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Awareness on Complications Induced by Corticosteroid Therapy Among Dental Students

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ABSTRACT

Corticosteroids are one of the widely used drugs in dentistry. These are immunosuppressive agents. The reason for its use is its anti-inflammatory as well as immunosuppressive properties. Corticosteroids have revolutionized the management of several disabling conditions, but its use in terms of dosage is inappropriate. Therefore, the aim of the present study was to analyse the awareness of complications induced by corticosteroid therapy among dental students. An online survey of 15-20 questions based on the awareness of corticosteroid complications has been prepared and uploaded online and circulated among 100 dental students. And the mean values were evaluated from the following responses. From the observed results of the survey among the 100 dental students 80% were almost aware of the complication induced by corticosteroid complications. And the remaining 20% of the individuals had very less knowledge comparatively. Corticosteroids are regarded as double-edged swords to the patients. Despite its various advantages, they also have severe side-effects. These drugs are one of the most misused drugs in the form of dosage. This present study concludes awareness levels were adequate and created awareness on the complications induced by corticosteroid among the dental students.

KEY WORDS: CORTICOSTEROID, COMPLICATIONS, ANTI-INFLAMMATORY, IMMUNOSUPPRESSANTS.

INTRODUCTION

Over the past 60 years, Glucocorticoids (GC) continue to be widely used in treating inflammatory diseases since their discovery (Hench, 1950). Oral GCs, most commonly have been prescribed in the context of respiratory disease. (van Staa, 2000). Corticosteroids have many side effects, including potentially life-threatening such as cardiovascular events and infections to less serious effects such as bruising, skin thinning and fat redistribution (Davis et al., 2007). Previous research has focused more on the serious side effects than the 'less serious' side effects which may be important to the patient and have the potential to markedly impair quality of life in patients. Moreover, patients may prefer not to take glucocorticoid therapy because of concerns regarding the possible side

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effects. Till date, only a few studies have investigated which side effects which are important to patients. (Davis et al., 2007; Forss et al., 2012). Osteoporosis was in the top three most important side effects, however these findings have not been consistent. One study stated 'diabetes/glucose intolerance' was ranked third most important, while in another 'trouble with blood glucose levels/diabetes' was 12th of side effects that bothered patients a lot.(van Staa et al., 2000).

Figure 1: Pie chart representing the awareness on usage of corticosteroids in the field of dentistry. Blue colour denotes the percentage of participants who agreed that corticosteroids were used as immunosuppressant (23.0%), red denotes the participants who agreed to corticosteroids were used as anti-inflammatory drug (43.0%) and green denotes the participants who agreed to corticosteroids were used as both immunosuppressant and anti-inflammatory agent (34.0%) in the field of dentistry

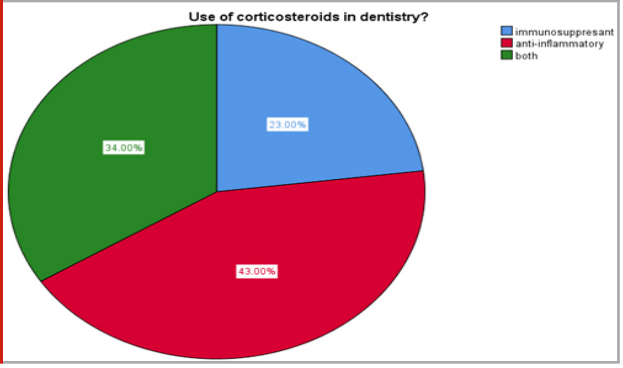
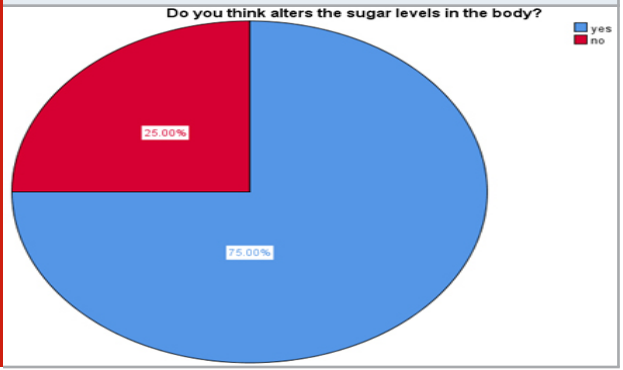


