

Policy Brief # 43

**Toxic Mercury and Mercury Amalgam
Use in Dentistry – the need to review
and revise current BDS curriculum
at dental teaching institutions**

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Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
BDS	Bachelor of Dental Surgery
BEP	Best in-house Environmental Practices
BMDC	Bangladesh Medical and Dental Council
BU	Bahria University
DCI	Dental Council of India
EEB	European Environmental Bureau
FJDC	Fatima Jinnah Dental College
HEC	Higher Education Commission
Hg	Mercury
KPK	Khyber Pukhtunkhawa
KU	Kerala University
MRL	Minimal Risk Level
ng/m³	Nano-gram per meter cube
OPD	Operative Dentistry
OSHA	Occupational Safety and Health Administration
PMDC	Pakistan Medical and Dental Council
Rfc	Reference concentration
REL	Recommended Exposure Limit
RGU	Rajiv Gandhi University
SDPI	Sustainable Development Policy Institute
UHS	University of Health Sciences
UKA	Swedish Higher Education Authority
UNEP	United Nations Environment Program
WBUHS	West Bengal University of Health Sciences
WCC	World Conservation Congress
WHO	World Health Organization
ZMWG	Zero Mercury Working Group

Introduction

The extreme hazardousness and toxicity of the only known liquid element mercury is well established. Mercury has been ranked third in the list of toxic substances (ATSDR 2012). Being assessed as a toxic substance to ecosystem, wildlife and human (UNEP 2002 & 2013), it affects nervous system and functioning of brain, especially of children. Short-term mercury exposure may cause damage to lungs, skin rashes and eyes irritation. Metallic mercury is an allergen that may cause eczema. Mercury amalgam use for teeth health care can lead to oral lichen (Jarup 2003; Martin & Griswold 2009; OPH 2008). In view of the adverse health impacts due to mercury exposure and its impacts on ecosystem and environment, in order to reduce and phase out global mercury use, “Minamata Convention on Mercury,” was in-acted by over 140 countries in early 2013 and till now 94 countries (including Pakistan) have already signed it (UNEP 2013).

In an earlier SDPI study carried out at 34 dental sites (including 17 dental teaching institutions) in five main cities of Pakistan, alarmingly high levels of mercury vapours were observed in outdoor/indoor air around these sites (Khwaja & Abbasi 2014; Khwaja et al. 2013). 88% of the sites indicated indoor mercury levels in air above the USA EPA reference level of 300ng/m³. SDPI study also indicated general unawareness among dental professionals regarding appropriate handling of mercury/mercury amalgam, poor management of mercury containing wastes, improper and inadequate ventilation system at the workplace, lack of awareness about hazards of mercury exposure to human health and its adverse impact on the environment. Use of liquid mercury for mercury amalgam making, non-mechanical mixing and very careless/care free use of mercury/mercury amalgam by the students at dental teaching institutions have been considered other main reasons for the above reported very high mercury vapour levels in the air at some of the monitored dental sites (Khwaja & Abbasi 2014; Khwaja et al. 2013).

The present study was designed follow up to the above SDPI study report, with the following objectives:

- to know the present level of awareness and general practices regarding mercury/mercury amalgam use in operative dentistry in Pakistan
- to review BDS curriculum/syllabus, presently offered by national and professional bodies (including Pakistan Medical and Dental Council-PMDC) to the students of dental teaching institutions in the country.
- to assess and evaluate its contents with regard to mercury/mercury amalgam use and occupational health, safety & environment, best environmental practices/technologies employed and management of mercury containing waste related issues.
- to emphasize the need to revise the curriculum/syllabus at the earliest time possible, in the light of the above findings and to develop recommendations for additional needed relevant

contents as part of the dental curriculum, for adequate knowledge and training of upcoming dental professionals towards minimizing mercury exposure, occupational health and safety of healthcare workers, mercury containing waste reduction at source and protection of environment.

For comparison and guidance, the curriculum offered by medical and dental councils of neighboring countries, Bangladesh and India and some teaching institutions in India and Pakistan were also reviewed.

Details of the above activities, collected data, findings/results and recommendations are briefly described and discussed in the foregoing pages.

