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Awareness of Immunosuppressant Drugs among Dental Students - A Cross-sectional Survey

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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

Drugs to suppress the human immune response in cases of organ transplants and autoimmune disorders have been used for more than half a century. Such agents are essential for treating patients who have received organ transplants or suffer from autoimmune diseases. The main drawback to the early immunosuppressive agents was their lack of specificity. As the understanding of immune system response at the cellular and molecular levels evolved, newer and more specific agents were developed that targeted particular components and elements of the immune response. While these newer immunosuppressive agents are not without potential adverse effects, their efficacy and safety have improved greatly when compared to earlier agents. Therapeutic guidance for the clinician is needed to handle those drugs. In dentistry, care should be taken for patients on immunosuppressive drugs. Hence knowledge about immunosuppressive drugs is needed to be known by the dental practitioners also to provide a proper treatment that benefits the patient. The study was conducted as a cross-sectional survey among 100 dental students pursuing the final year and internship in Chennai city. A self-assessed questionnaire containing 10 questions eliciting information about the knowledge of immunosuppressive drugs

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were framed. The responses obtained from the participants were compiled, processed further, and analyzed. Various studies were referred to gain more knowledge to improvise the study. The aim of the study is to assess the knowledge of students about immunosuppressant drugs.95.0% of the students knew about immunosuppressant drugs This study concluded that knowledge about immunosuppressive drugs is adequate. Dental awareness programs or lectures if arranged to address this concern may give additional knowledge and so as to ease their practices and pave more comfort for the patient.

Keywords: Awareness; immunosuppressants; immune deficiency.

1. INTRODUCTION

Immunosuppressants are drugs or medicines that lower the body's ability to reject a transplanted organ. Another term for these drugs is anti-rejection drugs. Immunosuppressant drugs are used to treat autoimmune diseases [1]. With an autoimmune disease, the immune system attacks the body's own tissue. Because immunosuppressant drugs weaken the immune system, they suppress this reaction. This helps reduce the impact of the autoimmune disease in the body [2]. Immunologically mediated mucocutaneous diseases constitute a large group of oral mucosal disorders that compromise the quality of life of patients due to their chronicity and are triggered by cellular or humoral responses directed against epithelial or connective tissues in a chronic, recurrent pattern. .Adequate function of the immune system is a prerequisite for any non-compulsory surgery. The immune system's inflammatory response plays a pivotal role in targeting infections as well as in orchestrating healing processes.

Immunosuppressants are agents used to suppress the overactive immune system causing damage to the host as in autoimmunity and hypersensitivity. Traditional agents used for immunosuppression are glucocorticoids, acting both systemically or topically as anti-inflammatory immunosuppressants. Glucocorticosteroids exhibit intervention at several points in the immune response and appear to affect many aspects of inflammation. In fact, corticosteroids have evolved and emerged as the mainstay of therapy for numerous oral lesions and conditions with an allergic, immunologic, or inflammatory basis and also have deleterious effects on fertility, pregnancy outcomes, and the unborn child.

Transplant is the replacement with therapeutic purposes, of organs, tissues or cellular material for others, from a donor. Due to the frequency of transplants that are performed actually, it is common to find these patients in dental clinics, therefore the dentist must understand the special dental management that should be carried out on these patients. It has been shown that after transplant there is an increased risk of malignant oral lesions. A greater predisposition to epithelial dysplasia and carcinoma of the lip has been observed. There have been several cases of squamous cell carcinoma and Kaposi's sarcoma in areas of gingival hyperplasia induced by treatment with cyclosporine. There is an increased prevalence of oral candidiasis and the cause is usually the species Candida albicans, has been observed. Cytomegalovirus infection (CMV) is common in the first months after transplant. The herpes simplex virus and varicella-Zoster have also been observed in these patients. In addition, prolonged immunosuppression makes them more vulnerable to humans. Another side effect of the use of cyclosporine is gingival hyperplasia.

Long-term use of corticosteroids, as required in these disorders, results in several adverse effects, including gastric ulcer or upper gastrointestinal bleeds, hyperglycemia, hypertension, myopathy, osteoporosis, altered response to physical stress, adrenal insufficiency, opportunistic infections, Cushingoid habitus, cataract, and glaucoma. A common side-effect of many immunosuppressive drugs is immunodeficiency, because the majority of them act non-selectively, resulting in increased susceptibility to infections and decreased cancer immunosurveillance. There are also other side-effects, such as hypertension, dyslipidemia, hyperglycemia, peptic ulcers, lipodystrophy, moon face, liver and kidney injury.