Figure 2: Pie chart depicting the awareness on corticosteroid altering the sugar levels. Blue denotes the participants who agreed that corticosteroids alters the sugar levels in the body (75.0%) and red denotes the participants who agreed that steroid does not alter the sugar levels in the body (25.0%)



Steroids are substances that are naturally produced in the human body. These are one of among the widely prescribed drugs in both medical and dental fields. The most commonly used steroids are hydrocortisone, dexamethasone, methylprednisolone, prednisolone, etc. Patients presenting with a history of corticosteroid usage may require special consideration before receiving any dental treatment. Currently, the misuse of steroids is due to its overdosage as it is been prescribed even before minor dental procedures. The risks that are associated with excess glucocorticoid administration are relatively small which includes impaired electrolyte balance and hypertension.

Figure 3: Pie chart depicting the awareness of individuals on corticosteroids and diabetes. Blue denotes the participants who agreed to corticosteroids causes diabetes (24.0%), red denotes the participants who disagreed that corticosteroids causes diabetes (21.0%) and green denotes the number of participants who were doubtful whether steroid administration would lead to diabetes or no (55.0%)

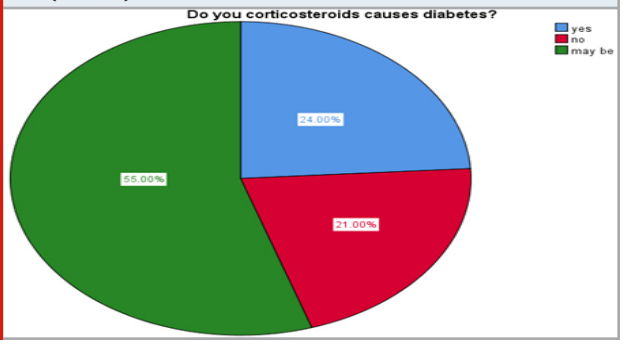
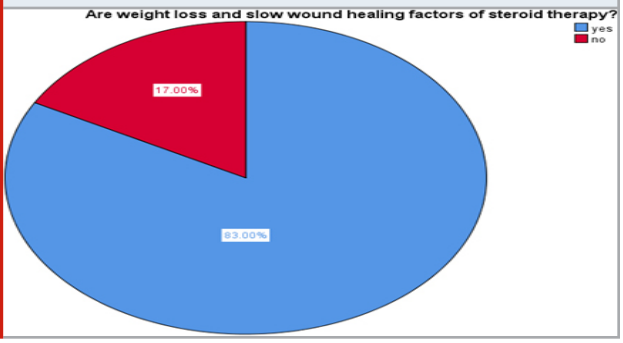


Figure 4: Pie chart depicting the awareness on factors associated with steroid therapy such as weight loss and wound healing. Blue denotes the participants who agreed to weight loss and slow wound healing are factors of steroid therapy (83.0%) and red denotes the participants who disagreed to weight loss and slow wound healing are factors of steroid therapy (17.0%)



Steroids have shown adequate effects on root resorption ((Sambandam and Neelakantan, 2014). In intracanal medications such as ledermix paste, it reduces pulpal inflammation as well as root resorption. Zinc oxide eugenol along with steroids is also used as root canal sealer. In cavity liners, when steroid is mixed with chloramphenicol and gum camphor to reduce mainly postoperative thermal sensitivity. In orthodontic treatment, it has been reviewed to show a lower amount of tooth movement. Therefore, it is essential that the patients are being consulted on their prior history of corticosteroids usage. (Dr.horiyah et al., 2020). Steroids are used after oral surgical procedures to limit the

postoperative inflammation. Topical use of steroid helps to prevent ulceration and excoriation which results during retraction during surgery over the lips and corners of the mouth (Hooley and Hohl, 1974). The anti-inflammatory property of steroids shows a direct healing action (Borle and Borle, 1991). Due to anti-inflammatory action of steroids, it is used to reduce swelling and persistent edema (Rogers, 1996).

