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# Knowledge, attitudes and practices of patients towards root canal treatment in the Mopani district, Limpopo

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**2024**

University of the Witwatersrand, Johannesburg

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Nkosi, Mokgadi Michille Veronica. (2024). Knowledge, attitudes and practices of patients towards root canal treatment in the Mopani district, Limpopo [Master's dissertation, University of the Witwatersrand, Johannesburg]. WireDSpace. https://hdl.handle.net/10539/42760

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# KNOWLEDGE, ATTITUDES AND PRACTICES OF PATIENTS TOWARDS ROOT CANAL TREATMENT IN THE MOPANI DISTRICT, LIMPOPO

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Science in Dentistry (Endodontics)

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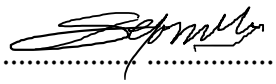
Johannesburg, 2024

# Declaration

I, Mokgadi Nkosi, declare that this research report, “Knowledge, attitudes and practices of patients towards root canal treatment in the Mopani District, Limpopo” is my own work. It is being submitted in accordance with the requirements for the degree of MSc (Dent.) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university. All sources cited in the research report have been duly acknowledged.

___29th_____day of _____January_____, 2024



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# Acknowledgements

I would like to give appreciative acknowledgement to the following persons who have made completing this research study possible:

- My supervisors, Dr Mothopi-Peri and Dr Patel. Your patience and continued interest in the topic of my research were a great motivation to keep going even when I felt at a loss. I am grateful for the invaluable contribution you have given from the initial to final stages of this study. Your guidance and positive criticism have bettered my understanding of research.

- The Limpopo Department of Health for permitting me to conduct this study. To the CEOs and senior/dental clinical managers of the different hospitals for openly allowing me access to the respective dental facilities. A special acknowledgement to the dental assistants that helped invite patients to participate in the study and those who volunteered to assist in the data collection. Your kindness and sacrifice of time have been invaluable during a challenging stage of this study.

- The participants that consented and took their time to participate in this study.

- Finally, my beloved family and friends. The goal of completing this research was inspired by the prospect of celebrating reaching that goal with you. Thank you for consistently reminding me that it was possible.

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# List of Abbreviations

| | |
|---|---|
| **AAE** | American Association of Endodontists |
| **AP** | Apical periodontitis |
| **DoH** | Department of Health |
| **HREC** | Health Research Ethics Committee |
| **IP** | Irreversible pulpitis |
| **KAP** | Knowledge, attitudes, practice |
| **LEO** | Lesions of endodontic origin |
| **OHE** | Oral health education |
| **OHL** | Oral heath literacy |
| **OHRQoL** | Oral health related quality of life |
| **POE** | Portal of exit |
| **RCT** | Root canal treatment |
| **RP** | Reversible pulpitis |

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# Chapter 1: Introduction and Literature review

## 1.1 Introduction

'*The South African National Oral Health Strategy*' is a document that was drafted and last modified in 2015 by the South African Department of Health and several oral health stakeholders. The authors of the document acknowledge that dental extraction is the primary form of treatment offered in the public health sector, outside of the academic oral health centres. This is supported by several studies conducted in the Western Cape, Gauteng, Kwa-Zulu Natal and Limpopo provinces of South Africa; which highlighted a greater adult tooth extraction statistic in public health institutions compared to the number of teeth being saved (Mthethwa et al., 2020; Smit and Osman, 2017; Thema and Singh, 2017b). Additionally, the document further highlights that the burden of untreated tooth decay remains unacceptably high in South Africa. The prevalence of dental caries in South Africa has shown a rising trend over time (Chikte et al., 2020a; Thema and Singh, 2017b), therefore the strategies and treatment modalities formulated were aimed towards restoring the carious teeth of patients' consulting at these public dental departments.

