

MANAGEMENT OF ORAL ULCERS AND ORAL THRUSH BY COMMUNITY PHARMACISTS

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KEYWORDS

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ABSTRACT

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Oral ulcers and oral thrush could be indicative of serious illnesses such as oral cancer, HIV and other sexually transmitted infections (STIs), among others. There are many different health care workers that can be approached for advice and/or treatment for oral ulcers and oral thrush (sometimes referred to as mouth sores by patients), including pharmacists. In fact, the mild and intermittent nature of oral ulcers and oral thrush may most likely lead the patient to present to a pharmacist for immediate treatment. In addition, certain aspects of access are exempt at a pharmacy such as long queues and waiting times, the need to make an appointment and the cost for consultation. Thus pharmacies may serve as a reservoir of undetected cases of oral cancer, HIV and other STIs.

Aim: To determine how community pharmacists in the Western Cape manage oral ulcers and oral thrush. **Objectives:** The data set included the prevalence of oral complaints confronted by pharmacists, how they manage oral ulcers, oral thrush and mouth sores, their knowledge about these conditions, and the influence of socio-economic status (SES) and metropolitan location (metro or non-metro) on recognition and management of the lesions. **Method:** A cross-sectional survey of community pharmacists in the Western Cape was conducted. A random sample of pharmacies was stratified by SES (high and low), and metropolitan location. A structured questionnaire was used to conduct a telephonic interview. The questionnaire was faxed to pharmacists 24 hours prior to the interview. Pharmacists were also telephoned 24 hours prior to the interview, but after the questionnaire was faxed, in order to gain informed consent for participation in the study, and to confirm a convenient time to conduct the interview. **Results:** Two thirds (63%) of pharmacists managed oral problems nearly everyday, and 30% managed these more than once a week. More pharmacists in high SES (73%) areas managed oral problems nearly everyday (Fisher Exact, $p=0.0005$). Just over

half (56%) and 49.2% of pharmacists said that ulcers and thrush, respectively, was the most common oral problem that they encounter. The prevalence of oral thrush was significantly higher in non-metro areas (58%) (RR=0.7 (0.5-1.0) Chi Squared=4.0, p=0.04), and it was also significantly lower in low SES areas (RR=1.6 (1.1-2.4), Chi Squared=6.5, p=0.01). Half the pharmacists reported that they would manage the patient comprehensively. Most would take a history but the quality of the history is poor, thereby compromising their ability to manage these cases appropriately. Only a third would refer a simple oral ulcer, thrush or mouth sore to a doctor/dentist but all pharmacists would have referred a long-standing ulcer to a doctor/dentist. In terms of knowledge, only 33% of pharmacists were aware that oral ulcers and thrush could be indicative of HIV infection, and only 8% linked oral ulcers with oral cancer. There was no discernable pattern of management of oral ulcers and thrush, or of knowledge of the link between these lesions with underlying diseases, by SES and metropolitan locations (Chi Squared, Fisher Exact, p>0.05). **Conclusion:** The result of this study strengthens the current view of pharmacists as oral health advisors as they encounter oral problems regularly, most commonly oral ulcers and oral thrush. Therefore, the pharmacist can play an important role in the early detection of HIV and oral cancer. However many pharmacists fail to refer these cases to a dentist. Most pharmacists lacked specific knowledge about the relationship of oral ulcers and thrush with underlying conditions, which may explain why many pharmacists are not managing these cases correctly. There is a definite need to train pharmacists at both an under- and post-graduate level with specific emphasis on the proper management of oral ulcers, oral thrush and mouth sores, as well as comprehensive training that outlines why vigilant management of oral ulcers and oral thrush is necessary.

DECLARATION

I declare that *The Management of Oral Ulcers and Oral Thrush by Community Pharmacists* is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Feroza Amien



Signed:

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CHAPTER 1. INTRODUCTION

There are many oral conditions that have a serious impact on mortality and quality of life of affected individuals and society at large, including caries, periodontal disease, head and neck trauma, sexually transmitted infections (STIs), and oral cancer, among others. These are important public health problems, and early detection and management can prevent disability and/or death. These oral conditions present in a variety of ways, the nature of which will determine the type of help sought. There are many different health care workers (both formal and informal, such as traditional healers) that can be approached for advice and/or treatment for these conditions (Cohen and Manski, 2006), including pharmacists (Dickenson *et al*, 1995; Chestnutt *et al*, 1998).

Some of these conditions, such as head and neck trauma, are acute and present with signs and symptoms that would lead the patient to seek immediate treatment from a medical doctor or emergency room. Therefore the pharmacist would probably not encounter such cases. Other conditions, such as caries and periodontal disease, may cause sensitivity and pain to varying degrees, ranging from mild intermittent toothache to severe pain that drastically affects the quality of life of the patient. These patients may present to one or more of a variety of health care professionals. Some sexually transmitted infections such as syphilis, gonorrhoea and HIV may present with oral lesions such as oral thrush and oral ulcers (Arendorf *et al*, 1998; Bruce and Rogers, 2004; Leão, 2006). Oral ulcers and oral thrush are usually self-limiting; however a non-healing ulcer could be indicative of oral cancer (Challacombe and Shirlaw, 1992). Generally, oral ulcers and oral thrush may be asymptomatic or can cause pain, discomfort, and eating difficulties. Oral thrush may also affect taste and/or induce a burning sensation in the mouth (Arendorf *et al*, 2000). The mild and intermittent nature of these symptoms, may lead the patient to bypass other health care workers, and present to a pharmacist instead for immediate treatment (Dickenson *et al*, 1995; Chestnutt *et al*, 1998).

Studies have shown that pharmacists are confronted with oral problems nearly everyday, probably because they are easily accessible to the general public, and they are available throughout the working day with no need for appointments (Leonard *et al*, 1996; Gilbert, 1997). Over the years, the role of pharmacists has evolved from a narrow job description of drug-dispensing, to that of a health care professional that provides a valuable service to the community which includes general health advice, as well as health promotion and prevention activities (Lombard, 1991; Gilbert, 1998a; Beney *et al*, 2000). This expanded role of pharmacists has led to an expanded definition of pharmacists/retail pharmacists to 'community pharmacists'. Consequently, the term 'community pharmacist' will be used throughout the text. The most common oral problem that community pharmacists encounter is oral ulcers (Dickinson *et al*, 1995; Gilbert, 1998b). Many patients also present to community pharmacists complaining of a 'mouth sore' (Gilbert, 1998a) and oral thrush (Dickinson *et al*, 1995). A mouth sore is a colloquial; non-descript term for an oral lesion that may cause pain or discomfort, therefore this category of oral lesions may include oral ulcers and oral thrush (JADA, 2002)¹. The community pharmacist has a definite role to play in both the recognition and the management of oral thrush and oral ulcers as they have important implications for the detection of serious oral diseases such as sexually transmitted infections (especially HIV, gonorrhoea and syphilis) and oral cancer.

To date there have been not been any South African studies, and only a few internationally based studies to determine the pharmacists' role in oral cancer detection, nor have there been any studies regarding the management of oral ulcers and oral thrush as an avenue for HIV prevention. A strong motivating factor for this study was the paucity of literature on these issues together with the serious consequences of sexually transmitted infections (especially HIV), and oral cancer. This report outlines a study that was conducted to determine how pharmacists manage oral ulcers, oral thrush and mouth sores in the Western Cape.

¹ Author details of this article were not specified. This article is a column in the Journal of the American Dental Association, which serves as an educational pamphlet for dentists to distribute to their patients.

CHAPTER 2. LITERATURE REVIEW

Community pharmacists appear to have a multifaceted role when managing their patients and this section commences with a summary of the literature that outlines the role of the pharmacist as a general and oral health advisor. The importance of early detection of STIs and oral cancer is reviewed followed by a specific overview of the oral manifestations of STIs. Thereafter, the clinical manifestations, diagnosis and management of oral ulcers and oral thrush are outlined before a brief review of studies that have specifically tried to determine how a pharmacist would manage a potential case of oral cancer. Finally, the demographic factors that influence the way pharmacists' manage their patients is discussed. The chapter concludes with a brief summary.

2.1 The community pharmacist as a general health advisor

Over the years, the role of the community pharmacist has expanded from being primarily a drug dispenser, to a health professional who is active in general health promotion and education (Beney *et al*, 2000; Lombard, 1991) with a patient-orientated approach (Gilbert, 1998a). Ambler (1996), the president of the South African Association of Community Pharmacists, referred to the expanded role of the pharmacist as: *'A role.....which enhances clinical skills and is vitally necessary, and one which should not enable him to be a barefoot doctor, but rather allow him to make an educated assessment of when a patient needs to be referred to a doctor. He needs to know what he doesn't know. He needs to know where his sphere of responsibility ends and where someone else's starts'*. This highlights the community pharmacists' role in the referral of patients to other health professionals. It also places them firmly within the Primary Health Care approach as they can offer preventive services that may enable them to detect abnormalities even before signs and symptoms of a disease manifest (Lombard, 1991; Gilbert, 1998b). Diseases such as hypertension, diabetes mellitus, and kidney disease, can also be detected and appropriately referred to a doctor for further investigation. Such diseases can be diagnosed at an early, treatable stage thereby substantially reducing the risk of complications due to these diseases (Lombard, 1991).

Pharmacists have a long history as health advisors to the public (Gilbert, 1998a). The advice most often sought is for colds and influenza (Gilbert, 1997), infectious diseases, upper respiratory tract infections and urinary tract infections (Gilbert, 1998a). It has also been shown that pharmacies tend to have a high level of utilization (Gilbert, 1998a). A study of 53 community pharmacies in Johannesburg, South Africa, demonstrated that a substantial number of patients go to pharmacies without a doctor's prescription, with the intention to seek advice from the pharmacist (Gilbert, 1997).

2.2 The community pharmacist as an oral health advisor

Studies have also demonstrated that community pharmacists have a definitive role as an oral health advisor. Chestnutt and colleagues (1998) argue that community pharmacists and their staff are well placed to offer advice on oral health. Studies conducted in the United Kingdom (UK) (Dickinson *et al*, 1995) and in Johannesburg (Gilbert, 1998b) showed that community pharmacists are approached for advice on oral health matters on a regular basis (i.e. more than once a week). A study conducted in Glasgow by McGovern *et al* (1995) (cited in Chestnutt *et al*, 1998)¹, demonstrated that oral ulcers are the most common oral problem that patients present with to pharmacists. Most of the pharmacists (87%) in the Johannesburg study (Gilbert, 1998b), and 93% of pharmacists in the UK study (Dickinson *et al*, 1995), reported that mouth ulcers are the most common oral complaint.

Studies have already suggested that community pharmacists have a role in preventing the transmission of HIV (Watson *et al*, 2003; Ward *et al*, 2003). The presence of STIs facilitates the transmission of HIV and therefore amplifies the risk of HIV infection (Sangani *et al*, 2004; WHO, 2006), and it may be an indicator of HIV infection as up to 90% of new HIV infections may be attributable to STIs as co-factors (Robinson 1997). It is widely documented that many patients present to pharmacists for STI management (Garcia *et al*, 1998; Tuladhar *et al*, 1998; Watson *et al*, 2003; Ward *et al*, 2003; Garcia *et al*, 2003).

¹ The original article by McGovern *et al* was unobtainable despite exhaustive efforts by the author.

Watson (*et al*, 2003) stated that: '*There is untapped potential for community pharmacists to be a focus for advice and information relating to the prevention of HIV...*'. In South Africa, Ward and colleagues (2003) demonstrated that pharmacists were treating STIs outside of their scope of practice and therefore recommended that pharmacists could be more effective in preventing HIV transmission if they were adequately trained and their scope of practice enhanced to include syndromic treatment of STIs. Similarly, many pharmacists encounter oral health problems, most commonly oral ulcers (Dickinson *et al*, 1995; Gilbert, 1998b), and are treating these patients with very limited training in oral health problems (Butler, 2006). Pharmacists are even allowed to perform HIV tests and provide counselling, therefore, it should not be too unrealistic to suggest that pharmacists have a role to play in the detection of HIV through the recognition and response to the presentation of oral lesions associated with this disease. However, the author is not aware of any studies to date that have explored this avenue of prevention in HIV transmission.

The literature demonstrates that community pharmacists have a role in the treatment and referral of oral ulcers and oral thrush; however it is not expected that the community pharmacist should make a differential diagnosis when a patient presents to him/her with an ulcer. Rather, the scope of their practice is to realise that the presence of an oral ulcer or oral thrush could be indicative of systemic diseases, some of which are quite serious and warrant immediate referral to a dentist for proper management (Challacombe and Shirlaw, 1992, Ambler, 1996). They must be conscious of the fact that oral lesions may not always just be a 'mouth sore' that will disappear with symptomatic treatment and without consequence. Therefore, the role of the pharmacist is to manage the patient comprehensively. This would entail taking a history, providing the correct symptomatic treatment as required, providing sound advice, and appropriate referral where necessary (Butler, 2006). In the case of oral ulcers and oral thrush, a proper history should include questions regarding the nature of the lesion, i.e. duration of the lesion; if medication has been applied; if so, was it effective, and whether the lesion is recurrent. These questions are important to determine if the lesion is of a sinister origin. Recurrent oral ulcers and oral thrush could be due to a sexually transmitted infection, and a single, non-healing ulcer that has been

present for more than two weeks could be oral cancer. The age of the affected person should be considered as oral cancer usually occurs in older individuals (Challacombe and Shirlaw, 1992; Johnson, 1999).

2.3 The importance of early detection of sexually transmitted infections and oral cancer

Sexually transmitted infections can have serious consequences on morbidity and mortality, and swift management would be beneficial to the patient therefore early detection is necessary. Syphilis, chlamydia and gonorrhoea are dangerous as they can lead to serious complications such as congenital syphilis, pneumonia, low birth weight, infertility and pelvic inflammatory disease. The latter can lead to abdominal pain, fever, internal abscesses, chronic pelvic pain, damage to fallopian tubes (leading to infertility) and ectopic pregnancy (a life-threatening condition) (Grodstein *et al*, 1993; Cunha, 1990; WHO, 2006). Other STIs, such as HIV, are directly catastrophic. In addition, the presence of STIs facilitates and enhances HIV transmission (Sangani *et al*, 2004), thereby perpetuating the epidemic.

