



Knowledge about Teratogenic Drugs among Dentists - A Cross-Sectional Survey

**B. Reshmi¹, Dhanraj Ganapathy^{2*}, Ashok Velayudhan²,
and Kirankumar Pandurangan²**

¹Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences,
Saveetha University, Chennai, India.

²Department of Prosthodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical
Sciences, Saveetha University, Chennai, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author BR designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors DG and AV' managed the analyses of the study. Author KP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Teratogen is any agent that might interfere with the proper growth and development of the embryo or foetus. Teratogens usually involve radiation, cancer, chemicals, and drugs. Comprehension of teratogenic drugs is of great value to dental practitioners because they handle a wide range of drugs that cause teratogenicity in the care of patients with dental problems during pregnancy. The aim of this survey is to assess the awareness among dentists of teratogenic drugs. The study was conducted among 100 final year dental students and interns in Chennai City. 10 questions eliciting information on the knowledge and understanding of teratogenic drugs were framed and distributed. The responses obtained from the participants were compiled, processed further, and analyzed. 83% of the participants were aware of teratogenic drugs. This study concluded that knowledge about teratogenic drugs is adequate among dental students.

*Corresponding author: E-mail: ghanraj@saveetha.com;

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1. INTRODUCTION

Teratogens are chemicals that can induce birth defects through adverse effects on the fetus or foetus. Teratogens prohibit pregnancy or induce congenital malformation (birth defect). The teratogenic groups include radiation, maternal diseases, toxins, and medications. Certain examples of teratogenic substances contained in the atmosphere and in rare situations may include metals, chemicals, radiation, and even heat. Sources of these teratogenic compounds can include mercury, potassium iodide, nuclear blast radiation, and even high-temperature hot tubs [1].

Almost all pregnant women disregard the value of visiting dentists, providing adequate oral health care during the prenatal period [2]. Alterations in the oral environment and intake of food during pregnancy may lead to increased risk of dental caries, although changes in hormones may increase the incidence of periodontal diseases. Poor management of oral health greatly increases the risk of pre-eclampsia, preterm birth and low birth weight. There is a need for efficient management of oral health during pregnancy [3].

The possibility that such medications given during pregnancy can be extremely harmful to the unborn child is one of the classic medical problems. Throughout the 1960s, pregnant women who ingested thalidomide gave birth to children with phocomelia [4]. Many other examples of drug teratogenic effects are known. Congenital anomalies caused by human teratogenic drugs have been reported to account for less than 1% of overall congenital abnormalities. However, it is still very important to prevent those morbidities as it can inflict severe lifestyle restrictions to the infant.

When it comes to dental consideration, Coronal scaling, polishing, and root planing may be performed at any time as required to maintain oral health. However, routine general dentistry should usually only be done in the second and third trimester of pregnancy. Radiation during radiographic procedures can act as a potential teratogen. Oral radiography is safe for pregnant patients, provided protective measures such as high-speed film, a lead apron, and a thyroid collar are used [2].

Previously our Department of Prosthodontics has published extensive research on various aspects of prosthetic dentistry [3–13], this vast research experience has inspired us to research about this topic. This study was done with aim to assess the awareness of teratogenic drugs among dentists.

2. MATERIALS AND METHODS

A Cross-sectional study was done to assess the awareness of teratogenic drugs among dentists and dental students in Saveetha Dental College. The total sample size was 100, which involved the final years and interns. The survey instrument was a pre tested questionnaire eliciting responses about the awareness of teratogenic drugs among the participants. The data was further transferred to SPSS software version 25 for statistical analysis.