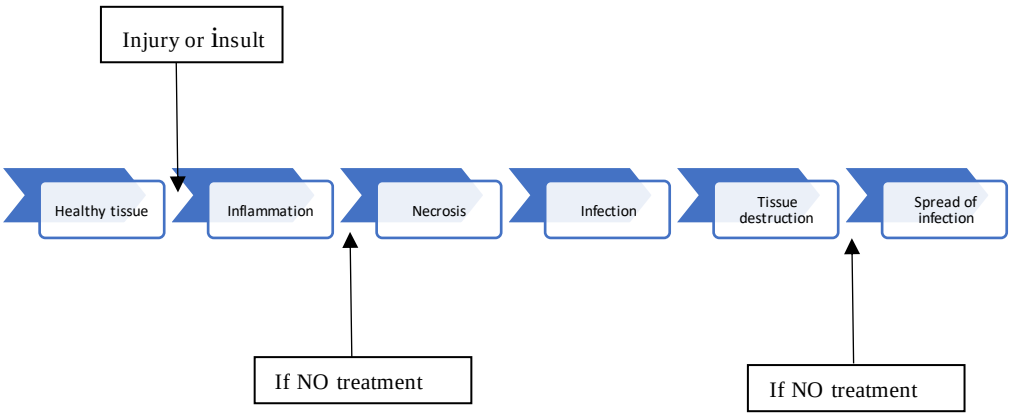
'The tooth loss goal' is one of the national oral health goals for 2030 that aims to preserve a minimum number of patients' natural dentition (e.g., 20 teeth in a 40-year-old patient) (National Department of Health, 2010). The key target area for the goal was to reduce the dental extraction ratio from the current level of 20:1 to 10:1. A tooth may be restored using conservative restorative approaches, or additively root canal therapy when indicated (Erazo et al., 2024).

Root canal therapy (RCT) is a tooth-saving treatment procedure in dentistry for teeth presenting with an irreversibly inflamed or necrotic pulp with possible periapical pathology (Walton and Torabinejad, 2009). The treatment involves a sequence of meticulous clinical techniques. This is completed as either a one visit appointment or over multiple visits, based largely on clinical factors. Since RCT could require multiple visits, patients must be motivated and willing to commit to keeping appointments for the duration of the treatment. Alternatively, another option would be to have the tooth extracted, with the option of a prosthesis to replace the missing tooth if indicated.

## 1.2. Literature review

### 1.2.1 The rationale for root canal treatment

Whenever a patient presents with dental pain, the signs primarily originate from the dental pulp (Estrela et al., 2011). The natural progression of pulpal disease is dynamic. The signs and symptoms are subject to the stage of disease and the medical condition of the patient (Estrela et al., 2017; Llena et al., 2020). Root canal treatment is indicated for pulpal diseases that have advanced beyond vital therapy management to prevent and cure apical periodontitis. The treatment involves creating optimal conditions for healing by removing all the infected pulp, bacteria, and related irritants from the root canal system through chemo mechanical practice (Siqueira Junior et al., 2018). The biological and clinical objective for RCT is to essentially decontaminate the root canal system and prevent any future microbial invasion, eliminating the tooth as a source of irritation to the peri-radicular space. This, therefore, is the basis from which the rationale for RCT is derived.




The general stages of disease progression in any tissue as a result of a stimulus or irritant that is not removed or treated (adopted from Abbott, P.V., 2004. Classification, diagnosis, and clinical manifestations of apical periodontitis.)

Figure 1.1: The natural progression of pulpal and peri-radicular disease

Endodontics offers patients an opportunity to preserve their natural teeth. The primary objective of modern dentistry is to preserve the natural dentition (Kunwar et al., 2021), as far as clinically possible. RCTs have shown success in ensuring the long-term retention of teeth with pulpal and periapical pathology (Landys Borén et al., 2015) leading to improved function, aesthetics, and form (Müller et al., 2017). There are several studies that have shown an improved oral health related quality of life (OHRQoL) in patients that undergo RCT (Dugas et al., 2002; Hamasha and Hatiwsh, 2013; Hamedy et al., 2013; Neelakantan et al., 2020; Wigsten et al., 2020). Wigsten et al., (2020) noted that tooth extraction ultimately has a negative impact on patients' OHRQoL. Torabinejad et al., (2007) found that tooth extraction, particularly without prosthetic replacement, resulted in negative psychosocial outcomes compared to RCT or extraction with prosthetic replacement.

### 1.2.2. Prevalence of root canal treatment

It is suggested that the prevalence of RCT is an indicator of dentists' clinical activity and dedication towards the treatment (León-López et al., 2022). Moreover, knowing the prevalence of RCT can reveal the level of demand patients have towards the treatment. In South Africa, the most prevalent oral disease that can eventually result in a dental diagnosis indicated for RCT, is dental caries (Bhayat and Chikte, 2019; Chikte et al., 2020a; Mthethwa et al., 2020). Many dental caries cases go untreated, despite oral health interventions that have been put in place by government (Bhayat and Chikte, 2019; Gbolahan et al., 2019). The result of untreated caries is apical periodontitis (AP), which can only be treated through RCT or dental extraction (Holt, 2001; Pratheebha et al., 2022; Zero et al., 2011).