HIV is highly prevalent in South Africa and is one of the greatest contributors to morbidity and mortality in this country. It has a devastating psychological and economical impact on infected and affected individuals, and has also drained state resources (Booyesen *et al*, 2002). It is expensive to treat and preventable. Undetected cases of HIV can only fuel the already soaring epidemic as early detection and knowledge of one's status may result in positive behaviour modification (i.e. practicing safer sex and disclosure of status to contacts) (Weinhardt *et al*, 1999). This in turn could decrease the incidence of HIV. Even though HIV infection is fatal and incurable, early detection would lead to patients taking antiretrovirals as soon as possible, thereby prolonging life and improving the quality of life (Cowlin, 1999; Schmidt, 1999).

Oral cancer is a life threatening disease that can cause severe disfigurement and functional limitation thereby substantially reducing the quality of life of cancer patients. It also has profound psychological effects on the patient, as well their families and friends. Social integration is nearly impossible toward the end-stage

of disease, and the patient is unable to work. The treatment modalities for oral cancer namely surgery, radiation therapy and chemotherapy, are very expensive and warrant specialist management. Therefore, the cost to both the patient and the state is quite high. Furthermore, most cases of oral cancer can be attributed to certain lifestyle risk factors and are thus preventable (Johnson, 1999). Even though the prevalence of oral cancer may not be that high (Hille *et al*, 1995), it is still a public health problem as it is a life-threatening disease that has an astounding impact on quality of life, is a great financial burden (to the state and patient) and can be prevented.

All these diseases are serious public health problems that warrant early detection. The responsibility of disease detection and prevention lies with all health professionals, not just an elite group consisting of doctors, dentists and nurses (Thompson *et al*, 2000). Therefore, it is important for each health professional to be properly trained in the detection and management of illnesses that they are most likely to encounter.

2.4 Oral ulcers, oral thrush and sexually transmitted infections

Aside from having a range of other clinical symptoms, STIs such as syphilis, gonorrhoea and HIV commonly present with oral lesions. Oral ulcers could occur at any stage of syphilis, gonorrhoea and HIV (Arendorf *et al*, 1998; Bruce and Rogers, 2004; Leão, 2006).

Approximately 70-90% of HIV positive patients will at some point present with oral lesions (Rudolph and Ogundbodede, 1999; Kamiru and Naidoo, 2002; Ranganathan *et al*, 2004). HIV can manifest in the oral cavity in many different forms such as, salivary gland diseases, Non Hodgkins Lymphoma, Kaposi's sarcoma, ulcers, thrush, oral hairy leukoplakia, and acute necrotizing ulcerative gingivitis/periodontitis. The latter three are the most common HIV associated oral lesions in South Africa (Arendorf *et al*, 1999). Oral lesions may be early clinical features of HIV infection (Arendorf *et al*, 1998). In fact, oral lesions may very well be the first presenting sign of HIV infection (Arendorf *et al*, 1999), and therefore appropriate management of oral lesions is essential. The most common

oral lesion in HIV positive patients is oral thrush (Arendorf and Holmes, 1999). Reported prevalence rates of oral thrush in HIV positive patients have varied widely, up to 72 percent in children and 94 percent in adults (Winfert *et al*, 1996; Magalhaes *et al*, 2001, Tirwomwe *et al*, 2007). Oral ulcers are seen less commonly in HIV positive patients, (Scully *et al*, 1991) however it is the most common lesion that patients present to pharmacists with (Dickinson *et al*, 1995; Gilbert, 1998b; McGovern *et al* 1995 cited in Chestnutt *et al*, 1998). The prevalence of oral ulcers in South African HIV positive patients is 2.9% (Arendorf and Holmes, 1999); however international studies have shown that the prevalence can range from 1-12 % (Winfert *et al*, 1996, Ranganathan *et al*, 2004; Tirwomwe *et al*, 2007).

Oral ulcers and oral thrush may be symptomatic of a more sinister condition. Their manifestations may require comprehensive management by a dentist as opposed to a once-off symptomatic medication from a pharmacist, a health professional who may not currently be adequately trained in the manifestations of oral diseases. Oral ulcers and thrush can manifest in different ways, and their presence could be indicative of other conditions besides STIs and oral cancer. An outline of the manifestations of oral ulcers and oral thrush that constitute symptoms and adequate knowledge, with which all health professionals should be familiar, is presented below.

2.5 Oral ulcers

Oral ulcers are fairly prevalent oral mucosal lesions which occur in about 20% of the population (Woo and Sonis, 1996), and the prevalence is greater in females (Challacombe and Shirlaw, 1992). Ulcers typically have a yellow necrotic base, which is surrounded by an erythematous halo and can be painful (Woo and Sonis, 1996) and can vary in size and number. Patients may complain of pain, discomfort, a burning sensation, and difficulty with eating and swallowing (Arendorf *et al*, 2000). They can appear in various parts of the oral cavity as single or multiple lesions. Oral ulcers are normally self-limiting by nature, and will usually heal in 7-14 days without treatment (Woo and Sonis, 1996). Oral ulcers can occur as a single episode, while other cases are recurrent. The latter is

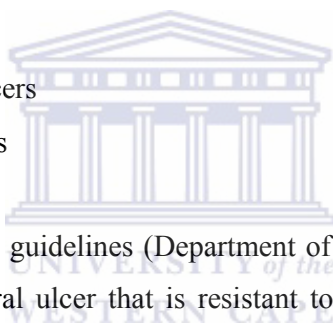
usually associated with systemic disease such as blood disorders, gastrointestinal disorders, mucocutaneous disease, connective tissue disease, and infective disease (Challacombe and Shirlaw, 1992) (Refer to appendix 1 for a detailed classification of oral ulcers). According to the Standard Treatment Guidelines and Essential Drug List for South Africa (Department of Health, 2003), the management objectives for oral ulcers should be to reduce discomfort and accelerate the healing process, and should include the following:

i. Drug treatment:

- Chlorhexidine, 0.2%, 15 mL as a mouthwash, 2-4 daily for 5 days
- Paracetamol, oral, 4-6 hourly, when required to a maximum of four doses daily

ii. Refer if there is:

- Recurrent oral ulcers
- Widespread ulcers



The standard treatment guidelines (Department of Health, 2003) omitted to state that a long-standing oral ulcer that is resistant to treatment may be a lesion of neoplastic origin, and therefore would require immediate referral to a doctor or dentist (Challacombe and Shirlaw, 1992). A proper history should be taken to ascertain if an oral ulcer has a suspicious origin (i.e. underlying systemic disease or neoplastic origin), and therefore should guide the pharmacist to manage such cases appropriately. Besides the drug treatment listed in the standard treatment guidelines, there is a variety of acceptable and efficacious drug management options available, such as (Challacombe and Shirlaw, 1992):

- topical analgesics (e.g. Benzocaine, Benzydamine Hydrochloride)
- topical antimicrobial or anti-inflammatory agents (e.g. tetracycline rinse, Povidone oral rinse, Dequalinium hydrochloride)
- topical corticosteroids (Triamcinilone, Hydrocortisone Sodium Succinate)

Severe cases can be managed with systemic corticosteroids ((Challacombe and Shirlaw, 1992), however these cases are best managed by a dentist or oral medicine specialist.

2.6 Oral Thrush

Oral thrush is a fungal infection that is most commonly caused by *Candida albicans* (Arendorf *et al*, 2000). There are various types of oral thrush, which present in different ways. It can present as a cheesy white layer which can be scraped off (pseudomembranous thrush), or pink or red macular lesions (erythematous thrush). Other types are characterized by white plaques that cannot be removed by scraping (hyperplastic) and by cracks/fissures at the corners of the mouth, which may or may not be painful (angular cheilitis) (Scully *et al*, 1991). Symptoms may range from asymptomatic to a burning sensation in the mouth. Patients may complain of discomfort and difficulty with swallowing (Arendorf *et al*, 2000).

The underlying causes of oral thrush include antibiotic therapy, poor denture hygiene, xerostomia, immune deficiencies, diabetes mellitus, and some less common conditions (Rossie and Guggenheimer, 1997), such as congenital neutropenia (Rezaei *et al*, 2005). If left untreated, oral thrush can lead to poor nutrition and prolonged recovery. In extreme cases, it can be fatal when it becomes disseminated (Akpan and Morgan, 2002).

Diagnosis of oral thrush can be based on clinical observation (Navazesh and Lucatorto, 1993; Akpan and Morgan, 2002). According to The Standard Treatment Guidelines and Essential Drugs List for South Africa (Department of Health, 2003); the management of oral thrush should aim to identify and eliminate the cause, and should include the following:

- i. Non-drug treatment:
 - Improve oral hygiene
 - Avoid bottle feeding and replace with cup-feeding

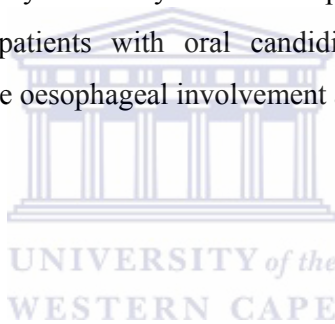
- Avoid the use of hypochlorite to sterilise feeding bottles, if this is not possible, rinse bottles adequately after sterilizing
- Ensure proper fitting dentures

ii. Drug treatment:

- Gentian violet, 0.5% aqueous solution, applied to the inside of the mouth three times daily, continue for 48 hours after cure
- For infants, nystatin oral suspension, 100 000 IU/mL, 0.5 mL after each feed
- For adults, antifungal lozenges (troches), oral, 1 lozenge sucked 6 hourly for five days.
- In severe cases or if the above treatment fails, an imidazole¹ oral gel, applied twice daily for 10 days should be applied
- HIV infected patients with oral candidiasis and painful or difficult swallowing have oesophageal involvement and may need fluconazole

iii. Refer if there is:

- a.no improvement
- b.pharyngeal spread
- c.the diagnosis is uncertain



According to Gupta and colleagues (1994), gentian violet has been discontinued as an antifungal treatment because of the development of resistance and adverse side effects, such as staining of the oral mucosa. Its' use has been replaced by nystatin and amphotericin B. Topical antifungal preparations are recommended as the first line of treatment for oral thrush. Systemic antifungal therapy is appropriate in patients intolerant of, or refractory to topical treatment; and those at high risk of developing systemic infections (Akpan and Morgan, 2002).

¹ Examples of drugs belonging to this class of antifungal therapy are miconazole, clotrimazole and ketoconazole

HIV and oral thrush

The most common oral manifestation in HIV positive individuals globally, and in South Africa is oral thrush (Arendorf and Holmes, 1999). All the various manifestations of oral thrush can be seen in HIV positive individuals, of which the pseudomembranous and erythematous varieties are most common (Arendorf *et al*, 1998; Blignaut *et al*, 1999).

Only one study that was conducted in the UK has demonstrated how often patients present to the community pharmacist with oral thrush. A prevalence of one percent was reported (Dickinson *et al*, 1995). While the prevalence of patients presenting to a pharmacist with oral thrush complaints in the UK study may appear to be low, its inclusion in a study of this nature can be justified in the Western Cape context due to the rising levels of HIV in this province (Department of Health, 2007). Oral thrush is the most common oral lesion in HIV positive patients, therefore health professionals in South Africa would encounter these cases more often. In addition, other predisposing factors for oral thrush, such as diabetes mellitus and malnutrition (Akpan and Morgan, 2002), are also fairly prevalent in South Africa. It is estimated that 5.5% of the South African population suffer from diabetes mellitus (Bradshaw *et al*, 2007). The prevalence of malnutrition is more alarming as 11.8% of South African children under five years old are underweight (Nannan *et al*, 2007). There are no prevalence data for malnutrition and diabetes mellitus in the UK so a comparison with South Africa is not possible. However, it is highly likely that more patients have been presenting to pharmacists (as well other as health care professionals) with oral thrush in the Western Cape due to the high prevalence of some conditions that predisposes to the development of oral thrush, such as HIV, diabetes mellitus and malnutrition.

2.7 The Community Pharmacist and Oral Cancer Detection

Only two published studies have reported on the role of pharmacists in oral cancer detection (Scully *et al*, 1989; Leonard *et al*, 1996). Both studies used a patient simulated methodology¹ whereby the interviewer pretended to be a patient seeking advice for a long-standing oral ulcer in an elderly family member. The results showed that most pharmacists did not know how to manage these patients appropriately. Scully (*et al*, 1989) and Leonard (*et al*, 1996) reported that only 10% and 33% of pharmacy staff, respectively, recommended a referral to a medical or dental practitioner. Leonard (*et al*, 1996) suggested that their findings indicate that ‘pharmacists need more education about oral conditions, with increased emphasis on clinical features.’ After all, any chronic non-healing ulcer present for two or more weeks must be biopsied to rule out squamous cell carcinoma (Mirbod and Ahing, 2000). Thus far there have not been any studies in South Africa to determine pharmacists’ knowledge of oral cancer detection.

2.8 Factors influencing community pharmacists’ management of oral conditions

There are various factors that could affect how pharmacists manage their patients, and conversely how patients would seek treatment. The perceived socio-economic status (SES) of the patient may influence how the pharmacist would manage the patient. Gender, area location and age of the pharmacist as well as the patient could also be influencing factors. The type of patient management could also be influenced by the number of years of experience that the pharmacist has had in community pharmacy (Katznellenbogen *et al*, 1997), and when the pharmacist qualified. In South Africa, the pharmacy curriculum was reoriented so that the focus of teaching had shifted from a drug-dispensing oriented course; to teaching and enabling pharmacy students to practice pharmacy with a patient-orientated approach. The reorientation of the pharmacy curriculum was introduced at different times to various universities during the early to mid-1990’s. The new

¹ Patient simulated methodology refers to a method of data collection whereby the interviewer poses as a patient with a particular query. Staff whose work is being audited is unaware of the simulated patient’s identity (Watson *et al*, 2004).

pharmacy curriculum was implemented at the University of the Western Cape in 1995. By 1995, pharmacists in South Africa were taught how to take a medical history and also to counsel the patient regarding the main complaint (Butler, 2006).