3. RESULTS AND DISCUSSION

All of the dental students (100%) were aware of the term teratogen (Fig. 1). All of them (100%) agreed that teratogen can be a drug (Fig. 2). 8.0% of students knew the drugs were the causatives of teratogenicity and 17.0% were not aware. (Fig. 3). 33.0% of students know the drugs that cause teratogenicity and 67.0% were not aware (Fig. 4). 64.0% of students agreed that all the children who are exposed to teratogenic drugs have abnormalities and 36.0% did not agree. (Fig. 5). 77.0% of students know that teratogenic disease can be treated and 23.0% were not aware. (Fig. 6) 19.0% of students know how to manage a pregnant patient with proper protocol and 81.0% were doubtful in treating them. (Fig. 7). 90.0% of students agreed that they refer to sources before treating the patients and 10.0% never refer to any sources before treating the patients (Fig. 8). All the students agreed to when asked about emphasizing knowledge on teratogen (Fig. 9). All the students were prepared to attend any source of special classes and training on teratogen if required (Fig. 10).

Nazarili A, et al. studied the toxic effects of drugs in many animal models and demonstrated the toxic concentration [14]. Several drugs have the capability of crossing the placental barrier and can induce varying levels of teratogenic effects. The volume of distribution of drugs is high in foetuses, as they have a large distribution of

blood vessels, and this may be another reason for sensitivity to the toxic effects of drugs [15,16]

The frequency of major malformations, growth retardation, and hypoplasia of the midface and fingers, known as anticonvulsant embryopathy, is increased in infants exposed to anticonvulsant drugs in utero. However, whether the abnormalities are caused by the maternal epilepsy itself or by exposure to anticonvulsant drugs was studied by Holmes LB et al [17]. They concluded a distinctive pattern of physical abnormalities in infants of mothers with epilepsy is associated with the use of anticonvulsant drugs during pregnancy, rather than with epilepsy itself.

In previous studies, infants exposed to carbamazepine were considered by clinical inspection to have an increased frequency of hypoplasia of the face and fingers characteristic of the embryopathy associated with exposure to anticonvulsant drugs [18]. One would predict that some infants exposed to anticonvulsant drugs have a greater risk of harmful effects than others because of an underlying genetic susceptibility. Such an interrelation between genetic factors and environmental exposure has been suggested in studies of the teratogenicity of maternal cigarette smoking and alcohol use. In the case of anticonvulsant drugs, a deficiency of the detoxifying enzyme epoxide hydrolase and

an increase in free radicals formed by the anticonvulsant drug are two theories of the reason for increased susceptibility [19,20].

Studies in animals indicate that natural forms of vitamin A are teratogenic. Synthetic retinoids chemically similar to vitamin A cause birth defects in humans; as in animals, the defects appear to affect tissues derived from the cranial neural crest. For defects associated with cranial-neural-crest tissue, the ratio of the prevalence among the babies born to women who consumed more than 15,000 IU of preformed vitamin A per day from food and supplements to the prevalence among the babies whose mothers consumed 5000 IU or less per day was 3.5. For vitamin A from supplements alone, the ratio of the prevalence among the babies born to women who consumed more than 10,000 IU per day to that among the babies whose mothers consumed 5000 IU or less per day was 4.8. High dietary intake of preformed vitamin A appears to be teratogenic. Among the babies born to women who took more than 10,000 IU of preformed vitamin A per day in the form of supplements, it was estimated that about 1 infant in 57 had a malformation attributable to the supplement [21]. Hence it is of paramount importance all health care professionals inclusive of dentists and dental students should be prudently aware of the teratogenic drugs and their harmful effects.

