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Assessment of attitude and implementation of eco-friendly dental office strategies among dental practitioners in Patna, eastern India

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Abstract

Introduction: Dentists generate wastes in their routine dental practices that challenges global environment and human health. 'Green Dentistry' an emerging new strategy for dental practitioner has opened a new path to improve human well-being through minimization of waste, decrease in pollution and conservation of energy and water. Eco-friendly or green dentistry can be a reality by effectively designing dental clinics and using more eco-friendly materials in the clinical practice.

Objective: To assess the Attitude and Implementation of Eco-friendly Dental Office Strategies among Dental Practitioners in Patna, Eastern India.

Methods: A cross-sectional questionnaire study was conducted among 135 registered dental practitioners of Patna city. A structured questionnaire assessed their knowledge and various strategies employed in their routine dental practices. Chi-square test was used to determine any statistical significance with p-value <0.05.

Result: An overall 81.5% of the study subjects agreed that green practices play an important role and 88.9% agreed that green practices has a long term benefits and when compared between their educational qualification, they were found to be statistically significant (p<0.05).

Conclusion: Current study results suggests that there is lack of knowledge and awareness regarding green

dentistry among dental PR actioners of Patna city. The findings also indicate that eco-friendly dental strategies were not implemented adequately by the study population as green dentistry is a relatively new development in India.

Keywords: Green Dentistry, Eco-Friendly Practices, Dental Practitioners

Introduction

It is generally believed that humans are the biggest threat to their own race. Our own attitude toward our environment is affecting our health and well-being on a large scale. Thus, it is essential for each individual to be aware of his carbon footprint and the changes that can be incorporated in his lifestyle to reduce the global burden. According to World Health Organization (WHO), SEARO, the 11 South Asian countries produce a total of about 35,000 tons of health care waste annually.[1]

Dentistry, among other fields in the medical industry contributes to climate change and increasing the pollution of our environment. Though individual dentists generate only small amounts of environmentally "unfriendly waste," the accumulated waste produced by the profession may have significant environmental impact.[2] Each year, dental practice generate 4.8 million sheets of lead, 28 million litres of toxic substances used in radiology, 3.7 tons of mercury waste, 1.7 billion sterilization pouches, 680 million chair covers, covers for grip light source and bibs for patients. Recently, there is a significant increase in the dental and medical teaching hospitals and correspondingly there has been tremendous increase in the amount of biomedical waste generated by the hospitals.[3] Today with the Covid-19 outbreak worldwide and use of personal protective equipment in every step of patient management has added an enormous burden on health care system and large-scale production of biological wastes. These have led to new changes in the days to come by.

'Eco-friendly' and 'Green' are terms that are widely used today and can indicate several things, such as renew ability, sustainability, energy-efficient, non-toxicity, being minimally invasive, having a reduction in carbon foot print and having a reduction in carbon dioxide emissions. By combining the health of humans with the health of our environment, eco-friendly dentistry provides an opportunity to reduce further degradation of our planet.[4]

It is the time for the dentists to become environmentally conscious and to create their dental practices eco-friendly and there is scarcity in the literature the present study was conducted with the aim to assess attitude and implementation of eco-friendly dental office strategies among dental practitioners in Patna city, Bihar.

Materials and methods

A descriptive Cross- Sectional study was conducted over a period of 2 months from February 2021 - March 2021 among dental practitioners of Patna city, Bihar. The proposed study was reviewed by the Ethical committee of Buddha Institute of Dental Sciences and Hospital, Patna and the required clearance was obtained. Only private practitioners were considered for this study as public sector dentists does not have the choice for eco-friendly policies and procedures. 135 available dentists who were registered in Bihar State Dental Council was considered. A simple random sampling method was employed for the selection of the study subjects. Informed consent was obtained from each participating dentists involved in the study. Each of the participating dentists was briefed about purpose of the study and the questionnaire was distributed the same day. The completed questionnaire was collected the following day. This was done understanding there busy schedule

with patients. The questionnaire used were checked for clarity, validity and content before distributing it to the participating dentists which was done under the supervision of Professor, Department of Public Health Dentistry, Buddha Institute of Dental Sciences and Hospital, Patna. The data was collected using a close-ended questionnaire. The questionnaire consisted of 3 major sections: demo graphic details, 8 questions based on the attitude and 31 questions related to implementation of green dentistry.