The area location of the pharmacy and SES thereof, may also influence pharmacists' management of their patients. International research has shown that people living in relatively lower SES areas are more likely to suffer from caries, advanced periodontal disease, oral cancer, and HIV (Lantz *et al*, 2001; Hobdell *et al*, 2003, Amien *et al*, 2004; Tladi, 2006). This differential profile of disease prevalence in lower socio economic areas directly influences the type of help and advice sought in these areas. Rogers (*et al*, 1998) conducted a study in North West England to determine how the locational context of a pharmacy might influence the nature and quality of advice-giving. They reported that locality (designated as rural, suburban, inner city, small and large town) does indeed influence and shape the activities and advice-giving potential of pharmacists. Some of the differences in advice-giving in the different pharmacy locations related in part to the SES of the populations using the pharmacy, as well as the available amenities in the area. This particular study suggested that *'an inverse care law may be operating in relation to the use of community pharmacy, with people in areas with the greatest health need seemingly receiving a poorer quality service than those using pharmacies in more affluent areas'*.

2.9 Summary

The literature has clearly demonstrated that oral cancer and HIV are serious public health problems that warrant early detection and management. The seemingly benign nature of oral ulcers and oral thrush may tempt many patients to seek immediate treatment from a pharmacist, rather than a doctor, dentist or other health professional. Pharmacists are confronted with oral problems on a regular basis, and the most common oral lesions that they encounter are oral ulcers and oral thrush. These lesions are strongly associated with HIV infection. Therefore, together with other health professionals, the community pharmacist is advantageously placed in the health care system to be another avenue of

prevention for HIV and oral cancer; however, there are no studies of this nature in the Western Cape.

2.10 Aims and objectives

Aim

To determine how community pharmacists in the Western Cape manage oral ulcers and oral thrush

Objectives

- 1) To determine how often patients present at a community pharmacy with oral complaints and oral health advice
- 2) To determine the prevalence of the most common oral complaints with which community pharmacist is confronted
- 3) To determine how community pharmacists manage oral ulcers
- 4) To determine how community pharmacists manage oral thrush
- 5) To determine if the management of oral ulcers and oral thrush by community pharmacists differs between high and low socio-economic groups
- 6) To determine if the management of oral ulcers and oral thrush by community pharmacists differs between metropolitan/non-metropolitan locations
- 7) To determine the knowledge of community pharmacists with regard to the link between oral ulcers and oral thrush with underlying diseases

CHAPTER 3. METHODOLOGY

This chapter outlines the methodology of this study and commences with a description of the study design and sampling procedures that were used. The latter section outlines the stratification procedure that was used, and includes a brief discussion about the choice of socio-economic indicator that was applied in this study. This is followed by a detailed section regarding the data collection tool and procedures. The chapter concludes with a brief discussion of data analysis, limitations of the chosen methods, ethical matters pertaining to the study and possible avenues of research dissemination.

3.1 Study design

A cross-sectional survey was conducted with community pharmacists in the Western Cape Province.

3.2 Sampling

A stratified random sample of pharmacies in the Western Cape was drawn from a list of pharmacies that was obtained from the South African Pharmacy Council. All pharmacies have to be registered with the South African Pharmacy Council; forming a complete list of pharmacies in the Western Cape. A computerized random number generator was used to draw the sample. Out of the 461 community pharmacies on the South African Pharmacy Council list of pharmacies, 457 pharmacies were contactable via both telephone and fax machine. A sample size calculation was conducted in the Statcalc function of EpiInfo version 6 in order to determine the minimum number of pharmacies required to yield statistically valid results. The sample size calculation was based on the following information: significance level = 95%; population size = 457; expected frequency = 50%; and worst acceptable result = 40%. According to this input, a minimum sample size of 79 pharmacies was required; however, 162 pharmacies were selected in order to compensate for non-responders.

a) Stratification

The sample of pharmacies was stratified by the relative SES (high and low), as well as by metropolitan/non-metropolitan locations (metro and non-metro respectively) so that there would be approximately 35 pharmacies in each of the following categories:

- i) High socio-economic metro (pharmacies in high socio-economic metropolitan area)
- ii) Low socio-economic metro (pharmacies in low socio-economic metropolitan area)
- iii) High socio-economic non-metro (pharmacies in high socio-economic non-metropolitan area)
- iv) Low socio-economic non-metro (pharmacies in low socio-economic non-metropolitan area)

The rationale for stratifying by SES and metropolitan location was to minimize the chances of confounding. Studies have shown that these variables could influence the nature and type of advice sought by patients and provided by community pharmacists (Cohen *et al*, 2006; Rogers *et al*, 1998). Metro and non-metro areas were defined by the City of Cape Town's boundaries. A metropolitan area refers to all areas within the Cape Town Unicity, whereas a non-metropolitan area refers to all areas that do not fall within the Cape Town Unicity.

Socio-economic status is a relative measure as it is difficult to define an absolute rich and poor state. A high SES in one country may be the equivalent to a poor or low SES in another country. Therefore the term 'relative SES' is preferred when referring to the SES of an area and is used in this text. For sampling purposes, the relative high and low SES areas were determined by the area location of the pharmacy, as this information was readily available from the list of pharmacies obtained from the South African Pharmacy Council.

The designation of pharmacies serving communities with a relatively high SES was determined by the top 50% ranked household income levels for each area. The relative SES of the area in which the pharmacy is located should serve as a

proxy of the SES of the clientele that the pharmacy serves (Domínguez-Berjón *et al*, 2006).

b) Choice of socio-economic status indicator

According to Daly and colleagues (2002), measures of SES indicators are meant to provide information about an individual's access to social and economic resources. In practice numerous indicators fit this description. Various studies have shown that the choice of SES measure can affect health outcomes (Lindelov, 2004; Daly *et al*, 2002, Shavers, 2007, Krieger *et al*, 2002) therefore careful selection of an appropriate SES indicator is warranted. However there is no published literature to date that recommends any one or a few preferred SES indicators for the purposes of health research in the South African context. An international study was conducted in order to determine optimal indicators for SES in health research (Daly *et al*, 2002). These authors stated that income and wealth based measures of SES have a much greater explanatory power of SES as compared with more conventional measures of education and occupation. Shavers (2007) stated that the choice of SES indicator should depend largely on the context in which it is being used. South African households seem to have an economic culture of pooling their financial resources (Case, 2001; Berzborn, 2007). The use of household income¹ as a SES indicator is not a new concept, as quite a few South African studies have used household income as a SES indicator (Statistics South Africa, 2000; McDonald *et al*, 2000; Solanki *et al*, 2005; Borat and Sheikh, 2004; Lalloo *et al*, 2004). Consequently, for the purposes of this study, household income was the SES indicator of choice as it is an economic indicator, it has been successfully applied in other studies, and it is appropriate in the South African context.

¹ Household income is the total income of all members of a household, whether related to the household or not (Smeeding and Weinberg, 2001), and includes the income of the householder and all persons 15-years-old and over in the household.

c) Calculation of median household income

A commercially available dataset that consisted of the average household income data of the Western Cape was received from a company called Eighty20 in an Excel sheet format. The dataset consisted of a list of each area in the Western Cape, with a corresponding list of income brackets. The number of households in each area whose household income fell within a certain income bracket was indicated (Table 2.1). This dataset was used to determine the weighted average household income of each residential area in the Western Cape. A weighted average income was used as average values are severely influenced by outlier values and therefore the average is not always an accurate measure of the true average of results. The weighted average calculation overcomes this limitation by taking into account the frequency of the calculated values (Keller and Warrack, 2000). The median household income for all the residential areas in the Western Cape was calculated in order to determine whether a residential area was in a relatively low or high SES area.

Table 2.1: Example of data format of household income

	Atlantis UNIVERSITY of the WESTERN CAPE	Frequency
a	No income	763
b	R1 - R4 800	215
c	R4 801 - R 9 600	772
d	R9 601 - R 19 200	1671
e	R19 201 - R 38 400	3011
f	R38 401 - R 76 800	2897
g	R76 801 - R153 600	1284
h	R153 601 - R307 200	258
i	R307 201 - R614 400	24
j	R614 401 - R1 228 800	13
k	R1 228 801 - R2 457 600	109
l	R2 457 601 - R5 000 000	88

The weighted average income was calculated by first determining the midpoint of each income range, and then using the SUMPRODUCT function in Excel version 11, which is based on the following calculation (Keller and Warrack, 2000):

$$\frac{\sum a-l \text{ Midpoint of income range } \times \text{ frequency}}{\text{Sum of all frequencies}}$$

The residential areas were ranked (in ascending order) according to the weighted average income. The median household income was then calculated based on the weighted average household income in each area. The median household income in the metro was R149 191 and in non-metro areas was R63 223. Consequently, all areas in the metro with a median household income of more than R149 191 were considered a high SES area and all areas in the non-metro with a median household income of more than R63 223 were considered high SES (Table 2.2). A single median of the household income was R92 777. This amount was not used to stratify by SES as it only rendered pharmacies in three categories i.e. Metro high and low SES and non-metro low SES. This method would have excluded any stratification by non-metro high SES.

UNIVERSITY of the

Table 2.2 Stratification of area location of pharmacies

Metropolitan location	Median income	Income	Area and income level
Metro	> R149 191	High	Metro high SES
Metro	< R149 191	Low	Metro low SES
Non-metro	> R63 223	High	Non-metro high SES
Non-metro	< R63 223	Low	Non-metro low SES

The median household income was used to determine socio-economic status of the area location of the pharmacy for sampling purposes. However, the following three proxy measures included in the questionnaire were used to estimate the SES of the clientele, and this was cross-checked with the SES of the area location of the pharmacy.

- 1) Pharmacists' perception of their clientele's income level. This was classified in the questionnaire, as high or low, however some pharmacists were unable to make an absolute choice as they felt that they had an equal number of clientele in both SES categories. They therefore referred to the answer as 'mixed/intermediate'.
- 2) Pharmacists' perception of the percentage of patients that are on medical aid.
- 3) The area location of the pharmacy.

3.3. Data collection and instrument design

The data was collected with a structured questionnaire in order to minimize any bias from the researcher's interpretation of the questions (Katzenellenbogen *et al*, 1997). All questions were asked in the same way, with the same probes and clarifications. Telephonic interviews were conducted by the researcher as it was a quicker and more convenient method of acquiring information from a sample that was meant to represent the Western Cape Province. Even though patient simulated methodology has been used successfully in many studies of pharmacists (Scully *et al*, 1989; Leonard *et al*, 1996; Watson *et al*, 2004; Vacca, *et al*, 2005; Watson *et al*, 2006; Watson *et al*, 2007), it suffers from the same drawback as personal interviews, i.e. it limits the geographical coverage of the sample. Postal and electronic surveys also allow for a greater geographical coverage, however these methods were excluded because of reported low response rates, the latter being lower than the former (McMahon *et al*, 2003; Seguin *et al*, 2004; Akl *et al*, 2005).

In an attempt to enhance the validity of the study, two slightly different questionnaires were used in order to minimize the possibility of fraudulent responses (Butler, 2006). One questionnaire was faxed to the pharmacist (henceforth referred to as the pharmacists' questionnaire). The other questionnaire was used as a data capture sheet by the researcher (henceforth referred to as the researcher's questionnaire). The researcher's questionnaire was more detailed as it listed a range of possible answers to questions that appeared on the pharmacists' questionnaire (refer to appendix 2 and 3 for the complete questionnaires). For example, question 8 in the pharmacists' questionnaire asked:

If a customer presents with an ulcer/s in the mouth, would you

- a) Take a history (i.e. ask more questions about it)?
- b) Recommend a treatment?
- c) Refer the patient to a doctor/dentist?
- d) All of the above?
- e) None of the above?
- f) Other, please specify_____

The pharmacist would immediately thereafter read question 9.

However, during the interview, if the pharmacist answered 8a, the researcher would then ask the pharmacist (via an open-ended question):

What questions would you ask? _____

If the pharmacist answered 8b, they would then be asked (via an open-ended question):

What treatment would you recommend? _____

It should be borne in mind that the researcher's questionnaire also serves as a data capture sheet. So even though the researcher's questionnaire may appear to be a set of close-ended questions, most questions are in fact open-ended and the answer options were not mentioned to the pharmacist at all. The answer options listed in the researcher's questionnaire was included for the purposes of capturing the answers more quickly and easily. These answer options have been included in the researcher's questionnaire as it was anticipated to be a range of the most likely answers provided for certain questions (the answer options were based on results from the pilot study). A complete copy of the researcher's questionnaire is available in appendix 3. As a guide to understanding which questions were asked by the researcher, all the questions in the researcher's questionnaire that were posed to the pharmacist appear in bold, whereas all the text that is not in bold was not mentioned to the pharmacist (Appendix 3).

The questionnaire was faxed to the pharmacy 24 hours prior to the telephonic interview. This was done so that the pharmacist that would be interviewed could familiarize him/herself with the questions that were to be asked. The researcher also telephoned the pharmacy 24 hours prior to the interview, but after the questionnaire was faxed, in order to verbally obtain informed consent from the pharmacist to participate in the study, and also to confirm a convenient time to conduct the interview. This method limited the possibility of the pharmacists researching the correct answers before the interview. It should also have eliminated the possibility of a speculative response to questions as each answer had to be justified by the respondent. Most of the questions were open-ended so as not to lead the respondent. The above-mentioned measures were implemented to ensure study validity. Certain measures were taken in order to increase the response rate (Butler, 2006). Phone calls to pharmacists during relatively busy periods were avoided, such as, month end period (25th- 02nd days of the month), Saturday mornings, 5-6pm daily, and pension day. If more than one pharmacist worked at a particular pharmacy, the researcher spoke to the pharmacist who was available at the time and set up an interview with that particular pharmacist.

