

## Knowledge And Awareness About The Risk Of Longer Usage Bluetooth Device Among Dental Student

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### ABSTRACT:

**Background and aim:** Bluetooth is used for wireless Personal Area Networks communication. It is the most common method of sending and transferring data among a variety of devices. It raised health effects on various issues concerned with public and scientific reasons. It is a short range wireless communication technology. Malicious intervention attacks the bluetooth device users and also affects their health. This study aims to assess the awareness level about the risk of longer usage of bluetooth devices among dental students.

**Materials and methods:** A cross sectional survey was conducted among Saveetha dental college with a sample size of 125. A standard self-administered questionnaire was prepared and circulated via online google forms. The statistics were done by using SPSS software, the association was done by pearson chi square test.

**Result:** In this survey, 65.60% were female and 34.40% were males. In this survey compared to females, male use Bluetooth devices for a longer time. All were aware of the bluetooth radiation and its effects. This study revealed that the most of the study participants were aware about Bluetooth radiation hazards and many of them developed dependent behaviour with bluetooth devices. 80.00% agreed that they are aware that cellphone radiation is dangerous. 52.80% participants were aware that large duration of Bluetooth device usage causes depression. 35.20% female and 20.00% male are not aware that the Bluetooth device causes brain cancer.

**Conclusion:** This study revealed that most of the study participants were aware about Bluetooth radiation hazards and many of them developed dependent behavior with Bluetooth devices. Longer usage of Bluetooth devices may lead to further physiological and physiological complications.

**Keywords:** Bluetooth device, Cell Phone radiation, Hazard, Malicious intervention, Innovation

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## INTRODUCTION:

Bluetooth technology raised health effects on various issues concerned with public and scientific reasons. Its long term exposure causes auditory damage (1). The most significant importance of longer usage of Bluetooth devices is that it damages mitochondrial DNA, the motility of the sperm. The long term usage of Bluetooth devices leads to carcinogenicity (2). Bluetooth was made as a cable replacement. Its short term exposure causes no damage. It is designed to connect portable and stable electronic devices (3). The Bluetooth device's maximum range is about thirty feet or ten meters. The hardware of Bluetooth devices is riding on a radio chip. The software has the main control and security protocols (4). By having both hardware and software, it has become a smart technology. It is the most efficient, flexible and useful wireless communication system (5). Bluetooth devices are low power. It maintains the confidentiality of data exchanged from Bluetooth devices (6). It ensures that the data has user authentication, use of individual passwords, and protection against unauthorised access (7).

Bluetooth devices are of low cost, low power, low complexity, high effectiveness and robustness. These are its basic features (8). The most significant usefulness of Bluetooth devices is replacement of cable, uncomplicated file sharing, internet connectivity at ease, wireless synchronisation (9). Enable encryption when establishing Bluetooth device connection to your PC. There's protection or prevention against malicious attackers. True end-to-end security is not possible (10). Bluetooth devices are low power radio frequency communication. It is the wireless personal area network. Approximately 2100 companies around the world support Bluetooth technology (11). It is an open specification publicly available and royalty free. Bluetooth provides both voice and data by making it an ideal technology. It has unregulated frequency bands all over the world (12).

Bluetooth mesh networks are available in several industrial ambiances which are applied in IT technologies (13). It can authorise massive scaling without changes to the network infrastructure (14). It is also handy when low latency requirements exist. Interoperability is important for the large-scale adoption of IoT (15). The denial of service, impersonation, and eavesdropping are the major threats and vulnerabilities of using Bluetooth devices (16). They broadcast their specific address which is subject to location threatening (17). It also threatens key management. It also implies sending unsolicited messages to the users of Bluetooth devices. It doesn't escape shell characters (18).