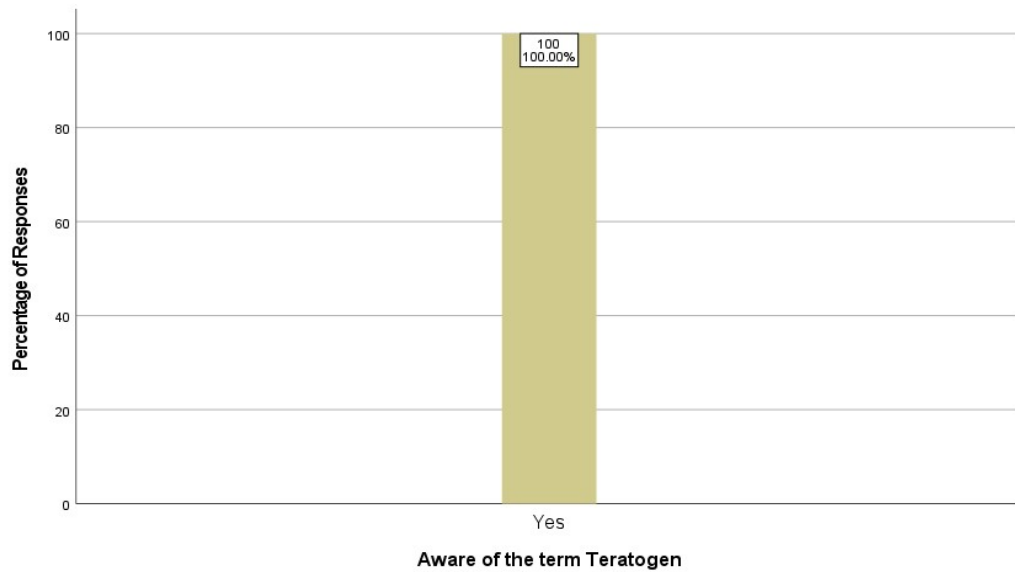


Fig. 1.A simple bar representing the frequency of responses based on teratogen. All of the dental students were aware [beige] about the term teratogen

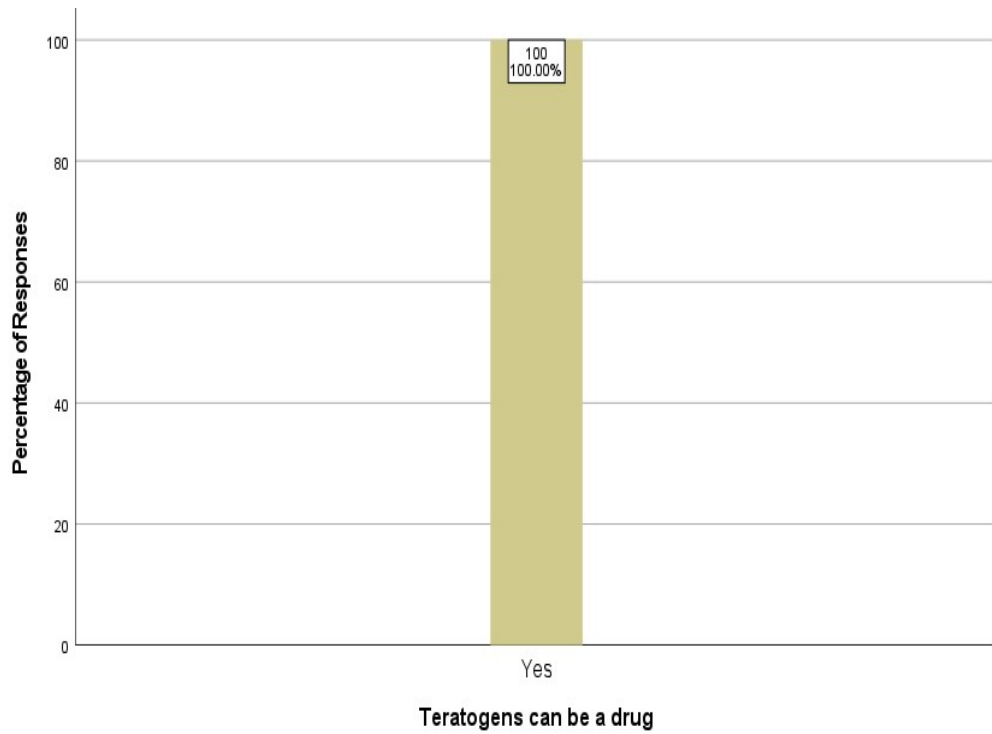


Fig. 2. A simple bar representing the percentage of response based on teratogen. All of them agreed that teratogen can be a drug too [beige]