The questionnaire was designed to elicit how pharmacists manage oral ulcers, oral thrush, mouth sores and an ulcer that has been present for more than four weeks. Questions regarding the management of mouth sores were included as it is a colloquial term used primarily by patients for many oral lesions, including oral ulcers and oral thrush. A question regarding how pharmacists confirmed a diagnosis of oral ulcer or oral thrush was deliberately excluded as the question itself would have been leading. This type of information was recorded under the answer option of 'other', where pharmacists could mention (without a specific prompt) whether they would examine the oral lesion or not. The proper management of an oral lesion by a pharmacist would entail taking a history, recommending an appropriate treatment, referral to a health professional if necessary and providing advice for the problem. Questions relating to these parameters were asked for each of the four oral lesions that were investigated in this study.

Information about the pharmacists' work-related background was also recorded. The amount of work experience in community pharmacy may influence how pharmacists manage oral problems and their knowledge thereof (Katzenellenbogen *et al*, 1997). Therefore their age and length of time (in years) that they were practicing in community pharmacy was recorded. The median number of years that pharmacists were in practice was used as an indicator of their experience in community pharmacy.

A question pertaining to the year in which the pharmacist had qualified was also included, as the pharmacy curriculum in South Africa has evolved over time. From approximately 1995, the pharmacy curriculum was reoriented to enable the paradigm shift of pharmacists' practice from a drug-dispensing approach to a patient-orientated approach. This implied a more comprehensive management of the patient that included taking a detailed history, recommending a treatment, counselling the patient and referring to a health professional if necessary (Butler, 2006). All results were analyzed using a stratified analysis that controlled for these factors which could have confounded the outcomes.

A pilot study was conducted on 10 pharmacists (5 each in metro and non-metro areas) in order to test the methodology, and appropriate changes were made to the questionnaire thereafter. The changes made were mainly in the domain of clarification of questions and the phrasing thereof in order to reduce subject variation¹ and intra-observer variation² (Katzenellenbogen and Joubert, 2007). This exercise assisted greatly with constructing the answer categories for the researcher's questionnaire as well as to minimize intra-observer bias. The 10 pharmacists that participated in the pilot study were excluded from the main study.

¹ Subject variation occurs when similar questions do not elicit similar answers from various subjects.

² Intra-observer variation may occur if the same interviewer uses different prompts, cues and explanations for the same question.

3.4 Data analysis

The data was captured in Excel version 11 and analyzed using EpiInfo version 13. The average of the numerical data was calculated as the measure of central tendency, and the range and inter-quartile range (IQR), variance and standard deviation was determined as an indication of the measure of the spread of the data. Various statistical analyses were carried out. Chi Squared tests were used to determine if there was a significant difference between categorical variables. The Fisher Exact test was conducted if the numbers were insufficient to conduct Chi Squared tests, or if the data was not normally distributed. Analysis of variance test (ANOVA) was used to determine if there was a difference between means. A 95% significance level was used, therefore all test results with a p-value less than 0.05 was considered statistically significant. The relative risk (RR) was also assessed for significance. A RR = 1 indicates that there is no difference between the exposure and outcome. A RR more than one indicates that the exposure is a risk factor, whereas a RR less than one indicates a protective factor. If the confidence interval of the RR contained a value of one, then the RR was not considered statistically significant. Results were stratified by gender, age, SES, metropolitan location, and the number of years that pharmacists have been practicing in community pharmacy. A variable was considered to be a confounder if the adjusted RR and crude RR differed by more than 10%.

3.5 Limitations

All research studies are bound by varying degrees of limitations, and this study is no different. The choice of SES may have imparted certain limitations to this study. This is a common problem in research as the choice of socio-economic indicator can have an impact on the results. Consequently very different conclusions can be reached about the same issue depending on the socio-economic indicator used (Lindelow, 2004). The use of household income in this study may have impacted on the sampling procedure due to misclassification of areas into high and low SES areas. Consequently, areas that were classified as low SES areas may in fact have been high SES areas. The metro areas may have suffered more from this shortcoming. However, as SES is a relative measure, any

SES indicator (such as personal income, family income, etc) would have suffered the same fate.

The methods used in this study may raise some issues regarding validity. Even though stringent attempts were made to ensure that community pharmacists answered the questions truthfully, this could never be guaranteed. It is possible that some participants guessed certain answers and some may have fallen prey to obsequiousness bias because the interviewer was a dentist. It was not always possible to conduct the interview 24 hours after the questionnaire was faxed to the pharmacist. The unpredictable patient flow in pharmacies meant that many pharmacists were busy at the time agreed for the interview. Many pharmacists were interviewed a few days later, which may have given them enough time to research the questions and provide the 'correct' answers. The extent to which they are actually practicing in the manner that was indicated in the interview is questionable, leading to a possible overestimation as to how many pharmacists are actually managing these patients appropriately.

3.6 Ethics Statement

This study was approved by the Ethical and Research Committee of the University of the Western Cape. Participants were informed about the nature of the study and the main aim of the study. Participants were made aware that their participation in this study would be on a voluntary basis, that they could enter the study of their own free will, and that they could withdraw at any time. These statements were included on the cover letter of the questionnaire and it was reinforced by the researcher telephonically. Thus, informed consent was obtained prior to the telephonic interview and noted on the researcher's questionnaire. Confidentiality was ensured to protect the identities of the participants. Participants' names were noted on the researcher's questionnaire; however they were not included in the data set.

3.7 Dissemination of research

The findings of this research will be prepared into bound copies which will be available in the University of the Western Cape Dental Library. The findings of this research will also be prepared and submitted for publication in a dental and/or pharmaceutical journal. The findings will also be prepared for conference presentations.



CHAPTER 4. RESULTS

This section commences with a description of the sample. The results are presented thereafter according to the order of the objectives. The frequency and prevalence of oral complaints are presented, followed by how pharmacists manage oral ulcers, oral thrush, a long-standing oral ulcer and mouth sores. Thereafter, pharmacists' knowledge of the link between oral ulcers, oral thrush and underlying conditions are outlined. This section concludes by examining the results with the various stratification parameters used in this study.

4.1 Sample description

The sample consisted of 123 community pharmacists even though 162 pharmacists were invited to participate in this study, yielding a response rate of 76%. The sample consisted mainly of males (67.2%). The mean age of all pharmacists was 43.9 ± 10.5 years (range: 21-72 years; IQR=35-52 years; median=44 years). The mean age of the male pharmacists (45.8 ± 10.7 years) was significantly higher than the female pharmacists (40.6 ± 9.1 years) (ANOVA, $p=0.01$). Almost all the pharmacists (98%) interviewed were principle/responsible pharmacists, while only two pharmacists were locums. None of the participants were pharmacist interns. Most of the pharmacists (78%) qualified before 1995 and the average number of years that the pharmacists in this study have been in community pharmacy was 19 ± 10.5 years (range: 1-47 years; IQR=10-25). Therefore, 19 years was chosen as a proxy for the amount of experience that a pharmacist has had in community pharmacy. The more experienced pharmacists would be in practice for more than 19 years, and less experienced pharmacists would have been in practice for less than 19 years. Subsequent analysis with this variable did not reveal any significant results; therefore this line of investigation was not pursued any further in the results section.

It was not possible to compare this sample with the national profile of pharmacists as the information was not made available by the South African Pharmacy Council, and the information that was supplied was inapplicable to this study.

For the purposes of this analysis, the SES of the clientele was determined by the average household income of the area location of the pharmacy in question. A linear regression analysis between the weighted average household income and the pharmacists perception of the percentage of clientele that have medical aid showed a strong inverse relationship between the two variables (Correlation coefficient=0.12; F statistic=15.8, p<0.001). Table 4.2 shows the subsequent Chi Squared tests for association between the proxies used for SES in this study.

Table 4.1: Chi Squared tests for association between the indicators for socio-economic status

Variables tested for association	Relative Risk	p-value
Income level and perception of clientele income	0.7 (0.6-0.8)	0.0001
Income level and percent clientele on medical aid	1.01 (0.84-1.21)	0.95

These results demonstrate that pharmacists' perception of their clientele's income and their perception of the percent clientele on medical aid does not correlate with the SES categories based on the household income of the area. Therefore subsequent analysis by SES was based solely on the average household income of the area. Just over a third of pharmacists (38 %) perceived that the income level of their clientele was high, 32 % (39) perceived that it was low, while 28.9% (35) claimed that they served a mixed income group.

There was an equal distribution of pharmacists in each category of metro high SES, metro low SES, non-metro high SES and non-metro low SES, i.e. 30 in each, as well as between metro and non-metro areas (61 and 60 pharmacists respectively). Overall, 65.3% (79) of pharmacies were in a low-income area (i.e. median household income per annum was < R92777). However, when separate medians were calculated for metro and non-metro areas, i.e. R149 191 in metro,

and R63 223 in non-metro, then there were 57 (47.1%) and 64 (52.9%) pharmacists in high SES and low SES areas respectively. The average household income was significantly more in metro areas than non-metro areas (R147 233 ± R79465 and R57 723 ± R13537 respectively) (p<0.01; Kruskal-Wallis). The average household income in terms of metro/non-metro and SES denominations was significantly different (Kruskal-Wallis, p<0.001) (Table 4.2).

Table 4.2: Average household income in terms of metropolitan location and socio-economic status

Metropolitan location & SES	Average household income	Test
Metro high SES	R198 850 ± R80 355	Kruskal-Wallis p=0.00001
Metro low SES	R97 864 ± R34 257	
Non-metro high SES	R69 345 ± R7 901	
Non-metro low SES	R47 187 ± R8 153	
Metro	R147 233 ± R79 465	Kruskal-Wallis p=0.00001
Non-metro	R57 723 ± R13 537	

Profile of non-responders

There were 39 community pharmacists who were invited to participate in this study but refused to do so. The reason cited by all pharmacists that did not participate, regardless of socio-economic status and metropolitan location, was that they were too busy to do a telephone interview. Almost two-thirds of the non-responders worked in pharmacies situated in the metro areas (62.5%) and high SES areas (61.5%). Table 4.3 shows that pharmacists in metro high SES areas were more likely not to participate in this study.

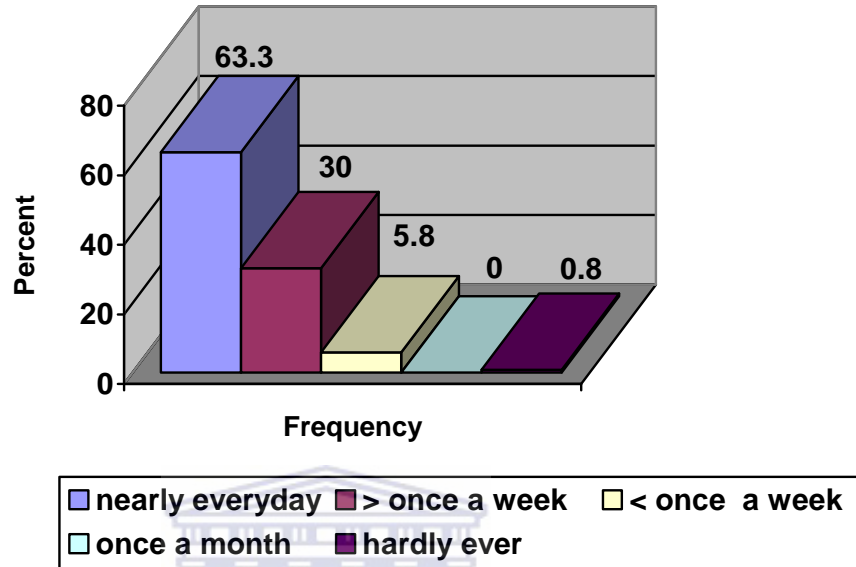
Table 4.3 Distribution of non-responders by metropolitan location and income categories

Area & income level	Frequency	Percent
High SES metro areas	15	38.5
Low SES metro areas	10	25.6
High SES non-metro areas	9	23.1
Low SES non-metro areas	5	12.8
Total	39	100.0

4.2 Frequency of oral complaints

Almost two thirds of pharmacists were confronted with oral problems nearly everyday, and almost a third dealt with these more than once a week (Figure 4.1). The frequency with which patients presented to pharmacists with oral problems did not differ significantly between metropolitan location and by gender (Chi Squared, $p>0.05$). However there were some differences in terms of SES. Significantly more pharmacists in low SES (when compared to those in high SES) areas claimed that people attended pharmacies with oral problems more than once a week (Fisher Exact, $p=0.005$), whereas significantly more pharmacists in high SES (73%) areas claimed that patients presented to them with oral problems nearly everyday.

Figure 4.1: Frequency of oral complaints encountered by community pharmacists



A different pattern emerged when these results were combined into two categories, namely regular and irregular attendance (where regular attendance refers to pharmacists who indicated that they deal with oral problems nearly everyday and more than once a week; and irregular attendance refers to pharmacists who indicated that they deal with oral problems less than once a week and hardly ever). Most pharmacists (91%) dealt with oral problems regularly. This did not differ by any of the stratification parameters, i.e. age, SES, metro/non-metro location, experience, and gender (Chi Squared, Fisher Exact, $p > 0.05$).

The frequency with which patients presented with oral problems did not differ between the four area types in this study, i.e. metro high SES, metro low SES, non-metro high SES, non-metro low SES (ANOVA, $p = 0.03$)

4.3 Prevalence of oral complaints encountered by pharmacists

The most common oral problems encountered by pharmacists were oral ulcers (55.8%) and oral thrush (49.2%). The third most common oral problem encountered was toothache (Table 4.4). The prevalence of mouth abscesses was significantly higher in high socio-economic areas (24%) when compared to low socio-economic areas (11%) (Fisher Exact, $p=0.04$). The prevalence of oral thrush was significantly higher in non-metro areas (58%) (Relative Risk=0.7 (0.5-1.0) Chi Squared=4.0, $p=0.04$), and it was also significantly lower in low SES areas (Relative Risk=1.6 (1.1-2.4), Chi Squared=6.5, $p=0.01$). The prevalence of mouth sores was significantly higher in non-metro areas (16.7%) than in metro areas (3.3%) (Fisher Exact, $p=0.01$), however there was no difference in the prevalence of mouth sores between high and low SES areas. The prevalence of toothache complaints was significantly higher in the metro areas (43.3%) than non-metro areas (23.3%) (Relative Risk=1.9 (1.1-3.2), Chi Squared=5.4, $p=0.02$) (Refer to Appendix 4 for a detailed list of these results).