There are many specific attacks on Bluetooth communication. Some are BlueSnarf, Bluejacking, BlueBug, BlueBump, BlueSmack, HeloMoto, BlueDump, CarWhisperer, BlueChop etc., (19). It is emerging as a pervasive technology which supports wireless communication (20). Bluetooth dangerous malware still indeed exists. It is prone to software and convert attack devices that demonstrates how healthy stackers reach (21). Bluetooth technology uses radio waves which are for sending information between two devices close to each other (22). It can travel only 33 feet and exchange information. It is very compatible and has a unique pairing code (23). It also eliminates the clutter and free calls. Bluetooth devices are not connected properly and it randomly disconnects. It also runs into interference (24). It has numerous privacy concerns and also explicit permission. Before the device is tracked, the energy is harvested. It automise buildings (25). It also has marked guidance, pairing issues, low charge and proximity (26). Bluetooth technology is the most commonly used. It is also vulnerable in security. With unauthorised access it becomes dangerous to the users (27). Malicious intervention attacks the Bluetooth device users and also affects their health (28). This study aims to assess the awareness level about the risk of longer usage of bluetooth devices among dental students.

## **MATERIALS AND METHODS:**

The self administered design questionnaire was made based on awareness. It was a cross sectional survey conducted among Saveetha dental college with a sample size of 125 and the study setting was quantitative method. The questionnaire was distributed in online google forms to the Dental UG population. The participants were explained about the purpose of the study in detail. The questions were carefully read and the participants marked the corresponding answers. Survey participants were randomly selected to minimise sampling bias. Avoided irrelevant questions and restricted them to particular populations and age groups. This survey was conducted in February 2021. The pros for this survey was online setting platforms and random selection of the population. And the cons were the same homogeneous study population were selected and in questionnaire error options may be present. Simple random sampling was the method used in the survey. SPSS was the statistical software used for this survey. The list of dependent variables were knowledge, awareness and gender . Descriptive analysis was the type of analysis being used. The internal validity was that the confidentiality was maintained and the personal information cannot be shared. Only responses were recorded. Chi square test was used to check the association and P value of less than 0.05 was said to be statistically significant.

## **RESULT:**

Survey conducted on knowledge and awareness about the risk of longer usage of Bluetooth devices among dental students. 65.60% were female and 34.40% were males. 37.60% responded 'Less than 3 hours' is their longer duration of using bluetooth devices (figure 1). For the awareness that cellphone radiation is dangerous, 80% agreed and they are aware of it (figure 2). For those aware that 58.40% responded that they were aware that bluetooth usage leads to cancer risk (figure 3). Again 52.80% participants were aware that large duration of Bluetooth device usage causes depression. For the question Bluetooth causes brain cell death 51.20% participants disagreed. 57.60% were not aware that Bluetooth damages DNA. 55.20% were aware that it affects foetal development in the mother's womb. 63.20% agreed that Bluetooth emits more radiation than corded headset. 62.40% were aware that it caused sleeping problems. 61.60% responded yes for the question that the Bluetooth device causes learning and memory deficits. 68.80% are aware that the Bluetooth device leads to headache. 55.20% were not aware that Bluetooth devices cause brain cancer. 58.40% responded no for the question that Bluetooth devices cause cognitive impairment. 24.00% females and 13.60% males use Bluetooth devices for less than 3 hours. 51.20% females and 28.80% males were aware that Bluetooth radiation is dangerous (figure 4). 41.60% females agreed that Bluetooth is at risk of cancer where 17.60% males disagreed (figure 5). Females were more aware than males, bluetooth devices can cause cancer. 34.40% of females disagreed that Bluetooth causes nerve cell death but 17.60% male agreed. 36 % females and 21.60% males responded that Bluetooth devices cannot damage DNA. 33.60% females and 21.60% males were aware that the Bluetooth device affects foetal development in the mother's womb. 36.00% females were not aware that Bluetooth devices affect fertility rate but 18.40% male responded yes. 40.00% female and 23.20% male aware that it emits more radiation than corded headset. 37.60% female and 24.80% male aware that Bluetooth devices cause sleeping problems. 43.20% female and 18.40% male responded yes for the question that Bluetooth devices cause learning and memory deficits. 44.80% female and 24.00% male are aware that Bluetooth devices lead to headache. 35.20% female and 20.00% male are not aware that the Bluetooth device causes brain cancer. 36.80% female and 21.60% male are not aware that it leads to cognitive impairment.