Methodology

A questionnaire based assessment was undertaken to evaluate the mercury/mercury amalgam related issues, as included in the curriculum/syllabus offered at dental teaching institutions in Pakistan. The main aim & objective of the survey was to get up-to-date information through the specially designed and developed questionnaire (annex 1). The questionnaires were responded either by head of the teaching institutions or in-charge/senior member of the “Operative Dentistry.”

Hard copies of the questionnaire were sent to 38 dental teaching institutions in 12 main cities of the country (annex 2) and followed by also sending e-questionnaires and in person contacts via e-mails / on telephone.

Information regarding national dental/medical councils of Bangladesh, India and Pakistan and the curriculum/syllabus offered to dental teaching institutions in the respective countries were retrieved from the internet at the given institutional website addresses. Similar information were also retrieved via internet for dental institutions in Bangalore, Kolkata and Kerala University in India and institutions at Lahore, Islamabad/Rawalpindi and Peshawar cities in Pakistan.

Results and Discussion

Since 2001 in Netherlands , the teaching of mercury dental amalgam has been ceased at Nijmegen dental school and substituted by resin composite and accordingly, the dental curriculum been revised (Roeters et al. 2004). Studies in India have indicated that 40.60% dentists disposed of silver amalgam into common bin, 68% mixed mercury amalgam manually and 5% were not using amalgam at all (Singh 2014; Sudhakar & Janakiram 2008). Studies in Pakistan have indicated that 92% dentists used amalgam often/always, 57% using hand mixing for dispensing and 55% disposed of mercury containing wastes in the sink (Rubina et al. 2010; Iqbal et al. 2011).

In the present study, curriculum for dental teaching institutions approved by medical and dental councils of Bangladesh, India and Pakistan and as offered in some dental institutions in India and Pakistan have been reviewed to specifically identified course content regarding mercury/mercury amalgam use in dentistry.

Medical and Dental Councils Curriculum

The dental curriculum of some selected parent bodies and dental teaching institutions in the two neighboring countries, Bangladesh and India, was reviewed for comparison of course contents with the curriculum offered to dental institutions in Pakistan. The course contents of curriculum offered by *Bangladesh Medical and Dental Council* (BMDC) do not mention mercury related health, environmental & waste management issues or occupational health and safety (BMDC 2007). *Dental Council of India* (DCI) recommended course contents, which include dental materials and concerns regarding health hazards due to the mercury toxicity and exposure. However, management of mercury/mercury amalgam contaminated waste has not been specifically mentioned (DCI). The curriculum offered by *Pakistan Medical and Dental Council* (PMDC) to dental teaching institutions in the country has been developed jointly or has the approval of Higher Education Commission (HEC). Among others, it includes mercury hazards in dental practice; operator and environment but not specifically with respect to mercury and mercury amalgam use (PMDC 2005).

Curriculum at Selected Dental Teaching Institutions in India and Pakistan

The curriculum of four selected dental institutions in India was reviewed. These were Rajiv Gandhi University of Health Sciences, Karnataka, Kerala University, West Bengal University of Health Sciences and SRM Kattankulathur Dental College and Hospital, Nagar Potheri.

The courses offered at Rajiv Gandhi University of Health Sciences, Karnataka seem to be in line with the DCI recommended course contents. The chapter on dental materials contains details with focus on silver amalgam alloy. Mercury hygiene and toxicity, the practical exercises for BDS students require the manipulation and trituration of silver amalgam. Pediatric and preventive dentistry chapter describes the restoration of teeth through various materials such as silver amalgam, composites and glass ionomers. The objective of the dental course offered by Kerala University (KU) is the growing concern of health hazards due to mercury toxicity, inhalation of certain vapours or dust materials, irritations and allergic reactions to skin due to contact of dental restorative materials. Others course contents include conservative dentistry, children using restorative materials such as silver amalgam, glass ionomers and composites. The best management practices, specifically for the disposal of mercury and mercury amalgam have not been mentioned in Kerala university curriculum. West Bengal University of Health Science (WBUHS) curriculum

includes science of dental materials: dental amalgam alloys; choice of filling materials; health education, environmental health, disposal of wastes but mercury or mercury amalgam are not mentioned in the course outlines. SRM Kattankulathur Dental College and Hospital (SRM) course contents include dental materials, properties and technical considerations of dental amalgam and basic aspects for management of restorative materials such as amalgam, cement, composites & glass ionomers, and amalgam & mercury hygiene management.

