Drug prescribing practices require continuous updates in knowledge that can be achieved by adopting drug utilization research. This will help in the rational use of drugs, thus avoiding the over-, under-, or misuse of drugs.

Drug treatment is part of the care of dental patients. Studies have indicated that one-fourth of routine dental care patients receive prescription drugs. Dentists most commonly prescribe drugs to reduce pain and/or combat infection.

Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly prescribed in various dental emergencies and following dental surgical procedures to control pain and reduce edema of the oral tissues. NSAIDs are drugs with high efficacy and safety profile if used appropriately. Inappropriate use of these drugs can lead to adverse effects, including increased risk of bleeding from the gastrointestinal tract.

Dentists prescribe antibiotics for the treatment of odontogenic and non-odontogenic infections and preventing focal and local oral infections. The use of antibiotics is sometimes associated with adverse events, including gastrointestinal disturbances, anaphylactic shock, and development of resistance. In some countries, many dentists prescribe antibiotics unnecessarily, for too long, and/or at excessive doses.

There is a strong need for evidence-based guidelines for drug prescribing in dental practice that take into account the specific characteristics of the community. To the best of our knowledge, no studies have been conducted in Oman about drug prescribing patterns in dental patients. This study aimed to describe the medications prescribed to patients attending the Dental and Maxillofacial Surgery (DMS) clinic at Sultan Qaboos University Hospital (SQUH), a tertiary care medical and educational institution in Oman.
METHODS

This was a retrospective cross-sectional study covering a six-month period in 2018 (January–June) of patients who attended the DMS clinic at SQUH. DMS consists of seven clinics: emergency, pediatrics, oral and maxillofacial surgery, special needs, orthodontics, prosthodontics, and restorative.

The study focused only on the former four clinics because these clinics are expected to prescribe more drugs than the other clinics.

A sample of 400 patients who visited the DMS clinic during the study period were selected randomly for inclusion in the study. Patients’ demographic data and drug utilization data (drug name/type, route of administration, dosage, frequency, and anatomical and therapeutic class (ATC)) were collected from the SQUH electronic medical record system.

The study was approved by the Medical Research Ethics Committee at the College of Medicine and Health Sciences, Oman.

RESULTS

A total of 88 drugs were prescribed for 400 patients, out of which 190 (47.5%) were males and 210 (52.5%) were females. The majority of patients were in ≥ 12 years (284, 71.0%) age group followed by the < 12 years (n = 116, 29.0%) [Table 1]. Twelve-years old was used as a cut-off between pediatric and adult patients.

The most common diagnoses were: dental caries (n = 177, 44.3%), screening for dental disorders (n = 21, 5.3%), chronic gingivitis (n = 15, 3.8%), and pulpitis (n = 13, 3.3%) [Table 2]. The most common comorbidities in the 400 patients were anemia (n = 45, 11.3%) and diabetes (n = 21, 5.3%) followed by chronic gingivitis (n = 16, 4.0%), and hereditary factor VIII deficiency (n = 12, 3.0%) [Table 3].

Among the 400 randomly selected patients, 260 (65.0%) did not receive any drug and only 140 (35.0%) were prescribed drugs. Out of 140 patients who received drugs, only 116 (82.9%) received drugs by a dentist’s prescription. The rest of the patients (n = 24, 17.1%) received drugs by other doctors’ prescriptions for their comorbidities.

A total of 88 different drugs were prescribed for the patients. The most frequent drugs per prescription were chlorhexidine (n = 43, 37.1%) and paracetamol (n = 36, 31.0%) followed by ibuprofen (n = 10, 8.6%), and amoxicillin/clavulanate (n = 5, 4.3%) [Table 4].

As per the ATC classification, the most common anatomical classes were: alimentary tract and metabolism (n = 48, 41.4%), nervous system (n = 37, 31.9%), and musculoskeletal system (n = 14, 12.1%) [Table 5]. The most common therapeutic classes were: anti-infectives and antiseptics for local oral treatment.

### Table 1: Demographic data of study patients (n = 400).

| Variables     | Male, n (%) | Female, n (%) | Total, n (%) |
|---------------|-------------|---------------|--------------|
| Age group, years |             |               |              |
| < 12          | 67 (35.3)   | 49 (23.3)     | 116 (29.0)   |
| ≥ 12          | 123 (64.7)  | 161 (76.7)    | 284 (71.0)   |
| Total         | 190 (100)   | 210 (100)     | 400 (100)    |

### Table 2: Common dental diagnoses among study patients (n = 400).

| Diagnosis                                         | Frequency, n | Percentage, % |
|---------------------------------------------------|--------------|---------------|
| Dental caries                                     | 177          | 44.3          |
| Screening for dental disorders                    | 21           | 5.3           |
| Chronic gingivitis                               | 15           | 3.8           |
| Pulpitis                                          | 13           | 3.3           |
| Post-surgical follow up                          | 13           | 3.3           |
| Partial loss of teeth                            | 8            | 2.0           |
| Impacted teeth                                    | 8            | 2.0           |
| Temporomandibular joint disorder                 | 8            | 2.0           |
| Dental examination and cleaning                   | 7            | 1.8           |
| Others                                            | 130          | 32.5          |