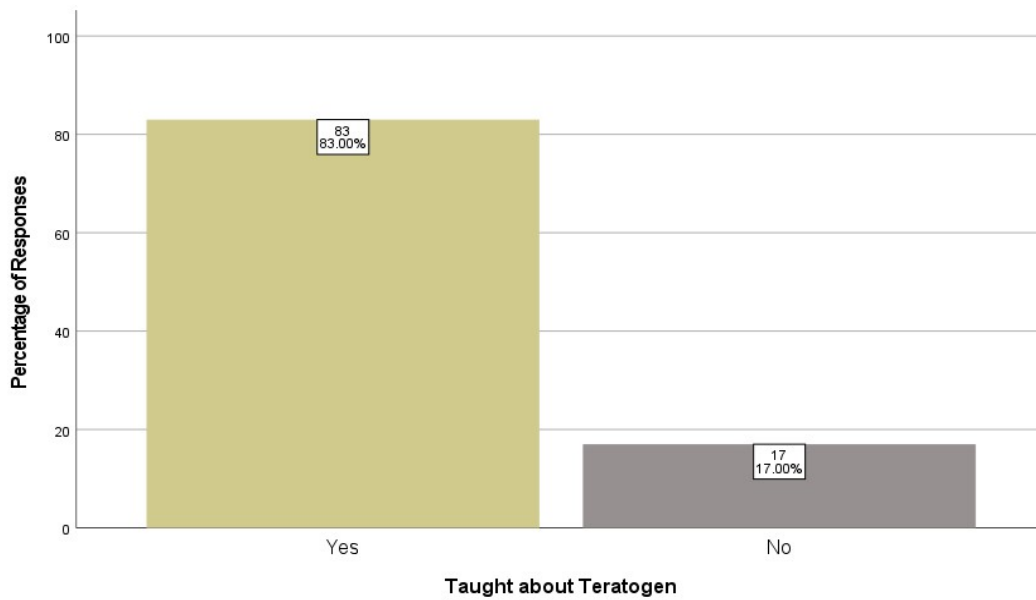


Fig. 3. A simple bar representing the percentage of responses based on teratogenic drugs . 8.0%of students know [beige] the drugs that cause teratogenicity and 17.0% were not [grey] aware