The curriculum of three selected dental institutions in Pakistan was reviewed. These were Bahria University, Fatima Jinnah Dental College and University of Health Sciences.

Bahria University, Islamabad (BU curriculum course contents include operative dentistry, restorative materials such as amalgam, mercury hazards and hygiene. Fatima Jinnah Dental College, Karachi (FJDC) curriculum course contents include science of dental materials, filling materials, amalgam restoration, polishing of restorations. Operative dentistry, restorative materials such as amalgam, mercury hazards and hygiene, preparations of dental amalgam, cross infection control, operator and the environment but not specifically with respect to mercury and mercury amalgam. University of Health Sciences (UHS) recommended curriculum course contents that include science of dental materials, amalgam, mercury toxicity, amalgam restorations and conservative dentistry, operative dentistry, operator's environment and self- protection but does not specifically with respect to mercury and mercury amalgam.

The information given above is not the full or complete regarding course contents approved/offered by the three parent national dental/medical councils or the dental institutions. These have been identified with reference to mercury/mercury amalgam use in dentistry and the resulting health, environmental and waste issues. It is evident from the mercury specific course contents described above, that whereas dental curriculum offered by some Indian institutions also include mercury related important aspects of occupational health and safety, the same seems to be lacking or inadequate in the dental teaching institutions of Bangladesh and Pakistan.

Survey of dental teaching institutions in Pakistan

The main aim & objective of the survey carried out at dental teaching institutions was to get the up-to-date information through the specially designed and developed questionnaire (Annex 1) – a set of 15 questions related to mercury/mercury amalgam use (35.71% of total number of questions), the resulting occupational health, environment, safety (21.42%), mercury contaminated waste (14.28%) and other issues (14.28%), as covered in the curriculum offered by the respective dental teaching institutions in the country.

The responses received were more than half (57.89%) of the sample size (38) of the dental institutions in the country. About one third (22.73%) of the respondents were females. Maximum responses (83.67%) were from KPK and minimum (40.00%) from Punjab provinces. The information collected has been described and discussed in the foregoing pages. For ready reference, some of the questions (annex 1) for each of the four specific areas have also been reproduced, prior to the description of the collected data and discussion of the same.

Mercury/Mercury Amalgam Use

To a question, does the BDS curriculum emphasize the environmental degradation due to mercury emission, release and waste, 66.67% response was no to the question and the respondents did not agree that that the dental curriculum adequately emphasized environmental degradation due to mercury emission, release and waste. 33.33% response was in the affirmative. Does the BDS curriculum require to be reinforced w.r.t more content about mercury poisoning, guidelines and technologies for mercury / mercury amalgam waste minimization at source? In response to this question, 90.48% respondents agreed that the curriculum needed to be reinforced with more information with respect to guidelines and technologies to minimize mercury releases/emissions as well as waste minimization at source. 9.52% did not agree. Majority of the respondents (57.14%) were unaware of Minamata convention on Mercury, while 38.10% knew about this global treaty (Minamata 2013). 52.38% responded that the amalgam mixing area is adjacent to filling/operative area whereas 19.05% indicated amalgam mixing area is within unit, 28.57% indicating different specified area. It is advisable that amalgam mixing area should be away from the filling/operative area for safety purposes and emphasis on the same, with enhanced information, needs to be included in the curriculum.

Occupational health, Safety and Environment:

76.19% of respondents believed that the students were well aware of the potential health hazards caused due to mercury/mercury vapours while 23.81% were of the opinion that the students did not know about the health hazards due to mercury/ mercury vapours. There is a need to address the health hazards due to mercury in dental practice and the necessary education/training be provided by inclusion of the relevant contents in curriculum offered at dental teaching institutions in the country. To a question that what protective measures are taken in case of accidental mercury spill, majority of the respondents responded in negative, indicating no special/specific measures to guard against the accidental mercury spill. Guidelines for self-protection as well as minimizing general exposure in the event of accidental mercury spills, with due emphasis be considered for inclusion in the curriculum for students at dental institutions. 57.14% respondents agreed that the curriculum effectively provides knowledge on occupational

health and safety regarding environmental and health hazards due to mercury, while 42.86% disagreed.