Previously our department has published extensive research on various aspects of prosthetic dentistry [3–13], this vast research experience has inspired us to research about the knowledge of dental students on immunosuppressant drugs.

2. MATERIALS AND METHODS

2.1 Study Design

Cross-sectional study.

2.2 Study Setting

It was an online-based questionnaire that was given among dental students of Saveetha Dental College, Chennai.

2.3 Sample Size and Sampling

The total sample size was 100, which involved the final years and interns. The sample size was obtained based on a pilot sample study involving 30 participants. Based on the statistical inputs it was reworked to 100 samples.

2.4 Survey Instrument

The self made questionnaire contained 10 awareness questions, apart from the general demographic details of study participants, like name, age, gender. The questions were close-ended, and depending upon the number of correct responses, they were grouped into yes and no. The questionnaire was administered in Google forms to general practitioners. The self made questionnaire validation was done giving the survey to 10% of the study population.

2.5 Data Collection and Statistical Analysis

The responses were transferred to excel sheets where it was segregated and tabulated accordingly. The data was further transferred to SPSS software version 25 for statistical analysis; the independent variables were age, gender education. The dependent variable was awareness. Descriptive statistics with percentages was used to express the results. A positive response to 80-100% of questions was considered adequate,60-80% was considered moderate and below 60 % was considered inadequate.

3. RESULTS AND DISCUSSION

95.0% of the students knew what immunosuppressant drugs were and 5.0% did not know what it was .96.0% of the dental students knew that immunosuppressants can be a drug and 4.0% said no. 87.0% of the students were taught about the term immunosuppressant while 13.0% were not.66.0% of the students were aware that the drug would cause immunosuppression and 34.0% don't know it would cause immunosuppression. 65.0% of the students knew that intake of immunosuppressant would cause oral effects and 35.0% were not aware. 61.0% of the students were ready to treat immunocompromised patients with proper protocol and 39.0% believed they could not .84.0% of the students were aware that transplant recipients and autoimmune disorder patients are under immunosuppressive drugs and 16.0% of them were not aware.88.0% agreed that more knowledge should be emphasized about these drugs and 12.0% denied it. 63.0% of the students wanted to attend any source of program or classes conducted about immunosuppressive drugs to educate themselves while 37.0% did not want any classes (Figs. 1-10).

In a questionnaire-based survey conducted among dentists, it was found that there was a significant knowledge gap regarding the safety and use of Tc's among them. The study also concluded that this is modified by adequate awareness programs preferably by dermatologists [14]. Study concluded that they had short gaps in knowledge regarding the use of topical corticosteroids [15].

Another study from Saudi Arabia also concluded that the knowledge of primary care physicians regarding TCS is inadequate [16]. In our study 38.2% of the respondents agreed that they had given advice regarding topical treatment to the patients. More than 30% of multiple sclerosis in France are treated with immunosuppressant drugs in some countries their treatment hardly prescribed [17].

Wrong drug posology (50%) was the most frequent prescription error done by students which is in total agreement with previous studies. This is a serious issue, in view of the fact that it affects patient health and safety. Not knowing what to prescribe, Not knowing brand names, Improperly filled out prescriptions is a common problem and in addition compromises patient safety. without asking about patients' allergies, the wrong duration of administration will unquestionably lead to therapeutic failure and this could worsen the patient's condition and may

result in toxicity [18]. The use of immunosuppressants by transplanted patients and those with auto-immune diseases are partly responsible for their longer survival, however, the use of immunosuppressants may influence bone metabolism [18].

Immunosuppressant activity with Rapamicine for long periods [1] or in high doses increases bone remodeling and inhibits longitudinal bone growth, reducing the speed of growth by around 30 to 50%, [19] in addition to inhibiting different cell types, including smooth muscle vascular cells and fibroblasts that are not part of the immune system [12]. Other immunosuppressants such as Mycophenolatemofetil and Azathioprine showed no deleterious effects on bone mineral density [20].

Immunosuppressive drugs have some adverse effects on insulin cells. R et al tested immunosuppressive drugs, including sirolimus, tacrolimus, mycophenolate mofetil (MMF), daclizumab and their combinations in parallel culture wells through either the expansion phase (5–7 days) or the entire culture period (4–5 weeks). MMF, alone or in combination with sirolimus or tacrolimus, severely hampered islet duct-cell proliferation by 8-fold during the expansion period, and significantly reduced the total DNA content by about 40% after 5-week culture [21]. Hence dental students should be aware of all these effects of these drugs while treating patients under immunosuppressive drug therapy. Future studies consisting of knowledge attitude and practice questions would benefit and give clear wisdom of immunosuppressant drugs.