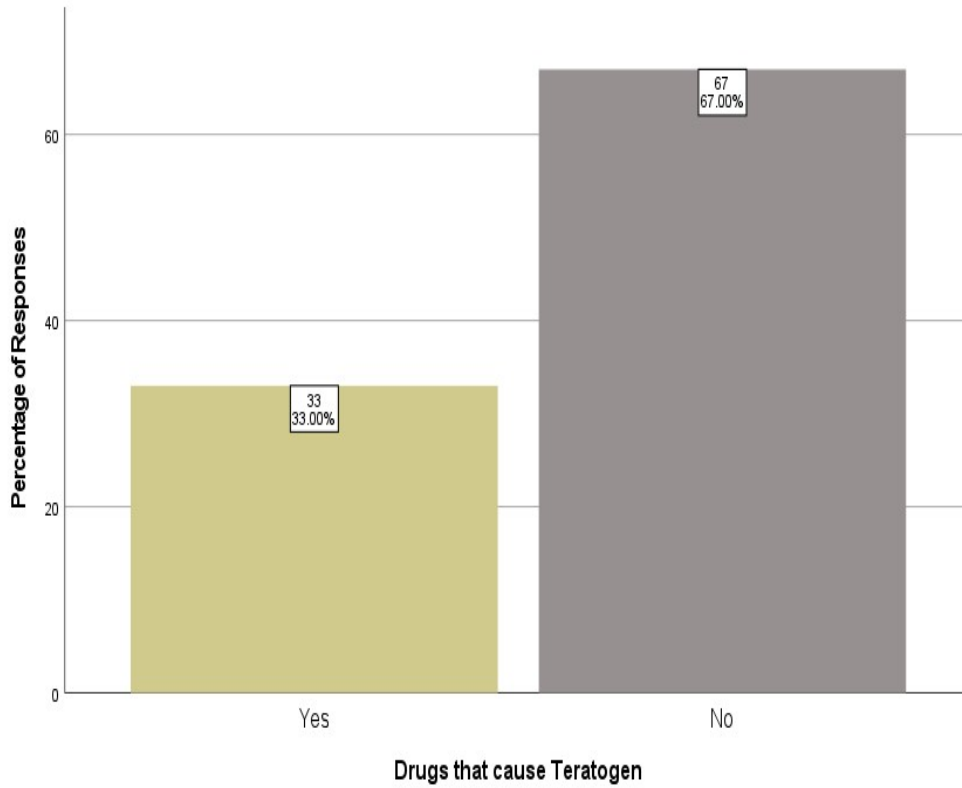


Fig. 4. A simple bar representing the percentage of responses based on teratogenic drugs. 33.0% of students know [beige] the drugs that cause teratogenicity and 67.0% were not [grey] aware

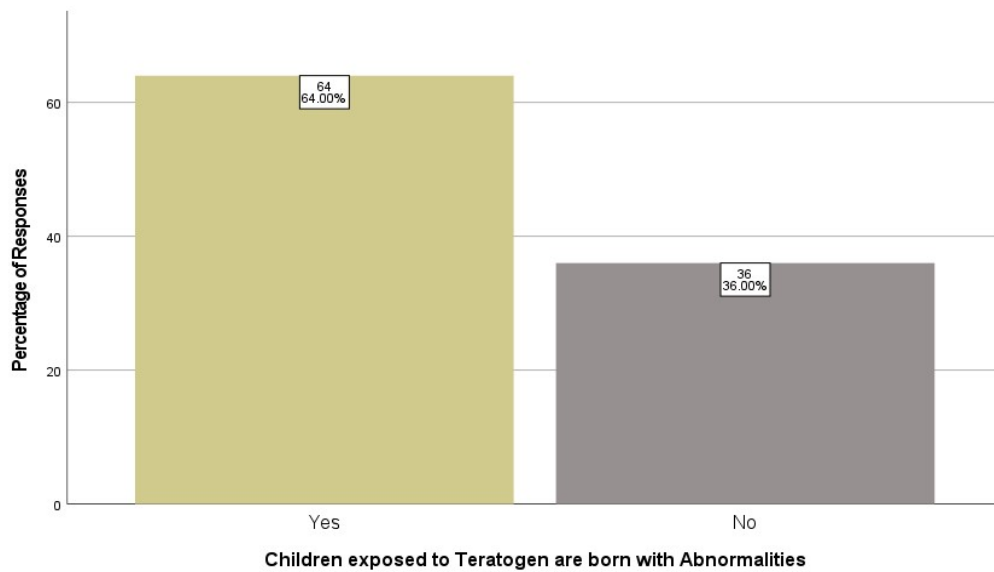


Fig. 5. A simple bar representing the percentage of responses based on teratogenic drugs. 64.0% of students agreed that all the children who are exposed to teratogenic drugs have abnormalities [beige] and 36.0% did not [grey] agree