Mercury/mercury amalgam waste management

2/3 of the respondents (about 61.9%) thought the information provided on mercury contaminated waste management was adequate, while 38.10 did not agree. It is strongly recommended that enough information regarding mercury emission/releases control, waste reduction at source and environmentally sound management of mercury contaminated waste be provided to the students and the same be effectively taught, for implementation of the same at workplaces. In response to a question that how mercury/mercury amalgam is being disposed of at your institution, 33.33% said, at their institutions separate bins were used for mercury/mercury amalgam contaminated wastes. 66.67% indicated that the mercury/mercury amalgam waste was not disposed of separately but collectively with the other hospital/municipal wastes. It is obvious that at majority of dental teaching institutions, the on-going waste disposal practices are not sound and environment-friendly, resulting in environmental degradation and causing threats to the health of the population residing close by the hospital waste dumps. Guidelines for environmentally sound management of mercury contaminated wastes have been well-established (Kulkarni et al, 2008; Minamata 2013) and the same may be included as part of the curriculum at dental teaching institutions.

Other Curriculum Related Issues

Generally, the respondents seemed not satisfied with the course content as well as the time allocated for training/learning about mercury toxicity and hygiene. 61.90% of the respondents felt for enhanced time allocation, especially with regard to mercury amalgam filling, while 23.81% also considered it inadequate and 14.29% thought that both the course content and the allocated time were sufficient. 90.48% of the respondents supported the review and revision of the dental curriculum with inclusion of more content to emphasize the mercury related occupational safety, health, environment and mercury contaminated waste issues. Only 9.52% did not agree to the same. Accordingly, there is a dire need to review and revise the dental curriculum offered at teaching institutions in the country. Majority of the dental teaching institutions in the country (38.10%) follow the recommended curriculum of Pakistan Medical and Dental Council (PMDC), also approved by Higher Education Commission (HEC). The remaining institutions follow curriculum offered by other bodies, such as University of Health Sciences, Bahria University and Karachi University.

Conclusion and recommendations

It is evident from the survey data described and discussed in the preceding pages and the review of the contents of the curriculum offered by the national professional parent bodies that an un-even education, with serious omissions regarding the use of mercury amalgam in operative dentistry is going on at dental teaching institutions in the country. The responses to the questionnaire have indicated that the offered curriculum did not address the main mercury related issues, such as occupational health, safety, environment and management of mercury contaminated wastes. 42.86% of the respondents indicated that the present curriculum did not effectively prepare outgoing future dental professionals by not providing information, knowledge and training on these mercury/ mercury amalgam related human health issues.

Curriculum is a comprehensive planning of an educational training programme for improving manpower to fulfil the dynamic needs of society. As also expressed by a large majority of the respondents (90.48%), it's time that the existing dental curriculum must be reviewed and revised to fulfil serious omissions by including relevant contents for the identified occupational health, safety, environment and mercury contaminated waste management, control measure and guidelines for the same.

To minimize the observed alarmingly very high mercury vapours contamination of air at dental sites due to mercury/mercury amalgam improper handling & use and to prevent health hazards resulting from mercury exposure to public in general and health workers, children & pregnant women in particular and for adequate teaching and training of students, we strongly recommend immediate review of the existing curriculum and inclusion of relevant contents in the revised curriculum with emphasis to the following:

Brief on the need, objectives and the relevant provisions of "Minamata Convention on Mercury," regarding mercury in products (dental amalgam), health and environment.

Toxicity and health hazards resulting from mercury/mercury amalgam use, protection and control measures for the same, to minimize mercury exposure and guidelines for environmentally sound mercury contaminated waste management.

Cost and clinically effective mercury-free alternatives to mercury amalgam filling, such as composites & glass ionomers, use of encapsulated mercury methodology and mechanized mixing

Occupational health and safety; use of best in-house environmental practices at dental facilities, to reduce mercury exposure and releases to air, water and land.

We also strongly recommend that Minama convention on mercury be signed & ratified by national governments, including Pakistan (already signed) and accordingly, measures be

taken by parties to the convention, to phase down the use of mercury/ mercury amalgam in their respective countries, leading to its elimination at the earliest possible time.