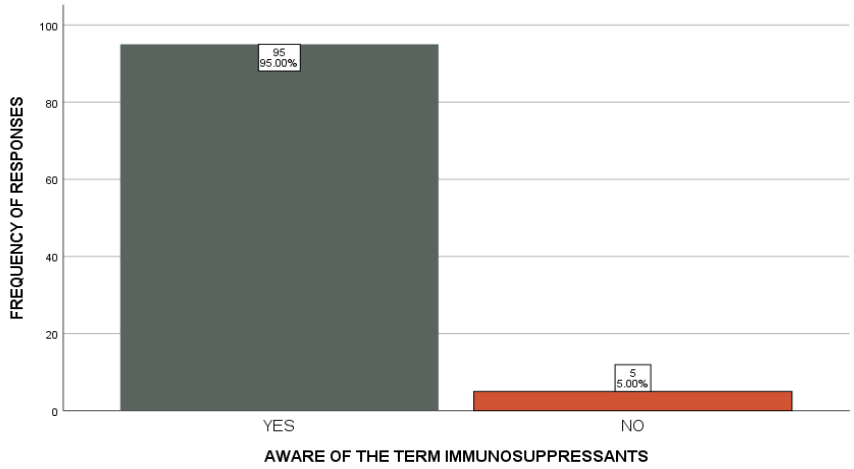

Fig. 1. A simple bar representing the frequency of responses based on immunosuppressants. 95.0%of students aware [grey] about the term immunosuppressive drug and 5.0% were not [brown] aware

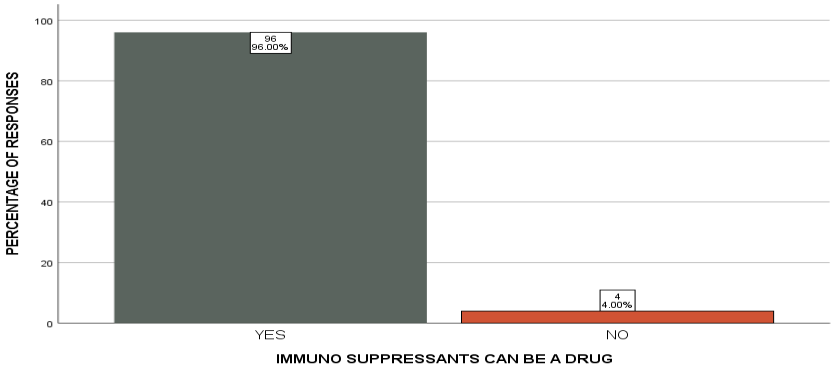

Fig. 2. A simple bar representing the frequency of responses based on immunosuppressants can be in the form of drugs.96.0% of the students [grey] know that immunosuppressants can be a drug 4.0% were not aware [brown] that it can be a drug too

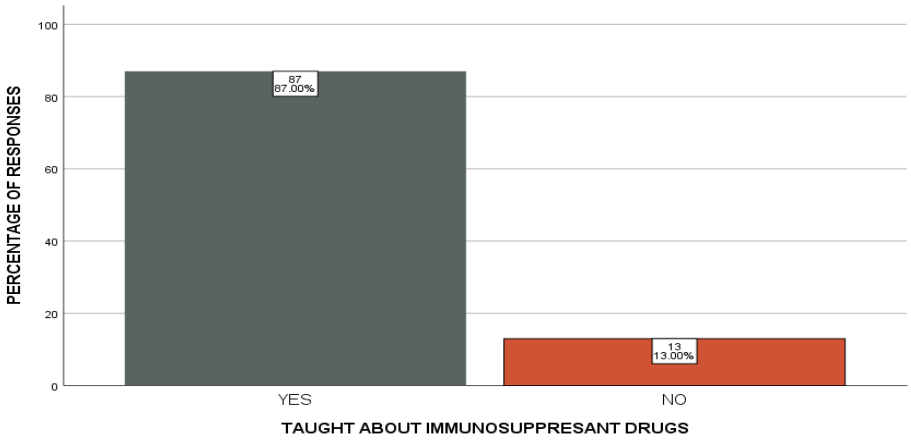

Fig. 3. A simple bar representing the frequency of responses based on the knowledge on immunosuppressants.87.0% of the students [grey] were taught about the term immunosuppressive drug and 13.0% were not [brown] taught about them