Previously our department has published extensive research on various aspects of prosthetic dentistry ('Evaluation of Corrosive Behavior of Four Nickel–chromium Alloys in Artificial Saliva by Cyclic Polarization Test:An in vitro Study', 2017; Ganapathy, Kannan and Venugopalan, 2017; Jain, 2017a, 2017b; Ranganathan, Ganapathy and Jain, 2017; Ariga et al., 2018; Gupta, Ariga and Deogade, 2018; Anbu et al., 2019; Ashok and Ganapathy, 2019; Duraisamy et al., 2019; Varghese, Ramesh and Veeraiyan, 2019), this vast research experience has inspired us to research about the awareness of complications induced by corticosteroid therapy among dental students.

Figure 5: Pie chart depicting the awareness about corticosteroids and infections. Blue denotes the participants who agreed that patients under steroid therapy are at higher risk of developing infections (69.0%) and red denotes the participants who disagreed that patients under steroid therapy are at high risk of developing infections (31.0%)

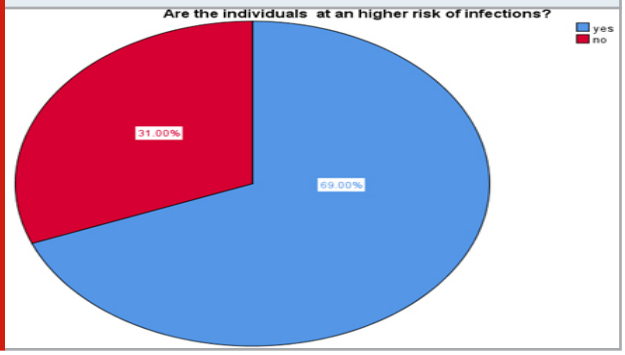
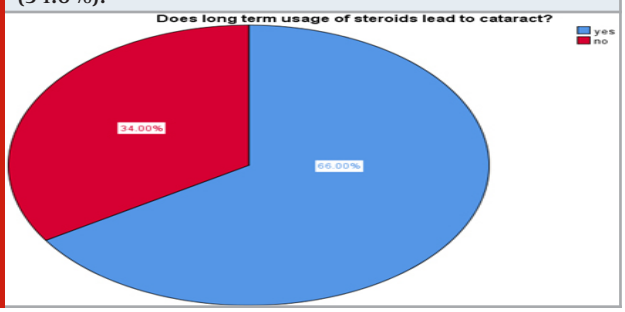


Figure 6: Pie chart depicting the awareness on corticosteroid complication (cataract). Blue denotes the participants who agreed that long term usage of steroid results in cataract (66.0%) and red denotes the participants who disagreed that long term usage of steroids resulted in cataract (34.0%).



MATERIAL AND METHODS

A cross-sectional questionnaire survey was carried out among to assess the awareness on complications induced by corticosteroid therapy . A simple random sample was drawn to reach the required sample size of 100. A online survey of 15-20 questions based on the awareness of corticosteroid complications was been prepared and uploaded online and circulated among 100 dental students. Questionnaire based on the complications of oral corticosteroids, adverse effects of corticosteroids and the use of corticosteroid in the field of dentistry was carried out. And the mean values were evaluated from the following responses. The responses was therefore estimated by personally collecting the completely filled questionnaire from the 100 participants.

Figure 7: Pie chart depicting the awareness on the alterations in blood pressure associated with steroid therapy. Blue denotes the participants who agreed that steroids alter the range of blood pressure (64.0%) and red denotes the participants who disagreed that steroids alter the blood pressure (26.6%)

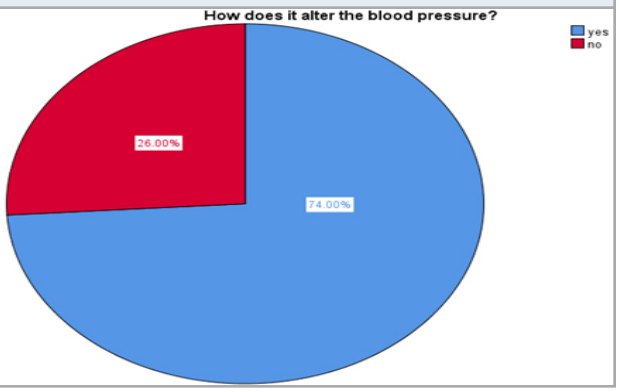
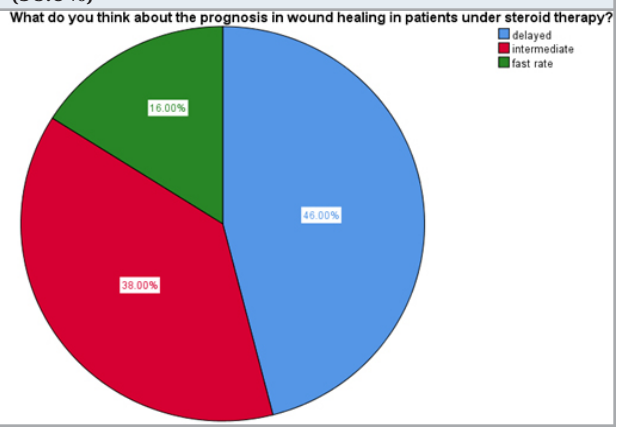