Full detailed report accessible at www.sdpi.org

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BU Bahria University, Islamabad. Pakistan

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Annex. 1

MERCURY POISONING DENTISTRY

SDPI Questionnaire on BDS curriculum followed in dental institutions of Pakistan

Name _____ **Position** _____

Institution _____ **Name** _____ **&** _____ **Address** _____

Phone No. /Mobile No. _____ **Fax No. (If any)** _____

Email Address: _____

Kindly respond as soon as possible to the following which would remain confidential and are only for the purpose of this research work.

Thanks for Your time.

Q1: Which Curriculum your Institution follows?

(a) HEC (b) PMDC (c) UHS (d) Bahria University (e) Karachi University (f) Other

Q2: Does the BDS curriculum emphasize onto the environmental degradation due to mercury emission, release and waste?

(a) Yes (b) No

Q3: In your courses like Science of Dental Materials & Operative Dentistry is there chapter /content focused mercury safe waste management available?

(a) Yes (b) No

Q4: Does the content of BDS curriculum effectively give knowledge for occupational health and safety incase of Mercury hazards?

(a) Yes (b) No

Q5: Does the BDS curriculum require to be reinforced w.r.t mercury poisoning and guidelines and technologies for mercury / mercury amalgam waste minimization at source?

(a) Yes (b) No

Please Follow on Next Page

Q6: Do you think the allocated content and practical's time duration emphasizes on mercury toxicity and hygiene is:

- (a) Sufficient (b) Inadequate (c) Rather should be more elaborate, for knowledge and awareness especially in case of mercury amalgam filling

Q7: Are you aware of global treaty "Minamata Convention on Mercury" for the phase out mercury use?

- (a) Yes (b) No

Q8: During practical, how far away is your amalgam mixing area from your dental filling area?

- (a) Within unit (b) Adjacent to filling area (c) Any other specify _____

Q9: Do the students know the potential health hazards due to the Mercury / Mercury vapors?

- (a) Yes (b) No

Q10: How many mercury amalgam fillings are to be made by students according to the practical hours per student? Kindly Specify Q11: How mercury/ mercury amalgam is being disposed off?

- (a) Combined with other waste amalgam (b) Separate bin only meant for mercury / amalgam

Q12: What protective measures are taken in case of Mercury spill? How room is made safe from Hg vapors when any accidental mercury spill occur?

Q13: Do you support the revision of the BDS syllabus curriculum with emphasizes on mercury health & waste issue?

- (a) Yes (b) No

Q14: Any additional comments you want to make regarding 'Mercury' use in field of operative dentistry?

Please Return to: Sadaf Nawaz, (SDPI) Postal Address: House No. 38, G-6/3, Embassy Road, Islamabad, Telephone No: 051-2278134; Fax No: 051-2278135

Annex. 2 List of dental teaching institutions in Pakistan

S No	Name of Institution	Focal person	Address	Contact	Email Address
1	de 'Montmorency College of dentistry	Prof Waheed-ul-Hamid	Fort Road, Lahore	Tel: 042-37669521	w_hammed@hotmail.com
2	FMH College of Medicine and Dentistry	Prof Yaqoob Baig Mirza	Shadman, Lahore	042-37503685, UAN: 111-555-600 Ext 540	ybmirza@live.com
3	Lahore Medical & Dental College	Dr Moeen-ud-din Ahmed Dr. Shujaat (HOD of community and preventive dentistry)	Tulspura, North Canal Bank, Canal Road, Lahore	042-36582201-06 Ext 122	drmoeen@hotmail.com drshujaathan@yahoo.com
4	Sharif Medical & Dental College	Prof Muhammad Saeed Dr Uzma (HOD Dental Materials)	Jati Umra, Rawind Road, Lahore	042-37860101	imran.hanif@sharifmediccity.org uzma_shahid112@yahoo.com
5	University College of Medicine and Dentistry	Dr Mogheez Baig (Dr Saad Asad)	1 KM Rawind Road, Lahore	042-35963421 Ext 1905, 1911	jamshediqbal105@gmail.com
6.	Akhtar Saeed Medical and Dental College	Prof Laiq Siddique Hussein	Sector C, BAHRIA Town, Multan Road, Lahore	042-35963643	No dental department
7	Fatima Jinnah Medical College for Women	Prof Sardar Fakhar Imam	Shahra-I-Fatima Jinnah, Queens Road, Lahore	042-99200572 042-99203718	Only Mbbs admissions
8	Shaikh Khalifa Bin Zayed Al-NahYAN	Prof Zafar Iqbal (Principal)	Shaikh Zayed Medical Complex,	042-35912229, (0300-	Dental department only for practice ayyazalikhan@iadsr.edu.

