Dr. Kajal Mitra
Chairman NCHPE 18
Dean, NKP SIMS & RC & LMIH

Dr. Sunish Chait
Organizing President
NCHPE 18

Dr. Shubhendu Gade
Organizing Secretary
NCHPE 18



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**Dental Education Technology Unit
(PRIDE)**



VSPM's DENTAL COLLEGE AND RESEARCH CENTRE, NAGPUR

MSDC/CDE/1587/2013-2014 dated, 04/01/2014 6 CDE Points

Certificate Of Participation

This certificate is awarded to

Dr. Surekha Rathod

For Participation at Maharashtra State level Conference on

"21st Century Dental Education: The Right Perspective" held on 11th January 2014

(Dr. Usha Radke)
Dean

(Dr. Ramakrishna Shenoi)
Vice Dean

(Dr. Mukta Motwani)
Organizing Chairperson

(Dr. Surekha Rathod)
Organizing Secretary



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
Institute of Medical Education Technology & Teachers' Training

Regional Centre, 3rd Floor, Civil Hospital Building, Aundh Camp, Pune 27.



CERTIFICATE OF PARTICIPATION

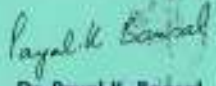
Dr. / Mr. / Smt. T. Karemore from
V.S.P.M.'s Dental College Nagpur. has participated
as a Delegate / Faculty in

Resident as Teacher - Basic workshop in Educational Methodology'

held from 10/11/2014 to 11/11/2014

conducted at
MUHS Regional Centre, Nagpur
&
V.S.P.M.'s College of Physiotherapy, Nagpur


Dr. Mangala G. Deshpande
Director
V.S.P.M.'s College of Physiotherapy,
Nagpur


Dr. Payal K. Bansal
Head, IMETT &
MUHS Regional Centre, Pune


Dr. Kashinath D. Gorkal
Registrar
MUHS, Nashik


Dr. Prof. Arun Jamkar
Vice-Chancellor
MUHS, Nashik





MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
Institute of Medical Education Technology & Teachers' Training

Regional Centre, 3rd Floor, Civil Hospital Building, Aundh Camp, Pune 27.

Certificate No.

203

This is to certify that

Dr./Mr./Smt.

Tapasya Katemohre

has participated as a Delegate / Faculty in

Resident as Teacher - Basic Workshop in Educational Methodology

held from 26 Oct 2015 to 27 Oct 2015

Organised by

VSPM's Dental college & Research Centre, Nagpur

Approved vide letter no. MUHS IMETT Pune/1973 dated 09/10/2015

Payal K Bansal

Dr. Payal K. Bansal
Head, IMETT &
MUHS Regional Centre, Pune

Dr. Kashinath D. Garkal

Dr. Kashinath D. Garkal
Registrar
MUHS, Nashik

Dr. Prof. Arun Jamkar

Dr. Prof. Arun Jamkar
Vice Chancellor
MUHS, Nashik



Dr. Rajesh R. Kambe Dental College & Hospital

Website : www.rrkdental.org

E-mail : dr.rrkdental@gmail.com

Ref. No. : RRKDC&H/1966 /201

Date : 06/09/18

Dear Sir/Madam ,

I take this opportunity to thanks Dr. Tapasya Karemore for effectively conducting the training programme as a RESOURCE PERSON on "Basic Workshop in Health Sciences Education Technology" (HSET) of MUHS at our institute from 4th September to 6th September.

Thanking you,

Principal

Dr. Rajesh R. Kambe Dental College & Hospital
Kanheri Sarap, Akola

Principal
Dr. Rajesh Ramdasji Kambe Dental
College & Hospital, Kanheri (Sarap),
Tq. Barshitakli Dist. Akola

Address : Kanheri (Sarap) Tq. Barshitakli Dist. Akola 444 401

M : 9545507130, 9552566277, 9552376735 ☎ : 07256-242144



डॉ. लता तपनीकर
सहायक प्राध्यापक

महाराष्ट्र आरोग्य विज्ञान विद्यापीठ, नाशिक
MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
विभागीय केंद्र, नागपूर Regional Centre, Nagpur
शासकीय वैद्यकीय महाविद्यालय, हनुमान नगर नागपूर - ४४० ००३
Govt. Medical College, Hanuman Nagar, Nagpur - 440 003
Phone & Fax : 0712-2752929
Email ID : rcnagpur@muhsnashik.com

Ref.No.MUHS/MET,Nagpur/ 2७७ /2013

Date: 12\12\2013

To,
Dr. Saeesh Deshpande
Asstt.Professor
VSPM's Dental College,
Hingna, Nagpur.

Subject : Letter of Participation as a Faculty in the " Basic Workshop in Health Sciences Education Technology ".

Dear Dr. Saeesh Deshpande

Thank you for attending our "Basic Workshop in Health Sciences Education Technology " as a faculty on 10th to 12th December, 2013 conducted by "Dept.Of Tribal Health ,Maharashtra University of Health Sciences,Regional Centre,Nagpur at NKP Salve Institute of Medical Sciences ,Hingna, Nagpur.

We are sure the participants have benefitted from your experience & expertise & will be able to apply the learning in their teaching endeavours.

Thanking you & looking forward to your continued contribution.

Yours Sincerely

Dr.Lata Tapnikar
Asstt.Professor, Incharge
MUHS Regional Centre,
Nagpur.

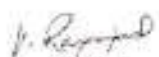


Certificate

This Certificate is awarded to Dr. Saee Deshmukh for presenting Key note lecture titled "Blended Learning : Improve clinical decision making in Prosthodontics" at 43rd Indian Prosthodontic Society Conference, Hyderabad 4th - 6th December 2015.




President
Dr. C. L. Satish Babu


Secretary
Dr. V. Rangarajan


Chairman
Dr. K. Mahendarnadh Reddy


Organising Secretary
Dr. Jangala Hari

FAIMER®

Foundation for Advancement of International Medical Education and Research



GSMC - FAIMER REGIONAL INSTITUTE

Seth GS Medical College and KEM Hospital, Mumbai - 400 012.

2012 - 2014

This is to certify that

Dr. Saeesh Deshmukh

is awarded "GSMC - FAIMER Regional Institute Fellowship" in Medical Education
and has successfully completed her educational research project.

Dr. William Burdick
Director

FAIMER Regional Institute, Philadelphia

Dr. Avinash Supre
Director

GSMC-FAIMER Regional Institute, Mumbai



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
Institute of Medical Education Technology & Teachers' Training

Regional Centre, 3rd Floor, Civil Hospital Building, Aundh Camp, Pune 27.



CERTIFICATE OF PARTICIPATION

Dr./Mr./Smt. Saee Deshpande from
NKP Salve Institute of Medical Sciences, Hingna, Nagpur has participated
as a Delegate / Faculty in

"Basic Workshop in Health Sciences Education Technology"

held from 10th to 12th DEC 2013

conducted at

MUHS Regional Centre, Nagpur
&

N. K. P. Salve Institute of Medical Sciences and Research Centre, Nagpur

Dr. S. Dasgupta
Dean

N. K. P. Salve Institute of Medical Sciences
and Research Centre, Nagpur

Dr. R. M. Powar
Chief Executive Officer
MUHS, RC, Nagpur

Dr. Payal K. Bansal
IMETT & RC Head
MUHS Regional Center, Pune

Dr. A. N. Suryakar
Registrar
MUHS, Nashik

Dr. Prof. Arun Jamkar
Vice-Chancellor
MUHS, Nashik

FAIMER

NKP Salve Institute of Medical Sciences & RC & LMH, Nagpur



NCHPE 18

2nd MUHS State Level HSET Research Conference 2018-2019
15th, 16th & 17th November 2018



Code No: MMC/MAC/2018/F-011469

Theme : Competency driven Health Professions Education: Initiatives within and beyond classroom

Certificate

This is to certify that

Dr. Saeed Deshpande

has participated as *Faculty* in the Pre Conference Workshop

titled *Different strokes for different folks: A training of trainers (TOT) on Implementing Leadership program in your Institute.* in the

10th National Conference on Health Professions Education (NCHPE 18) &

2nd MUHS State Level Health Science Education Technology Research Conference 2018-19,

held on 15th November 2018 and organized by

Medical Education Unit, NKP Salve Institute of Medical Sciences and Research Centre & Lata Mangeshkar Hospital, Nagpur.

Maharashtra Medical Council has granted Two credit hours for faculty.

Dr. Kalidas Chavan
Registrar
MUHS Nashik

Dr. Kajal Mitra
Chairman NCHPE 18
Dean, NKP SIMS & RC & LMH

Dr. Suresh Chari
Organising President
NCHPE 18

Dr. Shubhada Gade
Organising Secretary
NCHPE 18

Dr. Abhijeet Digambarrao Ninghot
MMC Observer
MMC/MAO-01792/2018



NKP Salve Institute of Medical Sciences & Research Centre, Nagpur
MEDICAL EDUCATION TECHNOLOGY UNIT



Leading Tomorrow

Nurturing Tomorrow's Academic Leaders Today
MET Unit NKPSIMS Initiative - 2 Months Certificate Course

Certificate

This is to certify that **Dr. Saeesh Deshpande** Dept of Prosthodontics of VSPM DC, Nagpur was **FACULTY** for leadership program "Leading Tomorrow" from 25th Jan 2019 to 25th March 2019, with three full day contact sessions, two half day small group discussion, two months online discussion and final assignment presentation.

The Sessions conducted were:

Self Discovery | Setting Goals & Decision Making | Leadership Types and Styles
Delegation, Empowerment & Team building | Assertive communication, Motivation and Handling Different People
Conflict & Change Management | Case Studies | Educational Scholarship

Dr Kajal Mitra
Dean
NKPSIMS

Dr Suresh Chari
Pilot Faculty
Director Research & MET



NKP Salve Institute of Medical Sciences & Research Centre, Nagpur
MEDICAL EDUCATION TECHNOLOGY UNIT



Leading Tomorrow

Nurturing Tomorrow's Academic Leaders Today
MET Unit NKPSIMS Initiative - 2 Months Certificate Course

Certificate

This is to certify that Dr....*Saee... Deshpande*..... Dept of...*Prosthodontics*
of*V.S.P.M. DCRC*..... was FACULTY for leadership program "Leading
Tomorrow" from 24th July 2017 to 25th Sept 2017, with three full day contact sessions,
two half day small group discussion, two months online discussion and final assignment
presentation.

The Sessions conducted were:

Self Discovery | Setting Goals & Decision Making | Leadership Types and Styles
Delegation, Empowerment & Team building | Assertive communication, Motivation and Handling Different People
Conflict & Change Management | Case Studies | Educational Scholarship


Dr Kajal Mitra
Dean
NKPSIMS


Dr Suresh Chari
Pilot Faculty
Director Research & MET



Dental Education Technology Unit (PRIDE)

VSPM'S DENTAL COLLEGE AND RESEARCH CENTRE, NAGPUR

MSDC/CDE/1587/2013-2014 dated, 04/01/2014 6 CDE Points

Certificate Of Participation

This certificate is awarded to

Dr. Susmil Patil

For winning First Prize

in *E-Poster Presentation* at Maharashtra State level Conference on

"21st Century Dental Education: The Right Perspective" held on 1st January 2014

(Dr. Usha Radke)
Dean

(Dr. Ramakrishna Shenoi)
Vice Dean

(Dr. Mukta Motwani)
Organizing Chairperson

(Dr. Surekha Rathod)
Organizing Secretary

Maharashtra University of Health Sciences, Nashik

Department of Medical Education & Technology
3rd Floor, ESIS Hospital Building, Aundh, Pune-27
"Workshop For Health Sciences Educational Technology"



Certificate of Participation

Certified that Dr/ Mr/ Smt. _____ from _____

VSPM Dental College & Research Centre, Nagpur has participated as

delegate / faculty in the Workshop

"Health Sciences Educational Technology"

held from 22/07/2008 to 24/07/2008

at ESIS Hospital Building, 3rd Floor, Aundh, Pune 27 organized by

Maharashtra University of Health Sciences, Nashik.

Dr. P.M. Shere
Chief Co-ordinator,
Dept. of MET and GIB,
MUHS, Aundh, Pune

(Dr. S. H. Fugare)
Registrar (In-charge),
Maharashtra University of
Health Sciences, Nashik



MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK

DEPARTMENT OF MEDICAL EDUCATION & TECHNOLOGY
MUHS Regional Centre, Aundh, Pune 411 027

CERTIFICATE OF COMPLETION

This is to certify that **DR. SWAPNIL PATTIL** From **VSPM Dental College, Nagpur** has completed the *"Advanced Course in Health Sciences Education Technology"* and has successfully carried out an Education Innovation Project titled *"Development of communication skills with special respect to patient counselling about oral hygiene in dental undergraduate students"* from August 2008 to January 2009.

Date : 2nd April, 2009

Dr. P. M. Shere

Chief Officer, Dept. of MET
MUHS Regional Centre, Pune

Dr. S. H. Fugare

Registrar,
M. U. H. S., Nashik



**Dr. Rajesh Ramdasji Kambe Dental College
& Hospital, Akola
MET Cell, MUHS**

WORKSHOP

**Health Sciences Education Technology (HSET)
4th Sep. to 6th Sep 2018
To appreciate your Contribution
towards Workshop**

Dr. SWAPNIL PATIL

Faculty

Dr. Navin Kothari
Dean

Dr. RRK Dental College & Hospital

Dr. Rajesh Kambe
Secretary

Dr. RRK Dental College & Hospital



Dr. Hedgewar Smruti Rugna Seva Mandal's

DENTAL COLLEGE & HOSPITAL, HINGOLI



MET CELL, MUHS & HEALTH SCIENCES EDUCATION TECHNOLOGY (HSET) WORKSHOP (MUHS RECOGNIZED)

This is to certify that Dr.**SWARNIL.....PATIL**.....
has contributed to HSET workshop as resource person on

4th, 5th, 6th Oct, 2017 in

Dr. Hedgewar Smruti Rugna Seva Mandal's
Dental College & Hospital, Hingoli

स्वर्णिल पाटील

D. Dhamankar

Place : Hingoli
Date : 6/10/17

B. T. Khurana
Chairman

Dr. D. M. Dhamankar
Dean



MUHS

**BASIC WORKSHOP IN HEALTH
SCIENCES EDUCATION TECHNOLOGY
SGPN'S NANDED RURAL DENTAL COLLEGE
& RESEARCH CENTER, NANDED**



CERTIFICATE

This is to certify that Dr. Sucapriil Patil
from _____ has participated as a Resource

faculty in the basic workshop in Health Sciences Education Technology, Conducted
by Nanded Rural Dental College & Research Center, Nanded from 27th to 29th March 2019.

MUHS, Nashik has approved this workshop vide letter No. MUHS/METT/37/2017

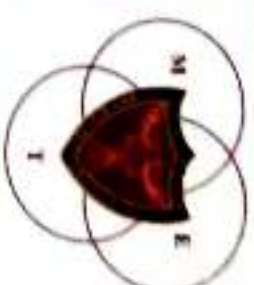
dated 23/08/2017.

Dr. Anil B. Warkar
MEU Convener
GMC, Akola

Dr. Suresh Kumar Kasagani
Principal
NRDC&RC, Nanded

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2016 - 2018

This is to certify that

Dr. Swapnil Patil

is awarded "GSMC - FAIMER Regional Institute Fellowship" in Medical Education
and has successfully completed his educational research project.

A handwritten signature in black ink, appearing to read 'William Burdick'.

Dr. William Burdick

Director

FAIMER Regional Institute, Philadelphia

A handwritten signature in black ink, appearing to read 'Avinash Supe'.

Dr. Avinash Supe

Director

GSMC-FAIMER Regional Institute, Mumbai

DET Unit activities in Various Daily Newspapers

The Hitwada 2nd Jan 2016

Innovative Mobile Learning App to train dental graduates

Dr. V. S. Deshpande, Director of the Department of Dental Education, VSPM, Nagpur, has developed an innovative mobile learning app for dental graduates. The app is designed to provide a comprehensive and interactive learning experience for dental students. It covers various topics related to dental education, including anatomy, physiology, and clinical procedures. The app is available for free download on the Google Play Store and the Apple App Store. Dr. Deshpande is a highly qualified dental professional with over 20 years of experience in dental education. He is currently serving as the Director of the Department of Dental Education, VSPM, Nagpur. He has also worked in various capacities in the dental profession, including as a lecturer, senior lecturer, and head of the department. He is a member of the Maharashtra Dental Association and the Indian Dental Association. He has published several research papers and books on dental education. He is also a frequent speaker at dental conferences and seminars. He is committed to providing the best quality of dental education to his students and to the dental profession in India.

The Hitwada, Saturday, September 1, 2012

DET workshop held at VSPM's Dental College



Dr. Shankar Rajekar addressing the audience. (From left) Dr. Suresh Ghai, Dr. P. G. Desai, Dr. Pooja Bhatnagar, Parag Ushankar, Dr. Vikas Reddy, Dr. Mohan Singh.

Staff Reporter

VSPM's Dental College and Research Centre, Nagpur, organized a workshop on 'DET' (Dental Education Technology) at VSPM's Dental College, Nagpur, on Saturday. The workshop was inaugurated by Dr. Shankar Rajekar, Director of Dental Education, VSPM, Nagpur. He addressed the audience and emphasized the importance of dental education technology in the current era. He stated that the use of technology in dental education can significantly enhance the learning experience of dental students. He also mentioned that the workshop was a part of the 'DET' initiative, which aims to promote the use of technology in dental education. The workshop was attended by a large number of dental professionals and students. It was a successful event and provided valuable insights into the use of technology in dental education.

The Hitwada - Sunday, May 5, 2013

'Research Methodology plays important role in dental edn'



Dr. Vikas Reddy and Dr. P. G. Desai with the faculty.

Staff Reporter

Dr. Vikas Reddy, Director of Dental Education, VSPM, Nagpur, addressed the faculty and students during a workshop on 'Research Methodology' held at VSPM's Dental College and Research Centre, Nagpur, on Sunday. The workshop was organized by the Dental Education Technology Unit. Dr. Reddy emphasized the importance of research methodology in dental education. He stated that research methodology is a crucial skill for dental professionals and that it should be taught and practiced in dental education. He also mentioned that the workshop was a part of the 'DET' initiative, which aims to promote the use of technology in dental education. The workshop was attended by a large number of dental professionals and students. It was a successful event and provided valuable insights into the use of research methodology in dental education.

January 14, 2014, Saturday, The Hitwada

MUHS V-C announces certificate courses in Dental Implantology, Microdentistry

MUHS is select Master of Public Health Education course soon



Dr. V. S. Deshpande, Director of the Department of Dental Education, VSPM, Nagpur, announced the launch of certificate courses in Dental Implantology and Microdentistry. The courses are being offered by the Maharashtra University of Health Sciences (MUHS), Nagpur. Dr. Deshpande stated that these courses are highly sought after by dental professionals and students. He mentioned that the courses are designed to provide a comprehensive and practical learning experience. He also mentioned that the courses are being offered at a highly competitive fee. The courses are being offered in Nagpur and Mumbai. Dr. Deshpande is a highly qualified dental professional with over 20 years of experience in dental education. He is currently serving as the Director of the Department of Dental Education, VSPM, Nagpur. He has also worked in various capacities in the dental profession, including as a lecturer, senior lecturer, and head of the department. He is a member of the Maharashtra Dental Association and the Indian Dental Association. He has published several research papers and books on dental education. He is also a frequent speaker at dental conferences and seminars. He is committed to providing the best quality of dental education to his students and to the dental profession in India.

ठाकसरता

नागपूर वृत्तान्त

विश्व सेवा संस्थान
संस्कृत शिक्षण संस्था
नागपूर वृत्तान्त

'मुखशेननिदान व क्ष-किरणशास्त्र' आता लॅपटॉप, मोबाईलवर

डॉ. अशोक देशपांडे यांचे अध्यक्षतेखाली आयोजित झालेला कार्यक्रम



Dr. Ashok Deshpande, Director of the Department of Dental Education, VSPM, Nagpur, announced the launch of a course on 'Mukhshenenidan' (Dental Examination) and 'X-ray Radiology' on laptops and mobile phones. The course is being offered by the Maharashtra University of Health Sciences (MUHS), Nagpur. Dr. Deshpande stated that this course is a significant step towards the use of technology in dental education. He mentioned that the course is designed to provide a comprehensive and practical learning experience. He also mentioned that the course is being offered at a highly competitive fee. The course is being offered in Nagpur and Mumbai. Dr. Deshpande is a highly qualified dental professional with over 20 years of experience in dental education. He is currently serving as the Director of the Department of Dental Education, VSPM, Nagpur. He has also worked in various capacities in the dental profession, including as a lecturer, senior lecturer, and head of the department. He is a member of the Maharashtra Dental Association and the Indian Dental Association. He has published several research papers and books on dental education. He is also a frequent speaker at dental conferences and seminars. He is committed to providing the best quality of dental education to his students and to the dental profession in India.

The Hitwada
NAGPUR • Wednesday • January 6, 2014

Dental professionals with knowledge of yoga can diagnose patients accurately: Dr. Deshpande



Dr. Ashok Deshpande, Director of the Department of Dental Education, VSPM, Nagpur, emphasized the importance of yoga in dental education. He stated that dental professionals with knowledge of yoga can diagnose patients accurately. He mentioned that yoga is a holistic approach to health and that it can significantly enhance the overall health and well-being of dental professionals. He also mentioned that yoga can help dental professionals manage stress and improve their concentration. Dr. Deshpande is a highly qualified dental professional with over 20 years of experience in dental education. He is currently serving as the Director of the Department of Dental Education, VSPM, Nagpur. He has also worked in various capacities in the dental profession, including as a lecturer, senior lecturer, and head of the department. He is a member of the Maharashtra Dental Association and the Indian Dental Association. He has published several research papers and books on dental education. He is also a frequent speaker at dental conferences and seminars. He is committed to providing the best quality of dental education to his students and to the dental profession in India.

DET Unit activities in Various Daily Newspapers

HSET made compulsory in State health science colleges

■ Staff Reporter

MHARASHTRA University of Health Sciences (MHHS) has made Health Science Education Technology (HSET) mandatory in colleges imparting health science education. Depending on it, VSPM Dental College had organized HSET workshop for its students.

The importance of education technology in health sciences cannot be overemphasized.

Dr Usha Radke informed the audience that about commitment of VSPM Dental College towards quality education. Dr Pravin Bhalod of MHHS was the head faculty for this workshop. Dr Mukta Mahajan, Chairperson of Dental Education Technology (DET) Unit



Dr Usha Radke lighting the lamp to mark the inauguration of HSET workshops.

of VSPMDCRC, Dr Anshu, Dr Tarash, Dr Sanjay Narayan, Co-ordinator of Medical Education Technology Unit, Government Medical College and Hospital (GMCH) were the co-faculty for the event.

Dr Suresh Chari, Director of MET Unit at NKPSSM, Dr

Amritha Bhalod Co-Chairperson and Dr Saan Deshpande Secretary of DET Unit VSPMDCRC deliberated on organizational barriers in HSET functioning in the workshop. Dr Mahajan in-charge, MET Regional centre, Nagpur worked hard to organize the event.

The Hitavada

NAGPUR ■ Wednesday ■ January 6 ■ 2016

Dental professionals with knowledge of yoga can diagnose patients accurately: Dr Deshpande

■ Dr Anjali Deshpande received best paper award for her paper 'Yoga in Dental Education'

■ Principal Correspondent

YOGA, being a science and philosophy covering physical, psychological and spiritual dimensions of health care, is complementary with dental education. Dental professionals with knowledge of yoga can reduce drug use and provide yoga for their people benefits to their patients and help them reduce anxiety during dental treatment. This is the conclusion drawn in the paper 'Yoga in Dental Education' presented by Dr Anjali Deshpande (dentist) at the 4th International Yoga Conference held recently at Raichavandhan, Nagpur. The award with cash prize was conferred to her by Professor Dr R. M. Hegde, an eminent cardiologist, medical scientist and entrepreneur.

On this occasion, Dr H. Devraj, Vice Chairman of Deemed to be University Council of National Human Rights Commission, Dr B. K. Deshpande, Director General of National Human Rights Commission, G. M. Thakur, Secretary General of Yoga.

The paper aims, the demanding role in



Dr Anjali presenting paper at International Yoga Conference.

stress, anxiety, depression, suicidal intent in dental students and occupational stress of oral and dental professionals associated with dental profession indicate a strong need to modify current education system, reduce the curriculum and provide timely interventions for physical and psychological health of our future dental professionals.

The major drawback of current dental education system is that there is no stress management class in regular training. Yoga offers a promising, cost-effective, well-tolerated complementary preventive and therapeutic modality

in which can be easily integrated into present dental education.

Integrating yoga in dental education will facilitate positive health and wellbeing of future dental professionals, effective patient care and improved health care services to the community. Combination of modern dental education and ancient wisdom of yoga with spirituality will give us a holistic health care which will prove to be effective for preventive and therapeutic requirements of the community. The booklets have also discussed 'Yoga And Education: Principles And Practice'. More than 300 delegates from 15 countries participated in this conference where international dental leaders gathered to prepare together and discussed ways to integrate yoga into our lives through education.

In her session, Dr Anjali highlighted the importance of application of yoga in dentistry, the specific therapeutic benefits of yoga for oral health problems and relevance of yoga in dental education to ensure quality and cost-effective dental services, practitioners.

Dr Anjali is working as VSPM Dental College and Research Centre. The management of VSPM Academy of Higher Education awarded her the title. Radke congratulated her for this achievement.



Anganwadi Community Health Workers: Awareness, Knowledge, Attitude and Beliefs about Diabetes Mellitus and Its Effect on Oral Health in Nagpur District

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Abstract

Purpose: This study aimed to evaluate the oral health related awareness and practices of diabetes mellitus and its effects on oral health in anganwadi workers.

Study design: It is an interventional type of study.

Materials and methods: 200 anganwadi workers from the areas of Hingna, Wanadongri, Gumgaon and Wadhdhamna in Nagpur district and 30 interns participated in the study. In the first part, all the interns were trained for a module that contained what are diabetes, aetiology, signs and symptoms of diabetes, complications, management and prevention of diabetes mellitus in Marathi language. In second part to know the awareness of diabetes, a pre-test was conducted and a validated questionnaire was distributed to the participant. Following this the interns educated the Anganwadi workers regarding diabetes through this module for 30 minutes and also information leaflets were distributed to the participants. In third part post -test was conducted for the participant. Descriptive statistics were used to report the results of the study.

Results: The knowledge of the participants was assessed using 16 questions related to diagnosis, risk factors, prevention and complications of diabetes and its relationship with oral health. Out of the total 100 participants, the pre-test showed an average of 36 participants to be aware about diabetes and the post test showed an average of 77 participants to have improved their knowledge.

Conclusion: Awareness and education programs should be planned and conducted for anganwadi workers according to community needs.

Keywords: Anganwadi workers; Diabetes; Education; Awareness

Introduction

Diabetes is a diverse group of metabolic disorders that is characterised by soaring levels of glucose in blood. These elevated levels of glucose are a result of paucity of insulin secretion caused by pancreatic β - cell dysfunction or by resistance to the action of insulin or a blend of these [1]. The disease is characterised by abnormalities in carbohydrate, fat and protein metabolism and results in chronic complications including microvascular, macrovascular and neuropathic disorders [2]. The oral complications include gingivitis, periodontitis, xerostomia, delayed wound healing, opportunistic infections, candidiasis, altered taste sensation etc [3,4]. Diabetes has a dramatic impact on the general health of the patient causing a high degree of mortality and morbidity placing a monetary burden on the health care system. The International Diabetes Federation has stated that the 78 million people in the South East Asia region suffer from diabetes and this number will rise to 140 million up to the year 2040 [5]. The prime objective of management of diabetes mellitus is to adjourn the macro and microvascular complications by achieving optimal glycaemic control [6]. The management protocol involves medications, lifestyle modifications including consistent exercise, healthy diet and nutrition and weight loss. To follow this protocol for treating the disease, health literateness is important. It has been observed that patients, who have a good knowledge about diabetes and its complications, seek proper treatment and care, take charge of their health and achieve better glycaemic control [7].

Anganwadi workers are a bridge between the rural population and doctors and are front line community health workers assigned to work

for identifying diseases in the community and creating awareness in the public about the treatment of the same. Previous studies on knowledge, attitude and practice on diabetes suggest that there is a greater need for awareness of prevention and risk factor control [8,9]. An insight about the knowledge and awareness of diabetes and its complications among the Anganwadi health workers can help in developing preventive strategies for the community. Therefore this study was conducted to determine and compare the level of awareness and knowledge regarding diabetes mellitus and its effect on oral health in anganwadi workers.

Objectives

1. To compare knowledge of diabetes mellitus and its effect on oral health.
2. To compare the level of awareness and its complication of diabetes mellitus in Anganwadi workers.

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3. To explore the awareness regarding management of diabetes mellitus in Anganwadi workers.

4. To study the effect of module for awareness of diabetes mellitus in Anganwadi workers.

Materials and Methods

This study was a community based cross sectional study conducted from July 2017 to September 2017 on anganwadi workers from the areas of Hingna, Wanadongri, Gumgaon and Wadhdamna in Nagpur district. 100 anganwadi workers and 30 interns participated in the study. In the first part, all the interns were trained for a module that contained what is diabetes, aetiology, signs and symptoms of diabetes, complications, management and prevention of diabetes mellitus in Marathi language. In second part to know the awareness of diabetes, a pre-test was conducted and a validated questionnaire was distributed to the participant. Following this the interns educated the Anganwadi workers regarding diabetes through this module for 30 minutes and also information leaflets were distributed to the participants. In third part post -test was conducted for all the participants. Therefore, participants solved the questionnaire before and after the session to compare the knowledge of participants about diabetes.

Questionnaire

An organized questionnaire was prepared based on thorough review of literature on similar questionnaires and the relationship between diabetes and oral health. The questionnaire first evaluated the demographic data such as name, age and gender following which the type of diabetes was assessed. The questionnaire also evaluated the knowledge of the participants regarding diabetes, the importance of maintaining blood sugar levels, complications of diabetes, insulin, awareness of diet and physical exercise in diabetic patients, regularity of visits to physician and oral health- diabetes association. After the aims and objective of the study were explained to the patients, they voluntarily entered in the study. Prior to data collection, informed consent was obtained from each participant. A scoring method was built by marking correct answers as “aware” and incorrect as “unaware”.

Statistical analysis

The knowledge on diabetes was assessed Chi-square test. All tests were two sided with $P < 0.05$ set as the significance level. All analyses were conducted using SPSS version 16 (SPSS Inc., Chicago, IL, USA).

Results

A total of 100 anganwadi workers and 30 interns participated in the study. All the anganwadi workers were females and had an education level up to grade 5. The knowledge of the participants was assessed using 16 questions related to diagnosis, risk factors, prevention and complications of diabetes and its relationship with oral health. Out of the total 100 participants, the pre-test showed an average of 36 participants to be aware about diabetes and the post test showed an average of 77 participants to have improved their knowledge. Thus, 77% of the participants were categorised as having good level of knowledge. When the pathophysiology of diabetes was concerned, 53% were cognizant that diabetes is an ailment characterised by raised blood sugar levels (Tables 1 and 2). When asked if aware about the complications of diabetes, 42% knew that diabetes affected other organs. 32% were aware about insulin and its uses during pre-test whereas 36% were mindful of the signs of reduced blood sugar in the body. With regards to effects of diabetes on oral health, 34% were aware that diabetes significantly

affected the oral cavity as well.

Practices of the participants were assessed using questions on participant's intention to seek treatment and preventive measures such as screening for diabetes, diet and exercise. 27% of participants stated that they were aware of the significance of regular medical check-ups of diabetic patients. 47% knew about the kind of diet to be taken by diabetic patients and 25% about the significance of regular physical activity by diabetic patients.

The knowledge and practices of the participants significantly increased after the module conducted by interns and the post test showed a suggestively better result (Figure 1).