Statistical Analysis

The data so obtained was compiled systematically. A master table was prepared in MS excel worksheet and the total data was subdivided and distributed meaningfully and presented as individual tables. Data was analyzed using IBM SPSS, Statistics Windows, and version 22(Armonk, NY: IBM Corp). For the comparison of proportions, Chi-square test was used with continuity correction whenever appropriate. 'P' value of <0.05 was taken to be statistically significant for the purpose of analysis.

Result

The present study was conducted among 135 dental professionals who were practicing dentistry in Patna city, Bihar. It was observed that maximum of study participants were males with 68.1% and majority were master of dental surgery degree with 62.2%.

Table 1 shows the distribution of the subjects regarding questions related to attitude on green dentistry.

The results shows that an overall majority of 81.5% of the study participants agreed that green practices plays an important in environment; green practices has a long term benefits (88.9%); difficulty to find products compatible with green dentistry with 31.8% and lastly 48.1% agreed that green Practice will provide lower operating and maintenance costs. When the results of above questions were compared with educational qualification, it was found to be statistically significant with p value <0.05. While for questions like difficulty in changing from current practice to green practice; whether green practice will increase financial burden; whether green practice increases patients satisfaction and green dentistry can be compatible with previous standers and new features, it was found to be statistically not significant when educational qualification were compared with p value > 0.05.

Table 2 shows the distribution according implantation of Green Dentistry.

2-a) Regarding Amalgam Management

Regarding whether the use of pre-capsulated alloy was better or not, an overall 30.3% agreed to be better while 51.1% and 18.5% were either not sure or disagreed completely. When asked about whether disposal of unused amalgam in well-sealed container is good option, an overall majority of 16.3% agreed to be good option while, 68.1% were not sure and 15.5% disagreed to this statement. Regarding whether use of amalgam separators were better or not, an overall 19.3% agreed to be better while 59.2% were not sure and 21.5% disagreed. When the results of above questions were compared with educational qualification, it was found to be statistically significant with p value <0.05.

2-b) Regarding Radiograph Management

An overall 6.6% of the study subjects agreed that preparing developer and fixer as and when required to avoid waste was a better choice and 94.8% were either not sure or completely disagreed that purchase of prepared concentrated form was not a better choice. Handing over the waste to bio-medical waste management team as a right approach or not was evaluated, a majority of 78.5% were not sure and only

11.8% agreed to be a better option and lastly when evaluated whether using digital radiography a good alternative or not, an overall 93.3% agreed to be a good alternative while the rest 6.7% were either not sure or disagreed. When the results of above questions were compared with educational qualification, it was found to be statistically significant with p value <0.05.

2-c) Regarding Paper Waste Management

When evaluated whether computer-based recording system should be encouraged or not, it was found that, an overall majority of 59.2% agreed to be encouraged while, 29.6% were not sure and 11.1% totally disagreed to it. Regarding whether recycling of paper products should be encouraged or not, an overall 16.7% agreed to encourage it while 39.2% were not sure. And lastly when asked about donating health magazines and other health related books to community library, an overall majority of 65.9% felt the need to donate while 24.4% completely denied to it. When the results of above questions were compared with educational qualification, it was found to be statistically significant with p value <0.05. However there was no statistical significant association with questions like printing both sides of paper whenever possible; use of practice management software would reduce paper waste; implementation of patient electronic messaging services and lastly use of educational videos to explain dental procedure instead of paper.

2-d) Regarding Infection Control Management

When evaluated whether using disposable instrument is a good alternative, an overall majority of 48.1% agreed to be a good alternative while 51.9% were either not sure or disagreed completely. When the results were compared with educational qualification, it was found to be statistically significant with p<0.05. however, there was no statistical significance associated with following questions like standard infection control protocols should be encouraged or not; using disposable instruments is a good alternative; use of personal protective wear should be made mandatory or not; sterilization should be made compulsory; use enzyme-based cleaners that are biodegradable and vaccination of clinicians should be made compulsion.