Table 4.4 Reported prevalence of oral problems encountered by community pharmacists

Oral problem	Percent of Pharmacists
Ulcers	55.8
Thrush	49.2
Toothache	33.3
Bleeding gums	19.2
Abscess	17.5
Other	15.8
Sore throat	15.0
Herpes	12.5
Mouth sores	10.0
Loose dentures	7.5
Gum problems	5.8
Pain in mouth	4.2
Tongue problems	4.2

4.4 Management of oral ulcers

Comprehensive management of oral ulcers includes taking a proper history, recommending an appropriate drug treatment, and referring the patient to a dentist or doctor if necessary. A referral should be recommended if the ulcer has been present for more than two weeks and/or is unresponsive to treatment.

Just over half the number of pharmacists in this study (55.4%) would take a history, recommend a treatment and refer the patient to a health professional (most commonly a doctor or dentist), while a quarter (25.6%) would only take a history and recommend a treatment, and 9.9% would treat and refer the patient. One pharmacist would take a history, recommend a treatment and advise the patient to return to the pharmacy if the lesion has not healed with the recommended treatment. These results did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, $p > 0.05$).

About a third (33%) of pharmacists would fail to refer a case of an oral ulcer to a health professional at all. Of those who would refer an oral ulcer; 41.6% would refer the patient to a doctor, 26% would refer to a dentist and 32.5% would refer to either a doctor or dentist (no preference indicated). Nine percent of the latter claimed that they would refer the patient to a dentist if the problem were 'tooth-related' and to a doctor if the problem were on the mucosa. Information regarding the location of the lesion was elicited through history-taking. More female pharmacists (69.2%) than male (50%) would manage the patient comprehensively, i.e. take a history, recommend a treatment and refer the patient (Relative Risk=0.7 (0.5-0.97), Chi Squared=3.9, $p=0.047$). This difference was close to statistical significance. Overall, 66.9% of pharmacists would refer the patient to a health professional either immediately or recommend that they see a doctor or dentist if topical medication did not help. There was no significant difference in referral patterns by any of the stratification parameters (Chi Squared, Fisher Exact, $p > 0.05$).

Topical treatment for oral ulcers

A range of topical preparations can be used for the treatment of oral ulcers, such as topical analgesics, topical corticosteroids and anti-microbial preparations. These can be in the form of a gel, cream, lozenge or mouthwash (Challacombe and Shirlaw, 1992). The treatment recommended by pharmacists was considered appropriate if it was in accordance with the Standard Treatment Guidelines and Essential Drug List of South Africa (Department of Health, 2003); and if efficacious medicines were recommended according to the literature (as outlined Chapter 2:Literature Review, page 9).

Almost all the pharmacists (99.1%) would recommend a topical treatment for an oral ulcer. Table 4.5 shows the type of treatment that is favoured for this oral lesion. The most popular treatment recommended was a topical steroid (Triamcinilone), followed by Tetracain, which is a topical anaesthetic (Gibbon, 2000). The type of treatment recommended for oral ulcers did not differ by SES, gender and metropolitan location (Chi Squared, Fisher Exact; $p>0.05$). Pwho qualified after 1995 were more likely to recommend Tetracain for ulcers (59%) than those who qualified before 1995 (36 %) (Relative Risk= 1.6 (1.1-2.5), Chi Squared=4.6; $p=0.03$).

Most pharmacists (86.4%) would recommend an appropriate treatment for oral ulcers, compared to 6.4% (7) who would recommend treatment that is not indicated for an oral ulcer, such as topical antifungal therapy. A few pharmacists (17.3%) did not specify the type of topical medication that they would recommend. These results did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, $p>0.05$).

Table 4.5 Recommended treatments for oral ulcers according to the active ingredient

Active ingredient	Pharmacological activity*	Percent of pharmacists
Triamcinilone	Topical steroid	45.5
Tetracaine	Topical analgesic	41.3
Salicylic acid	Topical analgesic	24.2
Not specified	-	17.4
Chlorhexidine	Antiseptic	17.0
Povidone	Antiseptic	8.3
Dequalinium	Antiseptic	6.6
Natural remedies	-	4.1
Antifungals	-	4.1
Vitamin supplements	-	3.3

Gibbon, 2000.

Type of history for ulcers

The first line of appropriate management for oral ulcers rests with taking a proper history (Challacombe and Shirlaw, 1992). It is especially important in order to exclude underlying systemic disease. History-taking should attempt to ascertain the overall condition of the patient. This can be done with a medical and personal history. A history of the lesion should include questions pertaining to the duration, nature and severity of the oral ulcer, as well as previous response to treatment (if applicable).

Most pharmacists (81%) would take a history if the patient had an oral ulcer. Less than half the pharmacists (45%) would take a past medical history, 17.7% would ask about lifestyle questions, 9.1% would take a personal history, and only one would ask for social and professional information (Refer to Appendix 5 for a detailed list of the questions in each category mentioned). With regards to the oral ulcer, 57.3% (55) would ask for a history of the present illness, of which 57% would inquire about how long the lesion was there, and only 28.3% would want to know if the ulcer/s is recurrent. The frequency of these questions did not differ by

metropolitan location and SES (Chi Squared, Fisher Exact, $p>0.05$). However, pharmacists in low SES areas might be more likely to take a medical history as this difference was close to statistical significance (Fisher Exact, $p=0.05$). More women (65.7%) would take a medical history compared to men (35%) (Relative Risk=0.5 (0.3-0.8); Chi Squared=8.6, $p=0.03$). However, more male pharmacists (63.5%) than females (34.3%), would take a lesion history (Relative Risk=1.8 (1.12-3.0); Chi Squared=7.7, $p=0.005$). Even though pharmacists were not asked whether they would examine the lesion, 12.4% (15) indicated that either they themselves or a clinic sister would examine the ulcer. This did not differ by any of the stratification parameters (Fisher Exact, $p>0.05$).

Advice for oral ulcers

Patient counselling forms an integral part of management by a community pharmacist. Most pharmacists (80%) would offer advice to patients who presented with an oral ulcer, regardless of SES and all other stratification parameters (Chi Squared, Fisher Exact, $p>0.05$). Table 4.6 shows the type of advice that pharmacists would give a patient for an oral ulcer. The type of advice mostly did not differ by the stratification parameters (Chi Squared, Fisher Exact; $p>0.05$), except for the following: more pharmacists in high SES areas (19%) than in low SES areas (5.5%) would offer advice regarding medicine application (Fisher Exact, $p=0.03$).

Table 4.6: Type and frequency of advice provided for oral ulcers

Advice type	Percent of pharmacists
Oral hygiene advice	32
Use multivitamin supplement	26.8
Dietary advice	18.0
Advice regarding application of medicine	11.3
Preventive advice	10.5
Other	7.0

4.5 Management of oral thrush

Generally, oral thrush should be managed by taking a history in order to determine the cause and severity of the condition, provide appropriate drug and non-drug management, and referral if necessary (Akpan and Morgan, 2002; Department of Health, 2003). Pharmacists are not expected to refer all cases of oral thrush immediately, but should advise the patient to see a doctor/dentist if the thrush is recurrent and/or is unresponsive to treatment. Clinicians should perform an oral examination to ensure proper diagnosis, however this is not expected of the pharmacists in this study. Drug management includes topical therapy as a first line of treatment. These may include antifungal lozenges for adults, nystatin suspension for babies and imidazole preparations for severe cases (Department of Health, 2003). Non-drug management would be to provide advice that stipulates an improvement in oral hygiene, advice regarding denture hygiene and proper infant bottle hygiene (where applicable).

Just over half of the pharmacists (57.5%) in this study would take a history, recommend a treatment and refer the patient; hence 43% would not manage these patients comprehensively. Almost two-thirds of pharmacists (61%) would refer the patient immediately or recommend a referral if the problem persists despite using topical medication. Just over a third of pharmacists would not refer the patient at all. Of those who would refer, 77% would refer a case of oral thrush to the doctor, while only 6.5% would refer to a dentist. A few pharmacists (13%) expressed no preference about who to refer to and 2.6% would advise the patient to return to the pharmacist if the medication did not clear the thrush. These results did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, $p>0.05$).

Topical treatment for oral thrush

The treatment recommended by pharmacists was considered appropriate if it was in accordance with the Standard Treatment Guidelines and Essential Drug List of South Africa (Department of Health, 2003); and if efficacious medicines were recommended according to the literature (as outlined in Chapter 2: Literature Review, page 10 and 11). The first line of treatment would be topical antifungal

preparations. Systemic antifungals are prescribed in severe cases or to patients who are intolerant or refractory to topical treatment (Akpan and Morgan, 2002).

Most pharmacists (94.2%) would recommend a treatment for oral thrush. Nystatin was the most popular treatment as it was recommended by 91.2% of pharmacists. A third (33%) would recommend Daktarin®, and a quarter (25.9%) would recommend a probiotic when taking antibiotics. Female pharmacists (38.5%) were more likely to recommend the latter than males (19.2%), (Relative Risk=0.5 (0.3-0.9), Chi Squared=4.9, p=0.026). A quarter of the pharmacists in high SES areas (25.2%) would recommend Daktarin® compared to 40.3% of pharmacists in low SES areas (Fisher Exact, p=0.05). This difference was close to statistical significance. A few (14.3%) would recommend an alternative treatment, which mainly included topical antifungal preparations. However, other recommendations included Acyclovir, Dequadin®, Dynexan®, Betamed® and antibiotics. Except for those already mentioned, most treatment recommendations did not differ by SES and metropolitan location (Chi Squared, Fisher Exact, p>0.05). Overall, 96.4% of pharmacists would recommend an appropriate treatment for thrush. This did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, p>0.05).

Type of history for thrush

A thorough history is necessary to ascertain if oral thrush is due to underlying disease. The type of questions asked should attempt to elicit the nature, severity and duration of oral thrush. Overall, 81% of pharmacists would take a history for oral thrush. Just over two-thirds (67%) would take a past medical history, 6.5% would ask lifestyle questions and only one person would take a social and professional history. Half (54.5%) of the pharmacists would take a history of the present illness, however only 23% would ask 'how long has it been there?', and only 16.8 % would ask if the lesion is recurrent. The latter was a more common question among males (23%) than females (5.4%) (Relative Risk=4.3 (1.1-17.9), Chi Squared=5.5, p=0.02). A few pharmacists (9.9%) indicated that they would examine the lesion/mouth. These results did not differ by metropolitan location, SES, gender, or the year in which pharmacists qualified (Chi Squared, p>0.05). Those who qualified after 1995 were more likely to take a personal history for oral thrush (19% vs. 1.3 %; Relative Risk=15.4 (1.9-125.8), Chi Squared=11.9; p=0.0005). Not a single pharmacist took a complete history. The most comprehensive history that was taken included questions about personal identifying details, past medical history, and a history of the present illness. This was done by one pharmacist only.

Advice for oral thrush

Pharmacists are expected to provide counselling pertaining to the patients' complaint. Sound advice for oral thrush would include oral hygiene advice, i.e. information regarding good oral hygiene practices that is related to the cause of the oral thrush. Most pharmacists (81.7%) would offer advice for oral thrush. This did not differ by any of the stratification parameters (Chi Squared, p>0.05). The most common advice given was preventive advice that was problem-specific (Table 4.7); for example, if it was a denture-related problem then the patient would be advised to practice good denture hygiene. There was no difference in the type of advice given by SES or metropolitan location (Chi Squared; Fisher Exact, p>0.05). Female pharmacists (20%) may be more inclined to give dietary advice than males (6.62%), (Relative Risk=0.3 (0.1-1.0), Chi Squared=4.9; p=0.046). Pharmacists who qualified before 1995 may be more likely to give oral

health advice if the patient presents with oral thrush (20% vs. 4.2%; Relative Risk=0.2 (0.03-1.5); Fisher Exact, p=0.05).

Table 4.7 Type of advice provided for oral thrush

Advice type	Percent of pharmacists
Preventive advice	22.4
Advice regarding application of medicine	18.4
Oral health advice	16.3
Take probiotics simultaneously with antibiotics	15.3
Dietary advice	11.2
Use multivitamin supplement regularly	4.1
Other	1.1

4.6 Management of potential oral cancer

A long-standing oral ulcer that is unresponsive to treatment should be referred to a doctor/dentist immediately as it could be a carcinoma. All the pharmacists in this study (100%) reported that they would refer the patient to a doctor or dentist if the complaint was about an oral ulcer that has been present for more than four weeks. Most pharmacists (81%) reported that they would refer the patient without recommending a treatment or taking a history. Many pharmacists felt that if they recommended a treatment it would result in the patient delaying seeing a doctor or dentist. Most pharmacists (68.4%) would refer the patient to a doctor, 15.4% would refer to a dentist, while 16% would refer to either a doctor or dentist, and 0.9% (one pharmacist) would refer to a dentist if it were a tooth-related problem and to a doctor if it was located on the mucosa (information regarding the location of the lesion was elicited through history-taking). This did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, p>0.05).

Less than half of the pharmacists (46%) would offer advice for the problem, the majority of whom would stress the importance of the patient seeing a doctor/dentist as soon as possible (Table 4.8). About 10% of pharmacists would offer preventive advice, however the type of preventive advice was not specified. Few pharmacists (11%) would only give oral health advice; 11% (5) would only recommend a multivitamin supplement for the problem (Table 4.8).

