Asian Pac. J. Health Sci., **2017; 4(2):133-136** **e-ISSN: 2349-0659, p-ISSN: 2350-0964**

Document heading **doi: 10.21276/apjhs.2017.4.2.22** **Research Article**

A study on awareness of Dental students in Electronic Waste Management

Karandeep Singh Sandhu[1*],Nidhi Gupta[2],Jatinder Singh[3],Preetinder Kaur[4]

[1]Senior Lecturer, Department of Public Health Dentistry, Sri Sukhmani Dental College and Hospital, Dera Bassi, Mohali, Punjab, India

[2] Professor and Head, Department of Public Health Dentistry,Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula, Haryana, India

[3]Jatinder Singh – Professor and Head, Adesh Institute of Dental Sciences and Research, Barnala Road, Bathinda, Punjab, India

[4] Ex- Lecturer, Laxmi Bai Institute of Dental Sciences & Hospital, Patiala, Punjab, India

ABSTRACT

Background: Electronic Waste or e-waste is one of the rapidly growing problems in the world. The old electronic appliances such as computers, laptops, TVs, DVD players and mobile phones etc which have disposed by their users come in this category. The presence of hazardous chemicals in electronic products is severely compromising human health and the Environment. This study was conducted with the aim to assess the awareness of Dental students in e-waste management. **Materials and Method:** A cross-section study was carried out in the month of January, 2017 among third year, final year students and interns of Swami Devi Dyal Hospital and Dental College, Panchkula. The E-Waste Management Awareness Inventory (EWMAI) was used to check the awareness of students regarding management of e-waste. All data analysis was done using the statistical package of social sciences 17.0 software (SPSS Inc; Chicago IL). Chisquare test was applied to test the association between variables. All reported probability values are based on two-sided tests and compared to a significance level of 5%.**Results:** A total of 100 students participated in the cross-sectional survey. The study sample consisted of 65 female and 35 male students. Only 37% of the males and 46% of females know about the formal e-waste collection services.10% of the males and 16% of females have knowledge on e-waste government policy. **Conclusion:** There is a need for increased public awareness through health education on hazards and handling of e-waste management along with strict legislations by the government.

Key Words: E-Waste Management, Dental Students, Awareness, E-waste, India

Introduction

Electronic Waste is the term used to describe old, end-of-life or discarded appliances using electricity. It includes computers, television sets, fridges, ovens, mobile phones and other such electronic appliances that are no more useful. The electronic goods are classified under three major categories:

- White Goods: Household appliances.
- Brown Goods:Tv, Cameras.
- Grey Goods: Computers, printers, scanners [1].

**Correspondence*

Dr. Karandeep Singh Sandhu

Senior lecturer, Sri Sukhmani Dental College and Hospital, Dera Bassi, Mohali, Punjab, India

E Mail: karanrules44@yahoo.com

Waste generated from the white and brown goods is less toxic as compared with grey goods. This kind of waste is creating serious challenge in both disposal and recycling in both developed and developing countries.

Disposal of e-waste is an global environmental and public health issue nowdays. E- waste contains hazardous constituents like lead, mercury, and Polycyclic Aromatic Hydrocarbons that have adverse affect on environment and human health causing various diseases. These types of wastes are buried, burnt in open air or dumped into surface water bodies which adds harmful substances in environment [2].

India, which has emerged as the world's second largest mobile market, is also the fifth largest producer of e-waste, discarding roughly 18.5 lakh tones of electronic waste each year. As per the Hazardous Waste Rules (1989), e-waste is not treated as hazardous unless

proved to have higher concentration of toxin substances. Composition of e-waste is diverse and constitutes iron and steel by 50%, plastics 21%, non ferrous metals (copper, aluminium, silver and platinum)[3]. From 1998 to 2002, there was a 53.1% increase in the sales of domestic household appliances. The growth of Personal Computer ownership per capita in India between 1993 and 2000 was 604% compared to world average of 181%. India ranked 101 on the 2005 recorded Environmental Sustainability Index. Environmental concerns take a back seat in India and this ensures that electrical products find second and even third hand users farther down in income chain. A result of the Empa field study suggests that the computers coming into the recycling market in India are of a much older vintage than those in Western Countries. This is likely because the useful life of a computer, like most electronic appliances, is much longer in India [4,5].The current practices of e-waste management in India records a number of weaknesses like the difficulty in recycling, inadequate legislation, and unwillingness of the corporate to address the critical issues[6].

The education of the Public regarding the proper management of e-waste is the need of hour today. There is scarcity of data regarding the knowledge of e-waste management among Dental students. This study was done among dental students to assess the knowledge of Dentists towards e-waste management.

Materials and methods

The present interventional cross-section study was carried out in the month of January, 2017. The study population included the students doing their internship and the third, final year students of Swami Devi Dyal Hospital and Dental College, Panchkula. Students that showed interest to participate were included in the study and those who were absent or not willing to participate were excluded from the study. The students were assembled in Auditorium and 100 participants were selected from 250 students through simple random sampling using the table of random numbers. Students willing to participate were included in the study and those who were absent or not willing to participate were excluded from the study. The protocol of the study was approved by the institutional ethical and review board. Written Informed consent was obtained from the participants after obtaining the necessary permission from the college authorities. A pilot study was conducted on 20 study participants to test the feasibility of the study. Problems encountered during this period were noted and appropriate modifications were made taking into account the comments and suggestions received from the students.