Discussion

The present study showed that the anganwadi workers had a poor knowledge about diabetes (36%) before the module was conducted. After the session, their knowledge increased to 77% post-test. This indicates that the expanded role of anganwadi workers in clinical setting will have a positive impact on management of diabetes. Factors affecting the knowledge of the workers can be literacy rate and social media. Similar findings were reported by another study that too revealed a shortage in the knowledge of diabetes among community members in Kenya with 27.2% participants aware of diabetes [10]. 30.2% of the participants were aware of diabetes on a study in Nigeria [11].

Only 34% of participants stated that they were aware of the relationship between diabetes and oral health. This shows that oral health was not a major priority for anganwadi workers. A study conducted in Saudi Arabia has shown that only 8% of female diabetic patients visited their dentists regularly [12] and 10% patients in another study conducted in Jordan [13]. Studies from other countries have also shown that the awareness of the relationship between diabetes and oral health is lacking [14]. Thus, regular visits of diabetic patients to their dentists for proper oral health education and awareness of diabetic complications in the oral cavity is invigorated. The difference between these percentages in the present study and the latter studies could be due to the different populations investigated.

53% of participants were aware of diabetes in the pre-test. This suggests that educational material focusing on diabetes and its complications on the general as well as oral health needs to be made available to the general population. Also, medical practitioners and dentists should be aware about the fast evolving knowledge on diabetes and its effects on oral health, so that they can educate the patients and the general population. 42% of patients were aware of the medical complications associated with diabetes and the effect of diabetes mellitus on body systems such as eyes, kidneys, nerves and diabetic foot. However, only 34% were aware of the oral complications of diabetes. This indicates lack of oral health counselling on the part of physicians as evidence by other studies.

It has been reported that education through paper and training packages is an organised and imperative intervention for long term raising of awareness of health issues such as oral health in different groups. In the present study, the method of training program was utilised for educating the anganwadi workers, the effect of which was satisfactory in the study. This method of education i.e., by lectures or group discussions is effective in increasing the consciousness of the participants. Other modes of education include newspapers, television and advertising [15]. However, this method of training program has the advantages of being cost effective and a significant number of individuals can be educated through them.

Name	Age	Gender	Type of diabetes- Type 1/type 2	Hereditary diabetes? Yes/No	Have you sought any information regarding diabetes before this?
1	Do you have any information regarding diabetes? Do you understand what diabetes is? Do you know diabetes is a lifelong disease?	Aware []	Unaware []		
2	Do you understand the importance of maintaining blood sugar levels under control? Do you know what will happen if the blood sugar levels are uncontrolled?	Aware []	Unaware []		
3	Are you aware of the complications caused by diabetes? Yes/No Are you aware that increased blood sugar levels adversely affect the heart, eyes and kidneys? Are you aware that diabetes affects the peripheral portion of the lower limbs which may have to be amputated? Are you aware that diabetes causes loss of sensation of body parts due to neuropathy?	Aware []	Unaware []		
4	Do you know why is it necessary to get your blood sugar levels checked regularly?	Aware []	Unaware []		
5	Do you know anything about insulin? Yes/No Do you believe insulin is lifesaving? Do you believe insulin adversely affects the kidneys?	Aware []	Unaware []		
6	Are you aware of the adequate blood sugar levels when fasting? Are you aware of the blood sugar levels in the body at any time during the day?	Aware []	Unaware []		
7	When blood sugar levels falls down, do you know what to do? Do you understand the signs of reduced blood sugar levels in the body	Aware []	Unaware []		
8	Do you know about your daily diet? Diabetic patients cannot eat fruits. Is it wrong or right? Should diabetic patients consume fiber rich vegetables or not? Is it appropriate that diabetic patients can consume foodstuffs with no sugar without any limit?	Aware []	Unaware []		
9	Do you understand the importance of daily exercise in a diabetic condition? Do you take special care of your legs in this diabetic condition?	Aware []	Unaware []		
10	Are you aware of the proper techniques of taking insulin? Do you know the proper site on the body where insulin injections are to be taken? Are you aware when insulin should be taken?	Aware []	Unaware []		
11	Are you aware that before or after insulin injections you should take some food? Have you understood the food that you should take along with insulin?	Aware []	Unaware []		
12	Do you know how and when to use insulin during the festival of Ramzan id? Do you know how to take care of diabetes during the fasting of Ramzan? Do you know it is important to take insulin during fasting	Aware []	Unaware []		
13	Do you know the importance of insulin during pregnancy? Are you aware that elevated blood sugar levels in pregnancy affects the woman and foetus both?	Aware []	Unaware []		
14	Do you know the importance of regular medical checkups and consultation in diabetes? Do you know that the treatment schedule of diabetes changes according to needs?	Aware []	Unaware []		
15	Do you know that it is important to get the blood sugar levels checked daily?	Aware []	Unaware []		
16	Are you aware how diabetes affects the oral health and teeth?	Aware []	Unaware []		

Table 1: A scoring method was built by marking correct answers as “aware” and incorrect as “unaware”.

Question	Pre Test	Post Test	P value	Sensitivity (%)	Specificity (%)
1	53	89	<0.001	55	50%
2	61	84	<0.001	84	46
3	42	84	<0.001	83	46
4	52	82	<0.001	53	46
5	32	77	<0.001	81	68
6	24	76	<0.001	87.5	85.7
7	36	87	<0.001	86	50
8	47	85	<0.001	87	50
9	49	88	<0.001	72	44
10	25	77	<0.001	62.95	65
11	27	57	<0.001	62	74.35
12	21	74	<0.001	90.47	91.30
13	24	82	<0.001	79.16	66.66
14	27	87	<0.001	88.88	70
15	27	74	<0.001	77.77	73.91
16	34	36	<0.001	23.52	57.37

Table 2: Individual responses with P value.

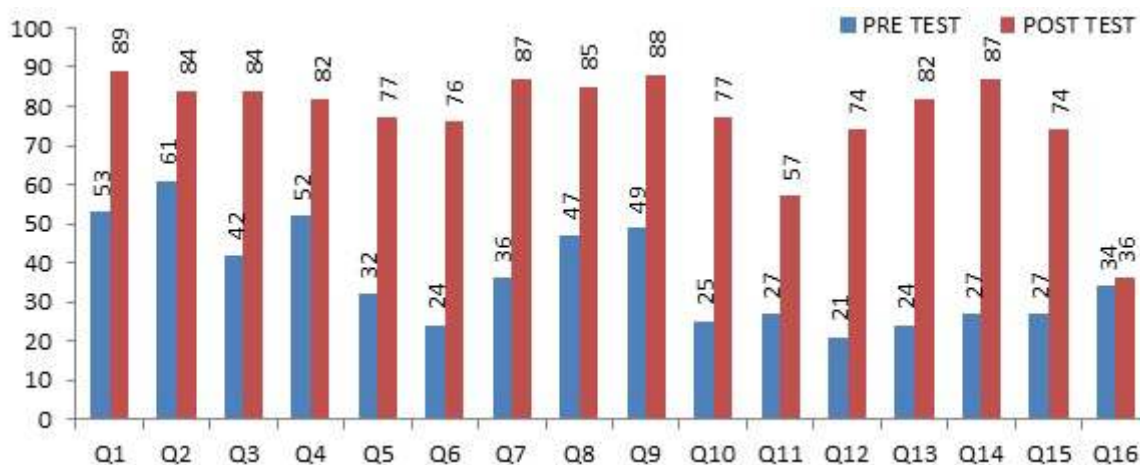


Figure 1: Graph showing the Pre-test and the post-test values among the study subjects.

Limitations of the Study

The study population consisted of anganwadi workers. Therefore the results of the study are not truly representative of the general population. All the participants were females which may create a bias. Also, the source of information was not enquired in this study. This may have helped in choosing the appropriate mode of health promotion among the population.

Conclusion

This study showed that there is a dire need of awareness and health promotion programs to be conducted for upgrading knowledge on diabetes mellitus as this matter is still neglected and needs instantaneous attention. Refining cognizance and thus altering health related behaviour and preventing complications cannot be achieved without health education. Health education attempts to modify behaviours by altering an individual's mindfulness, outlooks and beliefs about health matters.

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Impact of computer-based treatment planning software on clinical judgment of dental students for planning prosthodontic rehabilitation

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Purpose: Successful prosthodontic rehabilitation involves making many interrelated clinical decisions which have an impact on each other. Self-directed computer-based training has been shown to be a very useful tool to develop synthetic and analytical problem-solving skills among students. Thus, a computer-based case study and treatment planning (CSTP) software program was developed which would allow students to work through the process of comprehensive, multidisciplinary treatment planning for patients in a structured and logical manner. The present study was aimed at assessing the effect of this CSTP software on the clinical judgment of dental students while planning prosthodontic rehabilitation and to assess the students' perceptions about using the program for its intended use.

Methods: A CSTP software program was developed and validated. The impact of this program on the clinical decision making skills of dental graduates was evaluated by real life patient encounters, using a modified and validated mini-CEX. Students' perceptions about the program were obtained by a pre-validated feedback questionnaire.

Results: The faculty assessment scores of clinical judgment improved significantly after the use of this program. The majority of students felt it was an informative, useful, and innovative way of learning and they strongly felt that they had learnt the logical progression of planning, the insight into decision making, and the need for flexibility in treatment planning after using this program.

Conclusion: CSTP software was well received by the students. There was significant improvement in students' clinical judgment after using this program. It should thus be envisaged fundamentally as an adjunct to conventional teaching techniques to improve students' decision making skills and confidence.

Keywords: clinical decision making, dental education, case assisted learning, computers in dentistry

Introduction

Quality decision making is essential for planning prosthodontic rehabilitation. Many prosthetic treatment options are available today depending on patients' choice and operators' skills. Decision making involves making many timely and interrelated clinical decisions. Theoretical concepts are taught to the students during their curriculum but managing patients in clinical practice requires the application of that knowledge and a critical thinking ability. There are very few training tools available to help teach students diagnosis and treatment options of discrete conditions and treatment sequencing once a decision has been made.

Self-directed computer-based training has been shown to be a very useful tool to learn synthetic and analytical problem-solving skills to apply factual knowledge to real life, complex patient management.¹⁻⁴

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A survey conducted among the faculty of our institute indicated a perceived lack of competency of dental students to devise a comprehensive treatment plan for prosthodontic rehabilitation cases, and as a result the quality of patient care is often affected. One of the reasons cited was lack of exposure to a variety of clinical cases during I-IV Bachelor of Dental Surgery tenure. An inability of conventional teaching techniques to provide information on a generic framework to formulate a custom prosthodontic rehabilitation plan for a particular clinical situation was also mentioned as another possible factor.

Thus, the present study aimed to develop a computer-based case study and treatment planning (CSTP) software program which will expose dental students to a variety of clinical situations requiring prosthodontic rehabilitation using tooth and/or implant supported removable or fixed prostheses. Furthermore, it aimed to seek their perceptions about the said software and evaluate its effect on clinical judgment while planning prosthodontic rehabilitation.

Material and methods

This is a cross sectional pre- and post-test investigation. The flowchart of methodological sequence followed is depicted in Figure 1.

Software development

CSTP software was developed entitled “Case assisted Learning in Prosthodontics-Prosthodontic Rehabilitation of

the Partially and Completely Edentulous Adult” constituting 50 case scenarios adapted from real life situations which had been peer-reviewed.

Selection of cases

The cases were real life patients who were completely and partially edentulous requiring prosthodontic rehabilitation using tooth and/or implant supported removable and/or fixed prostheses. Cases with acquired maxillary and mandibular defects were also included. A special emphasis was given to select cases which required interdisciplinary planning namely, pre-prosthetic treatments by endodontics, periodontal therapy, surgery, and other specialized procedures. The intent was to train the students to make interdisciplinary clinical decisions and to follow the correct sequencing of the treatment.

Design of the software

The first phase was the provision of information about the real life patient in the form of clinical photographs, X-rays, reports of investigations, etc. In the second stage the request for some action from the respondent was sought, ie, to devise a treatment plan for that particular case using the structured template provided (including pre-prosthetic treatment, treatment sequencing, detailed design of the prosthesis, maintenance, and prognosis of the case), so as to guide them in the decision making processes. At the third stage, a standard treatment plan for that particular case, which was entered into the software

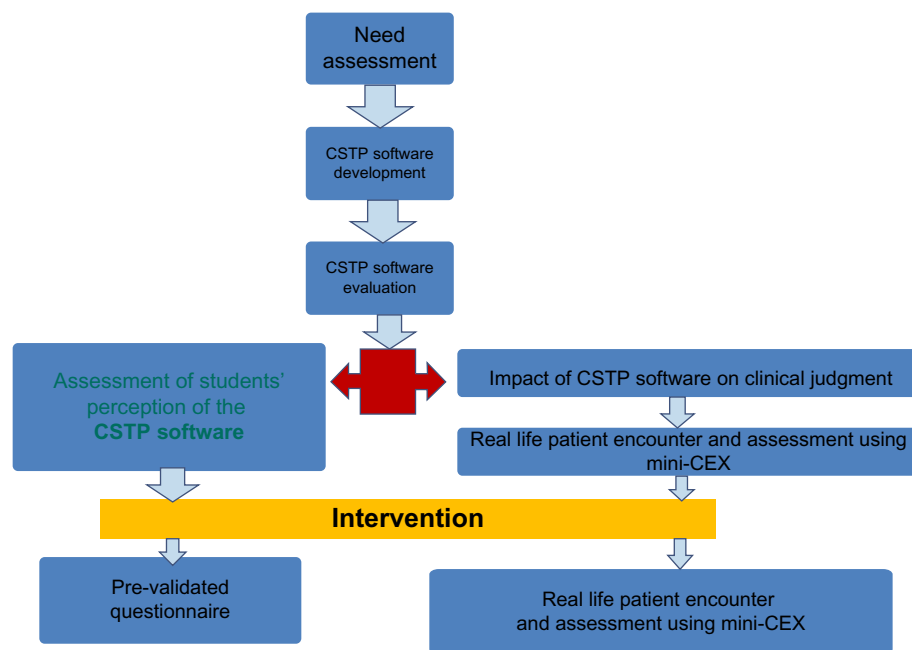


Figure 1 Flowchart of methodology.

Abbreviation: CSTP, case study and treatment planning.

program beforehand, was displayed along with the treatment plan submitted by the student for that case so that the student could compare, analyze, and learn from his/her mistakes.

Students can choose any case and after submission their response for that particular case is stored in the software for reference.

Selection of subjects

The study design involves a single group in which pre- and post-testing was carried out. After approval from Vidya Shikshan Prasarak Mandal's (VSPM) Academy of Higher Education ethics committee, universal sampling technique was adopted.

In our university, students enter into a one year rotating internship after passing their four year Bachelor of Dental Surgery course during which they are posted in each discipline for a stipulated period. This is the time when they are actively involved in the diagnosis and treatment planning for all patients who report to the prosthetic department. Thus, during the present investigation, all 60 interns posted at the Department of Prosthodontics at our institute during the period of one year (August 2011–July 2012) were asked to undertake all 50 cases. Consent to participate was obtained from the interns who used the software.

Software evaluation

The evaluation of the intervention was carried out according to Kirkpatrick's level 2b which assesses learners' reaction, modification of attitudes and perceptions as well as acquisition of knowledge and skills.⁵

Evaluation of the impact of this program on clinical judgment

Evaluation was done using mini-CEX (American Board of Internal Medicine [ABIM]) format.⁶ It has been validated for use in medicine and was chosen because assessment of students can be done in a structured manner by giving scores. Although all seven competencies (interviewing skills, examination skills, counseling skills, clinical judgment, organization/efficiency, professionalism, and overall clinical competence) were observed and scored, only "clinical judgment" was taken into account for analysis. It includes selecting the appropriate investigation, interpreting findings, and selecting proper treatment for a particular case. The scores range from 1–3 (unsatisfactory), 4–6 (satisfactory), and 7–9 (superior).

Pre-intervention real life clinical encounters with patients requiring extensive prosthodontic rehabilitation were planned for the students. They were asked to examine, diagnose, and plan the treatment while one trained faculty member

recorded the details using mini-CEX format. Scores were recorded. Feedback was not given prior to the use of CSTP software as it might have created biased results. All students were asked to go through and submit the treatment plan for all the cases in the CSTP program. Post-intervention, students were again subjected to real life clinical encounters with patients requiring extensive prosthodontic rehabilitation and their clinical judgment was scored using mini-CEX. They were asked to examine, diagnose, and plan the treatment while one trained faculty member recorded the details using mini-CEX format. Scores for clinical judgment were recorded.

Evaluation of students' perception about the software

Evaluation was done by a prevalidated feedback questionnaire with a total of seven questions of which three were close-ended.

The primary research question was: "Is the use of CSTP software associated with change in clinical judgment of dental students while planning prosthodontic rehabilitation?" The null hypothesis was that the use of the CSTP software does not affect the clinical judgment of dental students (P -value 0.05).

Results

The faculty assessment scores of clinical judgment using mini-CEX before and after the use of CSTP software are depicted in Table 1 and Figure 2. The mean scores before the intervention were 3.6 (standard deviation [SD] ± 1.94). Mean scores post-intervention were 6.32 (SD ± 1.92). Statistical analysis was done using chi-square test. The values were $\chi^2=14.4$, $P=0.0001$. Thus, the improvement in scores was statistically significant after using the program ($P<0.001$). Thus, the null hypothesis was rejected. It shows that the CSTP software has improved the clinical judgment of students for planning prosthodontic rehabilitation.

Students' perceptions about the program as evaluated by a feedback questionnaire are depicted in Figures 3 and 4. The analysis indicated that 86% of students felt that it was easy to navigate the program, 100% of students felt the program enhanced their existing knowledge about the subject, 90% of students felt that the program increased their confidence in

Table 1 Mini-CEX scores for clinical judgment

Number of students	Superior (8–10)	Satisfactory (4–7)	Unsatisfactory (1–3)
Pre-test	6	24	30
Post-test	24	32	4

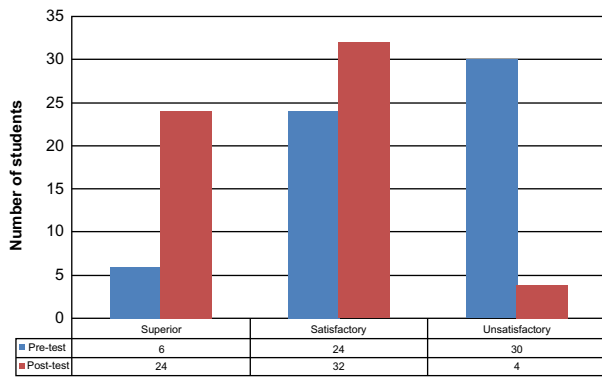


Figure 2 Impact of CSTP software on clinical judgment scores of students. **Abbreviation:** CSTP, case study and treatment planning.

planning prosthodontic rehabilitation, and only 6% said that they would prefer lectures instead of this program. Ninety-seven percent of students felt the program was informative, 86% were of the opinion that it was useful, 66% mentioned that it was enjoyable, and only 2% found it boring. Eighty-six percent of students agreed that conventional teaching techniques do not provide adequate training to plan prosthodontic rehabilitation but 13% disagreed with this statement. Ninety percent of students agreed that this program should be used along with conventional teaching techniques regularly.

In response to the open-ended question “What was the main thing you learnt?” most answers referred to the logical progression of planning, the insight into decision making and the need for flexibility in planning treatment.

The best things about the program were perceived to be the concept and self-paced nature of the learning process, as well as the screen design and layout. Students also described the program in their own words as “interesting”, “innovative”, and “relevant”.

The study was supplemented by a focus group discussion. The program was described by the students as a computerized treatment planning guide in which they could devise a structured treatment plan in a standardized manner. The themes that emerged from the focus groups revealed students’ agreement that a CSTP software program is helpful both for learning clinical application of theoretical knowledge and clinical judgment. They also expressed a need for self-directed learning. One common demand was that there should be human feedback at some stage. In conclusion, the overall attitude of dental students was positive toward CSTP software.

Discussion

A book can never provide or teach active dental therapy planning. To facilitate this kind of learning, real patients and training are required. When a case is presented in a book, all the learning material is presented linearly, frequently together with a subsequent solution to the case. Often the book begins from an already given topic with a description of a patient record and status of the cases. This principle is also frequently used in lectures wherein the student is usually told the solution without any interaction with the teacher or content.^{1,2}

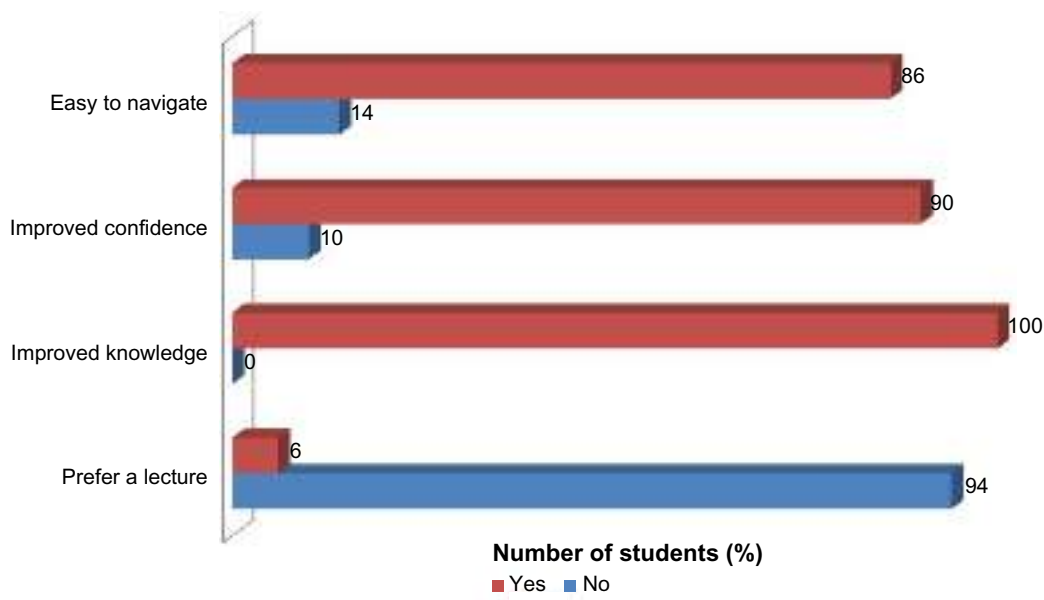


Figure 3 Students’ perceptions about the CSTP software, part I. **Abbreviation:** CSTP, case study and treatment planning.

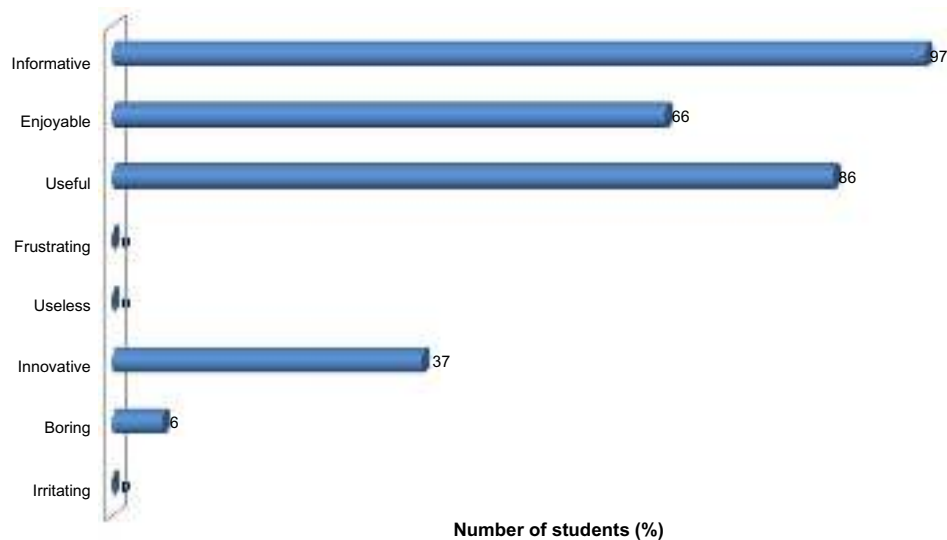


Figure 4 Students' perceptions about the CSTP software, part II.
Abbreviation: CSTP, case study and treatment planning.

Crespo et al³ examined the reasoning skills of “expert” dentists and found them to be qualitatively different from those of “beginner” and “competent” clinicians. They have proposed that such skills could be taught, concluding that students' clinical experience would be enhanced by exposing them to as wide a variety of cases as possible. They suggested that case-based scenarios could be utilized to inculcate an understanding of the processes of clinical decision making. Since clinical time in pre-doctoral dental curricula is constrained, students can be exposed to only a limited sample of the entire array of clinical conditions. Case-based teaching may provide a means to ease these constraints. Foster et al⁴ in their study on Dental Students' Attitudes towards the Design of a Computer-Based Treatment Planning Tool concluded that it could be a significant instructional tool for the development and practice of cognitive skills relevant to treatment planning through a library of structured patient cases of increasing complexity. They also stated that it is desirable that a CSTP tool should be developed in such a way that it will allow online, after-hours access to a library of planned and unplanned patient cases.

In the present curriculum students perform certain pre-decided clinical procedures for all disciplines during their clinical posting individually. However, they are not asked to treat all problems of a patient as a whole. So their critical thinking and problem solving ability is not fully developed. When these students enter into one year of compulsory rotating internship, they find it difficult to plan complex prosthodontic rehabilitation for patients who report to OPD (outpatient department) of the department. Taking into

account the limitations of the curriculum, time and paucity of clinical case material, computerized learning seemed to be an excellent alternative to train students for planning prosthodontic rehabilitation. Hence, the present program developed by us follows the concept given by Foster et al⁴ which allows students to work through the process of comprehensive, multidisciplinary treatment planning for patients in a structured and logical manner. The first phase is the provision of information about the patient, the second, the request for some action from the respondent, the third, the feedback to the respondent. The case scenarios in this program enable the students to visualize the clinical situation and analyze it critically. Also, a structured format helps them to plan and sequence treatment steps logically. An attempt has been made to record a variety of cases requiring all types of prostheses namely, complete denture, removable and fixed partial denture, full mouth rehabilitation, implant supported prosthesis, maxillofacial prosthesis, and so on.

Similar programs have been evaluated previously regarding students' perceptions,^{4,7-11} however, impact on clinical judgment has not been reported. Thus, in the present study it was deemed necessary to evaluate any change in the students' clinical judgment after using CSTP software.

Selecting a standardized assessment tool for clinical judgment was the most critical aspect of this study as it is very difficult to measure clinical decision making skills or clinical judgment objectively. The only assessment tool which rates clinical judgment is mini-CEX. It is a method for assessing clinical performance in the workplace developed by the American Board of Internal Medicine (ABIM).

It has seven competency domains including overall clinical competency, a nine point rating scale, and has been shown to be valid, reliable, feasible, and acceptable and fair assessment in postgraduate and undergraduate practice in the USA.⁶ It was used in the present investigation as it is a standardized assessment tool which can also be used to give feedback to the students during the course of the study. The assessment was done only in OPD set-up and focus areas were data gathering, diagnosis, and treatment planning. The complexity of cases ranged from medium to high. Scores of “clinical judgment” were recorded and compared pre- and post-intervention, ie, using the CSTP software.

Users’ reactions were positive as to clinical applicability, design, and ease of use of the program. There was definitive acquisition of knowledge and clinical judgment of dental students reflected by improved scores on mini-CEX. Although the exact same intervention has not been previously reported in the literature, the results of the present investigation are in accordance with Lechner et al¹² who developed a computer-aided learning program for teaching principles of removable partial denture design which was also very well received by students.

This study has a few limitations such as: in order to evaluate the CSTP software more effectively, more cases should be included in the software. Also, the evaluation should be done for a bigger number of students and over a long period of time.

In future, there is a need to evaluate long-term effects of using this program (Kirkpatrick’s level 3 and 4) for students as well as patient care. This software can also be evaluated as an assessment tool.

Conclusion

Computerized CSTP software was well received by the students. There was significant improvement in students’ clinical judgment after using this program.

It should thus be envisaged fundamentally as an adjunct to conventional teaching techniques to improve students’ clinical judgment and confidence. Also, it must be evaluated over an extended period of time to assess the effect on overall quality of patient care at the institute.

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Disclosure

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Assessment of postgraduate dental students using mini-clinical examination tool in periodontology and implantology

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Abstract:

Introduction: Mini-clinical examination (mini-CEX) is a new assessment tool that observes the student using a standard rating form. The aim of this study was to evaluate the feasibility and usefulness of the mini-CEX as an assessment and feedback tool in the postgraduate setting in periodontology. **Materials and Methods:** Eight postgraduate students and two evaluators were included in this study carried out for 4 months during which the students were made to appear for four encounters evaluated on a standardized nine-point Likert scale. Feedback was obtained from the students about this assessment after the fourth encounter. **Results:** Sixty-three percent of the students felt that mini-CEX is better than the conventional assessment tools. Seventy-five percent of the students felt that this type of mini-CEX assessment helped improve the student–teacher relationship and student–patient relationship. Sixty-three percent of the students were satisfied with this assessment pattern and were willing to face more encounters as it helped them improve their competencies. Seventy-five percent of the students agreed that they felt anxious on being observed while taking cases. **Conclusion:** The training and assessment of a wide range of procedures make dentistry unique. Good communication skills and counseling can allay patient’s fear and anxiety. This structured way of assessment of clinical skills and feedback provides good clinical care and helps improve the quality of the resulting information which would induce confidence, improve clinical competencies, and alleviate the fear of examination among the students.

Key words:

Assessment, competencies, confidence, mini-clinical examination, postgraduate, skills

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INTRODUCTION

Assessment is an important input for improving quality of education. This is especially so for helping students acquire good clinical skills during all phases of their learning as postgraduate students. The reason for dissatisfaction with traditional assessment is its lack of direct observation. A long case for example is assessed without actually observing the student taking the history or performing the physical examination. Mini-clinical examination (mini-CEX) is a snapshot observation of a clinical encounter. As the name indicates, it is briefly lasting for only 10–15 min. Traditional assessment has very little scope if any, for providing feedback to the trainee. Even when it is provided, it is not based on direct observation, is not in the vicinity of the performance, and is not reliable because of dependence on a single examiner.^[1]

The most important issue is to build validity. Miller’s pyramid provides a useful model for assessment of clinical competence. Mini-CEX assesses the trainee at higher levels of Miller’s pyramid. In 1990, Miller represented the elements

of clinical competence as a pyramid structure. Its base represents the knowledge components of competence: “know” (basic facts) followed by “knows how” (applied knowledge). The “shows how” indicates requirements by the qualifying physician and “does” represents performance of the professional in real clinical practice. Assessment of the highest level of Miller’s pyramid requires observation of the physician’s routine clinical work [Figure 1].^[2]

In the mini-CEX, the evaluator observes the student using a standard rating form. At the end of the observation, the evaluator provides a

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focused feedback to the students. Mini-CEX rating has also a good correlation with the other measures of clinical competence providing validity evidence.

Mini-CEX is a relatively new entrant in the Indian dental scenario. There have been some studies in the western countries which use the mini-CEX in the postgraduate setting but very few in India. The main purpose of this study was to expose the postgraduate student as well as the faculty to utility of formative feedback and how it can be assessed for better learning. The aim of this study was to evaluate the feasibility and usefulness of the mini-CEX as an assessment and feedback tool in the postgraduate setting in periodontology.

MATERIALS AND METHODS

This study was carried out in the Department of Periodontology and Implantology between July 2015 and October 2015. Institutional ethical committee clearance was obtained. All the students and the faculty members who consented to be a part of this study were sensitized with this assessment tool with audio-visual aids and made familiar with the mini-CEX rating form and anonymity was promised.

Two evaluators (A and B) alternated their turns at evaluation each month such that each student underwent at least two mini-CEX sessions with each evaluator. However, this is a FAIMER fellowship project and constricted time period for this project was only 4 months.