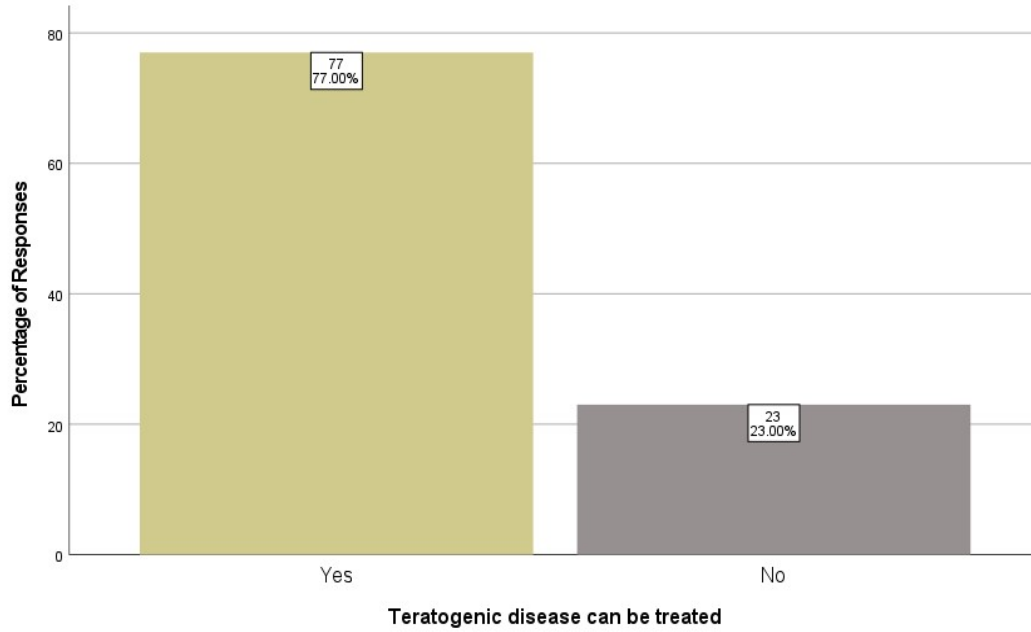


Fig. 6. A simple bar representing the percentage of responses based on teratogenic drugs. 77.0% of students know that teratogenic disease can be treated [beige] and 23.0% were not [grey] aware

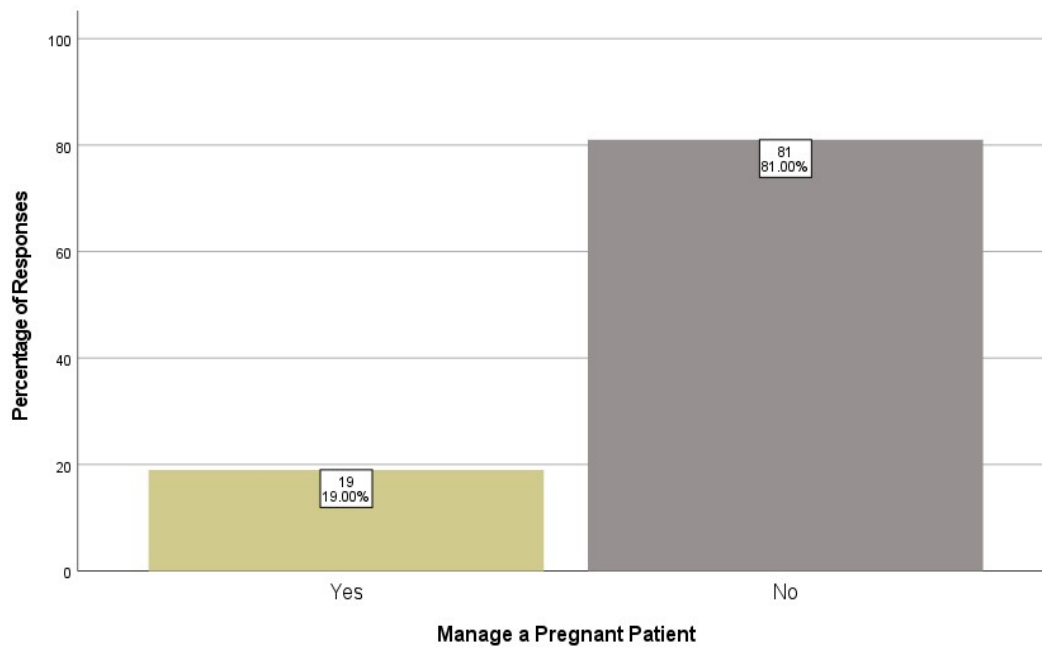


Fig. 7. A simple bar representing the percentage of responses based on teratogenic drugs. 19.0% of students know how to manage a pregnant patient with proper protocol [beige] and 81.0% were not [grey] doubtful in treating them