The E-Waste Management Awareness Inventory (EWMAI) [7]was used to check the awareness of students regarding management of e-waste. The inventory consists of 50 closed ended questions. The questionnaire was pre-tested for validity, reliability. The reliability of the questionnaire was analyzed using Cronbach's alpha which was found to be acceptable (0.84). Face Validity indicates whether the questionnaire appears to be assessing the desired qualities. When face validity was assessed, it was observed that 92% of the participants found the questionnaire to be easy. Mean content validity ratio of the questionnaire was calculated as 0.87 based on discussion with panel of six experts. Personal identification and sociodemographic details of all the participants was also recorded.

The data was entered in the MS Excel sheet 2007 and thoroughly checked to eliminate errors before analysis. All data analysis was done using the statistical package of social sciences 17.0 software (SPSS Inc; Chicago IL). Chisquare test was applied to test the association between variables. All reported probability values (p values) are based on two-sided tests and compared to a significance level of 5%.

Results

A total of 100 students participated in the cross-sectional survey. The study sample consisted of 65 female and 35 male students. Their average age was 21.5 years. The main source of information regarding e-waste management was television, followed by internet and family and friends. Desire for new technology was the major reason to purchase new electronic gadgets. 11.5% of the respondents had purchased mobile once and 88.5% twice during the last ten years. A total of 40% males and 48% females considered unused electronics as waste materials. 37% of the males and 46% of females know about the formal e-waste collection services. 85% of the females and 70% of males were aware of the hazards of e-waste. 10% of the males and 16% of females have knowledge on e-waste government policy. A statistical significant difference in awareness regarding unused electronics as waste was found between males and females ($P<0.05$).

Discussion

The study findings revealed that the current awareness regarding e-waste management is inadequate among dental students. It was found that only 40% males and

48% females considered unused electronics as waste materials. 37% males and 46% females know about formal e-waste collection services which are accordance with the study done by Anuj Shah where 37% of the public knew about formal e-waste collection services. 85% of the females and 70% of males were aware of the hazards of e-waste.10% of the males and 16% of females have knowledge on e-waste government policy. These findings are in accordance with Anuj Shah Study where 11% of the participants have knowledge regarding legislations of e-waste management [8].

There was a significant difference between males and females in awareness that unused electronics is considered as waste ($p<0.05$). In a study by SindhuBala, there was no significant difference in the awareness regarding existence of e-waste in college going students of professional and non-professional streams while a statistically significant difference in the awareness regarding dangers of e-waste among them was found, with those from the professional stream having a greater awareness [9].

On the basis of the results of our study it is clear that the current awareness regarding the existence and dangers of e-waste are extremely low and urgent measures are required to address this issue.

Table 1: Distribution of study subjects

Gender	Frequency	Percentage (%)
Male	35	35
Female	65	65
Total	100	100

Table 2: Reasons for the Purchase of New Gadgets

Reasons	Number (%)
Physical Damage	22
Need for Greater Functionality	18
Desire for New Technology	54
Others	6
Total	100

Table 3: Awareness regarding e-waste among study subjects

Variable	Males(%)	Females (%)	Chi-square value, p value
Unused electronics is a waste	40	48	$X^2 = 4.1998$, p=0.022*
Collection services for e-waste	37	46	$X^2 = 0.7508$, p= 0.432
e-waste causes health hazards	70	85	$X^2 = 0.6506$. p= 0.376
Policies regarding e-waste management	10	16	$X^2 = 0.4686$, p= 0.591

*p<0.05 considered statistically significant.

Conclusion

The growing quantity of e-waste necessitates the development of systems which can handle the e-waste in such a way that minimizes negative social and environmental impacts while maximizing the positive impacts. Consumer awareness through public awareness campaigns is a crucial point that can attribute to a new responsible kind of consumerism. Dental students being a responsible citizen can play a major role in e-waste management by buying energy efficient products and donating electronics for reuse, which extends the lives of valuable products and keep them out of the waste management system. There is a need for increased public awareness through health education on hazards and handling of e-waste management along with strict legislations by the government.

References

1. Kalana A "Electrical and Electronic Waste Management Practice by households in Shah

Alam, Selongor, Malaysia", International Journal of Environmental Sciences; 2010;1(2): 132-144.

2. Where does e-waste end up? www.greenpeace.org/ international/en/ campaigns/detox/electronics/the-e-waste-problem/where-does-e-waste-end-up accessed on 14/11/16.

3. Ongondo FO, Williams ID, Cherrett TJ. How Are WEEE Doing? A Global Review of the Management of Electrical and Electronic Wastes. Elsevier. 2011;31(4):714-30.

4. Borthakur, Anwesha, Sinha K. Electronic Waste Management in India: A Stakeholder's Perspective. Electronic Green Journal. 2013;1.36.

5. Cui J, Forssberg E. Mechanical recycling of waste electric and electronic equipment: a review. J Hazard Mater. 2003; 99(3):243-63.

6. Mittal D., et.al. 2012, "E-Waste: A Hidden Threat to Global Environment and Health", VSRD International Journal of Science and Technology; 2(3): 271-275.

7. Y.C. Jang and H. Yoon"The Practice and Challenges of Electronic Waste Recycling in Korea with Emphasis on Extended Producer Responsibility (EPR)", JK Journal of Management & Technology; 2010;1(1):11-24.

8. Shah A. An Assessment of Public Awareness Regarding E-Waste Hazards and Management Strategies. 2014. http://digitalcollections.sit.edu/ cgi/viewcontent.cgi?article=2832&context=isp_collection.

9. Bala S, Goel S. A Study of E-Waste Management in Relation to Awareness of College Students. IntJEducational and Psychological Research. 2012:1(2): 31-5.

Conflict of Interest: None