Thirty-two cases of equal complexity were selected for the students. In the first encounter, students exceeded the time limit which subsequently reduced to roughly 20–25 min. The postgraduate students examined the patients who came for periodontal treatment. Each student was observed by an evaluator both for the diagnosis and treatment planning. The evaluators were the teachers of the Periodontology Course who received instructions on this new form of assessment and were assisted by the study coordinator.

The evaluators evaluated the students for seven clinical competencies using the standardized mini-CEX form and gave the feedback to the students. The form used a standardized nine-point Likert scale with rating span from 1 to 3 (unsatisfactory); 4 to 6 (satisfactory); and 7 to 9 (superior) [Table 1 and Figure 2]. Each student faced four clinical encounters, and after the each clinical encounter, the student immediately presented an assessment and treatment plan.

At the time of the fourth encounter, students were asked to give their feedback on the assessment given by the evaluator and experience with encounter.

RESULTS

Postgraduate students showed satisfactory performance in different clinical skills, namely medical interviewing, CEX, professionalism, clinical judgment, and organization.

In-patient setting consisted of examination, diagnosis, and treatment planning of patient problem with the moderate complexities. The problems covered a broad range of presenting symptoms which included gingival bleeding, mobility of teeth, sensitivity, oral malodor, and pain. Routine physical examination consisted of chief complaints and history of present illness, plaque index, gingival index, and periodontal parameters such as probing pocket depth and clinical attachment level.

The medical interviewing skill improved from 41% to 68% over the first encounter to fourth encounter. The physical examination skill improved from 37% to 66% while a

Table 1: Rating skills and its description

Skills	Description
Medical interviewing skills	Facilitates patients telling of story, effectively uses questions/directions to obtain accurate, information needed, responds appropriately to affect, nonverbal clues
Physical examination skills	Follows efficient, logical sequence, balances screening/diagnostic steps for problem, and informs patients, sensitive to patient's comfort, modesty
Humanistic qualities/professionalism	Shows respect, compassion, empathy, establishes trust; attends to patients needs of comfort, modesty, confidentiality, information
Clinical judgment	Selectively orders/performs appropriate diagnostic studies, considers risk and benefits
Counseling skills	Explain rational for test/treatment, obtains patient's consent, educates/counsels regarding management
Organization/efficiency	Prioritizes, is timely and succinct
Overall clinical competence	Demonstrates judgment, synthesis, caring, effectiveness, and efficiency

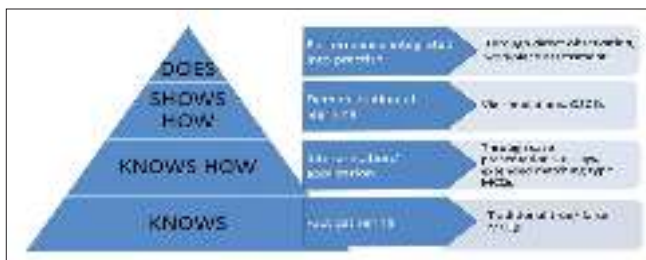


Figure 1: Miller's pyramid. OSCEs – objective structured clinical examinations, MCQ's – multiple choice questions



Figure 2: Rating skills

similar growth in skills was seen in the professionalism and communication and counseling skills 43%–63% and 40%–71%, respectively. Clinical judgment and organization and efficiency improved from 40% to 73% and 42% to 78%, respectively. The overall performance showed a drastic improvement from 40% to 81% from encounter 1 to encounter 4 [Table 2].

The student’s feedback regarding the mini-CEX was also positive as it helped them develop a better insight about patient examination and decision-making in diagnosis. It induced confidence and reduced examination fear among them. Seventy-five percent of the students felt that this type of mini-CEX assessment helped improve the student–teacher relationship as well as the student–patient relationship. Sixty-three percent of the students were satisfied with this assessment pattern and were willing to face more encounters as it helped them improve their competencies. Sixty-three percent of the students felt that mini-CEX is better than the conventional assessment tools. Seventy-five percent of the students agreed that they felt anxious on being observed while taking cases [Table 3].

In our study, the staff was unaware of the existence of any workplace assessment program before sensitization and agreed to improve learning in the clinical competencies of the students by giving them effective feedback about their presentations which was not a part of their routine. Twenty percent of the staff agreed to include the mini-CEX program as a part of their routine [Tables 4a and b].

The mean time taken for observation or examination reduced from encounter 1 to encounter 4 from 43.75 to 29.37 min. A similar reduction was seen when time was assessed for feedback of evaluators which reduced from 15.62 to 10.62 min [Table 5].

The evaluator’s satisfaction improved from a low of 50%–78% over the four encounters. The trainee’s satisfaction improved from 55% to 74% over the same period [Table 6].

DISCUSSION

The comparison of student mini-CEX scores between the first and fourth encounter of clinical practice evidenced an improvement in all competencies evaluated supporting the validity of this assessment method. The greatest score was in the overall performance followed by organization and efficiency, clinical judgment and counseling skills, and diagnosis and examination.

The overall growth in the student’s skill was seen to improve from a low of 40%–81% over encounter 1 to encounter 4. Hence, the evident advantage of the mini-CEX tool is direct observation of the evaluators and longitudinal tracking of the student and allows the correction and strengthening of actions or attitudes in performance.^[3,4]

Previous studies demonstrated mini-CEX to be a valid technique for assessing the students by standardizing the patient examination and standardized oral examination, diagnosis, and treatment planning.^[5,6] Norcini *et al.* observed that assessment of the student–patient relationship in due

Table 2: Rating of the clinical skills of the four encounters

Skills	Encounters			
	1	2	3	4
Medical interviewing skills	41%	50%	62%	68%
Physical examination skills	37%	46%	56%	66%
Humanistic qualities/Professionalism	43%	56%	65%	63%
Clinical judgement	40%	56%	70%	71%
Counselling skills	40%	46%	63%	73%
Organization/Efficiency	42%	60%	76%	78%
Overall clinical competence	40%	56%	75%	81%

Table 3: Percentage feedback questionnaire for students

Feedback questionnaire for students	Strongly agree		Agree	
	mean	%	mean	%
For confidence	4	50%	3	38%
Assessment helped to improve my competencies	5	63%	3	38%
Assessment helped me to improve student teacher relationship	4	50%	3	38%
Assessment helped me to improve student patient relationship	6	75%	2	25%
I received positive as well as negative feedback for improvement	1	13%	2	25%
To face more encounters with this type of examination	1	13%	7	88%
Satisfied with the entire Mini- CEX examination	5	63%	3	38%
New method of assessment is better than conventional method	3	38%	5	63%
Anxious on being observed during case taking	2	25%	6	75%

Table 4a: Percentage feedback questionnaire for staff

Feedback of Staff Questions	Evaluator				
	A	B	Sum	Average	%
Idea about workplace assessment	2	2	4	2	100
Awareness of mini-Cex	2	2	4	2	100
Need for effective feedback after presentation	1	1	2	1	100
Routine feedback after presentation	2	2	4	2	100
Feasibility of mini- CEX in department	3	4	7	3.5	50
Improve teacher student interaction	5	4	9	4.5	50
Improve student learning and competency	1	1	2	1	100
Mini- CEX followed routinely in PG curriculum	5	4	9	4.5	50

Table 4b: Likert scale for the feedback questionnaire of the staff

Likert Scale	For staff
1	yes
2	no
3	slightly agree
4	agree
5	strongly agree
6	neutral
7	strongly disagree

course of encounters was slightly biased toward the case difficulty and several patient interactions for each student. Therefore, in our study, we overruled this biasing by standardizing the level of complexity of patient problem.^[7]

Table 5: Mean of time for observations and feedback for evaluators

Encounters	1	2	3	4	Total time (minutes)
Mean of time taken for observation/ examination	43	39	36	29	149.375
Mean of time taken for feedback of evaluator	15	15	17	10	58.75

Table 6: Satisfaction of trainees and assessors in four encounters

No. of students	1	2	3	4	5	6	7	8	Sum	%
Encounter 1										
Assessors satisfaction	4	4	5	6	4	5	5	7	40	50%
Trainers satisfaction	4	5	6	6	5	6	5	7	44	55%
Encounter 2										
Assessors satisfaction	5	6	7	7	6	6	7	6	50	63%
Trainers satisfaction	7	6	6	6	5	6	6	6	48	60%
Encounter 3										
Assessors satisfaction	6	6	7	8	7	7	7	8	56	70%
Trainers satisfaction	7	6	7	7	5	7				
Encounter 4										
Assessors satisfaction	7	7	7	9	7	9	8	8	62	78%
Trainers satisfaction	7	8	7	8	6	8	7	8	59	74%

Our study showed that on the basis of a 10-point scale executed by our examiners, the medical interviewing skill improved from 41% to 68% over the first encounter to fourth encounter. The physical examination skill improved from 37% to 66% while a similar growth in skills was seen in the professionalism and communication and counseling skills as 43%–63% and 40%–71%, respectively. Clinical judgment and organization and efficiency improved from 40% to 73% and 42% to 78%, respectively. The overall performance showed a drastic improvement from 40% to 81% from encounter 1 to encounter 4.

The postgraduate students agreed that the mini-CEX was a better assessment tool when compared with the conventional assessment tools. The results were in accordance with Lima *et al.*, who stated that mini-CEX is a valid and reliable instrument and promotes direct observation and constructive feedback on real patient encounters in the clinical workplace.^[8] They even agreed that they felt anxious on being observed while they take case histories, which eventually diminished over multiple encounters. Similar findings were reported by Behere where he found that the students were frightened in the teacher's presence during mini-CEX but got accustomed to it with time.^[9]

According to Little *et al.* in 2001, patients of doctors who took a patient-centered approach were more satisfied, more enabled and had greater symptom relief and lower rates of referral.^[10] Feedback on the student-patient interaction proved to be an invaluable learning tool in our study.

The staff realized the need for an effective feedback after the presentation and was willing to include the mini-CEX in their postgraduate curriculum. This was found to be in accordance with Kogan and Hauer, who successfully correlated and implemented mini-CEX in undergraduate medical training programs, and thus, we have implemented the same for postgraduate students in this study.^[11]

Consistent with the previous work, the examiners as well as the trainees were satisfied with the new format and their satisfaction was correlated with their evaluation and their time spent in observing the trainee and the patient complexity. Future research should focus on at least two issues, first, recognizing that there is no gold standard to judge performance, and second, monitoring which can impact rating accuracy.

CONCLUSION

To the best of our knowledge, this is the first study of the implementation of mini-CEX into postgraduate dental education in the subject of periodontology. Our experience makes us believe that mini-CEX is an acceptable and practical tool in the postgraduate setting. The training and assessment of a wide range of procedures make dentistry unique. Good communication skills and counseling can allay patient's fears and anxiety. This structured way of assessment of clinical skills and feedback for the provision of good clinical care will help improve the quality of the resulting information and also help in learning from different perspectives which would induce confidence, improve clinical competencies, and alleviate the fear of examination among the students. Hence, we can conclude that:

1. The students showed great improvements in medical interviewing skill, physical examination skill, professionalism, communication and counseling skills, clinical judgment, and organization and efficiency skills as well as in overall performance
2. Mini-CEX emerged as a promising tool that overpowered the conventional methods of assessment
3. The students developed confidence and better insight about patient examination and decision-making in diagnosis
4. It not only improved the student-teacher relationship but also improved the student-patient relationship and worked toward their incompetency
5. Fear for examination among postgraduate students reduced over the period of encounters.

Limitations of the study

1. The patients were not asked to report for a feedback
2. This study was done in a single department with one discipline only
3. A small sample size was taken to conduct the study
4. Numbers of evaluations were limited per student.

Recommendation

Mini-CEX can be a useful tool to evaluate the clinical competencies of the students. It can be used from time to time in all subjects of dentistry to increase the efficiency of the student and thus should be incorporated in the dental curriculum in India.

Acknowledgement

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Conflicts of interest

There are no conflicts of interest.

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Development, implementation & evaluation of a leadership course for healthcare professionals: A pilot study in India

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Abstract

Leadership training in medical education is extremely important for faculty as they are not formally trained for the same and yet they have to assume leadership roles in various capacities in their professional life. This paper describes stages in development and implementation of one such leadership course in a healthcare institute in India, involving faculty from diverse specialities. The short term outcomes such as participants reactions and changes in attitudes was evaluated. Overall it was well received by the participants.

Keywords: faculty development; leadership

Introduction

“There is nothing in a physician’s education and training that qualifies him to become a leader”

Mathis, L.L. “The Mathis maxims: lessons in leadership” (Collins-Nakai R, 2006)

Leadership in medicine has never been more important than it is today. When we look at the healthcare institute the faculties have to work in various roles of teacher, facilitator, clinician, counselor, researcher and administrators. At all times it involves working with other faculties, patients, para-medical staff and students in various teams. This mandates use of not only subject knowledge, skills but significant amount of leadership qualities including task & relationship management for smooth functioning. Yet no one receives a formal training for leadership development and still is expected to learn it on job. Using soft skills can be easy for some but rather difficult for many others.

Especially if the institution has diverse specialties and involved in academics, research as well as patient care, it becomes imperative for them to work in unison to achieve best possible & sustainable outcomes.

With the increasing complexity of medical education and practice, and recognition of the fact that physicians must assume significant leadership roles, there has been an increase in faculty development activities designed to enhance leadership in medical education. These include formal training programs and fellowships; workshops and seminars; faculty internships; and mentoring programs (Steinert Y et al. 2012).

Although in India leadership development is taken as a part of faculty development programmes, there are no published reports regarding effectiveness or outcomes specific to leadership element.

Therefore need was felt to develop an exclusive leadership training programme relevant to our settings, implement and find out the outcomes on various levels. In this article we have described the design considerations, participants' reactions of pilot module in single organization.

Methods

Setting

NKP Salve Institute of medical sciences is a private medical college, Nagpur affiliated to Maharashtra University of health sciences, Nasik, India. It has a dental, physiotherapy and nursing college run by same management in the same campus. It has a **1000 bedded** hospital, 270 faculty members and nearly 1500 students including graduate and postgraduates studying at a given time.

Participants

Taking into account that this is a training programme in a pilot phase, small group was deemed suitable and hence the total number of participants to be 25. Applications were invited from faculty from all colleges voluntarily and selection was based on their specialty, age and experience. This was done to ensure diversity so as to facilitate a right mix of junior and senior faculties so that they can share their experiences, understand and learn from each others' experiences. Work profile of all faculty members involved academic, administrative as well as clinical responsibilities in the institution.

Design considerations

The main focus of this intervention was leadership development (knowledge, skills and attitude) amongst the participants.

1. Guiding frameworks

The guiding frameworks were Leadership training course (Blumenthal DM, et al. 2014), LME course guide (Mennin, et al. 2017) and nine established best practices for designing effective leadership training interventions (Blumenthal DM, et al. 2014). Two central ideas- learning by doing and Learning in context were at the core of developing the curriculum.

2. Course length, timing and size

The course timing and length was designed to overcome typical logistical challenges of work schedules of faculties involved. It is a 2 months long course with four face to face contact sessions, online discussions, a project involving

real life problem and presentation of that project as a poster in the end. Extended support was offered for those who wish to continue learning after course completion.

3. Resource persons

We had two of our authors who did a formal online course (by AMEE based in UK) on leadership in medical education. Rest three had done FAIMER fellowship and advanced course in medical education technology, conducted many training programmes in medical education and soft skills training for many years. Since employing internal faculty gave us advantage of knowing the participants, local conditions and various context specific issues it was decided to recruit internal resource persons for this pilot programme. Their role was to design the curriculum, as a facilitator and mentor for project completion.

4. Course content

Five resource persons brainstormed and designed the contents and mode of delivery. A hybrid approach was implemented to develop the content ie. customizing various elements in external course material to our context and setting. Detailed course outline is given in table as follows:

Table 1: Course contents

Total course duration : 2 months

S No	Activity / Duration	Mode of instruction	Description of Content
1	Pre contact session activity 2 weeks prior to start of first session	Online questionnaire based	MBTI personality assessment
2	First contact session Full day 6 hours	Large group discussion Role play Game – group communication	Leading self Leading with others Situational leadership Wellness
3	Online discussion 1- 1 month Part 1 Part 2	Online threads on Gmail	Leadership Styles, Goal setting, motivation, conflict & change management, communication skills Case scenarios
4	Second contact session- 1 hr	Small group discussions	Case scenarios
5	Third contact session Full day 6 hours	Large group discussion Role play Game- team building	Team building , delegation Educational scholarship Wellness – follow-up
6	Online discussions 2 1 month	Online goggle groups	One issue – one solution
7	Fourth contact session	Small group discussions	One issue- one solution
8	Fifth contact session Full day 6 hours	Large group discussions Individual participants 'presentations	One issue- one solution

After drafting the structure it was validated from three experts. One was ex vice-chancellor of a medical university.

Second was director of a management training institute and third was a reputed educationist serving on the committee of University Grants Commission, India. The content was modified according to their feedback and final draft was prepared.

The course has following elements-

- a. Theoretical concepts – taught in face to face and online session
- b. Case studies- discussed in face to face session
- c. Experiential learning- individual project to facilitate application of knowledge and skills gained to their personal context

5. Evaluation framework

We used a model of Kirkpatrick's four levels of evaluations for educational interventions adapted for health care interventions to guide the design of our evaluation framework. Before the course began, we finalized a list of outcomes to evaluate, which included: Participants' reactions to the course (Kirkpatrick Level 1) and participants' attitudes towards leadership skills and leadership development (Kirkpatrick Levels 2a-b).

We assessed participants' immediate reactions to the course with a survey which was administered to all participants after the course's final session. This survey included questions about the course's relevance to participants' roles and responsibilities, the effectiveness of different teaching methods and facilitators, and whether participants felt more prepared to address leadership challenges after taking the course. Responses to these questions were structured in five point likert scale format ("Strongly Agree," "Somewhat Agree," "Neither Agree Nor Disagree," "Somewhat Disagree," and "Strongly Disagree"). The survey also included free text questions which asked respondents about the course's strengths, weaknesses, and suggestions for improvement. The survey was designed by two resource persons and a survey design expert. One faculty member reviewed the survey, and deemed it to have adequate clarity, face validity, and content validity. Surveys were administered in face to face interaction. All survey responses were de-identified; participants were told that completion of a survey implied informed consent to use this information for research purposes.

In addition to this a focused group discussion was carried out to get the qualitative data for evaluation 2 months after the course was over. Data was recorded and common themes were extracted. This study was evaluated and deemed exempt by the Institutional Review Board (IRB).

Data analysis

Participants' responses to likert scale questions were assigned a numerical value ranging from one ("Strongly Disagree") to five ("Strongly Agree"). Using Microsoft Excel 2013 (Microsoft Corp., USA), we calculated mean response values for each question, and performed one-way T tests to determine if the mean value of all responses to a question was significantly different from three—the value corresponding to "Neither Agree Nor Disagree." Free text responses to questions about course strengths and improvement needs were analyzed using the comparative source method. Two co-authors independently identified themes in participants' responses, then iteratively compared and refined their theme lists until they agreed on a common set of themes. Next, the evaluators independently quantified the number of distinct references to each theme in the responses. They repeatedly compared and revised their reference lists until they agreed on the number of references to each theme.

Results/Analysis

We received 41 applications and shortlisted 25, out of which 1 participant dropped out due to emergency on the day of first contact session. Details of participants is as follows:

Characteristics of study participants

Age (years)

25-40: 10

41-60: 14

Gender

Male: 09

Female: 15

Marital status

Single: 02

Married: 22

Specialty

Medicine : 09

Dentistry: 13

Physiotherapy: 02

All 24 participants completed the course and participated in post-course evaluation (100% response rate).

Most participants indicated that, as a direct result of the leadership course, they felt more prepared to face challenges arising with team members below them, at their level, and above them, and with non-physician colleagues. Seventy five percent of the participants also strongly or somewhat agreed that taking the increased their interest in pursuing additional leadership training, while all of them indicated that they would recommend the course to colleagues. Seventy six percent of the participants felt that the course needs periodic reinforcements to be more effective. Participants noted that the course “made them aware of their strengths and weakness as leader”, “practically addressed and provided tools to deal with issues that we face in real work life”. Responses from all participants on various questions is given in table as follows:

Table 2: Participants’ evaluations of leadership development course

S No	Question	Mean likert scale response	P-value*	Percent who strongly or somewhat agree with statement
1	Overall, the leadership course provided content that is relevant to my professional life.	4.80	<0.0001	100%

2	This course has changed my perspective to look at the situations differently	4.85	<0.0001	100%
3	As a direct result of the leadership course, I feel more prepared to face challenges that arise with team members below me (e.g. residents, medical students, etc...). at my level (e.g. my co-residents). above me (e.g. fellows, attendings, etc...).	4.56 4.65 4.20	<0.0001	100% 86% 84%
4	I found online discussions to be useful	4.15	<0.0001	88%
5	The course content of first contact session relevant to my professional life.	4.86	<0.0001	100%
6	The course content of Third contact session relevant to my professional life.	4.88	<0.0001	100%
7	The small group meetings(second and fourth contact session) sessions contributed significantly to my learning	4.90	<0.0001	100%
8	Taking this leadership course has increased my interest in pursuing additional leadership training and development opportunities.	4.25	<0.0001	75%
9	I would recommend this course to my colleagues.	4.85	<0.0001	100%
10	This course would be more effective if there are periodic reinforcements	4.60	<0.0001	76%

*P-values are one sided, and compare the means of participants' likert scale responses to the number 3, which corresponds to the likert scale answer "neither agree nor disagree."

From the focused group discussions following themes emerged-

High satisfaction with program: Participants consistently found programs to be useful and of both personal and professional benefit. They also valued the practical relevance and applicability of the instructional methods used.

A change in attitudes toward organizational contexts and leadership roles: Participants reported positive changes in attitudes toward their own organizations as well as their leadership capabilities. Some reported greater self-awareness of personal strengths and limitations, increased motivation, and confidence in their leadership roles.

Gains in knowledge and skills. Participants reported increased knowledge of leadership concepts, principles, and strategies (e.g., leadership styles and strategic planning), gains in specific leadership skills (e.g., personal effectiveness and conflict resolution), and increased awareness of leadership roles in academic settings.

Changes in leadership behavior: Self-perceived changes in leadership behavior were consistently reported and included a change in leadership styles, the application of new skills to the workplace (e.g., departmental reorganization and team building). Participants mentioned that they understood that though most of the issues do not have tailor made solution, however, much can be achieved only if we could change the way we think about the approach towards solving that issue. If one way doesn't work, there surely could be another way of dealing with it.

Features contributing to positive outcomes included the use of: multiple instructional methods; experiential learning and reflective practice; individual projects; peer support and the development of community of practice.

Course strengths

Participants' comments about course strengths focused on the contents and interactive nature (fifteen comments), resource persons (twelve comments), practical skills learned from the course (fourteen comments), and the hands on

experience in dealing with real life issues (fifteen comments).

Course weaknesses and recommendations for improvement

Participants commonly mentioned about difficulty in time management for the online discussions sessions owing to their busy schedule. They preferred face to face contact session over online discussions.

Discussion

John Kotter, a world-renowned expert on leadership at Harvard Business School, defines leadership by what leaders do: they cope with change, they set direction, they align people to participate in that new direction, and they motivate people (Collins-Nakai R, 2006). Leadership skills are very important in all walks of life to become successful and field of medical education is no exception. Infact successful health care for the 21st century calls for diversification of leadership capabilities and management styles that will enrich our abilities to respond to the needs of all groups.

Faculty development refers to those activities that institutions use to renew or assist faculty in their roles effectively. Faculty development programmes in leadership development have gained popularity in past few decades across the world. However this is the first attempt in our country to develop and run exclusive leadership course (Kiesewetter J, 2013).

While designing the curriculum we focused on developing more inclusive style of leadership through influence, not authority; leadership by creating a shared purpose and a common vision, not by using position or power. We took into account our local problems, conditions and constraints. Rather than invite leaders of health systems, corporate executives, or business school professors to teach the pilot course, we recruited teachers from an internal pool of well-respected, experienced clinician-educators and clinician-leaders who were familiar with the leadership challenges that participants would likely face. Our decisions to design the course internally, and recruit internal faculty to teach in it, served as an opportunity for collaboration between faculties designing the course and improved its quality. Moreover, these decisions minimized the course's financial costs.

The ethos of this programme was learning by doing framework wherein firstly participants were made aware of their own strengths and weakness by SWOT analysis done by each one of them. They worked upon their weakness during the entire duration of course which helped greatly to boost their confidence levels in dealing with even the most difficult of impossible situations. The second part focused on how to get along with others including team building, practicing assertive skills, situational leadership and so on.

The online discussions took care of many important topics such as leadership styles, change management, motivation and so on.

There were many unique features of this course, one of it is the case study method has been used in leadership training. Its strengths include focus on analyzing complex, real-life problems that lack simple solutions; simulating decision-making; and debating alternative viewpoints with colleagues—make it well suited for teaching participants about leadership challenges. Moreover, adult learners, often learn best through experiential modalities, including case discussions and simulations (Steinert Y 2012). The other is a session on developing educational scholarship. The feedback on this session was quite positive where participants mentioned that it was completely new perspective on strategic career development and very useful in their professional life. Session on wellness also was too appreciated and feedback comments were 'a good tool for leading holistic life', 'motivational tool for healthy living'.

Our perception decides our attitude and if we change our perception towards looking at the situation, many issues

could be resolved. Therefore a need for actual implementation of the concepts taught in sessions was felt strongly. Inspired by AMEE LME course we also included hands on experience in dealing with real life issue that was taken up by each participant as a project. Various concepts and tools such as BATNA (best alternative to a negotiated agreement) table, which were explained in sessions need to be applied in practice and assessed for their utility. Issues taken up by participants ranged from interpersonal conflicts with colleagues, non-complying students, issues with seniors, management and so on. The purpose was not to solve the issue but to learn how to deal with it so that things start moving in positive direction. This project was presented by all participants on the last contact session and discussed extensively. The participants reflected upon this and felt that their perception about their problems changed during the course, they understood that most problems are not unique but generalized, they could look at the situation differently and were able to find effective solutions.

Regarding the course weakness we have decided to work out on time duration of online sessions to facilitate prompt and effective interaction. Although changes in organizational practice was not examined at this point, we will be examining it in due course of time.

Conclusion

In summary, leadership is the ability to make others succeed. This becomes very important factor for quality education and patient care in a heterogeneous environment of any healthcare institute. We implemented a multi-session leadership course pilot for faculties in health sciences education at a large academic medical center. This course was designed and taught internally, and included a number of unique elements, including business school style case studies about real life challenges in academic and clinical set-up and hands on experience of solving such issues. Initial course evaluations demonstrated improvements in participants' knowledge and skills about leadership, attitudes towards future leadership opportunities and training, and anticipated leadership behaviors.

While preliminary and limited in scope, our work suggests that such programme can be taken as a guide, modified according to the settings, implemented and evaluated in multiple centers further so as to validate the results.

Take Home Messages

The core contents of leadership course emphasized on concepts such as- leadership has to do more with attitude than skill. One needs to be constantly associated with analyzing oneself with tools such as MBTI, SWOT analysis. Every person and each situation is different and needs to be handled differently. Different strokes for different folks is a workplace dictum and hence it is said that 'it is so unequal to treat unequal people equally'. It is essential to develop educational scholarship as we progress in our career. To get things done effectively assertive communication is required and is key to interpersonal relationships and the transactions and appropriate skills to negotiate the transactions. Each situation is unique and does not have a tailor made solution. Changing the way we look at it helps in problem solving. Leadership and good health go hand in hand. The course was well received by the participants and can be replicated in other settings after contextualising the content.

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Appendices

None.

Declarations

The author has declared that there are no conflicts of interest.

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Ethics Statement

This study was submitted and approved by the Institutional Review Board of NKPSIMS, Nagpur. Reference IEC/NKPSIMS/9/2017.

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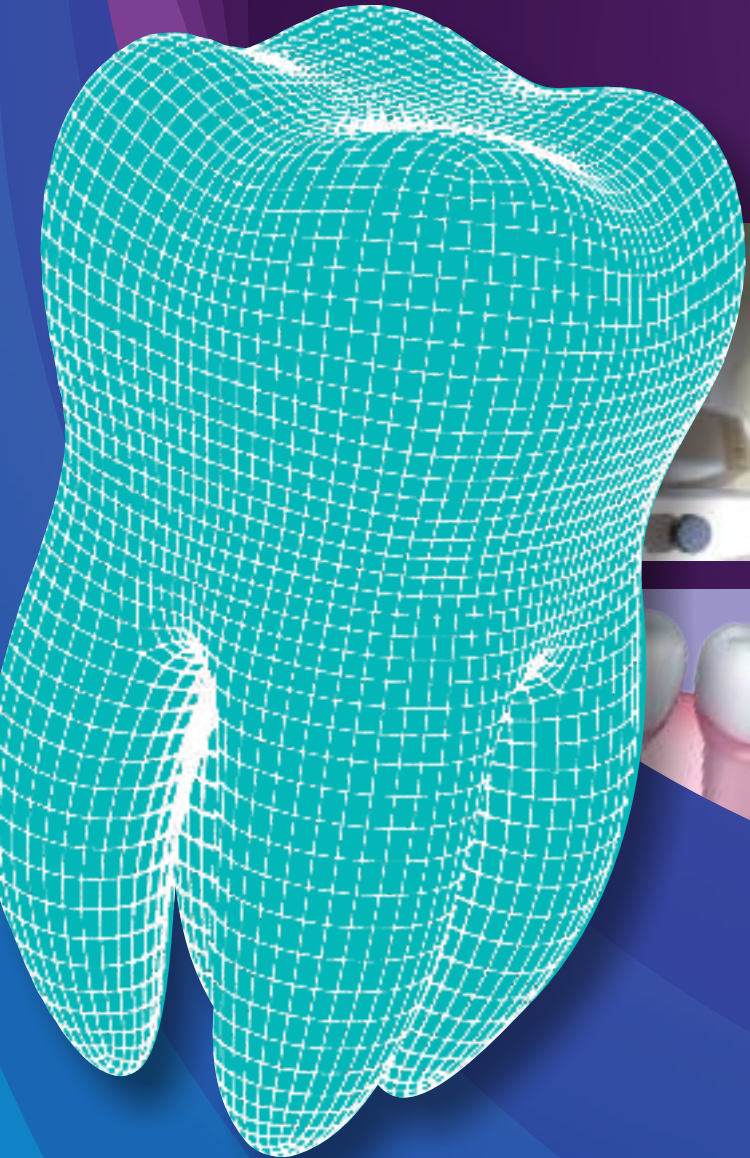
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Assessment of performance of dental students of different learning styles using different teaching aids

ABSTRACT

Background: In this innovative era of teaching and learning, today's teaching methodology has shifted from chalk and board to modern teaching. Due to the introduction of dental education technology, teachers training programs, conferences on teaching, the teaching has been modified a lot. The teachers deliver a multimodal type of lecture which suits to each student's learning style. The teachers deliver best to each and every student by taking the help of new innovative ideas and technology. Hence, this study was conducted to find the performance of students when they were taught in current teaching way and when they were taught according to their learning style.

Aims and Objectives: The aim of this study was to assess the performance of students when they were taught by current teaching and in their own learning styles.

Methodology: An experimental study was conducted among first-year BDS students of VSPM DCRC, Nagpur, Maharashtra. VARK questionnaire was used to assess the learning style. The students were divided into control and learning style groups, and a pretest was conducted. The control group was taught by current teaching practice and the learning style group was taught as per their learning styles, and the posttest was conducted. Pre- and posttest results were compared.

Results: Posttest results of both the groups were found to be statistically nonsignificant ($P = 0.9344$).

Conclusion: By getting the results, we can make the conclusion that current teaching and teaching in learning style of students are beneficial to all students of different learning styles.

Key words: Current teaching practices; dental students; learning styles; performance; VARK questionnaire


Introduction

“Good teaching is 1/4 preparation and 3/4 theatre.”