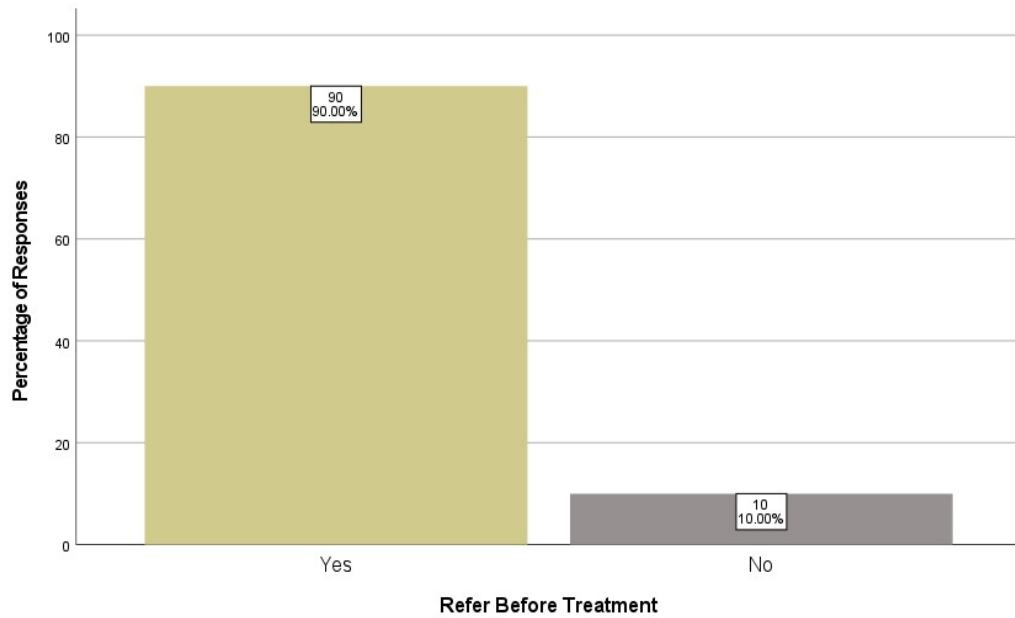


Fig. 8. A simple bar representing the percentage of responses based on teratogenic drugs. 90.0% of students agreed that they refer to sources before treating the patients [beige] and 10.0% never refer to any sources before treating the patients [grey]