2-e) Regarding Reusable Practices Among Dentist

Regarding use of reusable cups, syringes and suction devices should be encouraged or not, an overall 33.3% agreed to reuse it while 66.7% were either not sure or disagreed completely. When the results were compared with educational qualification it was found to be statistically significant with p<0.05. While regarding use of cloth lab coats that can be laundered rather than disposable ones, an overall 96.3% agreed to use laundry ones than disposable ones. When the results were compared with educational qualification it was found to be not statistically significant with p value < 0.05.

2-f) Regarding Water Conservation

When assessed regarding the use of water faucets sensors and hand dryer, use of hand sanitizers and encouraging patients to turn off water while practicing oral hygiene practices, an overall 76.3%, 97.8% and 93.3% agreed to be a good option respectively. There was no statistically significant association for above question for educational qualification with p value >0.05.

2-g) Regarding Energy Management

Regarding whether use of automated thermostat to control heating and cooling systems is better or not, an overall 33.3% agreed to be better option while 66.7% were either not sure or disagreed completely and regarding whether green dentistry/eco-friendly dentistry should implemented or not, only 0.7% were fully in place while 30.3% said it is in progress and a majority of

68.9% were aware but not implemented. For above questions when the results were compared with educational qualification it was found to be statistically significant with $p<0.05$. There was no statistical significant association for questions like whether to encourage renewable energy such as wind and solar power, power saving new light system and turning off and unplugging all electrical appliances after use with $p>0.05$.

Table 1: shows the distribution of the subjects related to various questions regarding attitude on green dentistry and their comparison with educational qualification of the subjects.

Questionnaire	Response	BDS	MDS	Total	Test of significance
Green practices can play an important role in environment:	Agree	33(24.4%)	77(57.03%)	110(81.5%)	X^2 value= 17.371
	Not Sure	13(9.6%)	17(12.6%)	20(14.8%)	P= <0.001
	Disagree	5(3.7%)	0(0%)	5(3.7%)	
Green practices have many long term benefits:	Agree	41(30.3%)	79(58.5%)	120(88.9%)	X^2 value= 9.537
	Not Sure	5(3.7%)	5(3.7%)	10(7.4%)	
	Disagree	5(3.7%)	0(0%)	5(3.7%)	P=0.008
Difficulty in changing from current practice to green practice:	Agree	21(15.5%)	36(26.6%)	57(42.2%)	X^2 value= 0.329
	Not Sure	15(11.1%)	27(20%)	42(31.1%)	
	Disagree	15(11.1%)	21(15.5%)	36(26.6%)	P=0.848
Green practice will increase financial burden:	Agree	17(12.6%)	34(25.2%)	51(37.7%)	X^2 value= 4.683
	Not Sure	29(21.5%)	33(24.4%)	62(45.9%)	
	Disagree	5(3.7%)	17(12.6%)	22(16.3%)	P=0.096
Difficulty in finding products compatible with green dentistry:	Agree	26(19.2%)	17(12.6%)	43(31.8%)	X^2 value= 14.189
	Not Sure	13(9.6%)	40(29.6%)	53(39.2%)	
	Disagree	12(8.9%)	27(20%)	39(28.9%)	P= <0.001
Green practice increases patient satisfaction:	Agree	20(14.8%)	25(18.5%)	45(33.3%)	X^2 value= 1.662
	Not Sure	20(14.8%)	34(25.2%)	54(40%)	
	Disagree	11(8.1%)	25(18.5%)	36(26.6%)	P=0.436
Green Practice provides lower operating and maintenance costs:	Agree	20(14.8%)	45(33.3%)	65(48.1%)	X^2 value= 7.900
	Not Sure	20(14.8%)	34(25.2%)	54(40%)	
	Disagree	11(8.1%)	5(3.7%)	16(11.8%)	P=0.019
Green dentistry can be compatible with previous standard and new features:	Agree	21(15.5%)	32(23.7%)	53(39.2%)	X^2 value= 0.281
	Not Sure	25(18.5%)	45(33.3%)	70(51.8%)	
	Disagree	5(3.7%)	7(5.2%)	12(8.9%)	P=0.869

Table 2: shows the distribution of the subjects related to various questions regarding Implementation of green dentistry and their comparison with educational qualification of the subjects.