Table 4.8 Type of advice provided for a mouth ulcer that has been present for more than 4 weeks

Advice type	Percent of pharmacists
Seek medical attention as soon as possible	64
Oral health advice	19
Use multivitamin supplement regularly	16
Preventive advice	9.5
Dietary advice	9.5

Only 11 pharmacists reported that they would take a history, the majority (7) of whom would take a past a medical history and a history of the present illness. Of these, two pharmacists indicated that they would examine the lesion themselves. Seven pharmacists indicated that they would recommend a treatment. The type of treatment varied between prescribing antibiotics, multivitamins, a mouthwash or oral ointment. There was no difference in any of these results by gender, SES, metropolitan location and number of years in community pharmacy. Seventy one percent of pharmacists who qualified after 1995 were more likely to strongly recommend that the patient seeks medical attention as soon as possible if he/she presents with an ulcer that has been present for more than 4 weeks (Relative Risk=1.8 (1.1-2.9); Chi Squared= 4.0; p=0.04).

4.7 Management of mouth sores

There are no standard treatment guidelines or scientifically sound research for the management of a mouth sore; however general patient management principles would be the same for oral ulcers and thrush, i.e. take a history, recommend an appropriate treatment and refer if necessary. There is no specific treatment for a mouth sore as it is a non-descript term for any oral lesion and may include a variety of oral lesions, therefore; treatment would depend on the cause. A history should be taken in order to determine the cause of the mouth sore which should pave the way for appropriate management. Pharmacists should advise the patient to see a doctor/dentist if the mouth sore is recurrent and/or is unresponsive to treatment.

In this study, half of the pharmacists interviewed would take a history, recommend a treatment, and refer the patient to a health professional (i.e. manage the patient comprehensively). Symptomatic management may include topical anaesthetic, anti-inflammatory and/or antimicrobial preparations.

Just less than a quarter (20%) of the pharmacists in this study would take a history and treat the lesion only, and 9.2% would treat and refer the patient to a health professional. Overall, 70% of pharmacists would refer the patient to a health professional. These results did not differ by any of the stratification parameters (Chi-Squared, Fisher Exact, $p>0.05$).

Topical treatment for mouth sores

The majority of pharmacists who responded to this question did not specify the type of treatment that they would recommend because the treatment would depend on the cause of the mouth sore (Table 4.9). Most of the treatment specified did not differ by any of the stratification parameters, however, pharmacists in metropolitan areas were more likely not to specify a treatment for mouth sores (Fisher Exact, $p=0.03$). Pharmacists in high SES areas were more likely to recommend povidone for mouth sores (Fisher Exact, $p=0.03$). More pharmacists who qualified before

1995 would recommend a treatment for a mouth sore depending on the cause of the lesion (53% vs. 20%; Relative Risk=0.5 (0.3-1.1), Chi Squared=4.4, p=0.04).

Table 4.9 Mouth sore treatment according to the active ingredient

Active ingredient	Pharmacological activity*	% Pharmacists that recommended treatment
Not specified	-	21.8
Benzydamine	Topical analgesic	11.9
Chlorhexidine	Antiseptic	10.9
Povidone	Antiseptic	9.9
Triamcinilone	Topical corticosteroid	7.9
Salicylic acid	Topical analgesic	6.9
Antifungals	-	5.9
Choline salicylate	Topical analgesic	5.9
Tetracaine	Topical analgesic	5
Dequalinium	Antiseptic	5
Vitamin supplements	-	4
Natural remedies	-	2

Gibbon, 2000.

Most pharmacists (73.5%) would definitely recommend an appropriate treatment, i.e. an anti-inflammatory, analgesic and/or antiseptic medication. Almost a quarter did not specify an active ingredient or trade name, therefore it cannot be assessed whether the treatment would be appropriate or not.

Type of history for mouth sores

A third of pharmacists (33%) would take a medical history. Almost two-thirds (59%) would take a history of the present illness, however only half (52%) would specifically ask: ‘how long has it been there?’, and less than a quarter of pharmacists (21.2%) would ask if the lesion is recurrent. Those who qualified before 1995 were more likely to ask if a mouth sore lesion was recurrent (25% vs. 5.3%, Relative Risk=0.2 (0.03-1.4); Fisher Exact, p=0.04). A lifestyle history was taken by 16.3% of pharmacists and 4.7% would take a personal history. 18.2% of pharmacists indicated that they would examine the lesion. These results did not differ by any of the stratification parameters (Chi Squared, Fisher Exact, p>0.05).

Advice for mouth sores

Just over two-thirds (66.7%) of pharmacists would offer advice for a mouth sore complaint (Table 4.10). A third of the pharmacists did not specify the type of advice that they would give, and just over a quarter would give advice depending on the cause of the problem. The type of advice given for mouth sores did not differ by gender, SES or metropolitan location (Chi Squared, p>0.05). Pharmacists in the metro areas (34%) were more likely to give oral health advice than those in the non-metro areas (13%) (Relative Risk=2.6 (1.1-6.3), Chi Squared=5.2, p=0.02).

Table 4.10 Type of advice given for mouth sores

Type of advice	Percent of pharmacists
No advice specified	32.1
Depends on cause	28.8
Oral health	22.2
Application of medicine	12.3
Dietary advice	8.6
Use multivitamin regularly	7.4

4.8 Knowledge of diseases due to oral ulcers

Most pharmacists (92.6%) were aware that oral ulcers could be an indication of an underlying disease. Only two pharmacists thought that oral ulcers were not indicative of an underlying disease, and seven (5.8%) did not know the answer to that question. These results did not differ by any of the stratification parameters (Chi Squared, $p > 0.05$). Table 4.11 lists the conditions that pharmacists assumed to be associated with oral ulcers. Each category listed in the table is not mutually exclusive, for example, the same pharmacist may have mentioned that ulcers could be indicative of HIV, an immune deficiency and a sexually transmitted disease.

Table 4.11 Pharmacists' knowledge of diseases due to oral ulcers

Disease	%	Disease	%
Immune deficiency	33.3	Dental problems	7.0
HIV	28.9	Lifestyle factors	6.1
Cannot think of any examples	15.9	Diabetes Mellitus	6.0
Vitamin Deficiency	14.9	Sexually transmitted diseases	5.3
Viral infection	13.2	Contagious diseases	2.6
Cancer	13.2	Gastric problems	2.6
Medical conditions	11.4	Tuberculosis	2.6
Medication	11.4	Trauma	2.6
Oral cancer	8.0		

% = percent of pharmacists

4.9 Knowledge of diseases due to oral thrush

Most of the pharmacists (94.2%) were aware that oral thrush could be indicative of an underlying condition. Very few pharmacists (5%) said that oral thrush is not indicative of an underlying condition and 0.8 % said they did not know the answer to the question. Table 4.12 lists the conditions that pharmacists assumed to be associated with oral thrush.

Table 4.12 Pharmacists' knowledge of diseases due to oral thrush

Disease	Percent of pharmacists
HIV	36.0
Immune deficiency	21.0
Other	15.0
Antibiotic use	13.2
Cancer	10.5
Diabetes mellitus	10.5
Cannot think of any examples	8.8
Fungi overgrowth	7.9
Corticosteroid use	7.0
Certain medication and drug reactions	6.1
Systemic thrush	6.1
Poor oral hygiene	4.4
Vitamin & mineral deficiency	3.5

These results did not differ by gender, metropolitan location or SES (Chi Squared, Fisher Exact, $p > 0.05$). However, 14.6% of pharmacists who qualified before 1995 believed that oral thrush could be indicative of the patient being on certain medication compared to none of those who qualified after 1995 (Odds ratio and Relative Risk undefined, Fisher Exact, $p = 0.03$).

4.10 Results by stratification parameters

All the results were analyzed by gender, metropolitan location (i.e. metro or non-metro areas), SES (high or low), when pharmacists qualified (before or after 1995), and the number of years that pharmacists have been practicing in community pharmacy (more or less than 19 years). There was no discernable pattern of knowledge and management of oral ulcers, oral thrush and mouth sores by most of these parameters. There were significant differences by SES and metropolitan location. These results have been reported in section 4.1, 4.2 and 4.3.

Table 4.13 Significant results by stratification parameters

Parameter	Variable	Relative Risk (CI)	p
Gender	More females manage oral ulcers comprehensively	0.7 (0.5-0.97)	0.047*
	More females recommend probiotics for oral thrush	0.5 (0.3-0.9)	0.026
	More females give dietary advice for oral thrush	0.3 (0.1-1.0)	0.046*
	Females more likely not to specify active ingredient for mouth sore treatment	0.5 (0.2-1.0)	0.05*
Graduation year	After 1995 were more likely to recommend Tetracain for ulcers	4.6 (1.1-2.5)	0.03

*= close to statistical significance

CHAPTER 5. DISCUSSION

The results of this study have yielded some important findings that will be discussed systematically, in the order in which the objectives are listed.

5.1 Prevalence of patients attending pharmacies with oral problems and prevalence of most common oral problems encountered

The results of this study have reinforced the idea of pharmacists as oral health advisors, as most pharmacists dealt with oral problems regularly, i.e. nearly everyday and more than once a week. More than half the pharmacists reported that the most common oral problem that they encountered were oral ulcers. This supports current literature from the UK (Dickinson *et al*, 1995) and Johannesburg (Gilbert, 1998b) that also found oral ulcers to be the most common oral problem that patients present to pharmacists with.

About half of the pharmacists reported that they commonly encountered oral thrush, which is substantially higher than the 1% prevalence reported in the UK (Dickinson *et al*, 1995). This finding is not surprising as certain conditions that predispose to the development of oral thrush, such as diabetes mellitus, malnutrition, (Bradshaw *et al* 2007; Nannan *et al*, 2007) and HIV (UNAIDS, 2006) are prevalent in South Africa¹. There is no comparable data regarding the prevalence of diabetes mellitus and malnutrition in the UK. The prevalence of HIV is substantially higher in this country (UNAIDS, 2006) than in the UK (UNAIDS, 2008). In 2006, the prevalence of HIV in the UK was a mere 121 cases per 100 000 (UNAIDS, 2008) compared to 11 595 cases per 100 000 in South Africa (UNAIDS, 2006). Therefore oral thrush would be encountered more often by health professionals, including community pharmacists in South Africa.

¹ There are many factors that predispose to the development of oral thrush as outlined in the literature review chapter, page 10. However, not all these factors have been measured or are measurable, for example, antibiotic usage. Therefore, diabetes, HIV and malnutrition have been used to highlight the higher prevalence of oral thrush in South Africa compared to the UK.

These findings suggest that pharmacies may serve as a reservoir of undetected cases of oral cancer, HIV and other STIs, because patients attend regularly with oral problems, the most common of which are oral ulcers and oral thrush.

The third most common oral problem encountered was toothache and many pharmacists (17%) also encountered an abscess in the oral cavity, which usually is a result of advanced untreated caries. Caries is highly prevalent in South Africa, especially untreated caries (Van Wyk and Van Wyk, 2004), that would undoubtedly cause toothache at some point. It is clear that many patients are presenting to the pharmacist for symptomatic treatment for caries before they seek curative treatment from a dentist, indicating that the pharmacist could play a role in oral health education to prevent future occurrence of caries.

These findings entrenches the position of the community pharmacist within the primary health care approach. They are approached on a regular basis for oral health advice, especially oral ulcers and oral thrush, and can therefore play a key role in the early detection of HIV, other STIs and oral cancer, provided that these patients are managed correctly.

5.2. Management of oral ulcers, oral thrush and mouth sores by community pharmacists

As mentioned previously, the appropriate management of a patient would be to take a history, recommend a treatment and recommend a referral immediately or if the lesion does not clear with topical medication. Just over half of the pharmacists interviewed would manage a patient comprehensively (i.e. take a history, recommend an appropriate treatment, provide sound advice and refer if necessary) if they simply complained of an oral ulcer, oral thrush or mouth sore. The majority of pharmacists would recommend an appropriate topical treatment for an oral ulcer or thrush, i.e. the treatment was according to standard treatment guidelines or efficacious treatment protocols outlined in the literature. However, a more detailed analysis revealed that the quality of their overall management is questionable. A third of pharmacists would not recommend a referral for oral

ulcers and oral thrush, while a quarter would not do so for mouth sores. Most pharmacists would take a history if a patient presented with any of these lesions, however, the quality of their history-taking is questionable. A large proportion of pharmacists would not take a medical history, or a history of the present illness and many pharmacists would not enquire if the lesion is recurrent or ask about the length of time that the lesion has been present. It is understandable that the time taken for history-taking could be severely curtailed if there are many patients waiting, however these questions are essential to determine if the lesion is of suspicious origin, and this kind of knowledge could pave the way for appropriate management.

All the pharmacists in this study would have managed a potential case of oral cancer appropriately, i.e. they would refer the patient to a doctor or dentist. This is in stark contrast to studies conducted in Avon (Scully *et al*, 1989) and Minnesota (Leonard *et al*, 1999) where most pharmacists only recommended topical treatment. This could be due to the difference in patient management protocols in different countries. By 1995, the training of undergraduate pharmacists in South Africa shifted from a purely drug-dispensing role to that of holistic management of the patient, i.e. pharmacists are required to take a history, recommend an appropriate treatment, counsel and refer the patient to an appropriate health professional if necessary (Butler, 2006). Regardless of when they qualified, the pharmacists in this study all had the correct knowledge of how to treat a long-standing oral ulcer. This knowledge may have been gained through undergraduate training, continuous professional development (CPD) courses or self-study, and this may ultimately be a reflection of the training that our pharmacists receive at an under- and post-graduate level, or the extent to which pharmacists in this country practice what they have learnt. The contrasting results could also be due to the different methodologies used. The Avon (Scully *et al*, 1989) and Minnesota (Leonard *et al*, 1999) studies used a patient simulated methodology, whereas this study employed the use of a hypothetical question to the pharmacist. The results of a real-life scenario would be more reliable as it provides an absolute indication of management. The hypothetical technique used in this study lends itself to obsequiousness bias, thus the validity of their response in this study should be viewed with caution. It is therefore recommended that future studies use patient

simulated methodology to determine how pharmacists in the Western Cape would manage a potential case of oral cancer.