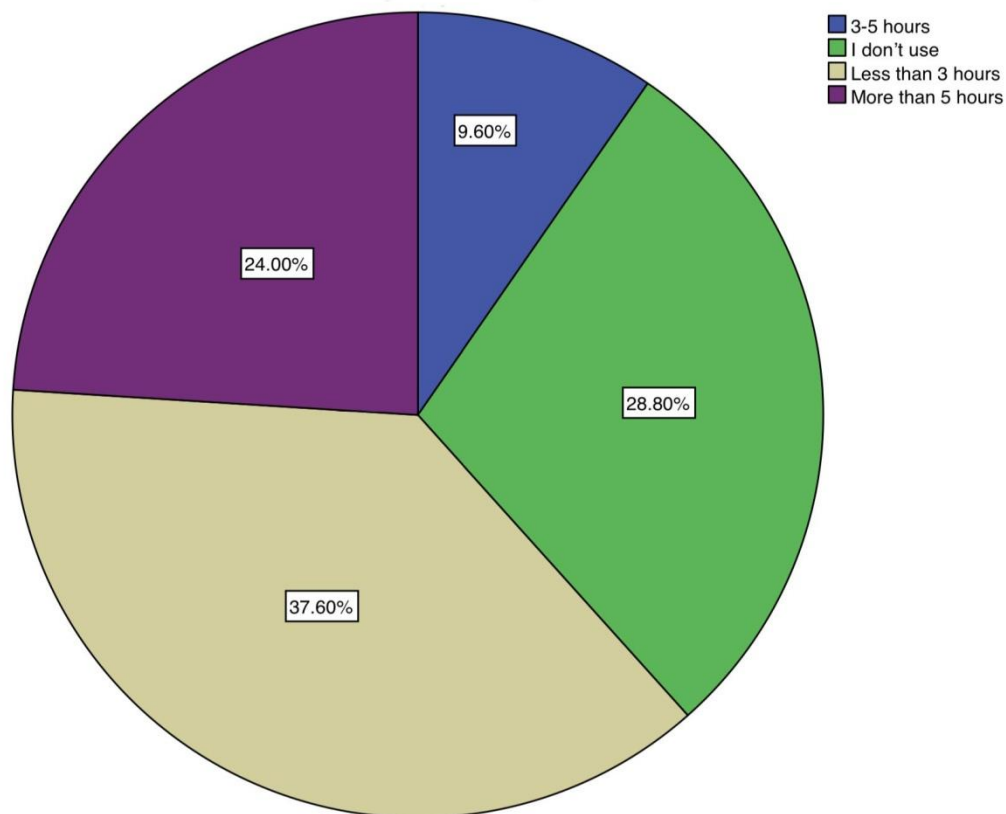


Figure 1: Pie chart represents how long participants use bluetooth devices. Only 9.6% represents 3-5 hours (blue), 28.8% represents 'I don't use' (green), 37.6% represents 'Less than 3 hours' (sandal), 24% represents 'More than 5 hours' (violet).