..... Gail Godwin

Very truly framed sentence by Gail Godwin, which denotes our current teaching–learning methods. Today's teaching methodology has shifted from chalk and board to modern

teaching. The introduction of dental education technology, teachers training programs, conferences on teaching, the teaching has been modified a lot. The teachers in their PowerPoint presentation during lecture not only include the text but also there is an inclusion of audio–visual aids, study cases of patients, animations, and discussion with students. Conjointly, the teachers give exposure to students in the clinics and dental laboratories to show them the actual procedures. Furthermore, there is an involvement of display

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of different materials and instruments. Therefore, today's teaching is multimodal which suits to each student's learning style. The teachers are devoting themselves for delivering the best to each and every student by taking the help of new innovative ideas and technology for the betterment of students. Hence, this study was conducted to find the performance of students when they were taught according to the current teaching practice and when they were taught according to their own learning styles.

Aim

The aim of this study was to assess the performance of dental students of different learning styles using different teaching aids.

Objectives

- To assess the performance of dental students by current teaching practices
- To assess the performance of students when they were taught in their own learning styles (i.e., visual, auditory, read and write, and kinesthetic learning style)
- To compare the performance of students by current teaching practice and teaching according to their own learning style.

Methodology

The institutional ethical committee approval was obtained. An experimental study was conducted among first-year BDS students of VSPM DCRC, Nagpur, Maharashtra. The inclusion criterion was the entire willing and present first-year BDS students on the day of the study conduction. The exclusion criterion was unwilling and absent students on the day of the study conduction. The study was conducted in two phases. In the first phase, the study instrument used was the VARK questionnaire^[1] to identify the students learning style, the sensory modality by which they prefer to take in information. The VARK questionnaire is 13-item, self-reported, multiple choice questionnaire that can be completed in 10–15 min. The submitted questionnaires were scored and tabulated to find the learning styles. After getting the results, the learning

style was briefed to the students. On this day, 82 students were participated.

In the second phase, where we have to assess the students' performance, 77 students were participated in this activity. The study instrument used was a validated open-ended questionnaire of twenty marks. For evaluation of the students, they were divided into control group and learning style group, and a pretest was conducted for both the groups. After that, the control group was taught by current teaching practice and the learning style group was taught as per their learning styles. After this activity, both the groups performed the posttest. The pretest and posttest results were compared.

Results

First phase results

There were about 82 students on the day of VARK questionnaire distribution. Of 82, 67 were female and 15 were male. Of the total students, 45 (55%) were unimodal type of learners (visual – 6 [13%], auditory – 13 [29%], read/write – 11 [24%], and kinesthetic – 15 [33%]) and 37 (45%) were multimodal (23 [28%] were bimodal, 6 [7%] were trimodal, and 8 [10%] were quadrimodal type of learners) as shown in Table 1.

Second phase results

Evaluation of student's performance – There were about 77 students present on the day of this activity. The students were divided into control group of 39 students and learning style group of 38 students (visual learners – 6, auditory learners – 11, read/write learners – 9, and kinesthetic learners – 12). For the evaluation, one open-ended validated questionnaire of maximum marks 20 was designed. One scale was made to grade their performance (excellent performance = 15–20 marks, good to average performance = 10–14 marks, and poor performance = 0–9 marks).

Pretest results

The pretest results of both the groups were in the third grade, i.e., poor performance.

Table 1: Learning styles of students by using VARK questionnaires

Unimodal (n=45; 55), n (%)	Multimodal (n=37; 45), n (%)		
	Bimodal (n=23; 28)	Trimodal (n=6; 7)	Quadrimodal (n=8; 10)
Visual - 6 (13)	AK - 13 (57)	RKA - 4 (67)	VARK - 8 (100)
Auditory - 13 (29)	RK - 4 (17)	RKV - 1 (17)	
Read/write - 11 (24)	VK - 1 (4)	KVA - 1 (17)	
Kinesthetic - 15 (33)	RV - 2 (9)		
	AR - 2 (9)		
	AV - 1 (4)		

Total students – 82, Male – 15, Female – 67. V – Visual learners, A – Auditory learners, R – Read/write learners, K – Kinesthetic learners

Posttest results

To find the significance level, open EPI calculator was used, and the data were inserted to assess the result. The pretest and posttest results of the individual groups were found to be statistically significant ($P < 0.0000001$) as shown in Tables 2 and 3. However, when we compared the posttest results of control and learning style groups, it was found statistically nonsignificant ($P = 0.9344$) as shown in Table 4, i.e., the posttest performance of both the groups was found to be more or less same.

Discussion

Teaching styles have changed significantly over the years. The traditional way of education was delivered through recitation and memorization techniques, whereas the modern way of doing things involves interactive methods. The old-style "chalk and talk" methodology of teaching that is persisted for many years is currently getting inferior results when compared with the additional trendy revolutionary teaching strategies that are available for use in schools today. Greater student interaction is inspired, the boundaries of authority are being weakened, and attention on enjoyment over grades is emphasized.^[2]

Theoretically, in the true lecture, slight or no active student participation is involved. The lecture is outlined loosely as a seamless verbal presentation of data of knowledge and concepts by the professor; it is presumably a synthesis of his own reading, research, and experiences, interpreted in light of his own insights.^[3] However, in this modern era, this traditional way of teaching has shifted from chalk and board to PowerPoint presentation which incorporates audio-visual aids, recorded patient procedures, animations, and students

Table 2: Pre- and posttest performance of control group

Performance	Mean	SD	P
Pretest	4.820	14.282	<0.0000001
Posttest	2.221	2.690	

SD – Standard deviation

Table 3: Pre- and posttest performance of learning style group

Performance	Mean	SD	P
Pretest	5.421	5.379	<0.0000001
Posttest	14.361	2.726	

SD – Standard deviation

Table 4: Posttest performance of control and learning style group

Performance	Mean	SD	P
Control group	2.221	2.690	0.9344
Learning style group	14.361	2.726	

SD – Standard deviation

interaction during the lecture to help the students for better understanding and learning. Due to this, the students of all learning styles find it easier for learning.

To give comment on the control group of our study, the result was very good. Of 39 students, there were about 25 (64%) and 13 (33%) showed excellent and good performance, respectively. There was only 1 (3%) student who was in the poor category, whereas in learning style group 18 (47%) and 18 (47%) showed excellent and good performance, respectively, and 2 (5%) were in the poor category as shown in Table 5. The results showed that both the ways of teaching were good. By these results, the authors want to comment that although the current teaching involves all the learning styles of the students, not only the students should know their learning styles but also the educators should also be aware of it. This is not only for the students for their self-awareness but also for the educators who could consciously update the teaching materials. It is rightly said by Hawk and Shah that faculty who are consciously aware of their students' learning styles as well as their own are in a position to make more informed choices in course material, design, and learning processes to broaden the opportunities for effective learning in their courses.^[4]

This recognition will also help the dental educators to learn more about their students, reflect on the effectiveness of their methods of instruction, and consider accommodating a variety of learning preference modalities. All of this knowledge will help them to develop more effective curricular approaches.^[5,6] However, the fact that cannot be ignored is that the university has decided certain curriculum hours for teaching which will be difficult for the faculty to teach each and every topic to the students in their learning style and most of the topics cannot be taught in individual learning styles. In our study, the learning style group and the control group results were more or less same which showed that students of different learning styles grasp the things by the way we teach nowadays. However, this method can be employed for some topics and also for the students who are not performing well. For the students of read/write group, different sources of reading materials should have to be provided. The author want to share that after this activity, we interviewed the students of learning group; according to them, they liked the way of teaching in their learning styles, but they showed their interest of learning in a multimodal way. That is what we do in our nowadays' teaching.

Al-Saud^[7] in his study informed their students that the learning reference results were a method for self-knowledge and were not intended to limit or label them to a certain mode of learning. VARK results can provide a vehicle for

Table 5: Posttest performance of control and learning style group

Performance	Learning style groups Total students - 38					Control group Total students - 39
	Visual - 6 Male - 1 Female - 5	Auditory - 11 Male - 1 Female - 10	Read/write - 9 Male - 1 Female - 8	Kinesthetic - 12 Male - 5 Female - 7	Total - 38	Male - 4 Female-35
	Excellent, <i>n</i> (%)	3 (50)	7 (64)	8 (89)	0	18 (47)
Good to average, <i>n</i> (%)	3 (50)	4 (36)	0	11 (92)	18 (47)	13 (33)
Poor, <i>n</i> (%)	0	0	1 (11)	1 (8)	2 (5)	1 (3)

Questions paper of 20 marks: Excellent performance=15–20 marks, Good to average performance=10–14 marks, Poor performance=0–9 marks

self-knowledge and help to explore opportunities for making the dental educational experience both more productive and enjoyable for students and faculty members.^[5] According to Fleming and Baume,^[8] knowing one's learning style can be beneficial if learners take the next step and consider how and when they learn as part of a reflective, metacognitive process, with action to follow. It is the beginning of a dialogue, not a measure of personality. However, Stellwagen^[9] warned against misapplication of learning style inventories that may lead to stereotyping and prejudicial labeling of individuals. It may obscure the understanding that learning style evolves over one's life and one's academic/professional career. Some researchers have suggested that the student's strongly preferred mode may not always be the best way to learn, depending on particular circumstances. Students may need to adapt to learning modalities differing from their preferences because of real-life environmental constraints. Some dental students may undergo a shift in learning preferences, as the learning environment changes from lecture hall to preclinical laboratory to patient clinic.^[5] The most effective learners are able to adapt to the style that the learning situation requires. Teachers can help them develop strategies for adapting to differing situations, especially when learning styles do not fit the task.^[10] Grasha suggests that some faculty members introduce different modes of instructional delivery to acknowledge the diversity of the learners that they teach.^[11] If teachers use a variety of teaching methods and styles, learners are exposed to familiar and unfamiliar ways of learning that provide comfort and tension during the process, ultimately giving the learners multiple ways to excel.^[10]

There were a number of studies have been conducted till now to assess the relation of learning style and their academic success. Where we can see the varied results? Nasiri *et al.*^[12] in their study found a significant relationship between visual learning style preference and the mean of students' final examination scores. A study in India^[13] of undergraduate medical students found no statistical association between learning style preference and academic performance based on grades. In addition, two other studies

on students in physiology classes found no association between learning styles and course scores.^[14,15] A study by Alkhasawneh *et al.*^[16] found that students with multimodal learning style performed better in a nursing course. While Al-Saud^[7] in his study found a lower mean grade point average (GPA) (4.648) among students who preferred a single mode of learning, a higher mean GPA (4.819) was found among students with multiple (quadmodal) learning style preferences.

Among the first-year medical students, Baykan and Naçar^[17] did not find any significant differences in the first-semester GPA and learning styles of the first-year medical students. Furthermore, the study conducted by Liew *et al.*^[18] at the Clinical Skills and Simulation Centre, International Medical University, Kuala Lumpur, Malaysia, revealed that the learning preferences (styles and approaches) of the students did not contribute significantly toward their learning outcomes.

In all the studies, the relation of students' learning styles and academic performance was observed, but the present study is one of its kinds where the faculty not only grouped the students according to their learning styles but also taught them in their learning styles and accessed their performance.

Today; the teachers by taking the help new and innovative ideas do the modification in their teaching to help out the students in understanding. However, at the same time, whatever modifications that the educators are doing should be got evaluated by the students regularly so that if any modification is required, it can be integrated or withdrawn for the better academic success of the students.

Limitations and future directions

The study sample group was less. The study result is based on teaching on one topic only. Hence, the study results cannot be generalized for all the dental students. The study can be extended by taking a large sample size and also taking more topics for the evaluation of the performance of the students.

Conclusion

The performance of learning style group and control group of students was good. Hence, we can conclude that teaching the students of this era in today's way of lecture techniques is beneficial to the students. At the same time, the learning style of students should be known to both teacher and students for the self-knowledge, so that the students can learn more productively. For the read/write group, more study materials can be provided for better performance. At the same time, the students and teacher should be aware of that the learning preference can shift to other as the students go in higher academic classes when they enter in the clinics and learn by working on the patients. Hence, having the learning style does not mean that you can learn in that way only and you cannot perform better in other way of learning.

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Conflicts of interest

There are no conflicts of interest.

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Evaluation of learning styles of dental students: A preliminary investigation

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Abstract:

Every person has their own learning style. Some may learn by watching, some by hearing, some by reading and writing and some by actively doing. If we know our learning style, we can learn better. For the students it is very essential to know their learning style. If the study material is presented to the students in their preferred mode of learning they will understand it better. They will recollect it and produce well in the exam to get the academic success. VARK questionnaire will help in assessing the learning style of students in terms of sensory modes. So, to determine the learning styles of first year dental students a cross-sectional study was designed. The VARK questionnaire was distributed among 100 First BDS students. The VARK questionnaire is 13- item, self reported, multiple choice questionnaire. The solved questionnaire were scored and tabulated to determine their learning styles. Out of 100 students 36% students preferred unimodal while 64% students preferred multimodal type of learning style. In unimodal style; 47.22% students preferred kinesthetic, 27.77% auditory, 19.44% read/write and 5.55% preferred visual type of learning style. In multimodal type; the highest preference was given to quadramodal (45.31%) followed by trimodal (28.12%) and Bimodal (26.56%). As the highest preference was given to the multimodal and kinesthetic type, the teaching will have to be changed accordingly for the betterment of the students.

Keywords: Learning style, VARK, Visual, Read/write, Kinesthetic.

Introduction:

Learning is the acquisition of information. If the information is produced in a favorable manner students will take interest in it, grasp it efficiently and produce it well in the examinations. The result will be seen in their academic success. A learning style or preference is the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn (1).

Educational researchers postulate that each individual has a unique learning style (2). As health care educators, it is our responsibility to be aware of the learning style of our students. Knowledge of learning styles may help educators to identify and solve learning problems among students, thus helping their students to become more effective learners (3-6). While doing so, it may be possible to reach out to more students

Because of the better match between teachers and learning styles (7). Keefe also noted that a better understanding of learning style by the faculty can help to reduce the students' level of frustration and improve instructional delivery methods. Instructors should attempt to alter their methods of teaching and give students with different learning styles an opportunity to learn in an environment more conducive to their preferences (8). There are about 53 theories of learning and about 80 models of learning style have been proposed (9). Most take into account the sensory modalities of information input as the determinant of learning style. Three learning style have been recognized according to this model as visual, auditory and kinesthetic styles (VAK model) (10) to which is added read-write style (the VARK model) (11).

Developed by Fleming and Bonwell, the VARK is a tool that categorizes learning style according to Visual, Auditory, Read/write or Kinesthetic modes as indicated on a simple preferences survey (12). Learners may be unimodal if they prefer single sensory modality of learning or multimodal if they prefer more than one sensory mode. Multimodal learners are sub classified into bimodal, trimodal or quadramodal if they prefer two, three or four sensory modes respectively. So, to find out the learning styles of dental students of our college this study was conducted.

Material and Method:

A cross-sectional study was conducted on 100 First BDS students of VSPM's Dental College and Research Centre, Nagpur during the academic year 2013-2014. The ethical approval was obtained from Institutional Ethics Committee VSPM's Academy of Higher Education. The VARK questionnaire developed by Fleming (13) was used to identify the students learning style; the sensory modality by which they prefer to take in information. The VARK questionnaire is 13-item, self reported, multiple choice questionnaire that can be completed in 10-15 minutes. The VARK questionnaire was selected because it is concise, appropriate, it is a simple 13 question survey Questionnaires which were evaluated on the basis of previously validated scoring done by others (14).

The respondents were permitted to omit a question or to choose two or more options for identifying the preferences for multiple learning styles. The small power-point presentation about the learning style was given to the students before distributing the questionnaire. The students solved the questionnaires with interest and submitted it after 10 minutes. The submitted questionnaires were scored and tabulated to find out the learning styles.

Results:

In our study, we got 100% response. Out of total 100 students, 86 were girls and 14 were boys. Out of total students 36% students preferred unimodal while 64% students

Preferred multimodal type of learning style (Table 1). In 36% of unimodal type highest percentage i.e. 17 (47.22%) students preferred kinesthetic, 10 (27.77%) students preferred auditory, 7 (19.44%) students preferred read/write followed by visual mode of 2 (5.55%) (Fig. 1). In multimodal type, the highest preference 45.31% was given to quadramodal style. In bimodal style (26.56%), auditory and kinesthetic was preferred by 47.05%, auditory and read/write was preferred by 23.52%, visual and kinesthetic by 11.76% and read/write and kinesthetic mode was preferred by 17.64% (Fig 2). In trimodal style (28.12%); auditory, read/write and kinesthetic was preferred by 66.66%, followed by visual, auditory and kinesthetic by 27.77% and visual, read/write and kinesthetic by 5.55%. In bimodal and trimodal style the kinesthetic mode was seem to be dominant.

Table 1: Learning style modes

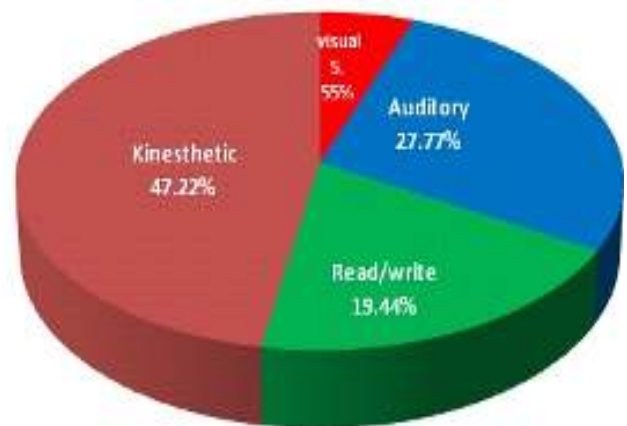
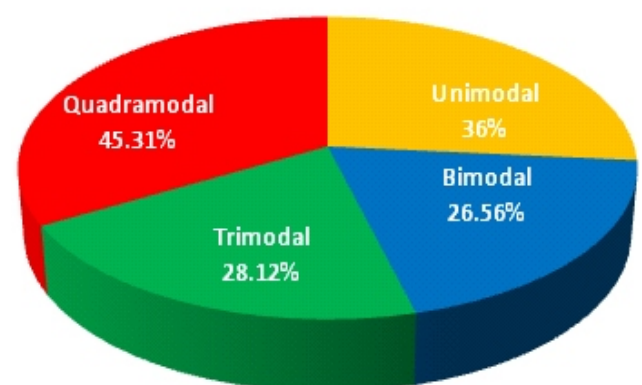


Figure 2: Multimodal Learning style preferences



Discussion:

The transition period from undergraduate to higher education; dental can be difficult for students because of the dramatic increase in the volume of content and mode they learned in schooling and Pre University. As this continues to happen, students begin to lose their confidence and resent school because of repeated failure (15). Every learner has his own learning style. Though learners use all of sensory modes of learning, one mode is often dominant and preferred (16). Visual learners prefer the use of symbolic devices such as diagrams, graphs, flow charts and models that represents printed information. Auditory learners prefer "heard" information and, thus, learn better through discussions, lectures, tutorials and talking through material with themselves or others. Read-write learners prefer printed words and texts as a means of acquiring new information; they thus prefer textbooks, lecture notes, handouts, lists and glossaries. Kinesthetic learning employs a combination of sensory functions; such learners have to feel or live the experience to learn; they prefer simulations of real practices and experiences, lessons that emphasizes on performing an activity, field trips, exhibits, samples, photographs, case studies, "real life examples", role-plays, and advanced concepts.

It is the responsibility of the teacher to understand the student's learning style and adapt rather than expecting the students to adapt to his/her style of teaching (7). When the learning styles of most students in a class and teaching style of the professor are seriously mismatched, the students are like to become uncomfortable, bored and inattentive in the class. They do poorly on tests; get discouraged about the courses, the curriculum and themselves, and in some case change to other curricula or drop out of school (17-18).

According to Dunn, Beaudry, and Klavas, "Learning style is a biologically and developmentally imposed set of personal characteristics that make the same teaching method effective for some and ineffective for others." Every person has a learning style-it's as individual as a signature (19). Learning style is not simply a concept; it is the key to improve

school climate. All students do not achieve the same, and at the same time all students do not learn in the same way. In all facets of education, students must be given the opportunity to explore their learning capabilities to succeed academically (16).

Carbo and Hodges explain that "Students who understand and then are provided opportunities to make use of their learning styles tend to feel valued, respected, and empowered" (20). Hein and Bundy similarly stated, "Acknowledgement of students' individual learning styles can play a critical role in the learning process"²¹ Furthermore, the use of formal learning style assessments can provide useful information that benefits the student as well as the instructor" (16).

Teachers and students feel most comfortable when they are working within the parameters of their own dominant learning styles (16). They will score higher marks on tests than those not taught in their learning style; and it is advantageous to teach and test students in their preferred modalities (21-22). By this analysis, slow learners can be identified and depending upon their learning style preference they will be taught and guided. This will help them in improving their performance.

In our study majority of students (64%) preferred multimodal type of learning style i.e. they preferred to acquire and understand information using more than one sensory modality. Our results are in concordance with a few other studies (23-29). So for such students the teaching will not be restricted to only one type of teaching but it will have to be changed in multiple sensory modes and variety will have to be included in the teaching. These multimodal students will benefit more from active learning strategies than the traditional lecture format which involves mainly one mode i.e. auditory. It can be applied in the form of debates, discussions, role play, models, simulations and games which involve multiple modalities for learning. These learning experiences promote group work, reasoning abilities and improve problem solving skills of students²⁶. In unimodal type, highest preference of about 47.22% of students preferred kinesthetic type of learning. These students prefer

learning by doing or when real life examples or metaphors are used by the educator (12-13, 30). For these students, different exercises like manipulation on models, various hands-on, role play will be required to be arranged routinely in the college.

Conclusion:

A preliminary investigation by VARK analysis will assist to determine the learning preference of students. Awareness of learning style diversity of students will help the instructors to optimize their teaching methods. Majority of the students of this study preferred the multimodal and kinesthetic type of learning. If we are aware of their learning style we can present the study material in their preferred mode which will help them in better understanding and attaining success in academics.

Limitations:

The present study was limited to only one batch of First BDS students. The gender difference was not evaluated in this study because of variation in the number.

Future directions:

Further studies should be undertaken to find out any correlation between the learning style and school education pattern of the students and to find out the effect on performance of students in academics after knowing and learning in their own preferred mode.

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Mobile Learning App: A Novel Method to Teach Clinical Decision Making in Prosthodontics

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ABSTRACT

Background: Prosthodontics involves replacing lost dentofacial structures using artificial substitutes. Due to availability of many materials and techniques, clinician's clinical decision-making regarding appropriate selection of prosthesis requires critical thinking abilities and is demanding. Especially during graduate training years, learners do not receive the exposure to a variety of cases, thus their clinical reasoning skills are not developed optimally. Therefore, using the trend of incorporating technology in education, we developed a mobile learning app for this purpose. The aim of this study was to evaluate learners' perceptions of this app's utility and impact on their clinical decision-making skills. **Methods:** After taking informed consent, interns of the Department of Prosthodontics of VSPM Dental College, Nagpur, India, during the academic year May 2015–May 2016 were sent the link for the app to be installed in their Android smartphones. Their perceptions were recorded on a feedback questionnaire using 5-point Likert scale. The script concordance test (SCT) was used to check for changes in clinical reasoning abilities. **Results:** Out of 120 students who were sent the link, 102 downloaded the link and 92 completed the feedback questionnaire and appeared for the SCT (response rate: 76%). The overall response to the app was positive for more than two-thirds of interns, who reported a greater confidence in their clinical decision-making around prostheses through this app and 94% of the students felt that this app should be regularly used along with conventional teaching techniques. Mean SCT scores were pretest 41.5 (± 1.7) and posttest 63 (± 2.4) ($P < 0.005$). **Discussion:** Clinical decision-making in prosthodontics, a mobile learning app, is an effective way to improve clinical reasoning skills for planning prosthodontic rehabilitation. It is well received by students.

Keywords: Clinical decision-making, learning, prosthodontics, smartphone

Background

Information and communication technology has become a critical component of teaching and learning in higher education, including in the education of health-care professionals.

The use of mobile devices by health-care professionals has transformed many aspects of clinical practice.^[1] Mobile devices have become commonplace in health-care settings, and numerous apps are now available to assist with

many important tasks, from information management to communications and clinical decision-making.^[2] For dentistry, in particular, many apps are available mainly for clinical case discussion, postgraduate entrance preparation, and patients' record management. The attitudes of young graduates and professionals regarding the use of mobile devices and apps have been quite positive.^[3-7]

Prosthodontics is a branch of dentistry dealing with the replacement of lost dentofacial structures with artificial substitutes. Any patient with missing teeth can be rehabilitated using removable dentures, a fixed tooth-supported bridge, or an implant-supported bridge. There are a wide variety of materials available, including ceramic, heat-cured acrylic, cold-cured acrylic, and metals.

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The choice of specific substitute depends on many factors including clinical situation, operators' skill, patients' ability to afford the substitute, and time available to the dentists and patients. A clinician's ability to make the best clinical decision requires experience through exposure to many cases and expert guidance. This may not always be available at undergraduate level, especially in internship when learners are posted in various departments for short periods.^[8] Furthermore, not all teaching institutions can provide exposure to a variety of clinical cases. To meet this need, we developed a mobile app for interns that simulates real-life clinical cases to teach clinical decision-making in the subject of prosthodontics.

The aim of the report is to describe this mobile app to teach prosthodontics and to evaluate its effect on intern's measured clinical decision-making capacity as well as their perceptions of its utility.

Methods

The study was conducted at the VSPM Dental College and Research Centre, Nagpur, India, a private college that follows the curriculum prescribed by Maharashtra University of Health Sciences, Nasik. The participants were B.D.S. students who had completed their 4 years of dental training and were just beginning their 1 year compulsory rotating internship before earning their degree.

Structure of mobile app

The structure of the app was very simple involving interactive screens as described in Table 1.

A total of 35 real patients' cases requiring prosthodontic rehabilitation with different types of prosthetic treatment modalities were peer validated and programed in the app [Figures 1-3]. Cases included patients' requiring removable complete and partial denture prosthesis, fixed prosthesis, implant-supported prosthesis, maxillofacial prosthesis, and any combination of these treatment options.

Table 1: Structure of mobile app	
Screen no	Content
Screen 1	Home screen
Screen 2	Selection of category of prosthetic rehabilitation e.g., removable, fixed, implant supported and so on.
Screen 3	Selection of the patient
Screen 4,5,6	Display of patient's intra-oral photographs, chief complaint, past dental history, relevant medical history and reports of pertinent investigations only upon asking by the student.
Screen 7	Filling up of treatment plan by student in given structured template
Screen 8	Display of ideal treatment plan (decided after peer validation amongst faculty) in green as opposed to student's treatment plan in blue available for comparison

A special emphasis was given to selected cases that required preprosthetic treatments by endodontics, periodontal therapy, surgery, and other specialties also. The intent was to train the students to make an interdisciplinary clinical decision and correct sequencing of the treatment.

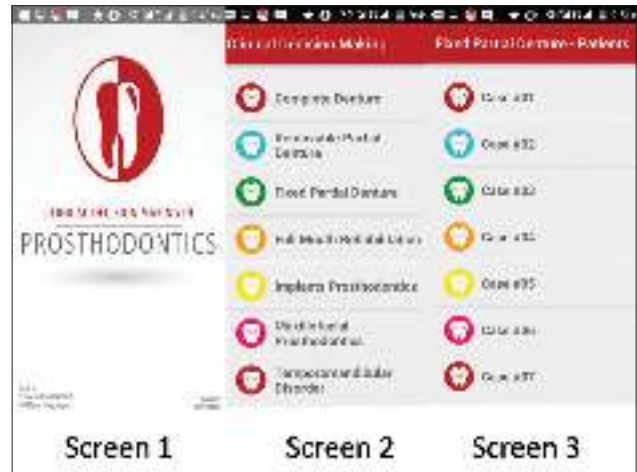


Figure 1: Structure of mobile app-I



Figure 2: Structure of mobile app-II



Figure 3: Structure of mobile app-III

Apart from this, regular features of app such as reading material, send a query, and recommend to a friend were also made available.

Approval from the Institutional Ethics Committee was obtained. A total of 120 interns were briefed about the nature of the project, its aim and steps involved, and the timeframe. It was made clear to them that participation was voluntary and there were neither any incentive for participation nor negative consequences of nonparticipation. After taking informed written consent, interns of the Department of Prosthodontics during the academic year May 2015–May 2016 were sent the link for the app to be installed in their Android smartphones.

Evaluation

Students' perceptions were recorded using a questionnaire.^[9] It included close-ended questions about topics such as students' perceived need for such app, the design of the app, i.e., whether it is user friendly, its understandability and ease of use, and the appropriateness of its content. Responses were provided using a 4-point Likert scale. The 4-point Likert scale response values were combined into three categories to simplify the analysis.

Improvement in interns' clinical decision-making skills was assessed using script concordance test (SCT) administered before and after the intervention. SCT is used to assess clinical reasoning in ambiguous or uncertain situations.^[10] It allows testing in real-life situations that are not adequately measured with the current tests. It probes the multiple judgments that are made in the clinical reasoning process. Scoring reflects the degree of concordance of these judgments to those of a panel of reference experts.

An SCT comprised twenty case scenarios with a total of sixty questions formulated, with a maximum attainable score of 100. It was peer validated and administered to the participants before and after they completed the test using all 35 cases in the mobile app. Students' pre- and post-test scores were compared using paired *t*-test.

Results

Out of 120 students who were sent the link, 102 downloaded the link and 92 completed the feedback questionnaire and appeared for SCT, with a response rate of 76%.

Most interns felt that planning prosthodontic rehabilitation is important in clinical practice and that conventional textbooks and teaching techniques do not provide adequate training to plan prosthodontic rehabilitation. Most interns found that the app was easy to navigate and many felt that the app enhanced their knowledge and confidence in planning prosthodontic rehabilitation.

Two open-ended questions were posed to the participating interns: in response to "What was the best thing about the app?," most mentioned its simple design and the wide variety of cases which otherwise they might not have seen during internship. Some mentioned the fact that they can use the app anytime and ask for guidance in an interactive nature. For the question "What can be done to make it even better?," students provided many suggestions, such as including more cases, procedure videos, and a capacity for live interaction with the faculty.

The groups' mean score on the SCT pretest was 41.5 (± 1.7) and posttest was 63 (± 2.4) ($P < 0.005$).

Discussion

The process of decision-making requires critical thinking abilities and an opportunity to observe and practice a variety of clinical situations. Dental students in their internship get very limited exposure to prosthodontics for many reasons, including a shortage of clinical cases in private institutes that exceed the large number of students.^[5] In addition, while posted in a particular department, interns are expected to diagnose and treat for that specialty only. Therefore, there is a fair chance of compartmentalization of knowledge and adversely affecting their ability to treat patients comprehensively. To address this issue, the authors sought to show students the real patients' photographs and provide other case details to train students in the proper diagnosis and selection of appropriate prosthesis for a range of clinical situations.

Computer-assisted, case-based learning has been shown to be effective in this regard, especially with blended learning module.^[8] However, desktop-based software cannot be accessed anytime and anywhere, lacking a portability and self-paced structure.

Mobile devices such as smartphones can make a significant contribution to modern health-care education. Apps developed to run on both computer and mobile devices can be used. The mobile app tested here was designed to present a wide range of real-life clinical cases to develop the critical thinking capacity of dental students for planning prosthodontic rehabilitation.

Program evaluation was done at Kirkpatrick's levels 1 (learners' reactions) and 2 (their change in knowledge).^[11] As with every technology, understanding the skills of the principal intended users and their attitudes toward the new tool is fundamental in guiding the development of appropriate educational innovation. Therefore, it was important to understand what students think about this intervention.

In the present investigation, we also evaluated the cognitive skills of clinical decision-making among the students before

and after the use of the app. SCT was used for this purpose as it probes the multiple judgments that are made in the clinical reasoning process.^[10,12]

In the present study, there was a meaningful and statistically significant improvement in students' test scores after using the app, which reflects improvement in their clinical reasoning.