There is a definite difference between how pharmacists would manage a simple oral ulcer and a long-standing oral ulcer. All pharmacists would refer the patient to a health professional if they complained of an ulcer that has been present for four weeks, however the same vigilant referral pattern is not seen when a patient would complain of a simple mouth ulcer. Hence, pharmacists were not aware of the serious morbidity that a simple ulcer could represent and therefore would not take the initiative to determine if these oral lesions are suspicious. This was also evident by the poor quality of history-taking for oral ulcers in this study.

It is expected that the number of years that any health professional has spent in practice would influence their manner of patient management (Katzenellenbogen *et al*, 1997). In this study pharmacists' management of oral complaints, and knowledge of the link between oral ulcers and thrush with underlying conditions, did not differ regardless of how long they had been in community pharmacy, or whether they qualified before or after 1995. It would also be reasonable to assume that pharmacists' management would differ if they qualified before or after 1995 because they were trained differently during these periods. Regardless of when pharmacists qualified, their management of oral complaints, and knowledge of the link between oral ulcers and oral thrush with underlying conditions, did not differ, therefore pharmacists knowledge of oral health management should be strengthened at an under- and post-graduate level.

It was interesting to note that more pharmacists would refer cases of oral ulcer, oral thrush and mouth sores to a medical doctor than to a dentist, and only a small percentage had no preference. Some pharmacists said that they would refer to a doctor if the problem was on the mucosa and to a dentist if the problem was tooth-related. This indicates that there is still a perception among certain health professionals that dentists are 'tooth specialists' whose jurisdiction of treatment does not extend beyond tooth-specific problems despite the fact that dentists undergo intensive training to manage all oral complaints, whereas medical doctors receive general and much less intensive training for oral problems.

5.3. Management of oral lesions by socio-economic status and metro/non-metro location.

Several inconsistent results occurred in this study when certain findings were stratified by SES and metropolitan location. The prevalence of toothache and abscess in pharmacies are rather contradictory when stratified by SES and metropolitan location. In this study, non-metro areas should have correlated with low SES areas because the average weighted household income was significantly less in non-metro areas. Abscesses are indicative of advanced carious disease and are most common in low SES areas (Hobdell *et al*, 2003; Amien *et al*, 2004); however the results of this study contradicted the current literature as it was shown that pharmacists in high SES areas are more likely to encounter this problem (Table 5.1).

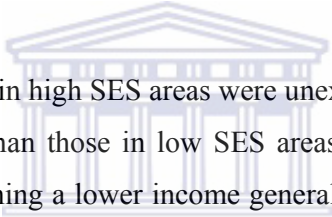
Ironically, pharmacists in high SES areas were unexpectedly approached with oral problems more often than those in low SES areas. A contrary result would be expected as people earning a lower income generally experience greater financial burden that is a huge deterrent in seeking healthcare from doctors, dentists and other health care professionals (Hobdell *et al*, 2003; Amien *et al*, 2004). It could be argued that some people may not be able to afford treatment at a pharmacist and therefore would attend the public health services instead, resulting in a low prevalence of reported oral problems at pharmacies in low SES areas. The extent to which this theory holds true is questionable as a paradoxical explanation could be encased in the utilization level of public oral health services in this country. Limited resources and inaccessibility are reasons cited for the poor utilization level of the oral health services in this country (Department of Health, 1998). Consequently, one would expect that people who are earning a lower income would utilize alternative health services, such as community pharmacies, to a greater extent as there may be fewer financial and time barriers at community pharmacies (Leonard *et al*, 1996; Gilbert, 1997).

Table 5.1: Frequency of oral problems by metropolitan location and socio-economic status

Oral problem	Stratification parameter	Relative Risk	p
Ulcers	Metro	0.7	0.04
Thrush	High SES*	1.6	0.01
Toothache	Metro	1.9	0.02
Abscess	High SES	2.2	0.05
Mouth sores	Metro	0.2	0.01

Significantly more pharmacists in low SES areas would recommend Daktarin gel as a topical remedy for oral thrush, even though it is one of the most expensive topical antifungal preparations. These pharmacists most probably serve a clientele that can afford this treatment even though they are situated in poorer areas.

These inconsistent findings suggest that the SES of the clientele may not correlate with the SES of the area of the pharmacy as has been suggested in another study (Domínguez-Berjón *et al*, 2006). People from low SES areas could be using pharmacies in high SES areas, and vice versa; as it is a common occurrence for people to attend a pharmacy that is not in their residential area. The dynamic movement of people across high and low SES areas could have blurred the socio-economic border distinction of the residential areas in this study. The socio-economic border indistinction could also be due to the SES indicator that was used in this study. However, as SES is a relative measure; the use of any other indicator would have been just as likely to introduce this kind of misclassification.

5.4 Knowledge of the link between oral ulcers and oral thrush with underlying conditions

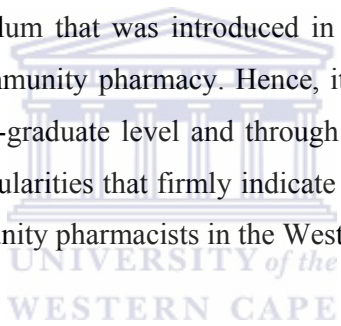
The majority of pharmacists were aware that oral ulcers and oral thrush could be indicative of an underlying condition, however their knowledge of specific conditions was lacking. Only about a third of pharmacists were aware that oral ulcers and oral thrush could be indicative of HIV infection, and only 8% were aware that oral ulcers could be an indication of oral cancer. This reinforces the notion that pharmacists are not aware of the serious consequences that a simple oral ulcer could represent. In addition to this, even though all pharmacists reported that they would refer a long-standing oral ulcer, only a few mentioned that an ulcer of this nature could be due to oral cancer. This may indicate that they know how to manage a long-standing oral ulcer and that they are aware that it is an urgent matter, however they are not exactly sure why they are referring these cases.

Aside from HIV and oral cancer, there is a wide spectrum of conditions that are associated with oral ulcers and oral thrush. While the full spectrum of such conditions was mentioned by pharmacists, very few pharmacists were aware of most of these conditions, for example, when pharmacists were asked to name conditions that are associated with oral ulcers, only 14.9% mentioned vitamin deficiencies, and 2.6% mentioned tuberculosis and trauma. These conditions are definitely associated with oral ulcers (Challacombe and Shirlaw, 1992), yet only a few pharmacists were aware of this. Very few pharmacists mentioned that antibiotic use and diabetes mellitus could be associated with oral thrush, yet there is a definite association between these factors (Arendorf *et al*, 2000).

Some pharmacists did not give the correct examples of conditions that could be associated with oral ulcers and oral thrush. A few (11.4%) mentioned that certain medical conditions are associated with oral ulcers, and 7% associated certain dental problems with oral ulcers. Unfortunately most of the medical and dental conditions mentioned were incorrect as those mentioned are not related to oral ulcers. For example gingivitis, tonsillitis, teething, poor oral hygiene, hypertension, flu/colds, alcohol intake, septicaemia, to name a few. Many of the

pharmacists were under the impression that acid reflux, stomach ulcers, hyperacidity and/or gastritis could result in oral ulcers. However, there is no association of such conditions with oral ulcers. There is a definite relationship with the presence of *Helicobacter Pylori* and gastric ulcers, gastritis and stomach cancer. *Helicobacter Pylori* may also be part of the normal oral flora and may play a role in recurrent aphthous stomatitis (Iamaroon *et al*, 2003; Fritscher *et al* 2004; Mansour-Ghanaei *et al*, 2005). But there is no literature that has reported on a direct link between gastric ulcers and oral ulcers.

There is a definite need to train pharmacists on how to manage oral ulcers, oral thrush and mouth sores, as well as to why the appropriate management of such lesions is important. There was no difference in pharmacists' knowledge of the link between oral ulcers and oral thrush with underlying diseases regardless of the new pharmacy curriculum that was introduced in 1995, or how long they have been practicing in community pharmacy. Hence, it may be necessary to provide such training at a post-graduate level and through CPD training. This study has highlighted many irregularities that firmly indicate a gap between knowledge and practice among community pharmacists in the Western Cape.



CHAPTER 6. CONCLUSION

This study strengthens the current view of pharmacists as oral health advisors since they are confronted with oral problems on a regular basis. Community pharmacists are therefore ideally placed to practice and enhance oral health prevention. This highlights their role in the primary health care approach to disease prevention. The most common oral problem that community pharmacists encounter is oral ulcers and oral thrush, respectively. Both these lesions can be indicative of underlying pathology, such as HIV, other STIs and oral cancer. Therefore, the pharmacist can play an important role in the early detection of these serious diseases by managing these lesions appropriately.

Unfortunately, many pharmacists are not managing these lesions appropriately due to inadequate history-taking and lack of referral to a dentist or doctor. Many pharmacists would not ask the correct questions in order to determine if the oral lesion is of suspicious origin. About a third of pharmacists would not recommend a referral if the oral ulcer, thrush or mouth sore does not respond to treatment. This could have dire consequences if these patients are suffering from a serious illness such as HIV, other STIs or oral cancer. On the other hand, all pharmacists in this study would refer a long-standing oral ulcer immediately, which suggests that pharmacists recognise the urgency of such cases. However, very few pharmacists' (8%) knew that an oral ulcer could be indicative of oral cancer. This suggests that pharmacists may not understand why urgent referral is required, or the nature of this study may have led to obsequiousness bias.

Most pharmacists were aware that oral ulcers and oral thrush are indicative of underlying conditions; however, they lacked specific knowledge about the relationship of such lesions with these underlying conditions. Only a third of pharmacists were aware that oral ulcers and oral thrush could be indicative of HIV infection, and a small number (8%) of pharmacists mentioned that an oral ulcer could be indicative of oral cancer. This may explain why many community pharmacists are not managing oral ulcers and thrush appropriately. There was no

discernable pattern in the management or knowledge of the link between these lesions and underlying disease by SES and metropolitan location.

There appears to be a definite need to train pharmacists with specific skills to improve their recognition, referral or management of oral ulcers, oral thrush and mouth sores, as well as the scientific evidence to explain the importance of these conditions. It is recommended that this training should be provided at under- and post-graduate level as well as through CPD training. Future studies to determine how pharmacists manage a potential case of oral cancer should incorporate a patient simulated methodology in order to overcome the limitation of obsequiousness bias inherent with interview techniques.



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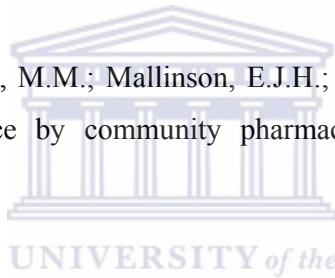
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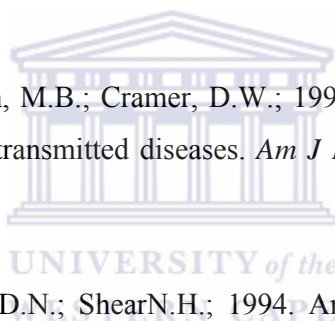
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APPENDIX 1

Classification of Oral Ulcers (Challacombe and Shirlaw, 1992):

1) RECURRENT ULCERATIONS, this could be indicative of

- Recurrent aphthous stomatitis (minor; major and herpetiform)
- Bechet's disease
- Erythema multiforme
- Atypical ulcers

2) CURRENT/PERSISTENT ORAL ULCERATION (usually indicates underlying systemic disease), this can occur secondary to:

- Haematological deficiency (vitamin B12, folate and iron)
- Gastrointestinal enteropathy (ulcerative colitis, Crohn's disease, coeliac disease)
- Dermatological condition (Benign Mucous Membrane Pemphigoid, Pemphigus, Erosive Lichen Planus, Linear IgA disease).
- Connective tissue disease (Systemic/discoid lupus erythematosus, Reiter's syndrome).

3. SINGLE EPISODE ULCERATION

- Infective (viral, syphilitic, tuberculosis)
- Traumatic (physical/mechanical, chemical)
- Drug reaction

4) SINGLE PERSISTANT ULCER

- Neoplastic

APPENDIX 2

QUESTIONNAIRE FOR THE PHARMACIST



Department of Community Oral Health and

School of Pharmacy

University of the Western Cape



Att: The pharmacist

Re: Study of pharmacists and oral health problems.

Dear sir/madam

The attached questionnaire is in aid of a study that is being conducted in collaboration with the Department of Community Dentistry (Dentistry faculty) and the School of Pharmacy at the University of the Western Cape. This study is being supervised by Prof. Nadine Butler (School of Pharmacy), and Prof Neil Myburgh (Department of Community Dentistry) and is being conducted on the premise that all health professionals should be working together and supporting each other in order to improve the health of communities. This study in particular looks at the overlap between dentistry and pharmacy regarding oral health problems. The aim of this study is to determine how often patients present at a pharmacy with oral complaints and oral health advice; to determine the prevalence of the most common oral complaints that a pharmacist is confronted with and to determine how pharmacists manage certain oral health problems. The results of this study will be disseminated in dentistry and/or pharmacy journals, presented at dentistry and pharmacy conferences. The completed thesis document will be available in the UWC library.

Please note that your answers will remain confidential. You also have the right to refuse to participate in this study. You are free to withdraw from the study at any time if you do decide to participate. If you decide to participate, please take note of the following:

- The questionnaire has been included so that the pharmacist can acquaint him/herself with the questions that will be asked by the researcher; therefore it does not need to be completed by the pharmacist.
- I will phone your pharmacy later today in order to gain permission to conduct a telephone interview with the pharmacist tomorrow, and also to set up a convenient time for the pharmacist to conduct the interview.
- The interview should last about 7-10 minutes.
- The questions that will be asked on the telephone will be based on the attached questionnaire.
- Only pharmacists can be interviewed for the purpose of this study.

Your participation will be greatly appreciated!!!

Yours sincerely,

Dr Feroza Amien

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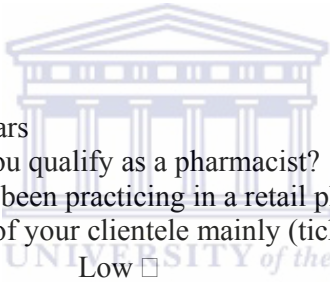
(Please feel free to contact me if you have any questions or queries).