	Medical & Dental College	Dr. Ayyaz Khan (Operative dentistry)	University Avenue, New Muslim Town, Lahore	8454981)	pk
9	Shalimar Medical & Dental College	Dr. Muhammad Zahid Bashir	Shalimar Link Road, Mughalpura, Lahore.	042-36852609	No response
10	Armed Forces Institute of Dentistry	Brig Waseem Ahmed Col Azad Dr. Maj Muzzamil Jamil Rana (HOD operative dentistry)	CMH Road, Rawalpindi	051-9270289 051-5562266 Ext 124 (P.A)	afidrwp@hotmail.com pakprosthodontist@hotmail.com drjamilrana@yahoo.com
11	Islamabad Medical and Dental College	Dr. Saima (HOD O.D) Dr. Mohtada Hassan (HOD Dental Materials)	Main Murree Road , Bhara Kahu, Islamabad	051-2807201 051-2232045	saima.azam@iideas.edu.pk mohtada.hassan@iideas.edu.pk
12	Margalla Institute of Health Sciences	Dr Nadia Aman Dr Raja Usman (dental materials)	Quaid-e-Azam Avenue, Gulrez Phase II, Rawalpindi	051-5509518	nadiaaman79@hotmail.com
13	Islamic International Dental College	Prof Ulfat Bashir (principal) Dr. Alia Ahmed (HOD of operative dentistry)	Principal's Office, Islamic International Dental College, 7th Avenue G7/4 Islamabad	051-2891836-9	ulfat.bashir@riphah.edu.pk aliaahmed@riphah.edu.pk

		Dr. Yawar Hayat (HOD of Dental Materials)			yawar.hayat@riphah.edu.pk
14	Rawal Institute of Health Sciences	Brig Manzoor (Principal) Ma'am Shazia Nawabi (Vice) Dr Shazeb Patoli	Rawal Dental Hospital, Lehtrar Road, Khana Pull near Ali Trust College, Islamabad	051-2617381 0332-3045279	brigmanzoorahmed@yahoo.com drshazianawabi@yahoo.com drshahzeb@hotmail.co.uk
15	YUSRA Medical and Dental College	—	Main G.T Road, Kahuta Morr, PO ModelTown, Humak Islamabad, Pakistan	Tele: 051-4492811-5	—
16	Nishtar Institute of Dentistry	Dr Pervaiz Iqbal Principal (Dr Illyas Medical Superintendent)	Nishtar Institute of Dentistry, District Jail Road, Multan	061-9201501-3) 061-9201504	drmpi@hotmail.com
17	Multan Medical & Dental College	Dr M.Zulfiqar Dr. Jameel (dean of dentistry)	Southern Bypass, Janhangirabad, Multan	061-6782877 061-6782874	pasha_789@hotmail.com
18	University Medical & Dental College	Akhtar Bukhari Principal	University of Faisalabad, Sargodha Road, Faisalabad	041-8868326 041-8869910	principaldental@tuf.edu.pk

19	Dental Section, Punjab Medical College	Prof Asif Ali Shah	Sargodha Road, Faisalabad	041-9210080 0333-4704010	asif_shah12@hotmail.co m
20	Sardar Begum Dental College	Prof Dr. Shaheed Iqbal	Canal Road University Town, Peshawar, khyber pakhtunkhwa	091-5844429	shaheed.iqbal@gandhara. edu.pk
21	Peshawar Dental College	Dr. Tallat Firdos	Warsak Road, Peshawar	0321-9029630	tallatfirdos@gmail.com
22	Khyber College of Dentistry	Prof Dr Khalid Ur Rehman (HOD of operative dentistry) Prof Dr. M.Saleem (HOD Dental Materials)	Khyber College of Dentistry, Uni campus, Peshawar	091-9216217 0300-5976764 091-9222065	khalidkcd@hotmail.com msaleemkcd@gmail.com
23	Frontier Medical & Dental College	Dr Imran (HOD Operative Dentistry) Dr. Adila	Mansehra Road, Abbottabad	0992-380190, 0992-383568 & 0992- 383712	imrankhan850@hotmail. com
24	Women Medical College	Dr. Zahir Shah (principal)	Murree Road, Nawanshehr, Abbottabad	0992-391443	wmcpc@doctor.com
25	Ayub Medical College	Dr. Abdul Wahid (HOD Dental Materials) Dr. Waqar- Ur-Rehman Qureshi	Karakorum Highway, Abottabad	0992-383157, 0992- 382221 0321-5724209	prof.a.wahid@gmail.com waqarqureshi_57@yahoo .com
26	Bolan Medical College	Dr. Zia-ul- haq	APB-1 Bolan Medical College Complex Colony, Quetta	081-9203132, 0300-9381033	samar_zia@yahoo.com