It was challenging to develop the app as it needed to be both user friendly and attractive. It took considerable effort to validate the cases presented through the app, as there are many possible treatment options available for each case and expert opinion on the best option sometimes varies. Nevertheless, the interns were excited and satisfied with the app; in fact, a few of the faculty from other disciplines as well as general practitioners asked to register for this app. This emphasizes the importance and recognized need for training in clinical decision-making by dentists and the role of technology in education.

Limitations of this study

A bigger sample size including interns from different institutions and regions would give us a better assessment of the broad applicability of this app.

Conclusions

This mobile learning app is a useful teaching technique to provide training for planning prosthodontic rehabilitation to dental interns. It provides exposure to a wide variety of clinical cases and a chance to improve clinical reasoning in choosing the correct prosthodontic treatment.

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Conflicts of interest

There are no conflicts of interest.

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Evaluation of the Educator's Portfolio as a Tool for Self-Reflection: Faculty Perceptions

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ABSTRACT

Background: Preparing a teaching portfolio to document educational expertise has shown to be useful for both promotion and to stimulate faculty development. This article describes a study of the effectiveness of the Educator's Portfolio (EP) as a stimulus for faculty reflection about educational practice. **Methods:** A sensitizing session of thirty faculty from medical, dental, and physiotherapy colleges on the same campus was conducted; faculty members were asked to complete and submit their EPs. Out of 30 members, 25 responded (83%). Semi-structured interviews of 25 faculties who prepared EPs were conducted, and a qualitative content analysis of the resulting protocols was completed to determine how the EP development process had promoted their reflection on education. **Results:** All the 25 faculty members indicated that reflection about education had occurred. Four categories of reflection emerged, namely, (a) lack of understanding regarding how to categorize their work; (b) lack of evidence of the effectiveness of educational activities; (c) reformulating educational practice; and (d) source of motivation and self-regulation. **Discussion:** The findings indicate that EP preparation serves as a tool for reflection on educational practice, which promotes faculty development.

Keywords: Educator's Portfolio, faculty development, reflective learning

Background

The Educator's Portfolio (EP) is a dynamic record of faculty teaching scholarship and its effectiveness. It depicts educators' work areas, efforts in that area, and progress over a period of time. Conventionally, a curriculum vita (CV) is used as a record for all academic, clinical, and other professional activities. However, with increasing emphasis on teaching as an area of scholarship, the CV has its limitations. In addition, EP has been implemented at various well-known institutes for faculty promotions and as a valid document to reflect faculty academic expertise.^[1,2]

The current study was aimed at evaluating the effectiveness of the EP as a stimulus for faculty reflection about educational practice.

Methods

This study was approved by the institutional ethics committee of the college. An informed consent was taken from all participants to use the material for research purposes. Privacy and anonymity was maintained while analyzing results and reporting the findings.

The study sample consisted of all faculty from medical, dental, and physiotherapy colleges of a private medical institution. The total sample size was 30 (10 each from medical, dental, and physiotherapy). Participation was voluntary.

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Module delivery used a blended approach as follows:

1. Face-to-face interaction: 90 min
2. Online discussion using Google Group: one week
3. Face-to-face problem-solving sessions: 30 min
4. Semi-structured interviews: 60 min.

Face-to-face interaction: A 1-day workshop was conducted as a sensitizing session consisting of an introductory PowerPoint presentation and small-group activities followed by a facilitated large-group discussion to allow the participants to explore what constitutes an EP and how this can be used for professional progress as a medical teacher. Contents of the sessions were adopted from previous published studies and included the following:

- Define and understand the concept of EP
- Compare EP with traditional CV use and understand advantages, and
- Elaborate the process of completing EP with examples.^[3,4]

The format for EP was “This Educator Portfolio” template, created by the Academy of Master Teachers at the University of Texas Medical Branch.^[5,6] It was circulated among participating faculty who were asked to submit the EP after careful consideration in a week's time. Sections of the EP were as follows:

- Teaching
- Assessment
- Mentoring
- Advising
- Enduring educational material
- Educational leadership.

Further, each section was subdivided into:

- Philosophy
- Goals
- Activities
- Indicators of quality accomplishments and evidence of impact created
- Dissemination.

Online discussion: To facilitate the completion of EP, online support was provided using Google Group to answer any queries regarding filling out the details. A sample EP was also shared.

Face-to-face problem-solving session: As many participants conveyed difficulties in understanding the section on teaching philosophy, it was discussed in details and resources were shared.

Semi-structured interviews: Interviews with faculty who prepared EPs were conducted. In the present study, an author with previous experience of conducting such interviews and handling qualitative research, working as an associate

professor at the present institute where the study was carried out, and not involved in the study as an investigator conducted the interviews. Interviews were preceded by observation and informal and unstructured interviewing to develop a keen understanding of the topic of interest necessary for developing relevant and meaningful semi-structured questions. The purpose of interview, permission to audiotape, and the conversation and procedure for data analysis were communicated to the participants. Interviews were carried out face to face with one respondent at a time.

The interview guide consisted of four questions, and their associated follow-up probes were generated based on the work of Beecher *et al.*^[7] The following questions guided the data analysis and categorization: whether there was understanding of the concept of EP and its significance in the faculty member's context; Was the process easy, and if not, what difficulties were faced; Did the act of conducting an EP encourage reflection on activities as a medical teacher; and What kind of change did this exercise affect in professional roles and responsibilities as a medical educator.

The data were audio-taped and also notes were made. On an average, one interview lasted for 60 min, and data saturation was discussed. Repeat interviews were not carried out. Data were transcribed. The interviewer performed an iterative review of interview transcript to develop a deeper understanding of what respondents described in the interviews. Things that recur across the interviews, the ones that surprised the interviewer, etc., were noted. Preliminary codes were assigned in order to describe the content. Themes were defined, reviewed, and reported. Patterns or themes in codes across the different interviews were searched. A qualitative content analysis of the transcripts was also conducted to determine if and how the EP development process had, overall, promoted faculty member reflection on education.

Results

The following four categories of reflection which were overlapping and nonsequential emerged from the analysis of transcribed interviews:

First, lack of understanding regarding how to categorize work was an issue. Almost all participants had difficulties in understanding how to differentiate the work they were doing into the various categories of EP template created by the Academy of Master Teachers at the University of Texas Medical Branch. One participant mentioned “I have never thought about my teaching philosophy.” This was echoed by almost all of the other participants.

Second, lack of evidence of the effectiveness of educational activities also emerged as a theme. It came as a surprise that

although all participants were engaged in some educational projects, there was no valid or substantiating evidence for efforts. Very few faculties had been maintaining records and feedback regarding their work in a consistent manner. One participant's reaction is particularly worth mentioning: "I advise many students, but never take a feedback or a follow up to determine whether my advice has been implemented and worked for the students."

Third, reformulating educational practice: the participants mentioned that in future they wish to be more attentive as to what they can do differently in order to get better results even in day-to-day activities.

Fourth, source of motivation and self-regulation: -majority of the participants said that after filling their EPs, they have now acquired a different perspective to look at their work. One of the participants said "I now understand the meaning of scholarship in everyday activities as a medical educator and this will enable me to become more successful in my career," another one mentioned that "EP will now serve as a constant reminder on the areas where in should focus in future."

Discussion

Medical education has evolved rapidly over the past few decades. This is evident by the increased number of conference presentations and publications, along with other research projects. Now, there are many international universities providing courses for developing skills as a medical educator. The role of medical educator not only entails teaching but encompasses many different categories such as assessment, curriculum planning, educational research, interprofessional education, leadership, and others.^[1,2] The educational literature has explored a theoretical foundation for using portfolios at many levels (e.g., student learning and professional development and promotion). The recent literature shows that many universities and colleges are making educational portfolios part of their faculty as well as students' assessment.^[8] Most of the focus in a typical CV is devoted to research and service to the institution with minimal evidence of the role as a teacher and related accomplishments. A small section in the CV on education has now transformed as a separate educational portfolio.

However, there is no consensus on the ideal structure of EP. Various studies have used different formats. In our study, we used a format created by the Academy of Master Teachers at the University of Texas Medical Branch. The main aim was introducing the concept, and not the specific details of every faculty. Therefore, a more concise and precise format was selected over long and tedious formats.

In our country, apart from teachers' training workshops, which are mandatory by the regulatory authority, there are very few

advanced centers such as the Foundation for Advancement of International Medical Education and Research-Regional centers that provide advanced courses in teaching technology. In such a situation, motivating faculty to understand knowledge and practice gaps in medical education, identify training opportunities, and develop competency is very challenging. Even for those who are consciously developing their career in medical education, it is imperative to have a tool that will both reflect the current status and provide directions for further growth. EP preparation can help medical educators for this purpose by facilitating self-reflection as it is a long and thoughtful process involving careful consideration of ones' work and relevant accomplishments. It has been shown to be an effective way to stimulate faculty development through self-motivation in earlier studies.

In our analysis, it was evident from the faculty interviews that they were familiar with the CV and unaware of the concept of EP, finding it difficult to initially complete the form. The sections in EP were easy to understand, but the subcategories of their role and how they assess and disseminate their effectiveness in respective roles as an educator need to be elaborated on with more examples.

After another problem-solving session with faculty, they were able to complete most of the EP pro forma. However, when it came to showcase the evidence of each activity, there were numerous problems, for example, faculty had not kept any record of student and peer feedback over the years as well as records on remedial actions. Overall, it appeared that efforts were made but not documented and therefore had little credibility.

However, all participants mentioned that this concept of EP and the process of completing it promoted self-reflection on educational practices. It was reported that the process provided a new perspective of looking at work and will definitely promote self-motivation, self-monitoring of progress, and, ultimately, development as an educator. These findings are consistent with those of previous studies^[8,9] where authors observed EP to be effective in stimulating self-reflection among faculty.

Conclusion

The portfolio is intended to be a complete account of teachers' thoughts, actions, and success. It is dynamic in nature and undergoes constant makeover in career development and evaluation.

A small sample size and single-center nature are the main limitations of this study. However, it can stimulate and provide direction for professional development, and is a rich source for personal reflection and learning.

The authors suggest that EP should be implemented in all health-care institutes as a tool for self-reflection and faculty development. In addition, adequate training should be provided to the faculty regarding completing EPs; it should be considered for recruitment as well as promotions in teaching institutions.

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Conflicts of interest

There are no conflicts of interest.

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Effect of dental laboratory exposure on dental students: A preliminary investigation

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Abstract

Background:

Teaching dental materials in first and second BDS training years is a very demanding task. The theory can be taught but the relevant clinical and laboratory procedures can be shown only in third and final BDS. Therefore, understanding can be improved if technical laboratory procedures are shown live to these students in early years.

Methodology:

An early laboratory exposure was planned for second BDS students related to various dental materials including dental ceramic, waxes and casting procedures. 60 students were divided in 2 groups of control and experimental respectively. Pre-test and post-test were administered. Semi-structured interviews were conducted to know their perceptions regarding the intervention.

Results:

The mean scores were pretest 29 ± 3 and for control group 33 ± 2 and for experimental group 45 ± 4 . the difference was statistically significant ($p < 0.001$). Common themes that emerged from semistructured interviews included better understanding of the topics especially technical procedures and scope of dental laboratory in clinical practice.

Conclusion:

Early laboratory exposure can be successfully coupled with traditional teaching of dental materials in early years of BDS training to provide a practical context to theoretical learning.

Keywords: Dental Materials, dental education

Introduction

Teaching dental materials for first year dental students is challenging task. Although basic theoretical concepts in material science can be learnt, prosthodontic application only comes after clinical exposure i.e in third and final BDS when they actually see various procedures in clinics.

Clinical postings give a chance to students to learn this applied aspect, however, laboratory procedures are rarely shown live. This makes the subject difficult to relate and understand especially in early years of training. Therefore present investigation was undertaken in order to enhance understanding of dental materials by giving laboratory exposure to students early in their BDS training years.

Aim

To evaluate effect of dental laboratory exposure on students' performance in dental materials.

Methodology

Total 60 students of II BDS were divided in 2 groups one control & other experimental of 30 each. Control group was given conventional lecture on selected topics and experimental group received lecture, guided tour of laboratory with explanation of equipments and instruments combined with video and live demonstration of related laboratory procedures. Dental materials included dental ceramic, waxes and casting procedures.

Pre-test and post-test were administered. Semi-structured interviews were conducted to know their perceptions regarding the intervention. In the present study author with previous experience of conducting such interviews & handling qualitative research and qualified (MDS) female Prosthodontist, working as a associate professor at the present institute where the study was carried out conducted the interviews. Interviews were preceded by observation, informal and unstructured interviewing in order to develop a keen understanding of the topic of interest necessary for developing relevant and meaningful semi-structured questions. Later a pre-validated interview guide with open ended questions was used. Participants were explained regarding her occupational status as well as research background before the interviews began. The data was collected at workplace and recorded by taking notes. On an average one interview lasted for 15 min. data saturation was discussed. Repeat interviews were not carried out. Data was not coded. Qualitative content analysis was performed to extract information from the data. Major themes were reported.

The students of control group also got the laboratory exposure after completion of the study.

Ethics approval was obtained from the IRB of VSPM Dental College and Research Centre, Nagpur, India (IEC/VSPMDCRC/30/2017 dated 22/4/2017).

Result

Data analysis was done by paired t test.

The mean scores were pretest 29 ± 3 and for control group 33 ± 2 and for experimental group 45 ± 4 . the difference was statistically significant ($p < 0.001$)

Semi structured interviews revealed following themes:

1. It provided context to theoretical learning and enhanced understanding of concepts due to live visuals and interaction with faculty
2. Improved understanding of scope of dental laboratory in clinical practice
3. Facilitated understanding of role of dental technician in success of prosthetic rehabilitation.
4. This intervention should be regularly conducted for teaching dental materials

Discussion

Dentistry is an amalgamation of art and science. Prosthodontics in particular deals with replacement of missing teeth and surrounding oral tissues with artificial materials mainly acrylic, ceramics and metals. Successful rehabilitation of patient demands clinical expertise as well as meticulous execution in dental laboratory to reproduce natural tooth-tissue contours. It is very essential for dental graduate to learn various laboratory procedures and their implications in clinical practice. However, in their BDS curriculum, students are required to perform only limited laboratory procedures related to selected materials, whereas they have to learn theory of all that are used in dentistry along-with fabrication and processing techniques. These procedures are performed in dental laboratories by dental technicians routinely and by observing them live makes understanding easier and facilitates dentist to technician communication in future.

Although knowledge about dental materials is the cornerstone to successful dental practice, very few researchers have investigated dental material teaching-learning techniques¹. In dentistry all laboratory procedures are dependent upon directions from dentist and therefore it is imperative for him/her to learn not only material science but actual functioning of dental laboratory.

There have been studies reporting early clinical exposure and its positive effect on dental students in the literature^{2,3} however, dental laboratory exposure has never been investigated.

Keeping this in mind all laboratory procedures related to dental materials syllabus in first and second BDS were listed. Live and video demonstrations of these procedures were arranged for experimental group with one facilitator from faculty and dental technician. Dialogue between technician and students was facilitated by the faculty so as to orient them for future clinical practice and improve communication.

Results show that there was improved understanding of related topics in experimental group as compared to control group evident from their test scores.

This intervention was taken very positively by students reflected by their responses in personal interview.

This study serves needs to be replicated for more number of students at many centers to generalize the results so as to develop a training module to be incorporated in BDS curriculum.

Conclusion

This intervention helped to strengthen students' understanding of theoretical concepts while learning dental materials. It was perceived well by the students and can be used as an adjunct to traditional teaching methods.

Take Home Messages

Dental laboratory exposure alongwith regular lectures and practicals can help students to understand theoretical concepts in dental materials in a better way.

Notes On Contributors

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Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.

Faculty views on competency- Based medical education during mentoring and learning web sessions: An observational study

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Abstract

Competency-based medical education (CBME) is an outcome-based education system which is learner oriented. This study was conducted to analyze the knowledge and views of the participants about competency-based medical education and its various aspects.

This was an observational study, conducted on thirty two (32) study participants in one of the regional FAIMER training institutes of India. A structured and validated set of questions on CBME was used for online discussion.

The responses of the participants were noted for each question. Approximately, response rate of 40% was noted for five questions. Remaining three questions witnessed response rate less than 25%.

As MCI in its 'Regulations on Graduate Medical Education, 2012 has mentioned competencies to be achieved by an 'Indian Medical Graduate', in-depth knowledge of CBME is required for each and every medical teacher/facilitator as a part of curriculum management team in medical school/universities.

Keywords: Competency, Competency-based Medical Education (CBME), WPBA.

Introduction

The medical education system all over the world is witnessing a paradigm shift from current/ traditional type of medical education to competency-based medical education. The current medical education being followed in most of the developing countries is of traditional type which is teacher centered and mainly deals with the teaching and assessment of knowledge component. The concept of competency based medical education is centered on a learner, focusing upon skill development and assessment in the form of skill performance.

The competency-based medical education (CBME) has been incorporated in the curricula of medicine in various medical schools and universities of developed countries across the world. CBME is an outcome-based approach to design, implementation, assessment and evaluation of a medical education program using an organized framework of competencies as proposed by Frank et al.⁽¹⁾

As it is an outcome-based approach, the emphasis is given on the end product rather than the educational process. In CBME, the educational outcomes are clearly defined. The content of the curriculum and its organisation, the teaching methodologies and the assessment methods are determined according to expected outcomes.⁽²⁾

The alignment of specific outcome competencies with the methods and assessment is facilitated by CBME.

This study was undertaken with the aim of evaluating knowledge and views of FAIMER participants and to promote self-learning with appropriate review of literature.

Materials and Method

This was an observational study, conducted in one of the regional FAIMER training institutes of India. Thirty two (32) FAIMER fellows, enrolled from different parts of the country and from other Asian countries for Foundation for Advancement in International Medical Education and Research (FAIMER) Fellowship programme were included as study participants. Sixteen (16) fellows of 2014 batch and sixteen (16) from 2015 batch participated in online discussion. A structured set of questions was prepared and validated from medical educationists. It was administered through Mentoring and Learning (ML) Web sessions and the participants were requested to respond within requested time period. All questions were of open ended variety which covered various aspects of CBME that included definition of competency and CBME, Differences between competency based medical education and traditional content medical education, viewpoints of faculty on merits and demerits of CBME and traditional/ current curriculum, Stages of competence, Steps of planning and implementation of CBME, challenges in implementation. The questions also covered different assessment systems for CBME and Workplace-based assessment (WPBA).

Results & Discussion

In the present study, the study participants were from pre-clinical, para-clinical and clinical subjects of medicine and also included faculty from physiotherapy and ayurveda. The set of questions used for the discussion during Mentoring and Learning Web Sessions on CBME is given in Table 1.

Table 1: Set of questions used for Mentoring and Learning Web Sessions on Competency-Based Medical Education (No. of participants= 32)

Question	No. of Responses
Define competency. What is Competency-based medical education (CBME)?	13 (40.62%)
How the CBME is different from traditional content medical education?	13 (40.62%)
Viewpoint on merits and demerits of current curriculum Viewpoint on merits and demerits of CBME	14 (43.75%)
Explain four stages of competence (Learning)?	08 (25%)
What are the steps for planning Competency-Based curriculum? What are the steps & strategies for its implementation?	15 (46.87%)
What are the challenges in implementation of CBME?	07 (21.87%)
What are the different assessment systems for CBME?	06 (18.75%)
What is work place based assessment and what is its role in CMBE?	15 (46.87%)

The discussion on specific questions covered in-depth information of CBME. The participants did a thorough review of literature to answer the above mentioned questions. Summary of responses for first two questions is tabulated below. (Table 1 & Table 2)

Table 2: Summary of responses of participants for “Define competency. What is Competency based medical education (CBME)?”

Response
Competency is an expertise or skill of acceptable norms/standards developed through a predetermined process of learning and practice
CBME is an approach of preparing a physician who can practice in such a way that can meet the current need of society and patients.
Considering the patient needs CBME focuses upon what competencies and assessment tools are required to meet those needs and accordingly sets appropriate curriculum for residents and physicians in practice.
Competency in a particular area means An observable ability of a health professional, integrating multiple components such as knowledge, skills, values and attitudes. Whereas, CBME is an approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organized around competencies derived from an analysis of societal and patient needs. It deemphasizes time-based training and promises greater accountability, flexibility, and learner centeredness.
Competency is an expertise which is derived from an analysis of needs of patients and society.
Five characteristics to define a competency proposed by Albanese et al. ⁽³⁾ <ol style="list-style-type: none"> 1. A competency focuses on the performance of the end product or goal state of instruction 2. A competency reflects expectations that are external to the immediate instructional program 3. A competency is expressible in terms of measurable behavior 4. A competency uses a standard for judging competence that is not dependent upon the performance of other learners 5. A competency informs learners, as well as other stakeholders, about what is expected of them.
Competency based education (CBE) is a framework for designing and implementing education that focuses on the desired performance characteristics of health care professionals.

Table 3: Summary of responses of participants for “How the competency based medical education is different from traditional content medical education?”⁽⁴⁾

Variable	Traditional content medical education	Competency-based medical education
Driving force for curriculum	Content: knowledge acquisition	Outcome: knowledge application
Driving force for process	Teacher	Learner
Path of learning	Hierarchical	Non hierarchical
Responsibility for content	Teacher	Student and teacher
Goal of educational encounter	Knowledge acquisition	Knowledge application
Assessment	Based on mastery of curriculum	Based on the health needs of the society
Typical assessment tool	Single subjective measure	Multiple objective measures (evaluation portfolio)
Assessment tool	Proxy	Authentic (mimics real tasks of profession)
Evaluation	Norm referenced	Criterion referenced
Timing of assessment	Emphasis on summative	Emphasis on formative
Program completion	Fixed time	Variable time

The participants discussed merits and demerits of current curriculum and CBME.

The merits of current curriculum includes:

- It is the ‘tested and tried’ method of teaching undergraduates in medical schools.
- It is highly manageable particularly when we are dealing with the large group of students.
- Medical training to date has included the completion of a minimum number and type of clinical placements and rotations for good reason.
- Traditional methods are capable of assessing the integrated knowledge and skills into comprehensive care of a wide range of patients and in varying settings.
- The implementation of traditional curriculum is familiar to the faculty. As present age medical teachers have all been trained through this pattern, they are well-versed with its implementation.
- Traditional curriculum has a strong foundation in medical training. Hence, whichever newer methods of curriculum would emerge would more or less have to be centered around traditional pattern.
- Outcome-based medical education will ultimately have to be founded on the grounds of traditional pattern.^(5,6,7)

Old data, outdated information, emphasis on rote knowledge, since years same type of questions being asked in the examination as a part of assessment, no integration in teaching as well as in textbooks are demerits of current curriculum.

The merits of CBME are as follow:

- It helps learner to identify areas to improve upon
- Improves evaluation of residents
- More defined feedback can be given to residents
- Earlier identification of underperformers can be done
- Provides aspirational goals for overachievers

Whereas, assessment of only competency based abilities i.e., ‘observable ability’, poor knowledge about the principles of CBME, educating the educators (Unwillingness of teaching staff to get trained), time needed for training staff, new implementation strategies unknown to the educators, development of standard evaluation systems, changing mindset of teachers and learners, funding barriers, potential to reduce learning to completing a list of ‘tick boxes’, set outcomes decrease the sense of academic exploration and learning by inquiry are some of the demerits of CBME.

The discussion on four stages of competence (Learning): In the fields of education and operations research, the Dreyfus model of skill acquisition is a model of how students acquire skills through formal instruction and practicing. Brothers Stuart and Hubert Dreyfus proposed the model in 1980.⁽⁸⁾

Initially described as “Four Stages for Learning Any New Skill”, the theory was developed by Noel Burch in the 1970s. It has since been frequently attributed to Abraham Maslow, although the model does not appear in his major works.

Conscious competence ladder/ matrix/ four stages of competence:

- One of the popular approaches that help us to manage our own learning process
- It also helps us to better coach our learners through the difficult learning process

The four stages of competence are as follow:

Unconscious Incompetence: The individual does not understand or know how to do something and does not necessarily recognize the deficit. He/she may deny the usefulness of the skill. The individual must recognize his/her own incompetence, and the value of the new skill, before moving on to the next stage. The length of time

an individual spends in this stage depends on the strength of the stimulus to learn.

Conscious Incompetence: Though the individual does not understand or know how to do something, he/she does recognize the deficit, as well as the value of a new skill in addressing the deficit. The making of mistakes can be integral to the learning process at this stage.

Conscious Competence: The individual understands or knows how to do something. However, demonstrating the skill or knowledge requires concentration. It may be broken down into steps, and there is heavy conscious involvement in executing the new skill.

Unconscious Competence: The individual has had so much practice with a skill that it has become "second nature" and can be performed easily. As a result, the skill can be performed while executing another task. The individual may be able to teach it to others, depending upon how and when it was learned.

The steps for planning CBME & strategies for its implementation are as follow as per discussion by the participants.⁽⁶⁾

Identification of competencies: This can be done by consensus opinion of experts, health needs, analysis of physician activities, self-report by physicians to identify critical elements of behaviour, critical incidents, public health statistics, medical records, practice setting and resources. By defining learning outcomes and communicating this with the faculty and students would define required competencies and their components.

Identification of the content & Program organization: Identification and sequencing of the corresponding course content should be done. Selection of required educational activities, delineating minimum and maximum time period of training, creating space for feedback sessions and reflections are some of the strategies for implementation. Defining the desired level of mastery/ expertise in each area, defining milestones or achievement points along development path for competency i.e. charting of student progression pathway are important strategies need to be followed.

Planning for Assessment and Program evaluation: Identification of observable and measurable form of competencies in real settings; E.g. Entrustable Professional Activities (EPA), defining performance criteria which include establishing minimum acceptable norms of summative performance and intervening levels of expertise is required. Appropriate assessment tools need to be selected to measure progress for achievement of milestones. Designing and developing a longitudinal assessment program with emphasis on WPBA methods, and an outcomes evaluation program is required as the final step of CBME implementation.⁽⁷⁾

During discussion on implementation of CBME, participants pointed out the following challenges:

- Specifying the competencies & assessing them is difficult & tiring task

- Students may pay attention towards learning the lengthy list of competencies rather than achieving expertise
- Since CBME promoting individualized flexible training, it is difficult to supervise large number of students improving at their own pace
- There may be Lack of order in managing so many people involved
- Breaking competencies into smaller observable units may lead to danger of minimizing contents
- Also by breaking complex competencies into smaller units so that they are observable, question like how does assessing these fragmented competencies reflect the real world situation? May arise
- Trimming content may not be justifiable
- Faculty development
- Lack of Human resources
- Funding barriers
- Lack of equipment
- Lack of infrastructure
- Assessing the validity & reliability of new teaching & assessing tools
- Coordinating medical student and PG/residency program
- Creating better systems of student assessment
- Change in teacher and student/learner ethos⁹

The assessment of CBME as discussed by the participants is as follow:

CBME can be assessed by Portfolios, Clinical Log books, use of chart stimulated recall (CSR), case discussion.^(10,11) As CBME is an outcome-based approach, the assessment should be done at the workplace by observing learners. Workplace Based Assessment (WPBA) is the assessment of working practices based on what doctors actually do in the clinical setting and is predominantly carried out in the workplace itself.

The WPBA methods assess at the topmost level of Miller's pyramid that is 'does' level. Few assessment tools used as WPBA are as follows:

- mini-Clinical Evaluation Exercise (mini-CEX)
- Directly Observed Procedural Skills (DOPS)
- mini-Peer Assessment Tool (mini-PAT)
- Multisource feedback (MSF)
- Clinical encounter cards (CEC)

Rationale for adopting WPBA:

- Conforms to the highest level of Miller's Pyramid
- Focus on clinical skills including the necessary soft skills (communication, behavior, professionalism, ethics, attitude)
- Observation (in real situation) and feedback
- Context and content specificity
- Compensates for some shortcomings in the traditional assessment methods
- Seamless blending of purpose and ideology with that of 'In Training Assessment'

- Alignment of learning with actual working
- Encourages reflective practice

Conclusions

Present study revealed multiple responses regarding various dimensions of competency-based medical education. It included learning of the concept of competency-based medical education, steps and strategies of its implementation and assessment methods. The overall participation in the discussion showed positive learning behavior and interest among medical faculties towards competency-based medical education and its incorporation into medical curricula.

Limitations

High non response rate of the participants in the discussion limits our study hence its conclusions cannot be generalized. However, further studies among medical faculty on awareness about CBME and actual training of the faculty in the medical schools/institutions would help implementation of CBME.

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Abstract

Brief Background

The dental students usually score well in theory but they lack in analytical skills, reasoning ability and problem solving. So it is necessary to make the dental students equipped with critical thinking, problem solving and decision making. This is only possible if the teaching technology is improved. The shift from traditional learning to blended learning could be a best solution. So, there was a need to evaluate the effectiveness of blended learning over traditional learning.

Objective

The main aim of this study was to evaluate the effect of implementation of flipped classroom model on second BDS students, quantitatively and to evaluate the knowledge gained.

Materials and Methods

This study was conducted on second BDS students for the subject of Dental Materials with a sample size of 80. The students were divided randomly into two groups of 40 each. Both the groups were given a pre-test to assess the knowledge. After the implementation of Flipped classroom, post-test was conducted to evaluate gain in knowledge and to see the effect quantitatively. An independent 't' test was carried out to see the significant difference between Flipped classroom and traditional classroom model.

Results

The quantitative analysis showed that the flipped classroom model is significantly better than the traditional classroom model. But statistically, the knowledge assessment showed insignificantly different results.

Summary and Conclusions

The flipping of traditional classroom is necessary and should be implemented to health care students.

Key Words

Flipped classroom, Blended Learning, Dental Education.

Introduction

Dental education in India is designed to create dental graduates with ample knowledge and clinical skills required to do the preventive as well as restorative dental treatment. The dental curriculum involves theory and practical which is stretched over a period of five years including compulsory internship. The teaching involves typical classroom lectures and practicals. The students are evaluated on the basis of theory and practical examination to test their knowledge and clinical skills. The students score good in theory but they lack in analytical skills, reasoning ability and problem solving.¹

For example, the dental students have preclinical subjects in first and second BDS and are never exposed to patients. Dental materials is one of the subjects which include all materials used in dentistry. In that, the students not only learn the physics and chemistry of the materials but also the manipulation and clinical application of it. Understanding of the clinical application is difficult as these students are not exposed to patients. And when it comes to handling the patients in third year, they forget the details of the materials.

So it is necessary to make the dental students equipped with critical thinking, problem solving, decision making. This is only possible if the teaching technology is improved. The shift from traditional learning to blended learning could be a best solution for the students to improve not only knowledge but also clinical skills, logical thinking, clinical problem solving abilities. It also inculcates in students a desire for learning. So there was a need to evaluate the effectiveness of blended learning over traditional learning.

Blended learning is a form of learning which combines online learning with the traditional classroom method. A propagation of blended education has emerged in recent years. As per the 2010 U.S. Department of Education report,² the instruction combining online and face-to-face elements was more effective than either face-to-face or online instruction alone. One study by Elaine Allen and Jeff Seaman, 2013, reported that 69.1% of chief academic leaders believed online learning is critical to long-term educational strategy, the highest percentage in ten years.³ Dr Park S E et al (2015), conducted a study on Implementation of Flipped classroom educational model in a pre-doctoral dental course, in which, this model was

proved to be beneficial.⁴ It encouraged an interactive and engaged environment in the Dental school. As per Dustyn E Williams, in medical education, although nothing can replace direct patient exposure, however, by pushing students to learn necessary medical knowledge and build skills and aptitude beyond information recall, the flipped classroom represents a potential model in medical education.⁵

The traditional model of classroom instruction is a typical lecture which is one of the oldest forms of teaching large groups. It is an efficient means of transferring knowledge and concepts. It provides complex and difficult information systematically that makes it clear and easy to understand. The experience of the teacher provides information which is not available in print. The information which is made available to the students is synthesized from various sources. However, traditional lecture is not an effective way of teaching skills, changing attitudes, or encouraging higher order thinking. It encourages passive learning. Students receive information but have little opportunity to process or critically evaluate the new knowledge presented. The lecture is focused on a particular topic and also it is confined to a fixed venue, such as the class room. The primary focus of traditional teaching is evaluation by examination and not the overall progress of the students.⁶

Flipped classroom is a training approach and a type of blended learning that revolves around the traditional learning environment by conveying the instructional content, usually online, outside of the classroom. It involves activities, including those that may have conventionally been considered homework, into the classroom. In a flipped classroom, students watch online lectures, participate in online discussions, or carry out research at home and engage in debate in the classroom with the guidance of a mentor.⁷

The flipped classroom is a student-centered model in which lecture time is utilized in group discussion, solving the problem in team while online videos, lectures, power point presentations are used to convey content off the classroom. Thus the lower order thinking skills such as understanding, remembering and applying are carried out off the class. And the higher order thinking skills such as analyzing, evaluating and creating are utilized in classroom. A teacher student interaction in a flipped classroom can be more personalized and less educational,

and students are actively involved in knowledge attainment and construction as they participate in and evaluate their learning. In flipped classroom, the teacher acts as a facilitator.