Figure 8: Pie chart depicting the awareness on prognosis of wound healing under steroid therapy. Blue denotes the participants who agreed that the prognosis of wound healing is delayed (46.0%), green denotes the participants who agreed that the prognosis is at a faster rate (16.0%) and red denotes the participants who agreed that the prognosis of wound healing is at an intermediate rate (38.0%)

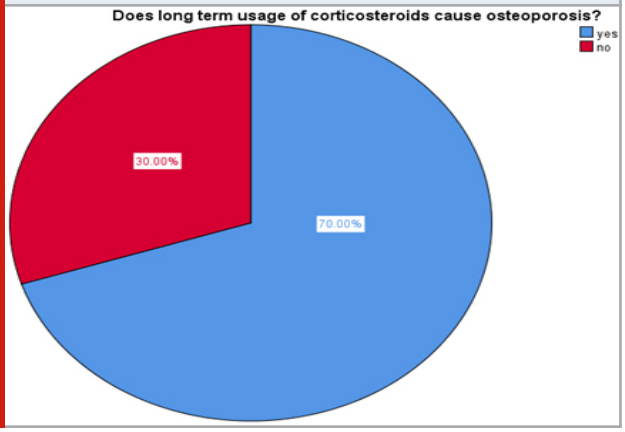


RESULTS AND DISCUSSION

From the observed results of the survey among the 100 dental students 80% were almost aware of the complication induced by corticosteroid complications. And the remaining 20% of the individuals had very less knowledge comparatively.

It is known that oral glucocorticoids have many side effects, but only few studies have investigated which matters most to the patients. Weight gain, insomnia and moon face were the side effects ranked highest, despite them being less clinically serious. This contrasted to all other communities where weight gain was the most important side effect overall taken in the previous studies. Most clinicians and patients make treatment decisions after weighing the benefits against the possible harmful effects, considering its probability, its nature, and a value judgement of how important it is to the individual. (Herxheimer, 2005) Patients with prevalent hypertension may have considered high BP or CVD to be particularly important to them as a corticosteroid associated side effect. While previous studies have estimated the frequency of side effects, few have considered how important they are to the patients. (Herxheimer, 2005) Patients value judgements about a given side effect which will further influence their decisions about treatment and adherence.

Figure 9: Pie chart depicting the awareness of complication induced by steroids (osteoporosis). Blue denotes the participants who agreed that corticosteroids cause osteoporosis (70.0%) and red denotes the participants who disagreed that corticosteroids cause osteoporosis (30.0%)



(Morrison, 2003) Osteoporosis was 'the most worrisome' side effect, followed by CVD, diabetes, weight gain and renal dysfunction.(van der Goes et al., 2010) The most bothersome side effects of those experienced in line with were moon face, weight gain and insomnia. (Guidry et al., 2009) Weight gain was one of the top five most worrisome side effects of corticosteroids. Weight gain is known to affect body image and self-esteem. A few studies have reported on weight gain following glucocorticoid therapy. (Curtis et al., 2006)However, studies have failed to address the sort of questions, such as the extent of weight gain with specific doses, or the likelihood of weight loss following discontinuation of steroid therapy. Few other studies have investigated insomnia in patients taking corticosteroid therapy. Further research should be informed by patients, and targeted to provide patients with better information about the side effects of higher importance.