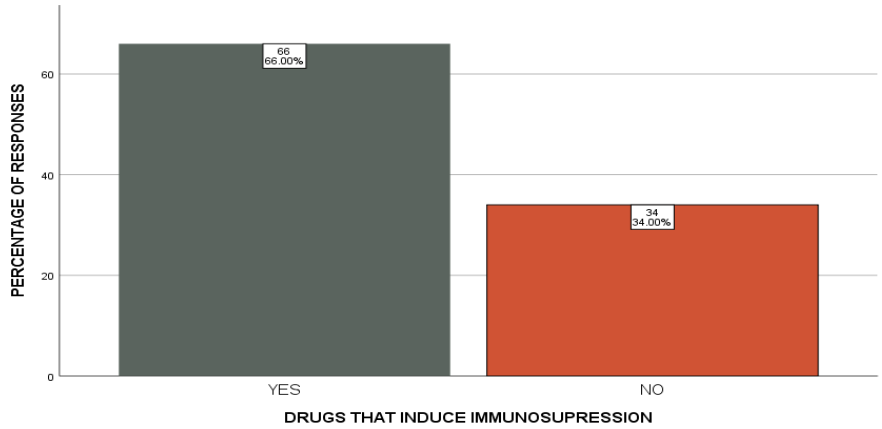

Fig. 4. A simple bar representing the frequency of responses based on drugs that cause immunosuppression. 66.0% of the students [grey] know the drugs that induced immunosuppression and 34.0% did not know [brown] the drugs that can induce immunosuppression

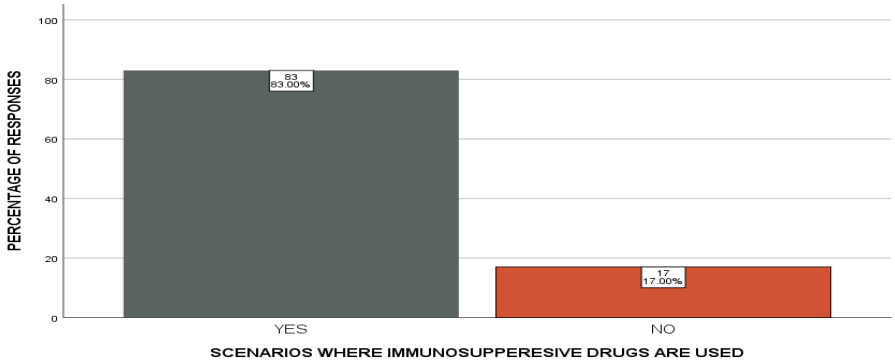

Fig. 5. A simple bar representing the frequency of responses based on immunosuppressants usage. . 83.0% of the students [grey] know where an immunosuppressive drug should be used and 17.0% didn't know [brown]

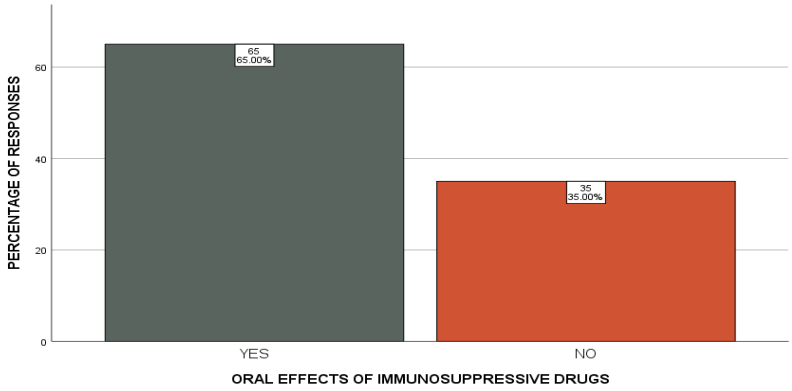

Fig. 6. A simple bar representing the frequency of responses based on the oral effects immunosuppressants. 65.0% of the students [grey] know the oral effects caused by immunosuppressive drug and 35.0% didn't know [brown] the oral effects caused by them