Aim

To evaluate the effect of implementation of flipped classroom model on second BDS students

Objectives

- To evaluate the effect of this model quantitatively.
- To evaluate the effect of this model qualitatively using semi structured interview and feedback questionnaire.
- To evaluate the knowledge gained.

Hypotheses

- There is no difference in the quantitative analysis of Flipped classroom and traditional classroom method
- There is no difference in the knowledge gained by Flipped classroom and traditional classroom method

Materials and Methods

This study was conducted on second BDS students for the subject of Dental Materials. Total sample size was 80. First the Institutional Ethical committee approval was taken. The students were divided randomly into two groups of 40 each; one group for the conventional teacher-oriented lecture and the other group for the flipped classroom model. Both the groups were given a pre and post test in the form of MCQ's to assess the knowledge gained. For the conventional lecture group, a traditional lecture was conducted in a classroom without providing teaching material.

For the Flipped Classroom Model group, content videos, power point presentations, related online and offline teaching material was provided for study at home. In the next lecture, for flipped classroom model, group activities were conducted to facilitate the team activity. At the end, for both the groups, a validated questionnaire was given for quantitative analysis. Semi-structured interviews were conducted to know their perceptions regarding the intervention.

Tools used for Data Collection

- A validated questionnaire for quantitative assessment. It consisted of 13 questions with scoring based on five

point Likert scale.⁴

- A multiple choice question paper consisted of 15 questions based on the topic chosen for the study for assessment of knowledge.

Interpretation and Results:

Quantitative Assessment: A validated questionnaire consisting of 13 questions was used to do the quantitative assessment. The scoring was based on five point Likert scale; strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). Means and standard deviation were calculated for both flipped class room and traditional teaching model.

On examining the Means and Standard Deviations from table 1, it was found that the quantitative assessment of flipped class room model is superior to that of traditional class room model. But from the Means and the Standard Deviations, conclusions cannot be drawn. So to find out the significant difference between these two groups, 't' test was carried out. The table 2 shows that the mean score for Flipped class room model (56.55 ± 6.424) was significantly higher than that of traditional class room model (35.67 ± 2.876) with a and p-value < 0.0001 . It means the difference in the means can-not be attributed to the factor of chance only.

That shows quantitatively, the flipped class room model is significantly better than the traditional classroom model which is illustrated in fig. 1. This result is not in accordance with the assumption of the study.

Assessment of Knowledge gained:

A multiple choice question paper consisting of 15 questions based on the topic chosen for the lecture

Table 1: Descriptive statistics for Quantitative assessment

Groups	N	Mean	SD
Flipped classroom	40	56.55	6.424
Traditional classroom	40	35.67	2.876

Table 2: Descriptive statistics obtained using independent 't' test for quantitative assessment of teaching technology according to flipped and traditional classroom methods

Groups	N	Mean	SD	P-value*
Flipped classroom	40	56.55	6.424	< 0.0001 (S)
Traditional classroom	40	35.67	2.876	

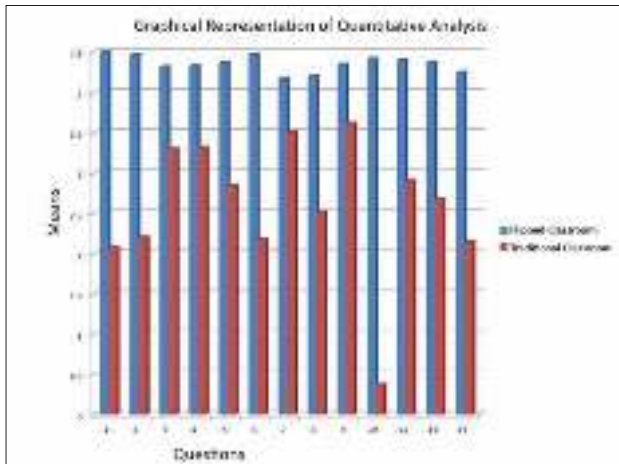


Fig.1: Graphical Representation of Quantitative Analysis

Table 3: Descriptive statistics for assessment of knowledge

Groups	N	Mean	SD
Flipped classroom	40	27.2	10.015
Traditional classroom	40	29.466	8.672

Table 4: Descriptive statistics obtained using independent 't' test for knowledge assessment of teaching technology according to flipped and traditional classroom methods

Groups	N	Mean	SD	P-value*
Flipped classroom	40	27.2	10.015	0.2827
Traditional classroom	40	29.466	8.672	(NS)

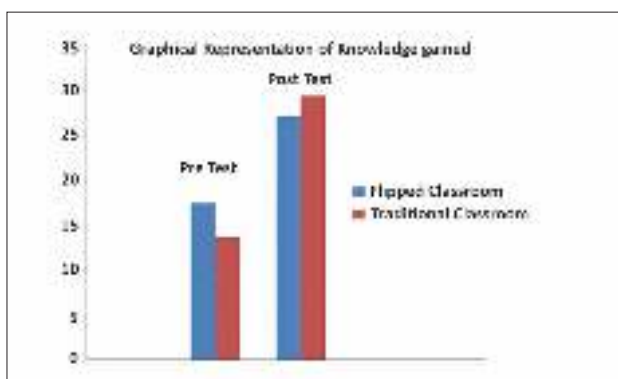


Fig.2: Graphical Representation of Knowledge Gained

was used to assess the knowledge gained by both the methods. One mark was given to the correct answer and zero marks for the wrong answer. The means and standard deviation were calculated for both the models.

On examining the Means and Standard Deviations from table 3, it was found that the knowledge gained in

traditional class room model is superior to that of flipped class room model. But from the Means and the Standard Deviations, conclusions can-not be drawn. So to find out the significant difference between these two groups, 't' test was carried out. The table 4 shows that there is no significant difference between the mean scores of traditional class room model (29.466 ± 8.672) and the Flipped class room model (27.2 ± 10.015). That means knowledge gained by both the models is insignificantly different as illustrated in figure 2, which shows there is no difference in the knowledge gained by Flipped classroom and traditional classroom method.

Discussion

Blended learning is an education program which combines online digital media with traditional classroom methods. As per Naeem Makhdoom et al (2013), blended learning is an effective method for teaching family medicine and may be applicable to other clinical sciences.⁷ The results of their study have encouraged the authors to apply blended learning in the teaching of other clinical medical disciplines. Ziegler, Paulus, & Woodside (2006), concluded in their study that blended learning provides more productive engagement among students in the online environment and in course content as well.⁸ Sang E Park (2014), implemented a flipped classroom model on pre doctoral dental course which has encouraged interactive and engaged environment in the classroom.⁴

As per Lalima et al (2017), blended learning is the solution to problems prevailing in our educational system.⁹ If implemented in a well-planned, organized way with right type of attitudes it can become the future of our educational system. In view of this discussion, a need was felt to evaluate the effect of flipped classroom model which is a type of blended learning. The purpose of the study was to convey the basic concepts innovatively and to make the students equipped not only with theoretical knowledge but also with analytical skills, reasoning ability and problem solving.

Also an attempt was made to improve the interpersonal communication. In the present study the effect of implementation of flipped classroom model as well as traditional teaching model was studied both quantitatively as well as qualitatively. Similarly the knowledge gained was also assessed through multiple choice questions. The quantitative analysis was based on a closed questionnaire

dealt with the perception of the students and the experience of learning through flipped classroom as well as traditional teaching. The data was tested with 't' test and the result of 't' test was significant. The mean score for Flipped class room model (56.55 ± 6.424) was significantly higher than that of traditional class room model (35.67 ± 2.876) with a p-value < 0.0001 . That means quantitatively, the flipped class room model is significantly better than the traditional classroom model. The students perceived the flipped classroom model positively. Access of material (videos, power point presentations, print outs) prior to lecture helped the students to understand the key concepts of the topic. Also interaction with peers and teachers played an important role in understanding the subject and problem solving. The pre lecture videos, power point presentations created interest in the students and inspired them for further learning. The students felt a need to have their future classes to be taken in the same way.

A semi structured interview was conducted to do the qualitative analysis. Few students had some logistical problem. Some students had doubt on the reliability of the material provided by their peers. Also, only videos or power point presentations did not help them understand new concepts. Lack of interaction with the group members was a major issue during group discussion. But the overall perception regarding flipped classroom was good.

The amount of knowledge gained was evaluated with the help of pre and post multiple choice questions test based on the topic. The test results for flipped classroom and traditional classroom did not show statistically significant difference. But if the means values are considered, the test result of traditional classroom model seemed to be improved. The learning atmosphere of the traditional classroom might have helped the students to stay attentive. The teacher not only shares his knowledge but also his experience with students which help the students to learn the matter which is not given in the text. Many students prefer face to face interactions. Also traditional classrooms provide a feeling of "then and there" throughout the learning process as the queries are solved in the class.

On the contrary, for flipped classroom model, some students don't have access to technological devices, so online classes are out of the question. Some don't know how to use them, and some don't care about them. Also the casual attitude of the students plays an important role in delaying the work to be done at home. If the students are not prepared before the class, then they do not take part in the discussion due to lack of knowledge. And ultimately they do not learn.

Conclusion

From the above discussion, we can conclude that the flipping the lecture will not serve the purpose. But it has to be blended with the traditional lecture. Especially for dental and medical students, blended learning will help the students to implement the knowledge practically.

Limitations:

1. As compared to the population, the sample size was small, despite the fact that statistically, the sample size was large. Hence, we may not generalize the conclusions to the entire population of health care students.
2. We may not generalize the conclusions drawn from the present study, as the scope was limited to undergraduate dental students of one College only.
3. Without access to digital devices, Flipped classroom model cannot be implemented.
4. Without motivation of students, the study is not possible.
5. Teachers should be trained to conduct this type of learning model.
6. Preparation in the form of Power point presentations, videos is required.

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Evaluation of impact of Interprofessional education module regarding dentistry on medical students: A Cross Sectional Study

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Abstract:

Health care is a complex issue, requiring an interdisciplinary approach from different specialties to have better outcomes. Medicine and dentistry need to collaborate effectively in many instances. Many systemic diseases have oral manifestations and many dental procedures require help from medical professionals such as emergencies in dental office, trauma, etc. Such collaborative approach requires inter professional knowledge which will in turn lead to improved practice outcome. However, in the present curriculum there is lack of proper training to boost such collaborative practices. Therefore, it was deemed necessary to develop and evaluate one such inter professional education module for medical students regarding dental specialty. The final year MBBS students (n=96) who were posted in the dental departments were exposed to an interactive session using power-point presentation on an overview of dentistry as well as case discussions. Evaluation was done on the basis of difference between pre & post-test (Multiple Choice Questions) scores and pre-validated feedback questionnaire. The mean scores before the intervention was 14.6 (SD± 3). Mean scores post intervention was 19.88 (SD± 5). Statistical analysis was done using chi square test. The values were $X^2= 14.4$, $p=0.0001$. The present module on inter professional education was perceived positively by the students and it was effective in improving the cognitive knowledge of final MBBS students.

Key Words: *Inter-professional education, Dentistry, Medical Education*

Introduction

Health is a state of complete physical, mental and social well-being and not merely absence of disease or infirmity¹. Health issues need to be addressed comprehensively to achieve the optimum outcome. Healthcare cannot occur in isolated set-up limited to any one specialty. All the professionals belonging to medicine, dentistry, physiotherapy, nursing, social workers etc. have to work together in order to give maximum benefit to the patient. Today there is a need for collaborative practice of health professionals to meet challenges of modern lifestyle. Inter-professional education (IPE) is an approach to develop healthcare students for future inter-professional teams. Students trained using an IPE approach are more likely to become collaborative inter-professional team members who show respect and positive attitudes towards each other and work towards improving patient outcomes².

Working effectively with other disciplines is an important and necessary skill for healthcare practitioners. Academic institutions can provide educational experiences that can begin to foster the prerequisite competencies needed to collaborate successfully with other healthcare professionals³. Medicine and dentistry are two such intertwined specialties where in many instances both have to coordinate and collaborate to facilitate improved healthcare outcomes for patients. However, in the present curriculum there is no provision for such training to the students in systematic manner during

their formative years. Their ideas about collaboration are hazy and lack evidence base.

Therefore, the present intervention was planned to develop one inter professional education module related to dentistry and evaluate its impact on medical students' knowledge and their perception regarding the intervention.

Methodology (Fig. 1)

This study was conducted during a period of March-October 2015 at VSPM Dental College & Research Centre along with NKPS Institute of Medical Sciences, Nagpur. Study type was cross sectional analytical. Study subjects included final year MBBS students posted in dental college (n=100) and who consented to participate in the study (n=96). Time of intervention was first day of their one week dental posting. The posting timing of the students was 2 hours every day for five days. So we had to restrict our timings to one hour since additional time for pre & posttest along-with feedback was required. Evaluation of knowledge gain was performed on the basis of difference between pre & post-test (pre-validated 20 multiple choice questions) scores. Evaluation of perceptions was done by pre-validated feedback questionnaire.

Interactive session was planned using a pre evaluated power-point presentation (approximately 1 hour) with clinical case photographs and small group discussions including following points:

Basic overview about dentistry, different sub-specialties, role of medical professional in situations like emergencies in dental clinic, dental care for pregnant females, oral care in systemic diseases like Diabetes Mellitus, Hypertension etc., Dental care for pediatric patients, common oral diseases and when to refer a patient and so on.

The primary research question was: 'Is the implementation of inter-professional education module associated with an improvement in knowledge regarding dentistry amongst medical students?' The null hypothesis was that there is no change in knowledge regarding dentistry amongst medical students. (p value at 0.05)

Results

The mean scores before the intervention was 14.6 (SD± 3). Mean scores post intervention was 19.88 (SD± 5). Statistical analysis was done using *chi square test*. The values were $X^2= 14.4$, $p=0.0001$. Thus the improvement in scores was statistically significant after use of the programme ($p<0.001$) and the null hypothesis was rejected. It shows that the Inter-professional education module has improved the knowledge of students regarding dentistry.

Learners' reactions were positive as to relevance, things learnt and contents of the module. Majority of participants mentioned content and way of delivery as the best thing about the module.

For the question 'Is learning dentistry important for medical practitioners', 88% of the participants responded yes and the reasons given for the same were that oral health problems are very common and the medical practitioners should be able to provide basic screening and referral services. Some mentioned that it is necessary to increase awareness about oral problems amongst common people.

85.71% of the participants responded that the module was well organized and 100% of the participants responded that their knowledge was enhanced by the module and it was informative.

The question 'conventional teaching techniques and posting schedule do not provide adequate training regarding dentistry' 45.23% strongly disagreed and equal number of participants strongly agreed. However, When asked 'whether the programme should be made a regular feature in dental posting', majority of them, 81% of the students agreed to it.

For the question 'what can be done to make this programme even better' participants felt that it should include video demonstrations, more clinical cases, etc. few stated that the module should be conducted at second MBBS level rather than Final MBBS.

Discussion

Inter professional education/training (IPE) is those occasions when members (or students) of two or

more professions learn with, from and about one another to improve collaboration and quality of care (Centre for the Advancement of Inter professional Education 2002)⁴. It is an initiative to secure inter professional learning and promote gains through inter professional collaboration in professional practice.

Patient care is a complex activity which demands that health and social care professionals work together in an effective manner. The evidence suggests, however, that these professionals do not collaborate well together. Reeves S et al⁵ in their review regarding effects of Inter-professional education on professional practice and health care outcomes have mentioned positive outcomes in emergency patient care, management of care delivered to domestic violence victims; and mental health practitioner competencies related to the delivery of patient care.

There are many studies reporting lack of knowledge of medical students / professionals regarding dentistry. A study conducted at the University of Washington, School of Medicine⁶ revealed low student knowledge of caries, oral systemic interactions, and oral health disparities across all training years. Similarly a national survey conducted by Lewis et al⁹ found that over 50 percent of those respondents reported no previous training in dental health issues during medical school or residencies which lead to lack of knowledge. Studies have reported students positive attitudes toward the importance of oral health training and many agreed they have an important role in identifying dental problems and counseling families⁹ as many physicians often fail to examine the oral cavity including the teeth and the supporting structures⁶⁻⁸. Thus these studies suggest that the knowledge and training provided to the physicians in connection with the oral cavity is limited. So, the role of educators is very important to bridge this gap and train medical practitioners who will have knowledge and required clinical skills for providing primary dental healthcare to all patients.

In our set-up the medical students in their final year receive one week of dental posting with 2 hours per day in any one of the eight sub-specialties of dentistry (oral pathology, oral medicine and radiology, oral surgery, orthodontia, prosthodontia, periodontia, endodontia, pedodontia and community dentistry) on oral health education during their medical school years. However, there is no structured training strategy to provide them all necessary knowledge and relevant skills during this time.

Therefore, it was deemed necessary to design an educational module for the medical students regarding scope of dentistry. The didactic program provided an overall knowledge of dental professions; patient centered care and discussed key issues where medical professionals should collaborate with their

dental counterparts. Thus, it emphasized on building a skilled inter professional team.

The main critical factor in the present study was evaluating the outcome of this intervention. Kirkpatrick has described four different levels of assessing programme evaluation ranging from level 1 which only checks learners' reaction to level 4 which assesses change in practice and ultimate benefit to the patients¹⁰. The evaluation of the present intervention was carried out according to Kirkpatrick's level 1 and 2b which assesses learners' reaction or perceptions as well as acquisition of knowledge. It is argued that traditional, control group experimental designs may not be adequate, appropriate or reasonable as the sole means of evaluating inter professional education¹¹. Therefore a specific tool to assess knowledge gain, a quantitative method using pre validated questionnaire with multiple choice questions was used in the present study. The difference in the scores of the pre and post evaluation questionnaire was statistically significant and indicates that a relatively short educational intervention implemented prior to graduation can positively improve the knowledge of other specialty and change perceptions toward learning and collaboration.

Many students recommended that the intervention should be conducted in the first year. This is in a way true as the students might get sufficient time during their graduation years to come across dental patients and apply clinically what they have learnt.

Owens et al¹² in their study about Internists' and Endocrinologists' Knowledge, Opinions, and Behaviors Regarding Periodontal Disease and Diabetes have concluded that internists and endocrinologists have some knowledge about oral health and believe that there is a link between periodontal disease and diabetes mellitus; however, the majorities do not have sufficient familiarity with the studies that link periodontal disease and diabetes mellitus. They agree with the idea of collaboration with dental professionals to reduce the number of patients at risk for developing periodontal disease.

Gail A. Czarnecki et al¹³ evaluated Nursing and Dental Students' and Pediatric Dentistry Residents' Responses to Experiences with Interprofessional Education and found that nursing students showed positive responses to IPE. Thus the literature evidence suggests that IPE is effective, however all interventions are done within subject or disease specific and not overall scope of dentistry, which has been covered in the IPE module included in the present study.

In the present study, similar number of participants agreed as well as disagreed on the question 'conventional teaching techniques and posting schedule do not provide adequate training regarding dentistry'. This might be due to the stress which the students are undergoing during their final year, which prevent them from accepting any change or addition in the

curriculum. In spite of the above responses, majority found IPE program to be informative, knowledge enhancing and should be made a regular feature in dental postings.

Conclusion

Holistic patient care is mandatory in modern times. All healthcare professionals should come together and collaborate to restore patients' optimum health. The concept and relevant training has to start at an undergraduate level and continue through all years of medical education. The present intervention is one such attempt to put together medical and dental profession and promote inter-professional practice.

The inter-professional education module regarding dentistry developed for medical student was well received by the participants. There was significant knowledge gain as a result of this intervention. This evidence suggests that it should be included as a regular feature during their dental postings.

Future directions:

To assess Kirkpatrick's level 3 & 4 i.e. Change in organizational practice and improvement in patient care, long term use of this programme and subsequent evaluations are planned.

Limitations:

1. To evaluate the module more effectively it should be done for more number of students and over a long period of time at multiple centers.
2. This investigation should have a qualitative research component in the form of 'focused group discussion' or in depth interviews of the participants which can give more information about the shortcomings of this module.

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Development and evaluation of learning module on clinical decision-making in Prosthodontics

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Abstract

Purpose: Best practice strategies for helping students learn the reasoning skills of problem solving and critical thinking (CT) remain a source of conjecture, particularly with regard to CT. The dental education literature is fundamentally devoid of research on the cognitive components of clinical decision-making.

Aim: This study was aimed to develop and evaluate the impact of blended learning module on clinical decision-making skills of dental graduates for planning prosthodontics rehabilitation.

Methodology: An interactive teaching module consisting of didactic lectures on clinical decision-making and a computer-assisted case-based treatment planning software was developed. Its impact on cognitive knowledge gain in clinical decision-making was evaluated using an assessment involving problem-based multiple choice questions and paper-based case scenarios.

Results: Mean test scores were: Pretest (17 ± 1), posttest 1 (21 ± 2) and posttest 2 (43 ± 3). Comparison of mean scores was done with one-way ANOVA test. There was overall significant difference in between mean scores at all the three points ($P < 0.001$). A pair-wise comparison of mean scores was done with Bonferroni test. The mean difference is significant at the 0.05 level. The pair-wise comparison shows that posttest 2 score is significantly higher than posttest 1 and posttest 1 is significantly higher than pretest that is, $\text{posttest 2} > \text{posttest 1} > \text{pretest}$.

Conclusion: Blended teaching methods employing didactic lectures on the clinical decision-making as well as computer assisted case-based learning can be used to improve quality of clinical decision-making in prosthodontic rehabilitation for dental graduates.

Key Words: Blended learning, case based computer assisted learning, clinical decision making

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INTRODUCTION

The cornerstone of professional practice is the application of thought processes that allow dentists to recognize pertinent information in a patient's presentation, make accurate

decisions-based on deliberate and open-minded review of available options, evaluate outcomes of therapeutic decisions, and assess their own performance. This is a gradual process which comes with gaining factual knowledge and also with exposure to various clinical cases during undergraduate training. Cognitive psychologists categorize "knowledge" into three areas viz., declarative knowledge, procedural knowledge, and an ill-defined gray zone between declarative and procedural knowledge that includes the reasoning skills often described as critical thinking (CT) and problem solving. In the health professions, CT and problem-solving are often loosely defined as clinical reasoning, decision-making or clinical judgment.^[1]

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Decision-making in Prosthodontics is very critical as every patient poses a unique problem with multiple possible solutions. In view of its ever-broadening scope, brought about by many new and improved materials and techniques, prosthodontic decision-making is becoming increasingly challenging. The role of more informed and more litigious patients at the individual level, as well as greater demands for cost-effectiveness of dental health care by funding authorities at the societal level, add to the complexities.^[2]

In the present educational system training and assessment of knowledge and psychomotor skills is being done effectively. However, training and assessment for clinical decision-making has been empirical in nature. Thus, a learning module for improving clinical decision-making in Prosthodontics was conceived and developed to train the dental graduates. It consisted of an interactive teaching module on the said subject for students and a computer-assisted case-based treatment planning software was developed and both these methods were evaluated for their impact on students' decision-making skills while planning prosthodontic rehabilitation.

METHODOLOGY

This was a cross-sectional study using pre- and post-test study design [Figure 1].

The study population involved 30 students who have entered into 1-year of compulsory rotatory internship after passing their final BDS exam during the period of June–August 2014. Evaluation was done using prevalidated written assessment method consisting of the case-based multiple-choice questions (MCQs) and paper-based case scenarios.

The scores were compared using one-way ANOVA test and Bonferroni test.



Figure 1: Impact of learning module: Test scores

Intervention

- Design of interactive module
 - Lectures on the concept of clinical decision-making, a general protocol to be followed in decision-making process and its importance in prosthodontic practice
 - Group activities related to different ways of decision-making.
- Design of software.

The cases included completely and partially edentulous patients requiring prosthodontic rehabilitation using tooth and/or implant supported removable and/or fixed prostheses. Cases with acquired maxillary and mandibular defects were also included. A special emphasis was given to select cases, which required preprosthetic treatments by endodontics, periodontal therapy, surgery and other specialties also. The intent was to train the students to make an interdisciplinary clinical decision and correct sequencing of the treatment.

The first phase is the provision of information about the patient in the form of chief complaint, clinical examination report, clinical photographs, X-rays, reports of investigations, etc. In the second stage the request for some action from the respondent was sought that is, to device a treatment plan for that particular case in given structured template (for treatment sequencing and prosthesis design). At the third stage, a standard treatment plan for that particular case which was fed in the software beforehand was displayed along with the treatment plan submitted by the student for that case so that student can compare, analyze and learn by means of reflective critique of their own decisions.

Students can choose any case and after submission their response for that particular case is stored in the software for reference.

In the present investigation, we wanted to evaluate cognitive skills of clinical decision-making amongst the students before and after our intervention. Assessment of clinical decision-making is challenging and rarely reported in the literature. Oral examination, essays, problem-based MCQs and case scenarios (role plays or paper cases) have been recommended.^[3] There is a lack of objectivity for orals and essays as a method of assessment. Therefore, an assessment using both Problem-based MCQs and case scenarios was designed and validated. Cases were designed in such a way that factors such as past dental history, patient's general health, time, economy were important for final treatment decision and planning.

RESULTS

Mean test scores [Figure 2] were as follows:

- Pretest (17 ± 1)
- Posttest 1 (21 ± 2), and
- Posttest 2 (43 ± 3).

Comparison of mean scores was done with one-way ANOVA test. There was overall significant difference in between mean scores at all the three points [Table 1].

A pair-wise comparison of mean scores was done with Bonferroni test. The mean difference is significant at the 0.05 level. Pair-wise comparison shows that posttest 2 score is significantly higher than posttest 1 and posttest 1 is significantly higher than pretest that is, $\text{pretest 2} > \text{posttest 1} > \text{pretest}$.

DISCUSSION

Prosthodontics represents a highly developed body of knowledge and skills. There are various biologic, mechanical, or materials science factors that influence decisions about patient care. On a daily basis as clinicians, teachers, or students we experience the interplay of social, economic, and psychologic conditions that similarly influence treatment decisions.^[4] Inconsistencies among clinicians' treatment decisions have a financial impact and ultimately can affect the clinical viability of the treatment outcome. Therefore, an improvement in professional ability to plan the treatment efficiently is required for a better clinical practice.^[5]

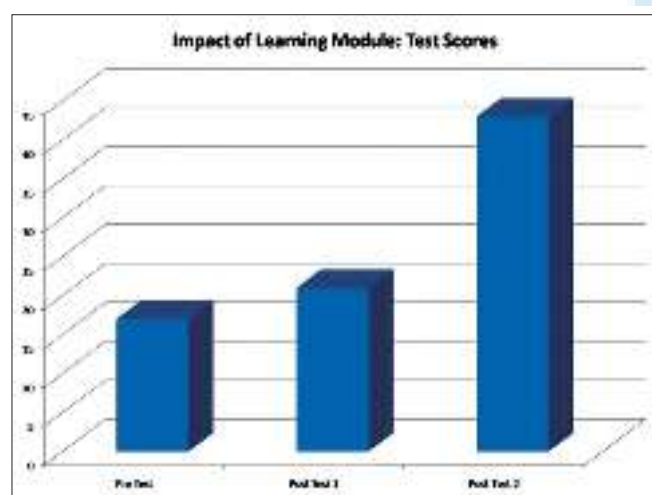


Figure 2: Impact of learning module on cognitive knowledge

Table 1: Comparison of mean scores with one-way ANOVA test

Dependent variable	Mean	SE	P
Pretest	17.133	0.115	<0.001
Pretest (1)	21.167	0.234	
Posttest (2)	43.167	0.316	

SE: Standard error

Computer-assisted learning (CAL) is a learning that supplements regular classroom activities with computer activities during or surrounding time.^[4] The educational goals related to CAL in health care education are enhancing CT and problem-solving skills.^[6] CAL has been proved as a method of providing alternate means of education.^[7-9] The basic objective of CAL is that the student should independently search for necessary information, apply it to the problem, and summarize what has been learned.^[10] Thus, it fosters the development of self-directed learning skills. It also promotes the structuring of new, accessible knowledge in clinical context and the development of effective clinical reasoning skills.^[8-10] Contemporary CAL programs used in medical education simulate patient scenarios either with text or by creating a virtual patient, using live video streaming and provide opportunities for patient assessment.^[8-10] Compared to lecture and discussion, it fosters activation of prior learning, high motivation to learn, and the development of self-directed learning skills. In the health sciences, it also promotes the structuring of new, accessible knowledge in clinical context and the development of effective clinical reasoning skills.

There has been a trend toward blended learning in higher education, involving initial acquisition of factual foundation knowledge in a traditional format and case-based or issue-based learning that allow students to clarify misconceptions and gain insight into the practical utility of foundation concepts by trying to apply them to problems. Trainees educated in the blended format described above do not make more accurate decisions than individuals trained in a purely classroom-based program, but they sample a wider variety of data sources, seek information from higher-quality and more desirable sources, have better understanding of the underlying diseases, and provide more sophisticated rationales and explanations for their treatment decisions.^[1,11,12]

Considering this background a blended learning module for improving clinical decision-making skills of dental graduates was evaluated. Firstly an interactive teaching module on the decision-making in prosthodontics was developed and validated. The content included theoretical information about various factors viz., clinical, socioeconomic etc., influencing decision-making regarding type and design of prosthesis followed by a logical sequence of treatment planning. Such information is lacking in the standard textbooks recommended to undergraduate students which provide compartmentalized knowledge about removable or fixed prosthodontics.

Secondly they were asked to plan the treatment for all cases in the computer assisted case-based learning software. The results showed that the test scores improved significantly. This can be explained by the fact that theoretical concepts regarding clinical

decision-making taught in the learning module were reinforced after using CAL software and observing and planning treatment for actual cases (in the form of pictures, their radiographs, study casts, etc.) brings clarity in thought process and promoted the reasoning skills of the students.

Analysis of the answers of patient case scenarios revealed that after using the software students applied the generic framework of treatment sequencing that is, emergency treatment first followed by preprosthetic treatment and lastly prosthetic rehabilitation. Even while planning prosthetic treatment, they elaborated on prosthesis design (different components and materials), steps in execution more effectively.

Furthermore, they addressed patients' chief complaint, their socio-economic status, the urgency of treatment and patients' overall health as a factor in deciding treatment plan, which was missing in the pretest. Students' gave a very positive feedback regarding both methods and strongly agreed that it should be included in regular teaching.

We have been attempting innovations in educational methodology at our institute for past 5 years. Our experience with the case-based educational software has been encouraging. According to Kirkpatrick's hierarchy of program evaluation,^[13] level 1 evaluates learners' reactions/perception. This was positive. Level 2 involves modification of attitude and behaviors of learners which was also found to be significantly improved after use of this software.^[14] The present investigation dealt with level 3 that is, investigating whether learning has occurred by the acquisition of knowledge *per se*. This blended approach should, therefore, be implemented in undergraduate training to improve clinical decision-making while planning prosthodontic rehabilitation.

Limitations

Limitations include small sample size, convenience sampling, researchers' bias and outcome measures as all of the measures were created for this study because of the specificity of the content. The study should be replicated at multiple institutes over a longer period to overcome these shortcomings.