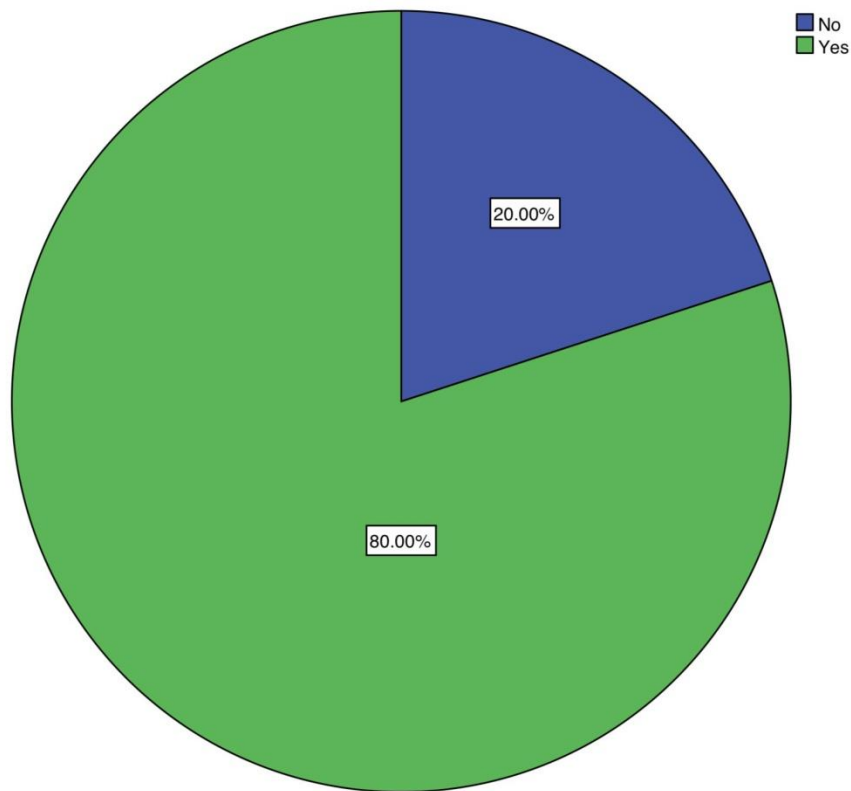


Figure 2: Pie chart represents that participants were aware that cellphone radiation is dangerous. 20.00% represents No (Blue) and 80.00% represents Yes (Green).

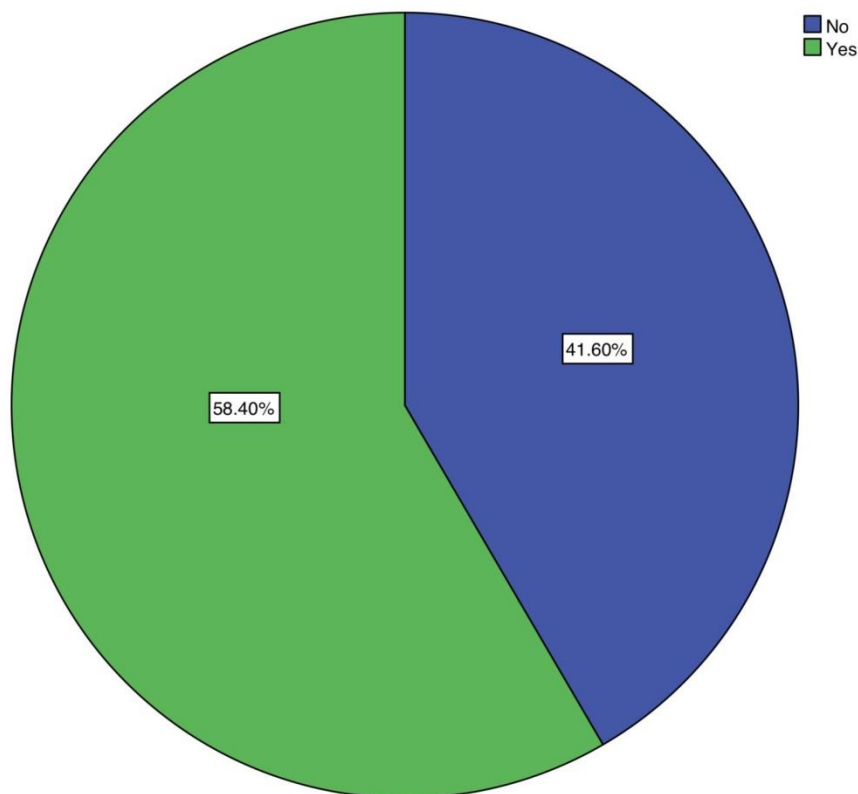


Figure 3: Pie chart represents that participants aware of bluetooth are at risk of cancer. 41.60% represents No (Blue) and 58.40% represents Yes (Green).