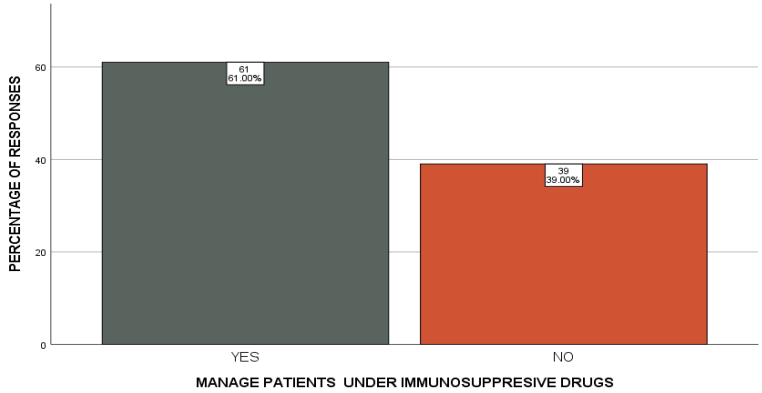

Fig. 7. A simple bar representing the frequency of responses based on managing patients under immunosuppressants drugs. 61.0% of the students [grey] were prepared to manage patients under immunosuppressant drugs and the 39.0% were doubtful [brown]

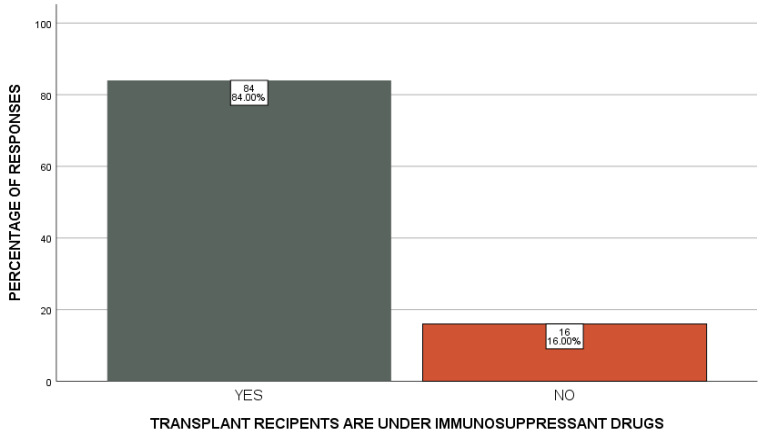

Fig. 8. A simple bar representing the frequency of responses based on knowledge of transplant recipients under immunosuppressant drugs. 4.0% of the students [grey] know that transplant recipients were under immunosuppressive drug and 16.0% didn't know [brown] that transplant recipients will under immunosuppressive drugs

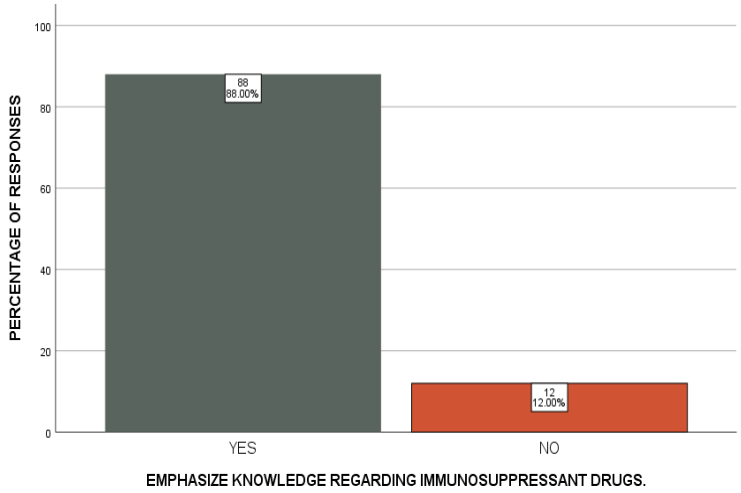

Fig. 9. A simple bar representing the frequency of responses based on acquiring knowledge regarding immunosuppressants. 88.0% of the students [grey] felt knowledge about immunosuppressant should be emphasized more and 12.0% of the students thought it was not needed [brown]

Fig. 10. A simple bar representing the frequency of responses based on immunosuppressants. 63.0% of the students [grey] wanted extra training/special programme regarding immunosuppressive drugs and the 37.0% did not wish for it [brown]

4. CONCLUSION

This study concludes that knowledge about immunosuppressive drugs is adequate. However, more continuing dental education and awareness programs or lectures if arranged may further provide additional knowledge about immunosuppressive drugs that will empower the dental students to provide more comprehensive care to the patients.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

The ethical board of clearance was obtained from the scientific review board of Saveetha University.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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