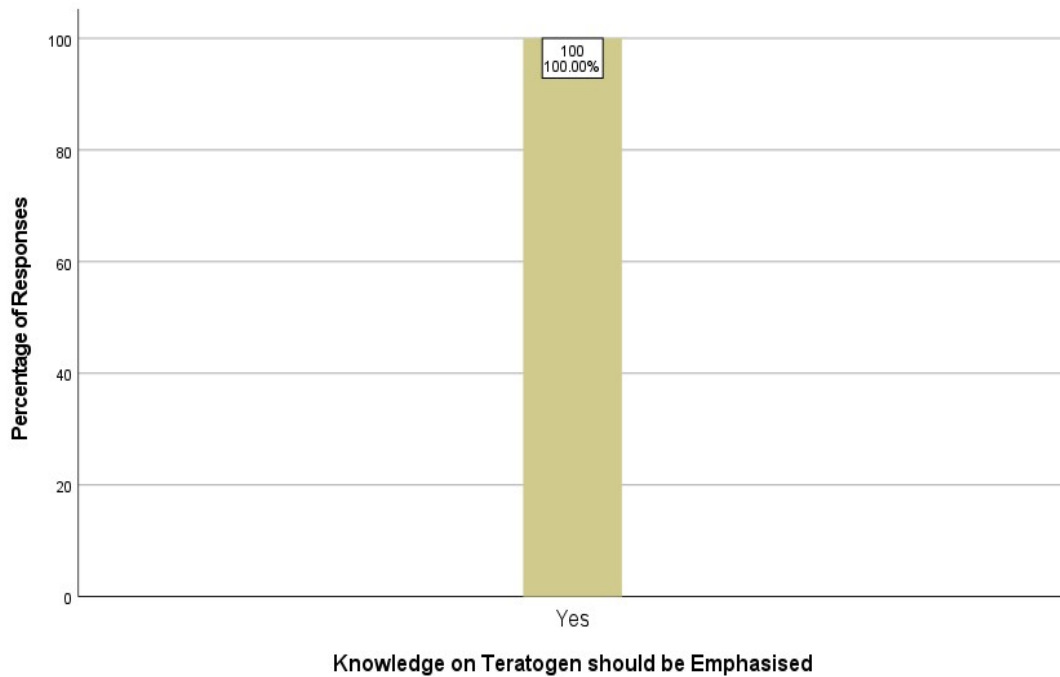


Fig. 9. A simple bar representing the percentage of responses based on teratogenic drugs. All the students agreed to when asked about emphasizing knowledge on teratogen [beige]

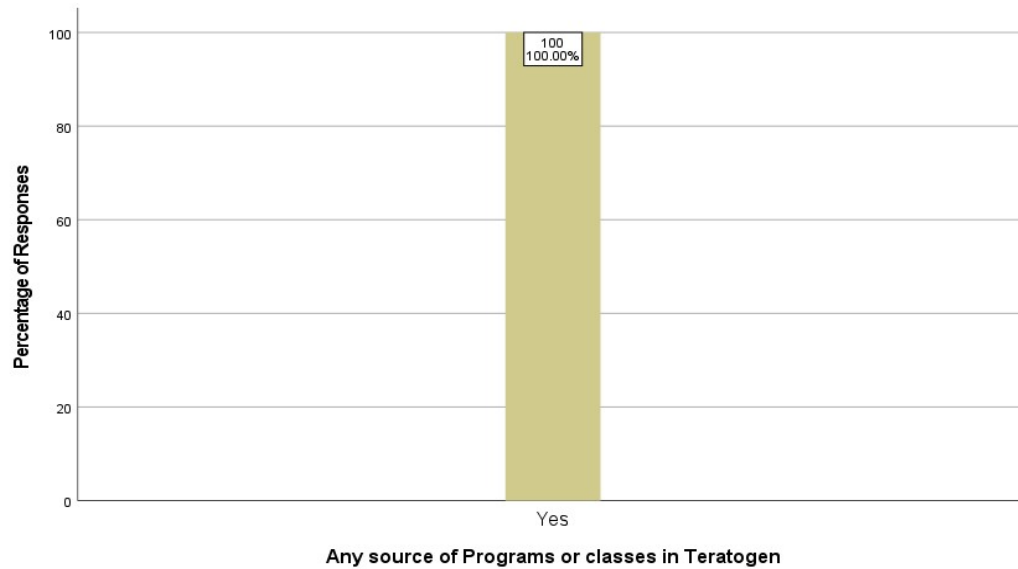


Fig. 10. A simple bar representing the percentage of responses based on teratogenic drugs. All the students were prepared to attend any source of special classes and training on teratogen if required [beige]

4. CONCLUSION

This study concluded that the majority of the students were aware of teratogenic drugs. All of them agreed that they need special training and classes to be more efficient to treat patients. Additional impetus should be given in the curriculum about the teratogens and their deleterious effects to further foster the knowledge of dental students. Also, more robust continuing education programs should be initiated to further enhance the understanding of teratogenic drugs.

CONSENT

After obtaining ethical approval and informed consent, the questionnaire was distributed to the participants. The responses obtained were transferred to excel sheets where it was segregated and tabulated accordingly.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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