CONCLUSION

Medical and dental education is undergoing reform all over the world, focused on both content and pedagogy that is, what we teach and how we teach. Blended teaching methods employing didactic lectures on clinical decision-making as well as computer assisted case-based learning can be used to overcome the drawbacks of conventional teaching such as

compartmentalization of knowledge and promote clinical problem solving skills thereby we can substantially improve quality of clinical decision-making.

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Impact of interprofessional education module on attitudes of health-care providers involved in maxillofacial rehabilitation: A cross-sectional study

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Abstract

Purpose: Rehabilitation of maxillofacial deformities is a challenging task because it involves not only a lot of skills and expertise but also many disciplines working in unison for optimum outcome. However, more often than not a prosthodontist is not a member of tumor board and consulted after surgery which affects the prognosis of the rehabilitation adversely. There was a perceived need to create awareness among referring surgeons and physicians, and interprofessional education (IPE) initiatives were deemed necessary to improve this collaboration.

Methodology: Four-hour IPE module was developed involving residents and faculty from three disciplines. The change in attitudes was evaluated quantitatively using Attitudes toward Health Care Teams questionnaire both before and after the module. Semi-structured interviews with selected participants provided the qualitative feedback.

Results: The questionnaire consisted of 14 questions answered on 5-point Likert scale (1–5). The mean score of pretest was 44.2 and of posttest was 49.1. Difference was statistically significant ($P < 0.05$). Higher score indicates better attitude.

Conclusion: A brief IPE program can improve interprofessional attitudes and collaborative behavior of health-care professionals involved in maxillofacial rehabilitation. It enables the professionals to understand interact and share viewpoints regarding most critical issues faced by them and find solutions to achieve best possible patient care.

Key Words: Health-care team collaboration, interprofessional education, maxillofacial rehabilitation

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INTRODUCTION

Maxillofacial prosthetics is a branch of prosthodontics that deals with congenital and acquired defects of the head and neck. Maxillofacial prosthetics integrates parts of multiple

specialties including head and neck oncology, ear, nose, throat (ENT), plastic surgery, speech, and other related disciplines.

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A comprehensive treatment planning involving all disciplines is mandatory for successful rehabilitation of patients. However, prosthetic consultation always comes last in the segment, and therefore, it becomes difficult to treat such patients with artificial prosthesis having predictable prognosis and improvement in quality of life. A survey conducted by Alani *et al.* indicated that only in 30% cases, a restorative dentist was a member of the multidisciplinary team treating patients with oral cancer.^[1]

Research has long suggested that interprofessional collaboration improves coordination, communication, and ultimately, the quality and safety of patient care. It utilizes both the individual and collective skills and experience of team members, allowing them to function more effectively and deliver a higher level of services than each working alone.^[2]

Therefore, an interprofessional education (IPE) module was developed to provide insights in maxillofacial prosthetic rehabilitation for various other team members to facilitate understanding of each other's role as well as limitations and expectations. The impact was evaluated using standard Attitudes toward Health Care Teams (ATHCTS) questionnaire^[3,4] both before and after the module. This study was aimed to evaluate the impact of IPE module on attitudes of health-care providers involved in rehabilitation of maxillofacial defects.

METHODOLOGY

After approval from the Institutional Review Board, an IPE module was designed and peer validated [Figure 1]. It was conducted as a 1-day activity since participants expressed their inability to manage time for extended module spread over several days due to busy clinical schedule.

It consisted of three presentations on following topics:

1. Malignancies of maxillary jaws and paranasal sinus – Etiology, prevalence, and surgical management
2. Malignancies of mandibular jaw – Etiology, prevalence, and surgical management
3. Prosthodontic rehabilitation of resulting residual deformities – Timing of obturators, mandibular guide flange prosthesis, surgical modifications to enhance prosthodontic prognosis, various materials, and advanced techniques.

It was followed by a discussion on various clinical cases of jaw malignancies and their rehabilitation.



Figure 1: Methodology

Evaluation tool was quantitative in nature done using ATHCTS questionnaire both before and after the module.

In addition, semi-structured interviews were conducted with ten participants who willingly gave consent for the same. In the present study, author with previous experience of conducting such interviews and handling qualitative research and qualified (MDS) female prosthodontist, working as an associate professor at the present institute where the study was carried out conducted the interviews. Interviews were preceded by observation, informal, and unstructured interviewing to develop a keen understanding of the topic of interest necessary for developing relevant and meaningful semi-structured questions. Later, a prevalidated interview guide with open-ended questions was used. Participants were explained regarding her occupational status as well as research background before the interviews began. The participants were selected by convenience sampling. Interviews were carried out face–face. Ten participants agreed for this and forty refused to cite the reason of busy schedule. The data were collected at workplace and recorded by taking notes. On an average, one interview lasted for 15 min and data saturation was discussed. Repeat interviews were not carried out. Data were not coded. Qualitative content analysis was performed to extract information from the data. Major themes were reported.

Information regarding this activity was sent to three dental colleges and medical colleges in the city. Totally, fifty members from following departments including faculty and residents from three different institutes, viz., two dental and one medical, consented to participate:

1. Department of ENT
2. Department of Oral Surgery
3. Department of Prosthodontics.

Primary research question was “whether participation in IPE module changes the attitudes/perceptions of health-care professionals involved in maxillofacial rehabilitation?”

RESULTS

Results were compared using repeated measures ANOVA ($P \leq 0.05$) for primary analyses and *post hoc* differences in statistically significant ANOVA findings using Bonferroni procedure, using SPSS software (version 10), IBM Inc., USA.

The questionnaire consisted of 14 questions answered on 5-point Likert scale. It was administered both pre- and post-module. Scoring was done on 1–5 scale. The mean score of pretest was 44.2 and of posttest was 49.1. Difference was statistically significant ($P < 0.05$). Higher score indicates better attitude.

The results are given in Table 1.

There was significant difference between the pre- and post-test scores of question numbers 2, 5, 6, 8, 11, 12.

Questions linked with following themes [Table I and Graphs I-6]:

1. Collaboration and role perception: Question numbers 2, 5, 6, 8, 11
2. Quality of patient care: Question numbers 12.

In the interview, participants expressed the view that this module provided them a common platform for interaction which is not possible in routine practice they understood the role of other professions better. However, regarding the content, they mentioned that not all parts of program had met the needs of their specialty due to differences in subject knowledge. All participants expressed their view that scope of maxillofacial prosthetic rehabilitation was understood better after this module.

DISCUSSION

Health is a state of complete physical, mental, and social well-being and not merely absence of disease or infirmity.^[5] Health issues need to be addressed comprehensively to achieve the optimum outcome. Healthcare cannot occur in isolated set-up limited to any one specialty. All the professionals belonging to medicine, dentistry, physiotherapy, nursing, social workers, etc., have to work together in order to give maximum benefits to the patient. Today, there is a need for collaborative practice of health professionals to meet challenges of modern

lifestyle. IPE is an approach to develop health-care students for future interprofessional teams. Students trained using an IPE approach are more likely to become collaborative interprofessional team members who show respect and positive attitudes toward each other and work toward improving patient outcomes.^[6]

Working effectively with other disciplines is an important and necessary skill for health-care practitioners. Academic institutions can provide educational experiences that can begin to foster the prerequisite competencies needed to collaborate successfully with other health-care professionals.^[7] Medicine and dentistry are two such intertwined specialties, where in many instances both have to coordinate and collaborate to facilitate improved health-care outcomes for patients. There have been few studies on IPE modules on topics such as women's oral health, prenatal oral health, diabetes and oral health, multidisciplinary teamwork in managing and temporomandibular disorders reporting effective use of IPE for better patient outcomes.^[8-11]

If this process of sensitizing involved health-care workers regarding managing any disease/disorder is started early in postgraduate training period, it can improve the teamwork among young professionals when they enter private practice. With this in mind, the participants for this study involved not only residents but also faculty members.

In cases of patients requiring maxillofacial rehabilitation due to loss of hard and/or soft tissues of jaws due to malignancies,

Table 1: Participants' perceptions using ATHCTS questionnaire

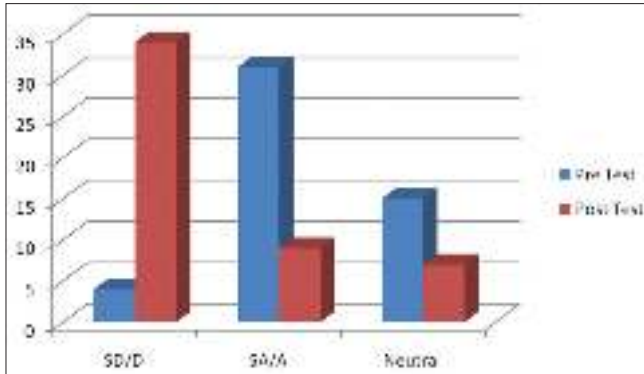
Statement	SD		D		N		A		SA	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Patients/clients receiving interprofessional care are more likely than others to be treated as whole persons	-	-	-	-	-	-	43	45	07	05
Developing an interprofessional patient/client care plan is excessively time consuming	-	11	4	23	15	7	31	9	-	-
The give and take among team members helps them make better patient/client care decisions	-	-	-	-	-	-	39	43	11	07
The interprofessional approach makes the delivery of care more efficient	-	-	-	-	-	-	43	44	07	06
Developing a patient/client care plan with other team members avoids errors in delivering care	-	-	-	-	42	12	8	35	-	03
Working in an interprofessional manner unnecessarily complicates things most of the time	3	26	22	18	-	6	15	-	10	-
Working in an interprofessional environment keeps most health professionals enthusiastic and interested in their jobs	-	-	-	-	-	-	33	41	17	09
The interprofessional approach improves the quality of care to patients/clients	-	-	-	-	42	11	05	23	03	16
In most instances, the time required for interprofessional consultations could be better spent in other ways	34	35	16	15	-	-	-	-	-	-
Health professionals working as teams are more responsive than others to the emotional and financial needs of patients/clients	-	-	-	-	-	-	37	39	13	11
The interprofessional approach permits health professionals to meet the needs of family caregivers as well as patients	-	-	-	-	26	07	15	10	09	33
Having to report observations to a team helps team members better understand the work of other health professionals	-	-	-	-	41	22	08	14	01	14
Hospital patients who receive interprofessional team care are better prepared for discharge than other patients	-	-	-	-	34	31	06	09	10	10
Team meetings foster communication among team members from different professions or disciplines	-	-	-	-	07	05	32	35	11	10

trauma, or developmental defects, team approach is extremely important. Schneider^[6] explained that removal and restoration of oral/dental tumors require multidisciplinary treatment planning. Rafter^[12] did a preliminary survey of IPE and concluded that many health-care setting models in the future will include dentists as part of an interdisciplinary health-care team.

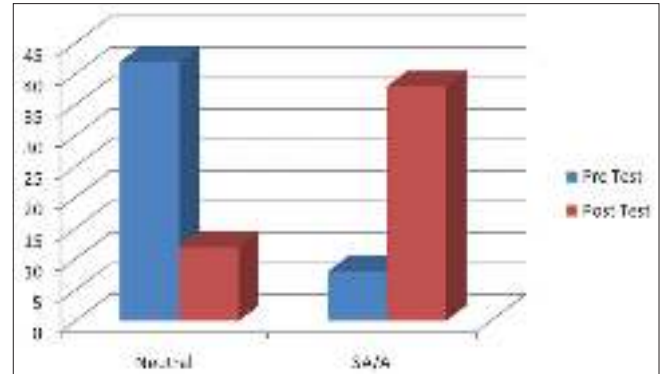
Khan^[13] in their article investigated cancer curricula of dental schools and it was found that deficits in “oncologic dentistry” education included failure to provide practical clinical oncology

experience in diagnosis, the decision-making process, referral procedures, management of oral complications of cancer therapy, maxillofacial rehabilitation, and psychosocial training in oncology.

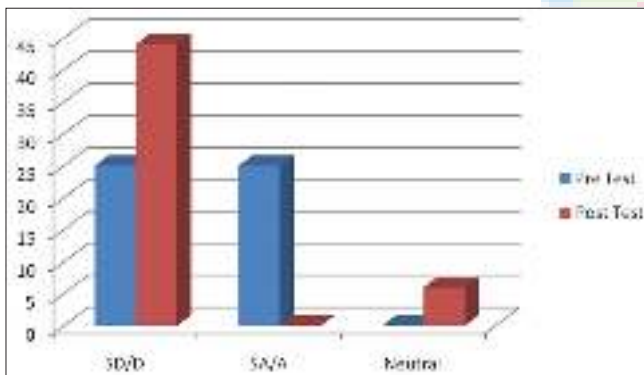
Team involves many specialists, but surgeons and prosthodontists are the main pillars behind success of every case, and their coordination during planning and execution phase is of paramount importance. The other supporting branches also include radiologist, speech therapist, psychiatrists, and social worker.



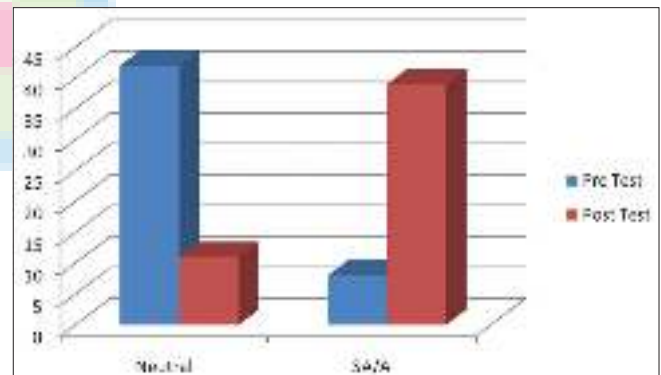
Graph 1: Q2-Developing an interprofessional patient/client care plan is excessively time-consuming



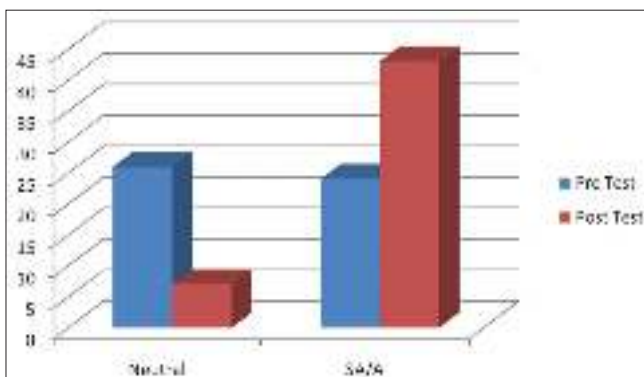
Graph 2: Q5-Developing a patient/client care plan with other team members avoids errors in delivering care



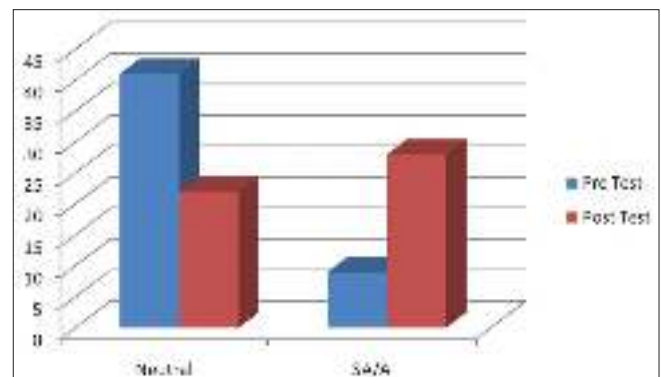
Graph 3: Q6-Working in an interprofessional manner unnecessarily complicates things most of the time



Graph 4: Q8-The interprofessional approach improves the quality of care to patients/clients



Graph 5: Q11-The interprofessional approach permits health professionals to meet the needs of family caregivers as well as patients



Graph 6: Q12-Having to report observations to a team helps team members better understand the work of other health professionals

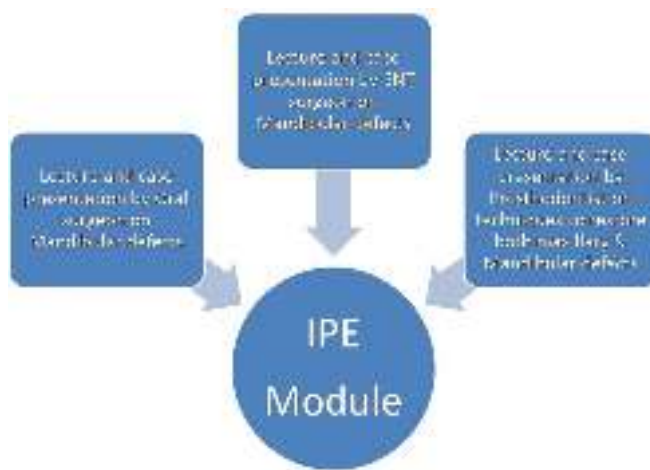


Figure 2: Interprofessional education module

Taking this into account it for the ease of conduction was decided to include surgeons and prosthodontists in the first phase of developing interprofessional module. Rest of the specialties will be included in subsequent modules in future.

The module was designed in such a way that all information right from basic to advanced techniques in management of jaw malignancies surgically was presented [Figure 2]. Modern ways of maxillofacial rehabilitation including advances in materials and retentive techniques were discussed. Advantages and limitations of surgical and prosthetic reconstruction as well as modifications during surgery to enhance the prosthodontic prognosis were emphasized giving clinical case examples. The role of prosthodontist early at treatment planning stage was outlined with its effect on final outcome. Small group discussions were carried out to answer pertaining to doubts raised by participants.

Regarding the scores of the evaluation done using ATHCTS questionnaire both before and after the module, there were statistically significant differences in answers to questions linked with following themes [Graphs I-6]:

1. Collaboration and role perception: Question numbers 2, 5, 6, 8, 11
2. Quality of patient care: Question number 12.

Interpretation of this points toward the fact that there were improved attitudes toward perception of each other's role in maxillofacial rehabilitation after participation in the module. Furthermore, positive effect of better teamwork on patient care was perceived by greater number of participants in posttest as compared to pretest.

The interviews also revealed that the participants perceived this intervention in a positive way.

Overall, the results are in accordance with the opinions of Hammick *et al.*,^[6] who observed that IPE is generally well received and useful for enhancing outcome of interdisciplinary care.

The module well received and was successful in improving the outlook of participants regarding collaborative practice during maxillofacial rehabilitation.

CONCLUSION

Rehabilitation of maxillofacial is a challenging task. The success depends on not only the skills of team members but also their communication and working as one cohesive unit understanding each other's strengths as well as limitations.

The present IPE module regarding maxillofacial rehabilitation was generally well received, enabling knowledge, and skills necessary for collaborative working to be learned. In the context of quality improvement initiatives, this module can be used as a mechanism to enhance the development of collaborative practice and improvement of services.

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Conflicts of interest

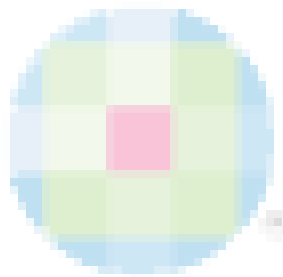
There are no conflicts of interest.

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Evaluation of relationship between leadership style and job satisfaction amongst healthcare professionals

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Abstract

Introduction: Leadership is viewed as a process by which people bring out the best in themselves. Transformational leadership, transactional leadership and laissez faire leadership are the three common leadership styles. Leadership styles are related to job satisfaction to varying degrees. Hence the overall aim of this study is to investigate relationship between the leadership style and job satisfaction amongst medical, dental and physiotherapy professionals working in same institute.

Methodology: This is a questionnaire based descriptive study. Leadership style was evaluated using Bass's Multifactor Leadership Questionnaire and job satisfaction was measured by Warr, Cook, and Wall's job satisfaction questionnaire.

Result: The results show that both transformational and transactional leadership are positively related to job satisfaction, with correlations of 0.49 and 0.21, respectively. The two attributes negatively related with job satisfaction were transactional leadership (management by exception) laissez faire leadership with correlation of -0.120 and -0.160 respectively.

Conclusion: The findings supported a strong relationship between various leadership styles and job satisfaction. This study highlights need for creating awareness about leadership style and job satisfaction and also training healthcare workers towards acquiring leadership skills to embrace challenges for high quality equitable health care.

Keywords: Leadership style; job satisfaction

Introduction

Effective leadership is one of the most crucial factors that lead an organization towards success. Leadership is the ability to influence a group toward the achievement of its goals^{1,2}.

Job satisfaction is the extent to which the employees are content with their job. Higher amount of job satisfaction leads to higher commitment towards their work and increased productivity. In context of healthcare institution this also reflects on quality of patient care and academic activities.

Although the effect of leadership styles on job satisfaction has been reported in the literature, the study subjects are primarily nurses and therefore findings are context specific. Leadership and its relation to job satisfaction has not been investigated amongst different disciplines of healthcare professionals.

Therefore this research was undertaken in order to establish a relationship between the leadership style and job satisfaction amongst medical, dental and physiotherapy professionals working in same institute.

Methodology

This study used a descriptive design with a self-report survey instrument. The survey questionnaire included minimal demographic information to group the data for analysis by type of position held.

All teaching staff of a healthcare institute including medical, dental and physiotherapy colleges were included.

Leadership style was evaluated using Bass's Multifactor Leadership Questionnaire and satisfaction was measured by Warr, Cook, and Wall's job satisfaction questionnaire.

The data collectors provided each staff member with a cover letter explaining the study and a questionnaire with return envelope. Anonymity was assured by including no identifying information on the questionnaires or envelopes. Return of the questionnaire verified consent to participate. Participation was strictly voluntary. Data were collected during a 2-week period.

Data was tabulated and statistically analysed using SPSS software.

This study was approved by the Institutional Ethics Committee of Vidya Shikshan Prasarak Mandal Dental College and Research Centre, Nagpur (Ref.No. IEC/VSPMDCRC/59/2016 dated 17/12/2016).

Results

Out of 157 employees 87 returned the filled questionnaires. 20 were omitted due to missing items and invalid scores. Finally 67 filled questionnaires were included in study, Medical -26, dental – 30, physiotherapy-07

Both transformational and transactional leadership are positively related to job satisfaction, with correlations of 0.49 and 0.21, respectively.

The two attributes negatively related with job satisfaction were transactional leadership (management by exception) laissez faire leadership with correlation of -0.120 and -0.160 respectively. Results of the study are tabulated and depicted in tables 1,2 and 3.

Table 1: Descriptive statistics: leadership styles

Leadership styles	N	Min	Max	Mean (SD)
Laissez- faire	67	0	5	2.78
Transactional Active	67	1	5	3.51
Transactional Passive	67	1	5	3.20
Ideolized influence	67	1	5	3.23
Inspirational motivation	67	0	4	2.96
Intellectual stimulation	67	1	5	3.56
Individualized consideration	67	2	5	3.74

Table 2: Descriptive statistics: Job satisfaction for each of the 10 items

Dimensions	Medical (n = 26) Mean (SD)	Dental (n = 31) Mean (SD)	Physiotherapy (n= 10) Mean (SD)
1. Amount of variety in job	3.70 (1.23)	3.94 (1.35)	3.70 (1.13)
2. Opportunity to use abilities	4.37 (1.53)	4.82 (1.47)	4.37 (1.33)
3. Freedom of working method	4.61 (1.41)	4.82 (1.23)	3.66 (1.41)
4. Amount of responsibility	3.64 (1.36)	3.92 (1.24)	3.64 (1.16)
5. Physical working condition	3.19 (1.45)	4.63 (1.45)	3.19 (1.15)
6. Hours of work	3.43 (1.67)	4.05 (1.12)	4.20 (1.67)
7. remuneration	4.49 (1.60)	3.09 (1.65)	4.20 (1.60)
8. Recognition for work	3.57 (1.62)	4.41 (1.49)	3.57 (1.62)
9. Colleagues and fellow workers	3.90 (1.00)	3.18 (1.02)	3.99 (1.00)
10. Overall job satisfaction	3.88 (1.12)	4.03 (1.05)	3.83(1.12)

Table 3: Descriptive statistics: Pearson correlation analysis

Variables	Job satisfaction
Overall transformational	$r = 0.490^*$
Transformational leadership-Ideolized influence	$r = 0.428^*$
Transformational leadership-Individualized consideration	$r = 0.434^*$
Transformational leadership-intellectual stimulation	$r = 0.492^*$
Overall transactional	$r = 0.211^*$
Transactional leadership- Contingent Reward	$r = 0.216^*$
Transactional leadership -Management-by-exception	$r = -0.120^*$
Laissez faire leadership	$r = -0.160^*$

*Correlation significant at 0.05 level

Discussion

Leadership is a trait whereby one influences the other by personality and intellect rather than violence and threat. An effective leadership style creates impetus for transformation. Literature on leadership identifies transformational leadership, transactional leadership and laissez-faire leadership as three common styles.

Transformational leadership is a process in which leaders and followers raise one another to higher levels of motivation and morality. This motivation enhances followers work oriented values and shapes their self efficacies, energizes people to perform beyond expectations by creating a sense of ownership in reaching the vision^{1,2}.

Transformational leadership includes four attributes: ideolized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Ideolized influence (role modelling) is a process whereby the leader provides followers with a vision and a sense of mission and gains respect, trust, and confidence from followers. Inspirational leaders engage in confidence building of their subordinates, thereby influencing their ability to perform assignments and tasks successfully. Intellectual stimulation is a process whereby the leader increases follower awareness of problems and influences followers to view problems from a new perspective. Individualized consideration includes providing support, encouragement, and developmental experiences for followers^{1,2}.

In contrast, transactional leadership pursues a cost-benefit, economic exchange to meet subordinates' current material and psychic needs in return for contracted services rendered by the subordinate^{1,2}. Transactional leadership will be operationalized in this study using the following attributes

Contingent Reward leaders tell others what to do in order to be rewarded, emphasize what you expect from them and recognize their accomplishments,

Management-by-Exception where leaders tell others the job requirements, are content with standard performance, and are a believer in "if it ain't broke, don't fix it."

Laissez-Faire leaders require little of others, are content to let things ride, and let others do their own thing. It is a passive style reflected by high levels of avoidance, indecisiveness and indifference. The leader assumes that followers are intrinsically motivated and should be left alone to accomplish the task. Maintaining status quo, negative feedback, and flexible use of punishment versus reward are typical behaviors of such leaders.

Job satisfaction is the positive overall feelings that individuals have towards their job. War, cook and Wall's job satisfaction questionnaire measures job satisfaction on a five point likert scale and higher the score higher job

satisfaction. There are nine parameters including amount of variety in job, opportunities to use abilities, freedom of working method, amount of responsibility, physical working condition, hours of work, income, recognition for work, colleagues & fellow workers.

In the present study, all attributes of transformational leadership were strongly associated with higher job satisfaction. The results are in accordance with previous studies¹⁻⁴.

Management by exception and Laissez-Faire styles were found to be having negative influence on job satisfaction. This is in accordance with previous studies^{4,5}.

Several research studies in the field of leadership found that transformational leadership attributes and behaviors were positively related to organizational outcomes such as teamwork success, effectiveness, staff satisfaction, commitment and extra effort and more. Moreover, transformational leadership processes have been found to enhance followers' work-oriented values and shape self-efficiencies of followers⁷. An effective leader is an effective change agent.

Rather than maintaining status quo or waiting for others to make mistakes and then rectify them or doing nothing, actively engaging in self growth by understanding current challenges, anticipating future needs and being a part of growth of others can lead to better work outputs.

Conclusion

Leadership style influences job satisfaction amongst healthcare professionals. Transformational leadership is positively related to job satisfaction and management by exception and laissez faire leadership styles are negatively related to job satisfaction. In view of this, there has to be sensitization of healthcare professionals about this topic of leadership styles and encouragement towards adopting transformational leadership style consciously to optimize their performance and better patient care.

Take Home Messages

Leadership styles and job satisfaction are inter-related. If healthcare professionals are made aware about this fact and trained to adopt favourable leadership behaviours, their job satisfaction and work efficiency can be optimized.

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Appendices

Declarations

The author has declared that there are no conflicts of interest.

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Perceptions of dental postgraduates about Mini-cex: A Pilot Study

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Abstract

Mini-CEX is a formative assessment tool designed to provide feedback on skills essential to good medical care by observing an actual clinical encounter. Considering the unique features of mini-CEX assessment, the preliminary investigation was carried out by direct observation of post-graduate students, in the Department of Prosthodontics. The objectives were to introduce and pilot test mini CEX & to offer a developmental feedback based on direct observation. Mini-CEX, is a unique combination of summative assessment and feedback. Mini-CEX provided a reliable data and helped in learning from different perspectives. This ultimately induced confidence and reduced examination fear in postgraduates in Department of Prosthodontics.

Keywords: Mini-CEX assessment, Post-graduate students, Prosthodontics.

Introduction:

One good way to conceptualize the assessment of a clinical competence is to use Miller's pyramid, the model which provides a framework for assessment methods from 'knows' to 'knows how' to 'shows' and to 'does'. Mini-CEX assesses the trainee at higher levels of Miller's pyramid(1).

Mini-CEX (mini- clinical evaluation exercise) was first introduced by the American Board of Internal Medicine in 1995 for the assessment of post-graduates(1). It is a formative assessment tool designed to provide feedback on skills essential for good medical care by observing an actual clinical encounter. In its original format, mini-CEX assessed the trainees on the seven core skills: medical interviewing, physical examination, professionalism, clinical judgment, counseling, organization and efficiency and overall clinical competence (Table 1).

The form used for recording the results is generic so that it would be applicable in most patient situations (Mini-CEX rating Form). The form also records the satisfaction of both the trainee as well as the faculty member with the process of mini-CEX. treatment plan is finalized.

The faculty member observes the trainee-patient encounter and scores the performance using the rating form. The encounters are brief, generally lasting 10-15 minutes and are followed by a feedback session which focuses on what was done well and what could be improved. A trainee is observed during a number of such encounters covering different aspect of patient care and is generally observed by different faculty members.

In Dentistry, when the patient comes in the OPD, for any type of dental treatment, detail clinical examination of his extra-oral as well as intra-oral findings is very important which is called data gathering. On this data, diagnosis is confirmed and afterwards,

In Prosthodontics, generally the patients are coming for the replacement of missing tooth / teeth either due to partial or complete loss of teeth. For this, there are number of treatment options available. However, after correlating the data and diagnostic findings, counseling therapy is at most important as the favorable prognosis of the treatment depends on the final treatment plan. So considering the unique features of mini-CEX assessment, this pilot study was carried out by direct observation of post-graduate students, in the department of Prosthodontics.

Table 1:- Competencies demonstrated during Mini-CEX

1. Medical Interviewing Skills: - Facilitates patients telling of story, effectively uses questions /directions to obtain accurate, information needed, responds appropriately to affect, non-verbal clues.
2. Physical Examination Skills: - Follows efficient, logical sequence, balances screening / diagnostic steps for problem, informs patients, sensitive to patient's comfort, modesty.
3. Humanistic qualities/ Professionalism: - Shows respect, compassion, empathy, establishes trust; attends to patient's needs of comfort, modesty, confidentiality, information.
4. Clinical Judgment: - Selectively orders / performs appropriate diagnostic studies, considers risks and benefits.
5. Counseling Skills: - Explains rationale for test / treatment, obtains patient's consent, educates / counsels regarding management.
6. Organization / Efficiency: - Prioritizes; is timely and succinct.
7. Overall Clinical Competence: - Demonstrates judgment, synthesis, caring, effectiveness and efficiency.

Aim:

To evaluate the feasibility and usefulness of the mini-CEX as an assessment and feedback tool in postgraduate students, in the department of Prosthodontics.

Objectives:

1. To introduce and pilot test mini CEX for evaluating post-graduate students in Dept. of Prosthodontics.
2. To train the faculty and post-graduates in the use of mini-CEX.
3. To evaluate postgraduate student and faculty response to the use of the mini-CEX, as an assessment and feedback tool.

Methodology:

Two evaluators and 20 postgraduates were selected for the mini- CEX assessment. Institutional Ethics Committee clearance was obtained. The students examined the patient who came for prosthetic treatment. Each student was observed by evaluator both for the counseling and for the therapy.