Questionnaire	Response	BDS	MDS	Total	Test of significance
Regarding Amalgam Management					
Is use of pre capsulated alloys better?	Agree	8(5.9%)	33(24.4%)	41(30.3%)	X^2 value= 8.836
	Not Sure	33(24.4%)	36(26.6%)	69(51.1%)	
	Disagree	10(7.4%)	15(11.1%)	25(18.5%)	P= 0.012
Dispose unused amalgam in well-sealed containers	Agree	3(2.2%)	19(14%)	22(16.3%)	X^2 value=6.518
	Not Sure	39(28.9%)	53(39.2%)	92(68.1%)	P=0.038
	Disagree	9(6.6%)	12(8.9%)	21(15.5%)	
Is use amalgam separators better?	Agree	4(2.9%)	22(16.3%)	26(19.3%)	X^2 value= 8.123
	Not Sure	37(27.4%)	43(31.8%)	80(59.2%)	
	Disagree	10(7.4%)	19(14.07%)	29(21.5%)	P=0.017
Use alternatives to amalgam fillings is a good option	Agree	49(36.3%)	74(54.8%)	123(91.1%)	X^2 value= 2.497
	Not Sure	2(1.5%)	10(7.4%)	12(8.9%)	
	Disagree	0(0%)	0(0%)	0(0%)	P= 0.114
Regarding Radiographic Management					
Prepare Developer and Fixer as and when required to avoid waste	Agree	7(5.2%)	2(1.5%)	9(6.6%)	X^2 value= 20.453
	Not Sure	30(22.2%)	27(20%)	57(42.2%)	
	Disagree	14(10.3%)	55(40.7%)	69(51.1%)	P= < 0.001
Purchase of prepared concentrated form is a better option	Agree	6(4.4%)	1(0.7%)	7(5.2%)	X^2 value= 25.006
	Not Sure	33(24.4%)	28(20.7%)	61(45.2%)	
	Disagree	12(8.9%)	55(40.7%)	67(49.6%)	P= < 0.001
Handing over the waste to bio medical waste management team is the right approach	Agree	10(7.4%)	6(4.4%)	16(11.8%)	X^2 value= 5.569
	Not Sure	35(25.9%)	71(52.6%)	106(78.5%)	
	Disagree	6(4.4%)	7(5.2%)	13(9.6%)	P= 0.062
Using Digital Radiography is a good alternative	Agree	44(32.6%)	82(60.7%)	126(93.3%)	X^2 value= 7.104
	Not Sure	5(3.7%)	2(1.5%)	7(5.2%)	
	Disagree	2(1.5%)	0(0%)	2(1.5%)	P=0.029
Regarding Paper Waste Management					
Printing both sides of paper whenever possible	Agree	45(33.3%)	70(51.8%)	115(85.2%)	X^2 value= 5.237
	Not Sure	4(2.9%)	14(10.3%)	18(13.3%)	
	Disagree	2(1.5%)	0(0%)	2(1.3%)	P= 0.073
Computer based recording system should be encouraged	Agree	23(17.03%)	57(42.2%)	80(59.2%)	X^2 value=8.987
	Not Sure	18(13.3%)	29(21.5%)	40(29.6%)	
	Disagree	10(7.4%)	5(3.7%)	15(11.1%)	P=0.011
Practice management software would reduce paper waste	Agree	2(1.5%)	5(3.7%)	7(5.1%)	X^2 value= 2.138
	Not Sure	40(29.6%)	56(41.5%)	96(71.1%)	