27	Karachi Medical and Dental College	Dr. Vaqar Hussein Kazmi	Block M, North Nazimabad Karachi	021-99260300	wakaz@hotmail.com
28	Baqai Dental College	Kashif Akram Dr. Talha Mufeed Siddique (Vice & HOD Operative Dentistry)	51, Deh Tor, Gadap Road, Near Toll Plaza, Super Highway, Karachi	021-34410293-8 021-34410295 (ext 223)	info@bdc.edu.pk drtms@bdc.edu.pk drtms@hotmail.com
29	Fatima Jinnah Dental College	Dr. Baqar Askary Dr. Sabiha (vice principal) Dr Nosheen Khawar (HOD Dental Materials)	AM-1/B , BLK-D Bhattai Colony Korangi Creek Karachi	021-35111963 – 65 021-35801741-42	drnosheenk@gmail.com
30	Jinnah Medical and Dental College	Prof Mumtaz-ud-Haider Prof Mohsin Girach (dentistry)	22-23 Shaheed-e-Millat Road Karachi	021-34931886 0300-2447739	mohsingirach@hotmail.com
31	Hamdard College of Medicine & Dentistry	Dr. Marvin Hosen Dr. Kashif Naqvi Dr. Nadeem (HOD	North Nazimabad Block L 02K Bus stop, Karachi	021-36648111	kashifnaqvi@hotmail.com

		Dental Materials)			
32	Altamash Institute of Dental Medicine	Dr. M. Altamash Dr. Ismail Sheikh	2-R Sunset Boulevard, Defence Housing Authority, Karachi	021-35874070 021-35821952, 021-35821955	drmaltamash@gmail.com
33	Ziauddin Dental College	Dr. Nuzhat Hussein Dr. Hina Ahmed (HOD Operative Dentistry) Dr. Shoaib (Dental Materials)	ST-4/B, Block 6, Scheme 5 Clifton, Karachi	021-35862937	drnuzhatshah@yahoo.com shoaib.khan@zu.edu.pk
34	Sir Syed college of Medical Sciences for Girls	Dr. H.R Sukhia Dr. Sana Shah (HOD of Operative Dentistry)	ST-32, Block-5, Boating Basin, Clifton, Karachi	021-35374095 021-35838682,	hsukhia@hotmail.com
35	Liaqat College of medicine & dentistry	Dr. Naveed Rasheed Qureshi Dr. Shumaila Iqbal (HOD Dental Materials) Dr Naheed Nazami (head of operative	ST 19- Block 15, Gulistan-e-Johar, Karachi	021-34610271 0300-2700155	nrmaxfac@yahoo.com shumailaiqbal@hotmail.com

		dentistry) Dr. Huma (faculty of O.D)			huma.huffain@live.com
36	Liaquat University of Medical & Health Sciences, Jamshoro/Hydr abad	Dr. Feroz Ali (Principal)	Jamshoro, Sindh	022-9213308- 13	feroze.kalhor@lumhs.e du.pk
37	Isra Dental College/Isra Dental Hospital	Prof Abdul Qadir Khero	P.O. 313, Hala Road, Hyderabad	Tele: 022- 2030181-4	
38	Bhitai Dental and Medical University	Dr. Ghulam Mustafa Butt (Chairman) Dr. Atif Jawad	Opposite Sattari Cotton Factory, Jarwari Canal, Ring Road, Mirpurkhas	0233-507511, 0345-3642909	info@bdmch.edu.pk