This questionnaire is for a master's research study that is being conducted in collaboration with the Department of Community Dentistry (Dental Faculty) and the School of Pharmacy at the University of the Western Cape. This study is being supervised by Prof. Nadine Butler from the School of Pharmacy, and Prof Neil Myburgh from the Department of Community Dentistry. The main aim of this study is to determine how pharmacists manage certain oral health problems. Please note that your answers will remain confidential. Your co-operation will be appreciated immensely.

Please note that this questionnaire is for your perusal only; it should NOT be mailed/faxed to anyone. The questionnaire has been included so that you can acquaint yourself with the questions. Dr Amien, from the Department of Community Dentistry, will telephone you tomorrow and ask these questions over the phone. Dr Amien will also phone you today in order to ask for your consent to participate in this study. If you agree to participate, then we can confirm a time for the telephone interview tomorrow, which can be done at the pharmacists' convenience. The interview should last approximately 7-10 minutes.

QUESTIONNAIRE

SECTION A

- 
- (1) Age:.....years
(2) In which year did you qualify as a pharmacist?
(3) How long have you been practicing in a retail pharmacy?.....
(4) Is the income level of your clientele mainly (tick the appropriate block)
High Low
(5) What percentage of your clientele has medical aid?.....%

SECTION B:

- (6) How often do customers present with mouth problems? (*Please tick one answer only*)
a) Nearly every day
b) < once a week
c) > once a week
d) Once a month
e) Hardly ever
- (7) What are the most common oral problems that customers present with?
- (8) If a customer presents with an ulcer/s in the mouth, would you (*More than one option can be circled for this question*).
a) Take a history (i.e. ask more questions about it)?
b) Recommend a treatment?
c) Refer the patient?
d) All of the above?
e) None of the above?
f) Other, please specify _____

(9) Would you offer the customer any advice for the problem mentioned in question 8?
(Please tick one answer only) Yes No

(10) If a customer presents with oral thrush (a fungal infection in the mouth), would you
(More than one option can be circled for this question).

- a) Take a history (i.e. ask more questions about it)?
- b) Recommend a treatment?
- c) Refer the patient?
- d) All of the above?
- e) None of the above?
- f) Other, please specify _____

(11) Would you offer the customer any advice for the problem mentioned in question 10?
(Please tick one answer only) Yes No

(12) If a customer complains that he/she has had a mouth ulcer for more than four weeks that hasn't healed despite topical medication, would you (More than one option can be circled for this question).

- a) Take a history (i.e. ask more questions about it)?
- b) Recommend a treatment?
- c) Refer the patient?
- d) All of the above?
- e) None of the above?
- f) Other, please specify _____

(13) Would you offer the customer any advice for the problem mentioned in question 12?
(Please tick one answer only) Yes No

(14) If a customer complains of a 'mouth sore' would you (More than one option can be circled for this question).

- a) Take a history (i.e. ask more questions about it)?
- b) Recommend a treatment?
- c) Refer the patient?
- d) All of the above?
- e) None of the above?
- f) Other, please specify _____

(15) Would you offer the customer any advice for the problem mentioned in question 14?
(Please tick one answer only) Yes No

(16) Can ulcers in the mouth be indicative of underlying disease?
(Please tick one answer only) Yes No I don't know

(17) Can thrush in the mouth be indicative of underlying disease/s?
(Please tick one answer only) Yes No I don't know

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

APPENDIX 3

Note to reader: all the questions that were posed to pharmacists appear in bold, whereas all text that is not in bold was not mentioned to the pharmacist.

QUESTIONNAIRE FOR RESEARCHER

Pharmacy council no: _____ Record Number: _____

Consent to participate

1.Y	2.N
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 Date:

Pharmacist name: _____

What type of pharmacist are you?

1.Intern	2. locum	3. principle
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Area location of pharmacy _____

Area type:

1. Metro	2. Non- metro
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Census Income level:

1. High	2.Low
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Area & income level

1. Metro High	2. Metro Low	3. Non metro high	4. Non metro low
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Ph. () Gender

1. Male	2. Female
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SECTION A

- 1) **Age:**.....years
- 2) **In which year did you qualify as a pharmacist?**
- 3) **How long have you been practicing in a retail pharmacy?**.....
- 4) **Is the income level of your clientele mainly (tick the appropriate block)**
High Low
- 5) **What percentage of your clientele has medical aid?**.....%

SECTION B

6) How often do customers present with mouth problems? (*Please tick one answer only*)

- a) 1. Nearly every day
- b) 2. < Once a week
- c) 3. > Once a week
- d) 4. Once a month
- e) 5. Hardly ever

(7) What are the most common oral problems which customers present with (please tick the appropriate options, note: more than one option can be chosen)

1)	Toothache	
2)	Bleeding gums	
3)	Loose/broken dentures	
4)	Mouth ulcers	
5)	Thrush	
6)	Herpes	
7)	Mouth Sores	
8)	Sensitive teeth	
9)	Teething in kids	
10)	Pain in the mouth	
11)	Other, please specify	

(8) If a customer presents with an ulcer/s in the mouth, would you

- a) 1. Take a history (i.e. ask more questions about it)
- b) 2. Recommend a treatment?
- c) 3. Refer the patient to a doctor/dentist?
- d) 4. All of the above?
- e) 5. a & b
- f) 6. a & c
- g) 7. b & c
- h) 8. None of the above?
- i) 9. Other, please specify _____

(8a) What questions would you ask?

- 1. How long has it been there?
- 2. What medication have you used for the ulcer?
- 3. What medication have you taken recently?
- 4. Is it a recurring problem?
- 5. Is it painful?
- 6. Other, please specify _____

(8b) What treatment would you recommend?

- 1. Kenalog in orabase
- 2. Pyralvex
- 3. Dynexan
- 4. Chlorhexidine
- 5. Other _____

(8c) **Who would you refer the patient to:** 1. dentist 2. doctor or 3. other

(9) **Would you offer the customer any advice for the problem mentioned in question 8?** Yes No

(10) **If yes, what advice would you give?**

1. Oral hygiene advice
2. Take a multivitamin
3. Advice regarding application of medicine
4. Other: _____

(11) **If a customer presents with oral thrush (a fungal infection in the mouth), would you**

- a) **1. Take a history (i.e. ask more questions about it)**
- b) **2. Recommend a treatment?**
- c) **3. Refer the patient to a doctor/dentist?**
- d) **4. All of the above?**
- e) 5. a & b
- f) 6. a & c
- g) 7. b & c
- h) **8. None of the above?**
- i) **9. Other, please specify** _____

(11a) **What questions would you ask?**

1. How long has it been there?
2. Have you taken antibiotics recently?
3. Are you taking any other medication?
4. Other _____

(11b) **What treatment would you recommend?**

1. Nystatin
2. Daktarin
3. Antibiotics
4. Probiotics
5. Mycostatin
6. Other:

(12c) **Who would you refer the patient to?**

1. dentist or 2. doctor or 3. other

(13) **Would you offer the customer any advice for the problem mentioned in question 10?** 1. Yes 2. No

(14) **If yes, what advice would you give?**

1. Advice regarding application of medicine
2. To improve oral hygiene
3. Take a multivitamin
4. If there's no change then see a doctor/ dentist

5. Other: _____

(15) If a customer complains that he/she has a mouth ulcer for more than four weeks that hasn't healed despite topical medication, would you

- a) **1. Take a history (i.e. ask more questions about it)**
- b) **2. Recommend a treatment?**
- c) **3. Refer the patient to a doctor/dentist?**
- d) **4. All of the above?**
- e) 5. a & b
- f) 6. a & c
- g) 7. b & c
- h) **8. None of the above?**
- i) **9. Other, please specify** _____

(15a) What questions would you ask?

- 1. How long has it been there?
- 2. What medication did you use for the ulcer?
- 3. Do you smoke and/ or drink alcohol?
- 4. Is it painful?
- 5. Other _____

(15b) What treatment would you recommend?

- 1. Kenalog in orabase
- 2. Pyralvex
- 3. Dynexan
- 4. Chlorhexidine
- 5. Other _____

(15c) Who would you refer the patient to: 1.dentist 2.doctor 3.other

(16) Would you offer the customer any advice for the problem mentioned in question 12? 1. Yes 1. No

(17) If yes, what advice would you give?

- 1. Basic oral hygiene advice
- 2. Seek medical attention ASAP
- 3. Take a multivitamin
- 4. Other _____

18) If a customer complains of a 'mouth sore' would you

- 1. Take a history (i.e. ask more questions about it)**
- 2. Recommend a treatment?**
- 3. Refer the patient to a doctor/dentist?**
- 4. All of the above?**
- 5. a & b
- 6. a & c
- 7. b & c
- 8. None of the above?**
- 9. Other, please specify** _____

(18a) **What questions would you ask?**

1. How long has it been there?
2. Is it a recurring problem?
3. Medication history
4. Other please specify _____

(18b) **What treatment would you recommend?**

1. Pyrelvex
2. Dequadin
3. Depends on the cause
4. Other: _____

(18c) **Who would you refer the patient to:**

1. dentist or 2. doctor or 3. other

(19) **Would you offer the customer any advice for the problem mentioned in question 14?** 1. Yes 2. No

(20) **If yes, what advice would you give?**

1. Basic oral hygiene advice
2. Advice regarding application of medicine
3. Depends on the cause
4. Other _____

(21) **Can ulcers in the mouth be indicative of underlying disease?**

1. Yes 2. No 3. I don't know

(22) **If you answered yes to question 16, please list the disease/s below:**

1. STD's
2. Vitamin and mineral deficiency
3. Immune deficiency
4. Other:

i _____ ii _____

iii _____ iv _____

(23) **Can thrush in the mouth be indicative of underlying disease/s?**

1. Yes 2. No 3. I don't know

(24) **If you answered yes to question 17, please list the disease/s below:**

1. Immune deficiency
2. Antibiotic use
3. Vitamin and mineral deficiency
4. Other:

i _____ ii _____

iii _____ iv _____

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!

APPENDIX 4

FREQUENCY OF ORAL PROBLEMS STRATIFIED BY METROPOLITAN LOCATION AND SOCIO-ECONOMIC STATUS

Mouth problem	Metropolitan location				Socio-Economic Status			
	Metro %	Non – metro %	RR (CI)	TEST	High %	Low %	RR (CI)	TEST
Ulcers	58	53	1.1 (0.8-1.5)	$\chi^2=0.3$ p=0.6	49.1	61.9	0.8 (0.6-1.1)	$\chi^2=1.9$ p=0.2
Thrush	40	58	0.7 (0.5-1.0)	$\chi^2=4.0$ p=0.04	61.4	38.1	1.6 (1.1-2.4)	$\chi^2=6.5$ p=0.01
Toothache	43.3	23.3	1.9 (1.1-3.2)	$\chi^2=5.4$ p=0.02	29.8	36.5	0.8 (0.5-1.4)	$\chi^2=0.6$ p=0.4
Bleeding gums	20	18.3	1.1 (0.5-2.3)	$\chi^2=0.05$ p=0.8	15.8	22.2	0.7 (0.3-1.5)	$\chi^2=0.8$ p=0.4
Abscess	13.3	21.7	0.6 (0.3-1.4)	$\chi^2=1.4$ p=0.2	24.6	11.1	2.2 (0.9-5.1)	$\chi^2=3.7$ p=0.05
Other	20	11.7	1.7 (0.7-4.05)	$\chi^2=1.56$ p=0.2	10.5	20.6	0.5 (0.2-1.25)	$\chi^2=2.3$ p=0.1
Sore throat	16.7	13.3	1.3 (0.5-2.9)	$\chi^2=0.3$ p=0.6	10.5	19	0.5 (0.2-1.4)	$\chi^2=1.7$ p=0.2
Herpes	11.7	13.3	0.9 (0.3-2.3)	$\chi^2=0.07$ p=0.8	7	17.5	0.4 (0.1-1.2)	FE p=0.07
Mouth sore	3.3	16.7	0.2 (0.04-0.87)	FE p=0.01	14.0	6.3	2.2 (0.7-6.9)	FE p=0.1
Loose dentures	6.7	8.3	0.8 (0.2-2.8)	FE p=0.5	3.2	11.1	0.3 (0.06-1.5)	FE p=0.1
Gum problems	5	6.7	0.7 (0.2-3.2)	FE p=0.5	3.5	7.9	0.4 (0.1-2.1)	FE p=0.3
Pain in mouth	3.3	5	0.7 (0.1-3.8)	FE p=0.5	3.5	4.8	0.7 (0.1-4.2)	FE p=0.5
Tongue problems	3.3	5	0.7 (0.1-3.8)	FE p=0.5	7	1.6	4.4 (0.5-38.4)	FE p=0.1

χ^2 = Chi Square test

FE = Fisher Exact test

RR= Relative Risk

APPENDIX 5

QUESTIONS FOR HISTORY-TAKING

CATEGORY	LIST OF QUESTIONS IN EACH CATEGORY
Past medical history	<ol style="list-style-type: none">i. Allergies and reactions to drugsii. Previous and current illnessesiii. Medicines were taken in the past 6 monthsiv. Current medication
Social and professional information	<ol style="list-style-type: none">i. History of illnesses in the familyii. Hygiene (face and hair cleansing routine)iii. Head coverings, e.g. hats, caps, bandanas, etc.iv. Bedbugs or other biting insects
History of the present illness	<ol style="list-style-type: none">i. Description of the problemii. Chronology of symptoms (abrupt or gradual onset, intermittent, transient, how long has it been there, is it recurrent, etc).iii. Precipitating, aggravating and relieving factorsiv. Accompanying symptoms, e.g. burns, itchiness, pain, etc)v. Personal contacts presenting with similar lesions
Lifestyle history	<ol style="list-style-type: none">i. Dietary questions, e.g. have you eaten hard or spicy foods latelyii. Oral hygiene questions, for e.g., how often do you brush your teeth, do you floss, etciii. Questions regarding smoking and alcohol consumptioniv. Questions to ascertain if the patient is under stress