	Disagree	9(6.6%)	23(17.03%)	32(23.7%)	P=0.343
Implement patient electronic messaging services	Agree	7(5.2%)	10(7.4%)	17(12.6%)	X^2 value= 2.089
	Not Sure	34(25.2%)	48(35.5%)	82(60.7%)	
	Disagree	10(7.4%)	26(19.2%)	36(26.6%)	P=0.352
Use educational videos to explain dental procedures instead of paper	Agree	48(35.5%)	77(57.03%)	125(92.6%)	X^2 value= 0.703
	Not Sure	3(2.2%)	6(4.4%)	9(6.6%)	
	Disagree	0(0%)	1(0.7%)	1(0.7%)	P=0.704
Encourage recycling of paper products	Agree	44(32.6%)	38(28.1%)	82(60.7%)	X^2 value= 22.410
	Not Sure	7(5.2%)	46(34.07%)	53(39.2%)	
	Disagree	0(0%)	0(0%)	0(0%)	P= < 0.001
Donate health magazines and other health related books to community libraries	Agree	25(18.5%)	64(47.4%)	89(65.9%)	X^2 value=25.002
	Not Sure	13(9.6%)	0(0%)	13(9.6%)	
	Disagree	13(9.6%)	20(14.8%)	33(24.4%)	P= < 0.001
Infection Control management					
Standard infection control protocols should be encouraged	Agree	49(36.3%)	83(61.5%)	132(97.8%)	X^2 value= 1.798
	Not Sure	1(0.7%)	0(0%)	1(0.7%)	P= 0.407
	Disagree	1(0.7%)	1(0.7%)	2(1.5%)	
Using disposable instruments is a good alternative	Agree	20(14.8%)	45(33.3%)	65(48.1%)	X^2 value= 10.377
	Not Sure	20(14.8%)	34(25.2%)	54(40%)	
	Disagree	11(8.1%)	5(3.7%)	16(11.8%)	P=0.006
Use of Personal protective wear should be made mandatory	Agree	12(8.8%)	18(13.3%)	30(22.2%)	X^2 value=3.508
	Not Sure	37(27.4%)	66(48.9%)	103(76.3%)	
	Disagree	2(1.5%)	0(0%)	2(1.5%)	P=0.173
Sterilization should be made compulsory	Agree	49(36.3%)	75(55.5%)	124(91.8%)	X^2 value= 2.111
	Not Sure	2(1.5%)	8(5.9%)	10(7.4%)	
	Disagree	0(0%)	1(0.7%)	1(0.7%)	P=0.348
Use enzyme-based cleaners that are biodegradable	Agree	2(1.5%)	11(8.1%)	13(9.6%)	X^2 value=3.069
	Not Sure	47(34.8%)	70(51.8%)	117(86.6%)	
	Disagree	2(1.5%)	3(2.22%)	5(3.7%)	P= 0.216
Vaccination of Clinicians should be made compulsion	Agree	40(29.6%)	50(37.03%)	90(66.6%)	X^2 value= 5.29
	Not Sure	9(6.6%)	17(12.6%)	36(26.6%)	
	Disagree	2(1.5%)	7(5.2%)	2(1.5%)	P=0.077
Reusable Practices among Dentist					
Use reusable cups, syringes and suction devices	Agree	24(17.8%)	21(15.55%)	45(33.33%)	X^2 value= 9.835
	Not Sure	23(17.0%)	42(31.11%)	65(48.14%)	
	Disagree	4(2.96%)	21(15.55%)	25(18.51%)	P=0.007
Use cloth lab coats that can be laundered rather than disposable ones	Agree	50(37.0%)	80(59.25%)	130(96.3%)	X^2 value= 1.265
	Not Sure	1(0.74%)	2(1.48%)	3(2.22%)	

	Disagree	0(0%)	2(1.48%)	2(1.48%)	P=0.531
Water Conservation					
Use water faucet sensors and hand dryer	Agree	41(30.3%)	62(45.9%)	103(76.3%)	X^2 value= 2.136
	Not Sure	10(7.4%)	19(14.07%)	29(21.5%)	
	Disagree	0(0%)	3(2.2%)	3(2.2%)	P= 0.344
Use hand sanitizers	Agree	49(36.3%)	83(61.5%)	132(97.8%)	X^2 value= 1.089
	Not Sure	2(1.5%)	1(0.7%)	3(2.2%)	
	Disagree	0(0%)	0(0%)	0(0%)	P=0.297
Encourage patients to turn off water while practicing oral hygiene practices	Agree	49(36.3%)	77(57.03%)	126(93.3%)	X^2 value= 0.993
	Not Sure	2(1.5%)	7(5.2%)	9(6.6%)	
	Disagree	0(0%)	0(0%)	0(0%)	P=0.319
Energy Management					
Encourage renewable energy such as wind and solar power	Agree	11(8.1%)	17(12.6%)	28(20.7%)	X^2 value= 0.037
	Not Sure	33(24.4%)	55(40.7%)	88(65.1%)	
	Disagree	7(5.1%)	12(8.8%)	19(14.1%)	P=0.982
Encourage power saving new light system	Agree	49(36.3%)	75(55.5%)	124(91.8%)	X^2 value= 2.111
	Not Sure	2(1.5%)	8(5.9%)	10(7.4%)	
	Disagree	0(0%)	1(0.7%)	1(0.7%)	P= 0.348
Use automated thermostats to control heating/cooling systems	Agree	24(17.7%)	21(15.5%)	45(33.3%)	X^2 value= 9.835
	Not Sure	23(17.0%)	42(31.1%)	65(48.1%)	
	Disagree	4(2.9%)	21(15.5%)	25(18.5%)	P=0.007
Turn off and unplug all electrical appliances after use	Agree	50(37.03%)	83(61.5%)	133(98.5%)	X^2 value= 2.256
	Not Sure	0(0%)	1(0.7%)	1(0.7%)	
	Disagree	1(0.7%)	0(0%)	1(0.7%)	P=0.324
Implementation of Green Dentistry/Eco-friendly Dentistry	Fully In Place	0(0%)	1(0.7%)	1(0.7%)	X^2 value= 8.789
	In Progress	23(17.03%)	18(13.3%)	41(30.3%)	
	Aware But Not Implemented	28(20.7%)	65(48.1%)	93(68.9%)	P=0.012