The evaluator evaluated students for 7 clinical competencies using the standardized mini-CEX form and gave the feedback to the student .The form used a standardized 9-point Likert-scale, with a ratings span from 13 (unsatisfactory), 46 (satisfactory), to 79 (superior). After the clinical encounter, the student immediately presented an assessment and plan, and the evaluator gave feedback. The scores did not contributed to the final grade, as the primary goal of the exercise was to provide "real time" constructive feedback. In addition, the students were also asked to give their relative feedback on the assessment given by evaluator and their experience with encounter.

Results:

The post-graduate students showed satisfactory results in 7 different competencies.

Encountered for	Data gathering, diagnosis and counseling		Therapy	
	Mean Value	S.D.	Mean Value	S.D.
Competencies				
Medical interviewing skills	4.21	0.7	4.5	0.76
Physical examination	4.5	0.65	4.57	0.76
Professionalism	4.57	0.76	4.71	0.83
Clinical judgment	4.86	1.03	4.64	0.84
Counseling skill	4.93	1	5.07	0.92
Organization	5.14	0.77	4.79	1.12
Overall clinical performance	5.36	1.01	5.5	1.16

From the above table, it was observed that the post-graduate students showed satisfactory performance in different clinical skills: Medical interviewing, physical examination, professionalism, clinical judgment and organization. Their patient's counseling skills and overall clinical competence was also better.

The students' feedback regarding the Mini CEX was also positive as they felt the overall exercise very useful to get a specific evaluation of their performance. It induced confidence and reduced examination fear amongst them.

Discussion:

The mini-CEX combines the 'prove' and 'improve' function of assessment, by not only grading the performance of the post-graduate students, but also offering them a developmental feedback based on direct observation. It has been found to be effective for assessing medical students (2-4). The mini-CEX assesses residents in a much broader range of clinical situations than the traditional CEX, has better reproducibility, and offers residents greater opportunity for observation and feedback by more than one faculty member and with more than one patient (5). The long case or OSPE, need specific time allotment of about 1-3 hours. These assessments generally initiated by one or two examiners and require proper patient's setting. The basis of assessment is as per examiner's judgment which may vary sometimes. It is focused on student's presentation skills and its utility is by grading of performance.

Whereas mini-CEX assessment can be integrated into daily clinical activities, it is initiated both by student and teacher/ examiner and the time required is 10 -15 minutes for each encounter. Depending upon the number of trainees / students, number of encounters can be increased. Here multiple settings arrangement is possible i.e. student can be assessed in OPD, in their working area, while doing laboratory work, emergency room/ operating room. The most important part in mini-CEX is that the basis of student's assessment is as per examiner's judgment which is based on global rating scales. Also it is focused on by observing student's performance and accordingly grading is given. At the same time, teachers provide educationally and practically useful formative feedback to the students. The teacher can share some related practical experience with students, which helps the students to improve their clinical skills for future clinical / laboratory exercises.

In the present investigation, the post-graduate students' performance was seen to be satisfactory. They perceived the mini CEX positively.

However, as mentioned in earlier investigations in medicine careful evaluation of the circumstances of mini CEX assessment will help to improve the quality of the resulting information. Future research should address issues of rater selection, training, and monitoring which can impact rating accuracy (6).

Conclusion:

Mini-CEX is a unique combination of formative assessment and feedback. Mini-CEX provided a reliable data and helped in learning from different perspectives. This ultimately induced confidence and reduced examination fear in postgraduates in Department of Prosthodontics.

Impact of the study:

Though it was a preliminary investigation, the post-graduate students actively performed all the clinical tasks. The mini-CEX rating form helps the encounters during proper assessment of students work. The most important part is providing feedback to students. Initially the students were nervous after seeing the score, but after providing information related to the procedure and showing the importance of that procedure students showed positive approach towards it and assured for superior / best performance in future.

Limitations:

In dentistry, especially in Prosthodontics, while treating the patients, there are multiple clinical as well as laboratory procedures. The success of any particular clinical procedure depends on the previous meticulous laboratory work. In clinical practical assessment, the student's laboratory work cannot be assessed.

Future plans:

Considering the above limitations, there is a need to assess the separate laboratory work done by the students. This part can be assessed initially during their pre-clinical exercise schedule.

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Evaluation of Mini Clinical Evaluation Exercise (Mini-CEX) for post-graduate students in Prosthodontics: Student and Faculty Perceptions

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Categories: Assessment, Medical Education (General), Postgraduate

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Abstract

Background: The mini Clinical Evaluation Exercise or mini-CEX is a method for simultaneously assessing the clinical skills of trainees and offering them feedback on their performance. Although it is a well-established method of assessment for medical residents, in dental education it is very scanty especially in post-graduate education.

The aim of this study was to train the faculty for the use of Mini CEX in training post-graduate students in Prosthodontics and evaluate their perceptions regarding this novel assessment method.

Methodology: Faculty training was carried out by conducting a workshop consisting of pre-test, video demonstration, small group discussion and post-test. Total 5 faculty members evaluated 12 postgraduate students in seven competency domains on a 9-point Likert scale on a standard miniCEX form. Focused group discussion was carried out with students and faculty to evaluate their perceptions regarding the exercise.

Results: There was a statistically significant improvement in cognitive knowledge by comparing the pretest and posttest results (7 ± 4 and 17 ± 2 respectively, $p < 0.0001$)

Total 82 encounters were recorded by 5 faculty members and 12 postgraduate students. All seven competencies were evaluated. Mean time for observing students by evaluator was 15.25 min and evaluator giving feedback was 11.20 min. Students' ratings for satisfaction with the format (mean) were 8.34 and evaluator 7.23. Main themes emerging from focus group discussions were constructive feedback, objectivity and useful for exam preparation.

Conclusions: Data from this study supports the use of mini CEX for post-graduate training in Prosthodontics. It is a cost-effective way of assessing and giving constructive feedback to the students in a structured manner. Further studies

in different settings are needed to generalize its use in routine post-graduate training.

Keywords: Assessment, mini Cex

Introduction

Clinical competence is ‘the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individuals and communities being served.’¹

As post-graduate students approach entry to practice, their education and assessment needs to be based on performance with real patients. This is necessary to assist in development of skills as well as to ensure their ability to provide the professional service effectively to the society. Assessing clinical competence is a complex task. Assessment methods need to cover the broad spectrum of clinical skills as well as provide a fair and reliable feedback to all students. Appropriate feedback facilitates self directed learning and professional development.

Assessment of medical students has changed considerably during the last 5 decades. Written examinations and summative ratings (practical examination and viva voce) although are used since many decades, lack structured format with respect to giving feedback. Research has shown that structured form of evaluations better than open ended ones².

The mini-CEX serves as a standardized format for an evaluator to observe a student at the bedside, hear the student’s assessment, and critique the interaction in a non-threatening, non-graded situation³.

There have been some studies in the western countries which used the mini-CEX in the postgraduate setting in medical education^{4,7}. It is a relatively new entrant in dental education scenario⁸ and but very few studies have been done in India.

The main Aim of this study is to evaluate the feasibility and usefulness of the mini-CEX as an assessment and feedback tool in the dental postgraduate education setting.

The Objectives were:

- 1) To introduce and pilot test mini-CEX,
- 2) To train postgraduates and faculty in the use of the mini-CEX,
- 3) To evaluate response of postgraduate students and faculty regarding the use of the mini-CEX, as an assessment and feedback tool.

Methodology

Faculty development is a prerequisite to train evaluators in order to implement a successful mini-CEX assessment program⁵. Therefore a one hour workshop comprising a pretest, mini-lecture, video-clip rating exercise, small group discussion, and a posttest. Improvement in cognitive knowledge was assessed by comparing the results between the

pretest and posttest. Initially 5 faculty evaluators and 12 postgraduate students were introduced to the mini-CEX concept.

The faculty evaluator evaluated the student's 7 clinical competency areas, using the standardized mini-CEX form. [Figure 3] The form used a standardized 9-point Likert-scale, with a ratings span from 1–3 (unsatisfactory), 4–6 (satisfactory), to 7–9 (superior).

Each student was observed by an attending evaluator at least once. Multiplicity of evaluators during different encounters helped to even out the inter-rater variability in assessment.

In addition, the students were also asked to provide anonymous feedback, on their experience of encounters, using a 5-point Likert scale and open-ended questions.

The scores did not contribute to the final grade, as the primary goal of the exercise was to provide "real time" constructive feedback.

This study was approved by the Institutional Ethics Committee of Vidya Shikshan Prasarak Mandal Dental College and Research Centre, Nagpur on 16/12/2016, Serial number 58.

Results

Total 82 encounters were recorded with 12 post-graduate students and 6 faculty members. Mean pre and post test scores of faculty were 7 ± 4 and 17 ± 2 respectively.

Tables 1-4 summarize details of outcomes of encounters.

Table 1: Details of encounter

S no.	Focus areas assessed	N (%)
1	Data gathering, Diagnosis treatment planning and Counseling	40
2	Therapy / Treatment Procedure	42

Table 2: Competencies assessed

S no.	Variables	N (%)
1	Interviewing skills	42
2	Physical examination skills	82
3	Professionalism	82
4	Clinical judgment	82

5	Counseling	75
6	Organization	66
7	Overall clinical competence	82

Table 3: Time required during the exercise

S no.	Purpose	Mean time	Range
1	Evaluator observing students	15.25 min	10-22 min
2	Evaluator giving feedback	11.20 min	7-15 min

Table 4: Ratings for satisfaction with the format

	Mean	Range
Students	8.34	6-9.5
Evaluators	7.23	5-9.1

Focus group discussions

Assessment of residents' perceptions of the mini-CEX was done using qualitative method of focus group discussion. A semi-structured focus group with all post-graduate students was undertaken. It was conducted by an independent moderator, audio-taped, and transcribed verbatim and organized into major themes.

The major themes included feedback, objectivity and Exam Preparation. Participants believed that the mini-CEX experience would benefit them in preparation and successful completion of their final MDS exam.

The benefits of mini-CEX as mentioned by the faculty and students were as follows:

Faculty

- Lacunae in clinical competence, Progress made over a period of time can be documented.
- Variety of skills evaluated in a short time,
- It is a low cost, low resource-intensive method that does not require any special preparation.
- It can be done in a natural patient care setting, providing authenticity to the assessment.

Students

- Exercise was relevant clinically as well as objective
- Feedback received was very useful and specific

Discussion

The basic difference between evaluation and assessment is forming value judgment. Evaluation decides final outcome (eg. Pass or fail) whereas assessment provides feedback on current state and a chance to improve in subsequent stages of course. Formative assessment is a form of learning. The ideal purpose of practical/performance assessment is to check all domains of learning including cognitive, psychomotor and humanistic qualities viz., professionalism as well as communication skills in real patient encounters. Although summative assessments are intended to provide professional self-regulation and accountability, they may also act as a barrier to further practice or training. Methods of Performance assessment are Long case, Clinical notes Portfolios, Direct observation of procedural skills (DOPS), OSCE/ OSPE and CEX & Mini-CEX.

All methods of assessment have strengths and intrinsic flaws. The use of multiple observations and several different assessment methods over time can partially compensate for flaws in any one method.

Competence is not an achievement but rather a habit of lifelong learning; assessment plays an integral role in helping physicians identify and respond to their own learning needs.

Ideally, the assessment of competence (what the student or physician is able to do) should provide insight into actual performance (what he or she does habitually when not observed), as well as the capacity to adapt to change, find and generate new knowledge, and improve overall performance⁹.

Before 1950's performance assessment in medical education largely relied on traditional bedside oral exams/long cases. In 1972, American Board of Medicine introduced Clinical Evaluation Exercise (CEX) as a way to do the same. However, it was only single encounter and took two hours to complete it. Therefore, mini CEX was introduced which is more concise and for multiple encounters in different settings to overcome these shortcomings. The mini-CEX is a way of simultaneously assessing the clinical skills of trainees and offering them feedback intended to enhance their future performance³.

Importance of constructive feedback cannot be overemphasized in medical education. Benefits of good feedback are that it provides an assessment of strengths and weaknesses, enables learner's reaction, encourages self-assessment and promotes development of an action plan¹⁰.

In the specialty of Prosthodontics, diagnosis and treatment planning is a very challenging task. Each clinical situation has many prosthetic rehabilitation options and choice depends upon patients' desires and systemic conditions, his socioeconomic status, available soft and hard tissue support, time and operators skills. Therefore, during post-graduate training period this skill of decision making has to be developed in a student for effective treatment outcome.

Also, there are numerous clinical procedures in our specialty to be learnt and practiced during residency including removable, fixed, implant and maxillofacial prosthodontics. While performing various procedures the student has to be not only good in dexterity but also his/ her approach should be organized with respect to instrumentation.

The importance of humanistic qualities like professionalism, ethics and communication skills cannot be overemphasized. Although, in routine clinical set-up postgraduate teachers do evaluate the residents and suggest improvement, it lacks structured rating and opportunity to give a systematic feedback. Also, lacunae in clinical competence & improvements made over a period of time are never documented on paper.

Our experience makes us believe that mini-CEX is an acceptable and practical tool for assessment of postgraduate students. It could be repeated in additional encounters to further enhance feedback and improve the reliability of the scores.

However, a single method will never solve the whole problem, not in education, nor assessment, nor research.¹⁰ On the contrary; strength will come from a carefully balanced combination of traditional and newer methods.

Conclusion

Within the limitations of the study viz., small sample size, less number of clinical encounters and single set-up, the following conclusions can be drawn:

Mini CEX was well received by both faculty and post-graduate students in the given setting.

It was a good learning experience for the students and the chance to receive structured feedback was the greatest asset of this method. Therefore it can be effectively used as one of the formative assessment method to enhance clinical performance of post graduate students.

However, before generalizing its acceptability, more such studies in different settings should be carried out in future.

Take Home Messages

Mini Clinical evaluation exercise works well for assessment of post-graduate students in prosthodontics.

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Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.

Perceptions of faculty and students regarding use of mobile apps for learning in dentistry: A questionnaire based study

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Abstract

Mobile technology is changing the way we live, and it is beginning to change the way we learn. There is widespread use of mobile devices as reference and information management tools in clinical practice and medical training among healthcare professionals.

To assess the perception of faculty and students for the utility of mobile technology in their learning experience.

The study was designed as a descriptive questionnaire based study. Sample consisted of faculty & students of two dental colleges in Nagpur city.

Out of 118 faculty members 84 responded (response rate 71%) and out of 128 students 118 responded (response rate 92%). Majority of the faculty as well as the students used smartphones in daily life for the purpose of social networking and entertainment. Only a few of them used it for academics. Nearly half of them knew about different mobile apps in dentistry. Overall perceptions regarding use of mobile apps as teaching tool were positive.

Mobile app is a promising teaching tool that can be blended with traditional teaching for dental students.

Introduction

Healthcare education in 21st century has many unique features adopted with changing understanding of educational environment, improvements in technology and students' demands. Current teaching techniques have seen paradigm shift from teacher centric to student centric approach. Another important change is the increasing use of e-learning including mobile devices. They serve many purposes viz., educational activities to access course content, acquire information related to students' performance and to encourage discussion and sharing between students and teachers.⁽¹⁾

However, successful integration of any new teaching- learning tool largely depends upon the end users i.e. faculty & students perceptions regarding its usefulness.

Therefore, present study was planned to assess perceptions of both students and faculty members about the use of mobile app in learning dentistry.

Methods

Present study is a descriptive study and pre-validated questionnaire was used as a method of data collection. Sample consisted of faculty members and interns (from academic year 2015-16) from two dental institutes.

Results

After giving the survey questionnaire, out of 118 faculty members 84 responded (response rate 71%) and out of 128 students 118 responded (response rate 92%). The detailed results have been reported in Table 1 & 2. In the present study, majority of the faculty as well as the students used smartphones in daily life for the purpose of social networking and entertainment. Only a few of them used it for academics. Nearly half of them knew about different mobile apps in dentistry.

Table 1: Characteristics of participants

Total No. of Participants				
Students	118			
Faculty	84			
Age				
Students	21±1.5 Years			
Faculty	37±7.5 Years			
Gender				
Students	Male	11	Females	71
Faculty	Male	36	Females	48

Do you use a smartphone?				
Students	Yes	77	No	5
Faculty	Yes	84	No	0
What do you use your phone for?		Social Networking	Academics	Entertainment
Students	77		5	69
Faculty	54		17	41
Have you come across any mobile learning app in dentistry?				
Students	No	77	Yes	41
Faculty	No	41	Yes	43

Table 2: Perceptions about utility of mobile apps

Question	Faculty					Students				
	SDA	DA	CS	A	SA	SDA	DA	CS	A	SA
Mobile apps are helpful in learning different aspects of clinical dentistry?	1	12	21	39	11			32	86	
Mobile apps allow students to learn at their own time and pace.	1	13	16	48	2			43	75	
Mobile apps promote self-directed learning in students.	1	22	31	27	3		23	36	59	
Mobile apps should be used along-with traditional teaching to improve educational outcomes.	0	10	13	45	16			32	86	
Mobile apps reduce the importance of traditional lectures and clinical postings	10	15	15	43	1		43	46	29	
For training freshly passed out dental graduates on clinical decision making mobile apps are very useful	2	23	18	39	2		42	7	69	

All the student respondents & 85% of faculty felt that Mobile apps are helpful in learning different aspects of clinical dentistry and allow students to learn at their own time and pace.

All the students and 90% faculty felt that Mobile apps should be used along-with traditional teaching to improve educational outcomes.

However nearly 45% of faculty showed their concern that apps reduce the importance of traditional lectures and clinical postings although only 20% students felt so.

65% of students and 54% faculty believed that mobile apps are very useful for training freshly passed out dental graduates on clinical decision making in different subjects.

Discussion

Many investigators have studied the uptake of mobile learning techniques across the globe. Medical students in the United Kingdom strongly agreed that having the internet on their smartphones had a positive impact on their dental education (55%). Also, Applications on smartphones are very popular and instant messaging is an upcoming form of communication for students.⁽²⁾ In a study on Australian students concluded that students use smartphones and social media for their learning activities even though this technology has not been formally included in the curriculum, and perceive their smartphones as learning tools.⁽³⁾ In Indian context Thakare et al reported that majority of the students use Smartphone mainly for communication, learning, and entertainment purpose.⁽⁴⁾ With increasing use of portable devices by students, it is logical to expect the next step to incorporate these

devices in the learning environment and should, therefore, be appropriately considered for curriculum. Mohapatra et al summarized various mobile learning apps currently available in medical education. They emphasized that educator in medicine needs to embrace this new technology, study its further adoption, and assist in the responsible integration of these devices into the art and practice of medicine.⁽⁵⁾

Mobile devices such smartphones can have a significant contribution to modern health care education, since these devices might offer possibilities to enhance teaching and learning. Apps are software programs that have been developed to run on a computer or mobile device to accomplish a specific purpose. As with every technology, however, understanding the skills of the main users and their attitudes toward the new tool is of fundamental importance, in order to guide development of appropriate educational innovation. Apps incorporating wide variety of patient cases can be effectively used to overcome the problem of paucity of good clinical material so that students get the knowledge & exposure which is essential for developing clinical decision making skills.

In the present study, both faculties as well as students are using mobile devices routinely. However, it's not for the purpose of academics. More than half of them are not aware about the fact that mobile apps are available for learning dentistry. However, their perception about the role of mobile learning is positive. There is a need to create awareness regarding the scope of mobile leaning opportunities amongst students and faculty alike.

One concern expressed by faculty members was that the use of mobile apps for learning can reduce the importance of traditional techniques. It can be

addressed by using blended learning techniques which use both of them effectively.⁽⁶⁾

Limitations of this study

This investigation is limited to two institutions and students from one academic year (interns), a broader sample including many institutions with more number of students is desirable.

Conclusions

Within limitations of this study it can be concluded that smartphones are commonly used by faculty & students and their attitudes towards use of apps as learning medium are also positive.

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Simulation-based surgical skill training in internship program

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ABSTRACT

Background: Objective structured assessment of technical skills (OSATS) are crucial in assessing operative skills. The education of basic surgical skill (BSS) depends on precise assessment of their surgical skill levels and competency level. Hence, this study aimed to determine the effectiveness of BSS module on intern's competency and confidence. **Materials and Methods:** Fifty-four interns were included in the module. Three faculty members were included in the module. The module has been prepared on: (1) Asepsis – surgical hand scrubbing, gloving, gowning. (2) Simple interrupted suturing. **Intervention:** Small group teaching was given to each batch, and hands-on training in dry skill laboratory on simulation was given. Interns were assessed by OSATS, and feedbacks were taken at the end of the assessment. **Results:** The score of global rating scale for each trainee increased within the 15 days of posting. The knowledge domain of posttest score also improved. **Conclusion:** BSS module was found to be effective, aiding for the interns to improve their knowledge and skills.

Key words: Basic surgical skill, objective structured assessment of technical, simulation

INTRODUCTION

Blending of knowledge, technical skills, decision-making, communication skills, and management skills are required for the surgical competency. Supreme importance among surgical trainees to improve surgical competency is handiness and technical skills.^[1] Before dental students proceed their clinical works on actual patients, one of the vital steps is

including suturing and knot-tying skills in the preclinical basic surgical skill (BSS) training.^[2]


There are challenging situations for the practitioners that need implementation of ambulatory surgical procedures. During the academic training, the majority of practitioners are not provided with adequate surgical training; hence, it is essential to set up a training program planned at educating undergraduates and newly graduate about surgical technical skills.^[3]

Simulation to substitute or intensify real-patient experiences with guided experiences, artificially contrived that evokes or replicates substantial aspects of the real world in a fully interactive manner.^[4]

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Various types of simulations such as simulated and virtual patients, static and interactive manikin simulators, task trainers, and screen-based (computer) simulations are used by healthcare professionals to improve education and ultimately enhance patient's safety. The main role of simulation is to reconstruct situations that are infrequently practiced and test professionals in difficult circumstances and to cautiously replay or inspect their actions. Simulation helps the modern healthcare professional to accomplish higher levels of capability and safer care and thus is considered as an influential learning tool. The main principle of using simulation is to improve technical capability and to deliver beginners with a chance for careful training. It provides safe environment so that they can make mistakes, learn from those mistakes, and achieve skills.^[5]

Usually, the supervisor assesses the surgical skills of trainees, with feedback. In contrast to these subjective assessments, the validity and reliability of several objective methods of assessing surgical skills have been reported previously. Objective structured assessment of technical skills (OSATS) is one of the objective skill assessment tools, used by the University of Toronto since 1990s. The OSATS comprise of two components: an operation-specific checklist and a global rating scale. Both of these methods were testified to be relative to the maturity of surgical skills. Common method of evaluation is the global rating scale which is not restricted to any definite procedure, which consists of seven evaluation items scored on a 5-point scale. The global rating scale can be applied to any other skill assessment.^[6]

There is no planned structured training during BDS internship to teach BSS to interns; but, at the same time, the interns are expected to perform BSS during their posting. Hence, our aim was to develop BSS module and assess its effectiveness for interns.

MATERIALS AND METHODS

After ethical clearance from institutional ethics committee, students and faculty members were sensitized about the module and OSATS. 54 interns and 3 faculty members were participated in the study. Inform consent was taken from each participant before study was started. At the beginning of the module, a pretest was conducted. The questions in test were based on basic knowledge about asepsis, suturing, and knot-tying techniques. Small group teaching was carried out on asepsis, gloving, gowning, and suturing techniques.

After the lecture, faculty members shown the videos on hand scrubbing, gloving, and gowning; at the same time, suturing techniques demonstrated on simulations. Interns practiced suturing and knot-tying techniques on simulations which included soft cardboard templates and plaster models. At the end of the module, a posttest was taken to assess the

knowledge as well as the improvement of the interns. Surgical skills were assessed using OSATS. Skills of the interns were assessed using OSATS illustrated in Table 1. Simulations used are shown in Figures 1 and 2.

RESULTS

Knowledge assessment

A total of 54 interns were participated in the module. A pre- and post-training test was conducted; each consisted of 12 questions to assess the knowledge of the trainees. The data in the pre- and post-training questionnaire were given in Tables 2 and 3. Posttraining scores were improved compared to pretraining scores, which was statistically significant.

Skill assessment

Skill assessment was done using OSAT global rating scale. Global rating scale has scoring range of 1-7 for each domain. Scores were given in Table 4. Most common score found during this module was between 3 and 4 for domain 1, 3-5 for domain 2, whereas for domain 3, it was 4.

DISCUSSION

Marked improvement was seen among the interns regarding the knowledge and skills. OSATS was used successfully to evaluate surgical skills. Including small group teaching in the module, which was based on asepsis, sterilization, suture material, suturing techniques was found to be helpful in improving the knowledge of interns. The knowledge was evaluated by pre- and post-test, and marked results were seen.

Operative time, difficult procedures, and medicolegal concern are some of the factors that affect the proper

Table 1: Structured assessment of technical skills' global rating scale

Domain 1: Respect for tissue						
1	2	3	4	5	6	7
Frequently used unnecessary force on tissue caused damaged by inappropriate use of instrument		Careful handling of tissue but occasionally cause inadvertent damage		Consistently handle tissues appropriately with minimal damage		
Domain 2: Time and motion						
1	2	3	4	5	6	7
Many unnecessary moves		Efficient time/motion but some unnecessary moves		Clear economy of movement and maximum efficiency		
Domain 3: Knowledge and handling of instrument						
1	2	3	4	5	6	7
Repeatedly awkward and unsure, inappropriate use of instrument		Occasionally stiff and awkward, mostly appropriate choice and use of instrument		Fluid moves and obviously familiar with the instruments		

Table 2: Pretest results

	Question number											
	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Question 12
Correct (%)	68.5	33.3	31.4	94.4	48.1	72.2	92.5	77.7	50	59.2	53.7	12.9
Incorrect (%)	31.4	66.6	68.5	5.5	51.8	27.7	7.4	22.2	50	40.7	46.2	87.0

Table 3: Posttest results

	Question number											
	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Question 12
Correct (%)	96.1	86.5	94.2	100	86.5	94.2	90.3	61.5	75	92.3	61.5	63.4
Incorrect (%)	3.8	13.4	5.7	0	13.4	5.7	9.6	38.4	25	7.6	38.4	36.5



Figure 1: Simulations: Plaster models



Figure 2: Simulations: Soft cardboard template

teaching of operative skills to trainees. Teaching basic skills on a patient arises ethical concerns. Budding dentists struggle with the process of a surgical exercise on patients which also causes inconvenience to patient who are under prolonged anesthesia. Another factor is trying to learn in an extremely tense situation in which the purpose is the achievement of a beneficial procedure is a provocation to the growth of error patterns in motor performance. Thus, students have a lesser amount of chance to get acquainted with BSS and procedures on living human patients. Furthermore, simulator models offer a precise situation to carry out technical skills, and obtainable simultaneous response delivers a more planned and comprehensive method to the acquire BSS.^[7]

Moulton *et al.* found that the application of academically sound concepts to improve learning skills is one of the advantages of training surgical skills in dry skill laboratory.^[8]

Acquisition of technical skills is the key principle of having simulators in the surgical training arena. From both the trainees and patient’s perspective, it provides safe training environment. Use of simulation in surgical training is imperative in educating the surgical trainees and to monitor their improvement along the training programs until they possess the essential technical skills without risking patients’ lives.^[9]

Shabbir *et al.* found that use of workshop setting to teaching BSS is both viable and beneficial using simulation and stated that all medical student’s should undergo training BSS, regardless of their career aims.^[7] Because of the greater degree of cognitive involvement, surgical skill may be more complicated than other motor skills. Therefore, assumptions about how well existing motor learning principles apply to surgery cannot be confidently made without testing them in the surgical skills arena.^[8]

The OSATS guarantees a dependable and valid method for testing specific operative skills in surgical trainees.^[10]

Shaharan and Neary noted that OSATS persists the top assessment tool in surgical training particularly in open technical skills and stated that simulation-based evaluation has now started to cross the threshold of incorporation into conventional skills’ training.^[9]

Martin *et al.* proposed that assessment of surgical skills by OSATS is reliable and valid. They also found that the bench model simulation gives corresponding results when live

Table 4: Structured assessment of technical skills scores

Category	Range	Most common score
Domain 1: Respect for tissue	1-7	3-5
Domain 2: Time and motion	1-7	3-4
Domain 3: Knowledge and handling of instrument	1-7	4

animals were used for training.^[10] Alam *et al.* in their study evaluated the usefulness of OSATS as a tool for measuring surgery skills during dermatology residency training. They observed that the OSATS seems useful and reliable for the evaluation of dermatologic surgery skills.^[11]

Considering our results, marked improvement was seen regarding the knowledge of BSS among the interns. Such workshops including use of simulation encourage the budding dentist to learn the surgical skills in safe environment without any stress so that if mistakes are made, they can learn from their mistakes and can practice again under the supervision of trained faculties.

CONCLUSION

Development of BSS module found to be effective and helpful for the interns to improve their knowledge and skills. Such module can be included in the educational curriculum. The OSATS remains the top priority tools to assess the technical skills of trainee.

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Conflicts of interest

There are no conflicts of interest.

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Things I Learnt

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Abstract:

Coming together is a beginning, Working together is Progress and keeping together is success. Being in academic field, every day gives a chance to hone my skills as a teacher, facilitator and trainer. However, organising conference or conventions give us a unique opportunity to learn at various stages of organizing this event and ultimately become a better professional and human being.

Coming together is a beginning, Working together is Progress and keeping together is success. Being in academic field, every day gives a chance to hone my skills as a teacher, facilitator and trainer. However, as a scientific convener of 17th prosthodontic Society gave me a unique opportunity to learn at various stages of organizing this event and ultimately become a better professional and human being.

I always wished that being one of the premier institutes in Central India we should showcase the talent and infrastructure of our college and I thought hosting such large event will be a great opportunity for our institute to be recognized at a national level. I gave this suggestion to our Dean and Head of Department Dr Usha Radke Madam and she graciously accepted it. After the IPS accepted our proposal, began a long process of planning, preparing, and organizing which lasted for next two years. Her encouragement gave me **confidence that taking initiative is the first step towards success.**

During preparation phase, many committees had to work together to achieve set targets and thus we prepared Gantt chart, one thing I had learnt in FAIMER sessions. Although we had to modify the chart many times, it served as a tool for effective time management and motivation. At first, I worked along with my colleagues from other committees since the work of scientific committee was scheduled later in the course of time. This step was very challenging as there were several issues related to interpersonal communication, differences of opinions and so on. The things I learnt In FAIMER sessions regarding **conflict management again came handy and I implemented them so that we could work effectively in team.**

The next stage involved managing enormous amount of entries from all over the country regarding various scientific activities, a few of them were being conducted for the first time. My scientific team comprising of postgraduate students and interns worked day and night to sort out the data and develop

a user friendly system so that all delegates could find their allotted halls and timings easily. During this phase although I was rather hesitant earlier and wanted to do all things myself, gradually I **learnt how to trust my students and delegate important work so as to gain positive outcome in minimum time.**

Last fortnight before the event and the actual event itself was extremely challenging for all of us as we faced many hurdles related to infrastructure management, we had to stay back for long hours and take care of all minute details. During this phase I implemented all strategies of **stress management and keeping a very positive attitude** helped me sail through that time.

During the days of convention we got a very positive response from students as well as faculty who participated in it. Few of them gave us suggestions regarding certain parts which we implemented immediately. The head office bearers of IPS were satisfied with the arrangements. After the event was over we received a very good feedback again from all over country with students telling us that it was one of the best organized convention so far. It was very satisfying to see that all our efforts paid off.

But for me a word of appreciation and smile on my HOD's face was the biggest reward for me. Her managerial and administrative skills were unparalleled and because of that we could overcome all roadblocks successfully. In my interaction with her during this time, I learnt a lot regarding effective communication, and leadership qualities. It was overwhelming to see that she completed such a herculean task had been successfully with the support of our management and dedicated team work.

All this has made me **believe in myself more and dream bigger** since I now know dreams come true...!!