Current evidences reveals that majority of patients with adrenal insufficiency can undergo routine, nonsurgical dental treatment without the need for supplemental glucocorticoids.(Bromberg et al., 1994) Dental procedures do not stimulate the level of cortisol production and local anesthetic blocks neural stress pathways required for adrenocorticotropic hormone secretion. (Bromberg et al., 1994; Miller, Little and Falace, 2001) Major controversy resides for patients who are undergoing any oral surgical procedures and had discontinued steroids recently. A conservative approach remains to wait 2 weeks for normal adrenal functioning to return before performing elective oral surgical procedures.(Streck and Lockwood, 1979).

Figure 10: Pie chart depicting the awareness of steroid therapy related to muscle damage. Blue devotes the participants who agreed that steroids lead to muscle damage (70.0%) and red denotes the participants who disagreed that steroids lead to muscle damage (30.0%)

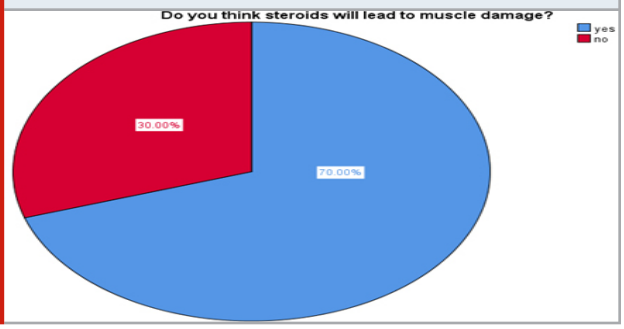
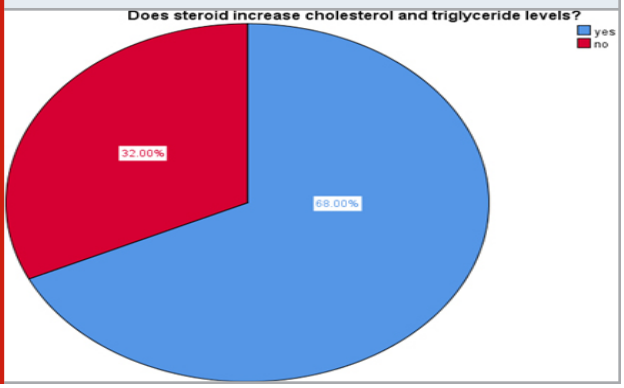


Figure 11: Pie chart depicting the awareness of cholesterol and triglyceride levels and steroid therapy. Blue denotes the participants who agreed that steroids increases the levels of triglyceride and cholesterol (68.0%) and red denotes the participants who disagreed that steroids increases the levels of cholesterol and triglycerides (32.0%)



Steroids may exacerbate the response in the following conditions. subh as in primary bacterial infection, hypersensitivity, diabetes mellitus, hypertension, osteoporosis, etc.(Bernard and Charneux, 2011) Side effects depend on duration for which steroids are given, dosage of drug as well as the route of drug administration. Other side effects of steroids include skin atrophy, precipitation of diabetic myopathy, susceptibility to infection, delayed healing of wounds, osteoporosis, osteonecrosis, ophthalmic complications, growth retardation, CNS complications, malignancy, etc. (Dahl, 2006)

Figure 12: Pie chart depicting the steroid therapy associated with complications particularly in the bone. Blue denotes the participants who agreed that steroids make the bones more fragile and prone to fracture (38.0%), red denotes the participants who disagreed that steroids causes complications in the bones and green denotes the participants who agreed that it may or may not cause changes to the bones (53.0%).

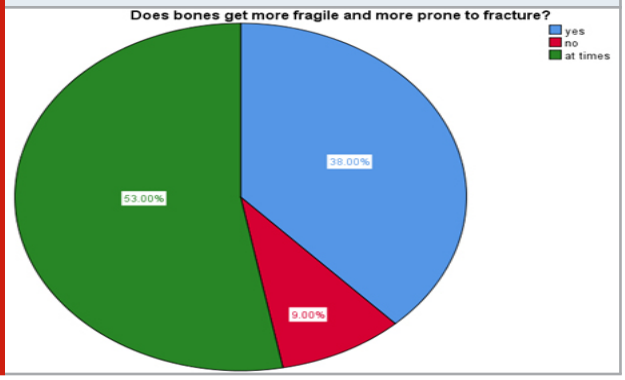
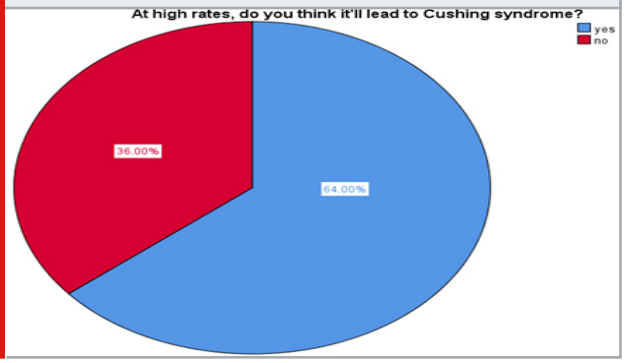