Discussion

Dental professional's produces waste in many forms in their dental practices which calls for the eco-friendly dental strategies implementation among the dentists around the globe.[4] Eco-friendly dentistry is a new upcoming emerging concept in dentistry. It is a high-tech approach, which reduces the environmental impact of dental practices in moving toward an ecologically sustainable health care system. It also encompasses a service model for dentistry that supports and maintains wellness. Eco-friendly dentistry is an approach to meet the needs of millions of patients and helps dental professionals to protect planetary and community health as well as the financial health of their practices.[5] In India green dentistry is still a progressing practice while in several countries it has been developed for several years.[6]

The present study comprised of 135 subjects, out of whom 68% were males and 32% were females. This finding is in accordance with the study conducted by AL Shatrat et.al.[7] where majority of the participants were males (67%). The collective reason behind this gender difference in our study might be due to family and domestic commitments of females and also male dentists have more tendencies to go for private practice and comparatively devote more time to their practice.

The present study findings depicted that 81% agreed that green practices can play a role in environment conservation which is slightly lower than the study result of Kallakuri et.al.[6] where 90 % of the practitioners agreed to it. A possible reason for the dentists knowing more about the concept of green practices and their role in environment conservation might be because that they are in regular association with books, journals, research work and in union, implementing the facts which they obtain from recent literature and studies worldwide. Contrary to this finding another study done by Bhargava et.al.[8] which showed that only 59 % of the practitioners agreed that green practices can play a role in environment conservation.

In the present study it was observed that 89% of the practitioners agreed that green practice has many long term benefits which was similar to the study conducted by Agrasuta et.al.[9] where 91 % practitioners believed that green practice has many long term benefits which was slightly more than the present study, more awareness regarding benefits of green practice has to be created to overcome this gap.

Regarding the difficulty in finding green dentistry compatible products, it was found that majority of the study subjects (39%) were not sure that whether they will find products compatible with green dentistry or not, the reason might be their lack of interest in changing from current practice which ultimately leads to lack of interest in finding compatible products. Our findings are slightly lower than the study findings of Bhargava et.al.,[8] where 49% of the practitioners feel that green dentistry products are difficult to find. However, companies are now proving green solutions for dental practice ranging from biodegradable materials to recycling techniques, this misconception of non-availability might be prevalent in study population due to lack of up gradation of knowledge.

Regarding whether green practice provides lower operating and maintenance costs, it was found that majority of the subjects (48%) agrees on it. This finding is in accordance with the study done by Kallakuri et.al.[6] where 52% of dentists assert that eco-friendly practices influence on providing low operating and maintenance costs. Contrary to this finding, in another study conducted by Bhargava et.al.[8] where 78% of the dental practitioners believe that green dental practice influence on providing low operating and maintenance cost, which is large in number as compare to our study finding. The reason might be adequate knowledge about green practice among dental practitioners of Hubli city. This paradoxical perception of the dentists reveal unfamiliarity towards green dentistry.