### Table 3: Common comorbidities among the study patients (n = 400).

| Comorbidity                                         | Frequency, n | Percentage, % |
|-----------------------------------------------------|--------------|---------------|
| Anemia                                              | 45           | 11.3          |
| Diabetes                                            | 21           | 5.3           |
| Chronic gingivitis                                 | 16           | 4.0           |
| Hereditary factor VIII deficiency                  | 12           | 3.0           |
| Asthma                                              | 7            | 1.8           |
| Malignant neoplasm of breast                       | 7            | 1.8           |
| Chronic ischemic heart disease                     | 5            | 1.3           |
| Acute lymphoblastic leukemia                        | 5            | 1.3           |
| Chronic periodontitis                              | 4            | 1.0           |
| Others                                              | 121          | 30.3          |
Table 4: Drugs prescribed to the study patients (n = 116).

| Drug name                | Frequency, n | Percentage, % |
|--------------------------|--------------|---------------|
| Chlorhexidine            | 43           | 37.1          |
| Paracetamol              | 36           | 31.0          |
| Ibuprofen                | 10           | 8.6           |
| Amoxicillin/clavulanate  | 5            | 4.3           |
| Diclofenac               | 2            | 1.7           |
| Mefenamic acid           | 2            | 1.7           |
| Others                   | 18           | 15.5          |

Table 5: Common ATC drugs prescribed to the study patients (n = 116).

| Common prescription                  | Frequency, n | Percentage, % |
|--------------------------------------|--------------|---------------|
| **Anatomical class**                 |              |               |
| Alimentary tract and metabolism      | 48           | 41.4          |
| Nervous system                       | 37           | 31.9          |
| Musculoskeletal system               | 14           | 12.1          |
| Anti-infectives for systemic use     | 6            | 5.2           |
| Others                               | 11           | 9.5           |
| **Therapeutic Class**                |              |               |
| Anti-infectives and antiseptics for local oral treatment | 43 | 37.1 |
| Analgesics                           | 36           | 31.0          |
| Reducing hormones that reduce inflammation and pain (NSAIDs) | 10 | 8.6 |
| Antibiotics                          | 6            | 5.2           |
| Anti-inflamatory and anti-rheumatic products | 4 | 3.4 |
| Others                               | 17           | 14.7          |

*ATC: anatomical and therapeutic class; NSAID: non-steroidal anti-inflammatory drug.*

Table 6: Common ATC of drugs prescribed by medical doctors for the study patients (n = 24).

| Common prescription                  | Frequency, n | Percentage, % |
|--------------------------------------|--------------|---------------|
| **Anatomical class**                 |              |               |
| Blood and blood-forming organs       | 8            | 33.3          |
| Anti-neoplastic and immunomodulating agents | 3 | 12.5 |
| Others                               | 13           | 54.2          |
| **Therapeutic class**                |              |               |
| Anti-hemorrhagic                     | 6            | 25.0          |
| Anti-anemic                          | 3            | 12.5          |
| Others                               | 15           | 62.5          |

*ATC: anatomical and therapeutic class.*

**DISCUSSION**

This study revealed that 260 (65.0%) of the patients were not prescribed any drugs by their dentist. This is in line, or even better, with some international dental practices. A study by Carter et al. showed that about 53% of patients attending general dental practice in England were not prescribed any drugs in 2005.

The most frequently prescribed drugs in this study were chlorhexidine mouthwash, paracetamol, ibuprofen, and amoxicillin/clavulanate, respectively. These results are similar to those obtained from studies from other parts of the world, which showed that analgesics and antibiotics were the most commonly prescribed drugs by the dental team. Amoxicillin/clavulanate was the most frequently prescribed antibiotic in our study, which is similar to a study of antibiotic prescribing in dental practice in Belgium and a study conducted in Croatia that showed 60.0% of doctors prescribed amoxicillin/clavulanic acid. Furthermore, a study of therapeutic antibiotic prescribing in National Health Service general dental practice in England revealed that the most frequently prescribed antibiotic was amoxicillin. In Scotland, it was recorded that 17 types of antibiotics were prescribed by general dental practitioners, in which amoxicillin accounted for 1743 prescriptions and amoxicillin, metronidazole, and penicillin V accounting for almost 90% of the prescriptions.9

Unlike a study conducted in Merseyside, UK, in which over 80% of patients came to the dental clinic with a localized dental infection or dental abscess, our study showed that most patients...
(44.3%) who attended to the clinic were diagnosed with dental caries. In contrast, periodontal and gum diseases were the commonest diagnoses for patients attended a dental clinic in Nigeria (68.1%). This difference in the pattern of diseases presenting to the dental clinic is reflected in the percentage and type of specific drugs prescribed to these patients in different studies.

The most common anatomical class of prescribed drugs in our study was alimentary tract and metabolism. A study conducted in the UK showed that cardiovascular system drugs were the commonest class of drugs seen in dental patients. Among the 400 patients, those who needed analgesics were commonly prescribed paracetamol. Unlike our result, a study in Kuwait showed that the most common analgesic prescribed was diclofenac.

Currently, there are no standard treatment guidelines in Oman related to the use of antibiotics in dental patients. This study and other similar local studies would pave the way for standardized treatment guidelines.

**CONCLUSION**

The drug prescribing pattern in the DMS clinic at SQUH was within the international norms. Sixty-five percent of the patients were not prescribed any drug by the dental team. Oral antiseptics, analgesics, and antibiotics were the most common drugs prescribed by dentists.

**Disclosure**

The authors declared no conflicts of interest. No funding was received for this study.

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