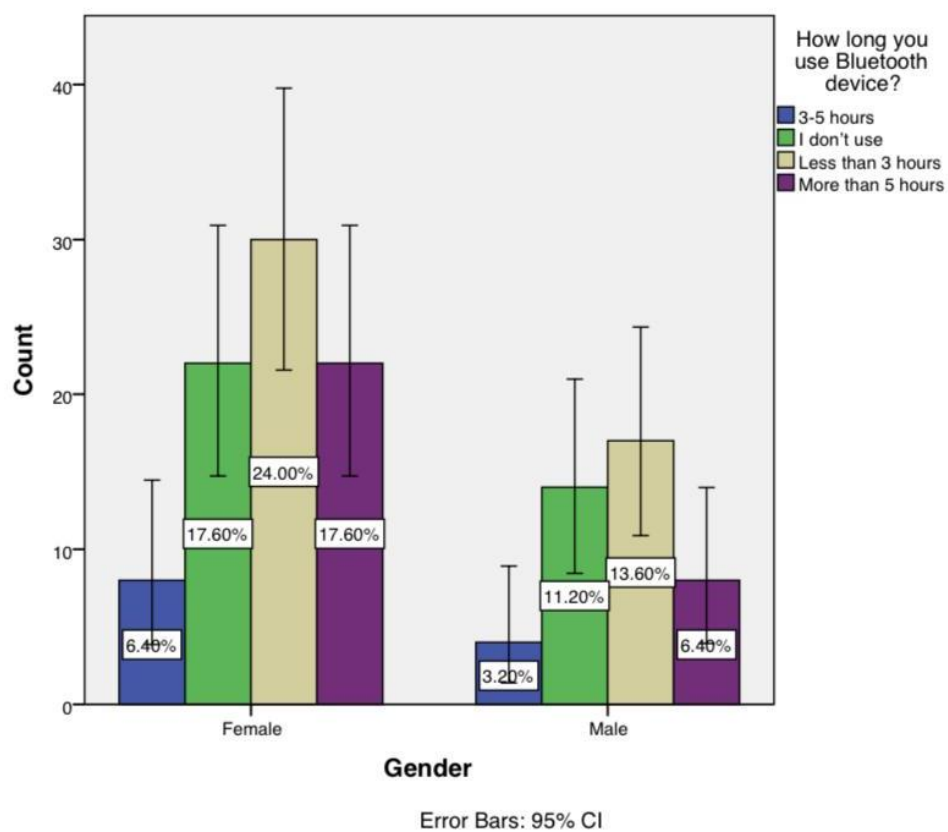


Figure 4: The bar graph showing the association between gender and how long participants use bluetooth devices. X axis represents the gender and Y axis represents the number of responses. Blue represents 3-5 hours, green represents 'I don't use', sandal represents 'Less than 3 hours', violet represents 'More than 5 hours'. Majority of females used the bluetooth devices less than 3 hours than males. Pearson chi square test showed p value is 0.756 ( $>0.05$ ), hence insignificant.