Present study results revealed a low level of implementation of amalgam management strategies; this could result from the high use of alternative restoration materials (91%) and therefore represents a low need for amalgam waste management which is slightly higher than the study result of Kallakuri et.al.[6] The use of pre-capsulated alloys in different sizes was 30% among the participants of our study. This finding is contradictory to that of Sawair et.al.[10] who found that about 76% of Jordanian general dental practitioners use amalgam capsules of different sizes and also conflicting to the

study conducted by Al Shatrat et.al.[7] where there is high (68%) usage of amalgam capsules of different sizes.

Present study results illustrated that 93% of the dental practitioners used digital radiography. This result is in accordance with the finding of study conducted by Kallakuri et.al.[6] where 92% of the dental practitioners uses digital radiography. High percentage of usage of digital radiography might be because dental professionals may find digital radiography convenient since working hours decrease and image diagnosis could be done in a better fashion. In our study only 1% of the study subjects disagreed on using digital radiograph as good alternative. This may be due to the fact that some senior dentist still prefer the use of conventional radiographic techniques and waste management and hence, use both digital and conventional radiography.

Present study revealed that 59% of the study subjects used computer-based record systems which is in congruent with the previous study done by Chopra et.al.[11] where 62% of the study subjects use the same. In contrast with our study, in a study conducted by Kallakuri et.al.[6] there only 10% of the study subjects uses computer-based record system. This difference is may be due to the upgradation of dental practice management. There is a need for an up-gradation of converting dental practice management from a paper-based record system to a computer-based records system which saves time while updating patient's records and also reduces paper waste, reduces the risk of losing patient records in emergencies, such as fires and floods.

According to the result of the present study 48% of the study participants agreed on using disposable instrument for infection control. This result is in contrast with the result of the study done by Kallakuri et.al.[6] where 48% of the study participants prefer using sterilisable instruments, trays and film holding devices, rather than disposable products which is similar to the studies done by Al Shatrat et.al.[7] (54%) and Sen et.al.[3]

The present study result revealed that only 1% of the study subject have fully implemented eco-friendly dental practice. Majority of the practitioners (69%) chosen that they are aware of the strategy but not implemented the eco-friendly practices. Our result is in accordance with the result of a study conducted by Kallakuri et.al.[6] where only 2% of the dental practitioners have fully implemented eco-friendly dental practice and majority of the practitioners (52%) were aware of the strategy but not implemented the eco-friendly practices. These findings are may be because of many barriers faced by the practitioners during the implementation of eco-friendly practice. One of the major barrier is “the cost” and Bihar government is giving no advantages to the dental practitioner for the implementation of eco-friendly dental strategies. The majority of Patna dentists earn middle incomes; therefore, may not have the resources to implement what they perceive as costly strategies. The Bihar government might encourage dentists to implement eco-friendly strategies in their offices by providing tax incentives and free custom duties for purchase and use of the equipment or materials that have minimum effect on the environment.

Recommendations

1. Further research should be conducted on a larger population which should include dental practitioners and teaching faculty from different parts of state or country because their knowledge and attitude will pass to the young dental students.
2. The future of green dentistry rests in the hands of the younger dental students, there upon the Dental Council of India must include the concept of green dentistry in the existing curriculum to bring out this transformation in the field of dentistry.

3. Our study examined the role of dentists but the role of dental hygienists and dental assistants in the implementation of eco-friendly dental strategies may also be important.

4. As eco-friendly dentistry is a fresh and emerging concept, the existing dentist population is unaware of the notion. Therefore, special workshops, seminars, and conferences must be conducted in this regard.

5. Future campaign strategies should address these issues by convincing dentists and making them realize that they have a crucial role to play in addressing climate change issues by imbibing certain changes in their practice which would help them in a long run.

Conclusion

The current study results propose that lack of knowledge and awareness regarding green dentistry prevails among the dentists of Patna city. The findings also indicate that eco-friendly dental strategies were not implemented adequately by the study population. Green dentistry is a relatively new development in India. However, awareness among dentists needs to be increased which is required to conserve the environment for a better future and more initiatives are required to evolve from current practice to green practice. This innovation urges an involvement of dentists at a mass level and everyone must realise their responsibilities towards the current environmental issues. Current study also suggests that implementation strategies of eco-friendly dental practices among the dental practitioners of Patna is not adequate. Furthermore, proper education through CDE programs, workshops, and seminars can bring a change from conventional dentistry to green dentistry as there is a positive attitude among dental practitioners.

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