Figure 13: Pie chart depicting the awareness of participants on higher levels of corticosteroids. Blue denotes the participants who agreed that higher levels of corticosteroid administration would lead to Cushing's syndrome (64.0%) and red denotes the participants who disagreed that higher levels of steroids would lead to Cushing's syndrome (36.0%)



The usage of probiotics play a crucial role in minimizing the effects of candidiasis when any patient is under steroid therapy. Probiotics inhibits pathogenic enteric bacteria, improves epithelial and mucosal barrier function by enhancing mucus production, increasing barrier integrity and by producing short chain fatty acids and finally it alters immune regulation by stimulating secretory immunoglobulin a production, decreasing tumor necrosis factor expression, by inducing interleukin-10. (Sartor and Balfour Sartor, 2004)

Figure 14: Pie chart depicting the awareness of steroid therapy associated with ulcers and developmental of gastritis. Blue denotes the participants who agreed that the patients under steroid therapy are more prone to develop ulcers and gastritis and red denotes the participants who disagreed that the patients under steroid therapy are more prone to develop ulcers and gastritis (31.0%)

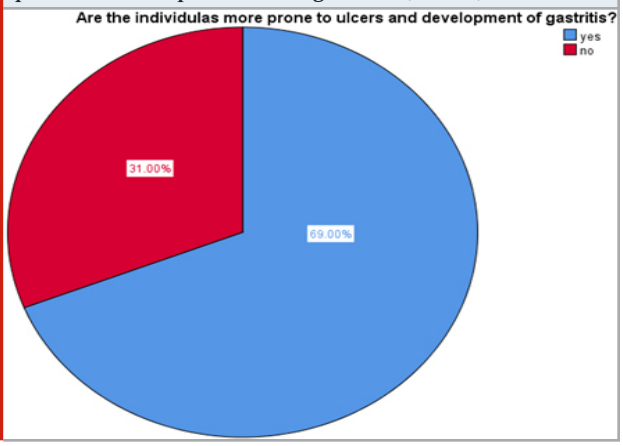
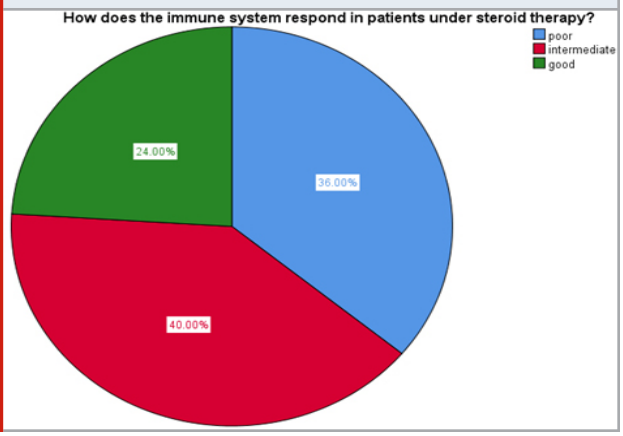


Figure 15: Pie chart depicting the awareness of the immune system of patients undergoing steroid therapy. Blue denotes the participants who agreed that the immune system of patients under steroid therapy would be poor (36.0%), green denotes the participants who agreed that the immune system would be good (24.0%) and red denotes the participants who agreed that the immune system in patients undergoing steroid therapy would be intermediate (40.0%).



CONCLUSION

Corticosteroids are regarded as double-edged swords to the patients. Despite its advantages, they also have numerous side-effects. Corticosteroids are one of the most misused drugs in the form of dosage. The present

study highlights its complications and awareness among the dental students.

Conflict of Interest: The authors declare that there were no conflicts of interest in the present study.

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