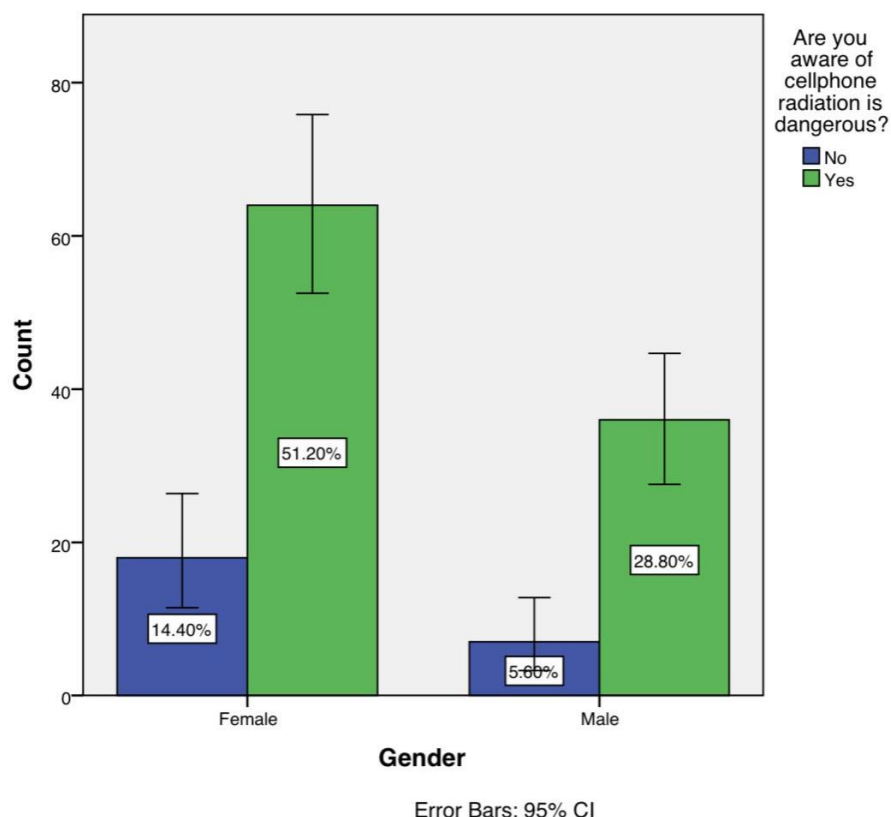


Figure 5: The bar graph showing the association between gender and the awareness of cellphone radiation is dangerous. X axis represents the gender and Y axis represents the number of responses. Blue represents No and Green represents Yes. Females are more aware about cellphone radiation than males. Pearson chi square test showed p value is 0.451( $>0.05$ ), hence insignificant

## DISCUSSION:

For the use of Bluetooth devices 37.80% responded in less than 3 hours and 9.60% responded for 3-5 hours. Pearson chi square value is greater than 0.05 so it is non significant. cellphone radiation is dangerous, longer usage leads to risk of cancer, longer usage causes depression, usage affects the foetal development in mothers womb 80.00%, 58.40%, 52.80%, 55.20% respectively agrees and they are aware of it. Bluetooth devices cause nerve cell death, damage DNA and it affects fertility rate 51.20%: 57.60% and 52.00% respectively disagreed and are not aware of it. Bluetooth devices emit more radiation, causing sleeping problems 63.20%, 62.40% agreed. Pearson chi square value is greater than 0.05 so it is not significant.

The radiation induces reversible, non-specific adaptive responses when the duration of exposure is small and the organism is sensitive (29). In this survey, 55.20% and 58.40% disagreed that Bluetooth

causes brain cancer and it can lead to cognitive impairment but in the article (30) if it's not ideally positioned, it has some adverse effects on the brain(31). In the survey, 61.60% and 68.80% agree that longer usage of Bluetooth devices leads to learning and memory deficits and causes headaches(32). Use of devices causes 0.1°C increase in temperature of deep tissues like the brain. 62.40% agreed in this survey that longer usage causes sleeping problems(33) and in an article (34) studied mobile phone addiction and the sleep quality in 576 university students and found that sleep quality worsened with an increase in addiction level(35).

**Limitation:** The limitations of this survey lies in the fact that a cross-sectional survey was done among a restricted population (i.e) 125 dental students, and this is an online survey not a in-house or personal interview where a respondents bias can be expected.

#### **CONCLUSION:**

This study revealed that most of the study participants were aware about Bluetooth radiation hazards and many of them developed dependent behavior with Bluetooth devices. Longer usage of Bluetooth devices may lead to further physiological and physiological complications. Currently, no evidence directly supports the idea that using It is also important to remember that Bluetooth headphones produce far less EMF than cell phones. So this study may increase the awareness among participants to reduce the use of bluetooth devices.

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#### **CONFLICT OF INTEREST:**

All the authors declare that there was no conflict of interest in the present study.

#### **AUTHORS CONTRIBUTIONS :**

Deepasakthi: Literature search, data collection, analysis, manuscript drafting .

GAYATRI DEVI.R: Data verification, manuscript drafting.

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