Remarkably, half (52%) of the global adult population was found to have at least one tooth with AP. The developing countries had a higher prevalence of AP compared to developed countries (Tibúrcio-Machado et al., 2021). The lower prevalence of AP in developed countries is attributed to an efficient referral system (both in healthcare system and community culture), that contributes to the improved diagnosis of AP (Miri et al., 2018).

RCT was found to be universally common. The prevalence of RCT has been reported to range from 1.3–22.2% globally (Timmerman et al., 2017). More than half of the world population (55,7%) was found to have at least one root canal treated tooth, and the global prevalence of

RCT was calculated to be at 8,2% in a study by León-López et al., (2022). A study done on a Nigerian subpopulation, found a 12.2% prevalence of endodontically treated teeth; with the younger population making up the majority of this proportion (Oginni et al., 2015). A Ukrainian study found that 82.5% of examined adults had at least one root canal treated tooth (Dydyk and Hrynyshyn, 2020). In another study by Razdan et al., (2023), the prevalence of RCT increased with age in a longitudinal study performed over a span of 10 years. The maxillary and mandibular first molars and premolars were the most frequently root treated teeth in the Ukrainian and Danish population (Dydyk and Hrynyshyn, 2020; Razdan et al., 2023). However, due to financial restrictions, patients in South Nigeria were reported to elect extraction of posterior teeth instead of undergoing RCT. Oginni et al., (2015) reported that maxillary anterior teeth were the most prevalently root treated teeth for the Nigerian population.

In South Africa, the caries experience in adults was reported to be high with unmet treatment needs (Chikte et al., 2020). One would expect that since root canal treatment is prescribed to treat sequelae of dental caries, the prevalence of endodontic therapy would be at a significant percentage in South Africa. There is however, not many studies found on the prevalence of apical periodontitis or root canal treatment specific to the South African population. The only study that could be found regarding the demand for RCT in South Africa is by Mostert and Postma (2016). The study represents the population of Tshwane that depends on subsidised government health care. The University of Pretoria Oral and Dental academic hospital is the only government funded facility that provides services for RCT in Tshwane (Mostert and Postma, 2016). Demand for RCT was found to be greater than the facility's capacity to fulfil the treatment, with 44.98% of teeth reaching treatment completion.

### 1.2.3. Fear and anxiety associated with root canal therapy.
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Our past experiences involving fear and anxiety have a significant contribution towards our present behaviour. Hamedy et al., (2013) reported this as one of the primary reasons for patients' delay in seeking or avoiding dental treatment (Carter, 2014; Chen, 2019). Dental fear and anxiety are a relatively consistent occurrence across the world; the consequences of which create an undesirable cycle. The extent of anxiety in the experience surrounding dental treatment has shown to impact the attitude of patients towards follow-up oral health care

(Armfield et al., 2007; Tanja-Dijkstra et al., 2014). Deteriorating oral health, together with delayed dental visits, feeds back into and worsens the existing dental fear and anxiety. This results in these patients often seeking symptom-driven treatment that is mostly invasive and complex (Armfield et al., 2007).

Aldawsari et al (2017) and Ahamed et al. (2018) as cited by (Bansal and Jain, 2020) reported fear and anxiety to be the major concern for patients indicated for RCT, greatly influencing their behaviour towards the treatment (Hamedy et al., 2013; Mostert and Postma, 2016). Possible treatment avoidance as a result of fear and anxiety could result ultimately in the loss of the tooth through extraction(Gbadebo and Adebayo, 2023). This fear is postulated to be fuelled by a limited knowledge about root canal procedures (Bansal and Jain, 2020). Studies show that previous experience with RCT alleviates this anxiety, as more patients have reported a decrease in fear after undergoing RCT compared to those who have not (Hamedy et al., 2013). Modern RCT techniques aim to provide painless dentistry treatments; and although patients may experience pain during RCT, it's commonly at low levels of severity and at levels less than what was anticipated (Hamedy et al., 2013; Torabinejad et al., 2007).

The dentist and dental assistant have the duty to alleviate anxiety or fear towards RCT, through accurately informing and educating patients concerning RCT. This may potentially increase patients' comfort regarding the treatment and improve the accuracy of their expectations pertaining to any discomfort, as pain experienced during the procedure is correlated to the level of anticipated anxiety (Hamedy et al., 2013).

### 1.2.4. Health literacy, oral health education and oral health service utilisation

Health literacy is defined as "the degree to which patients have the capacity to obtain, process and understand basic health information and services to make appropriate health decisions"(van Rensburg, 2020). The question of whether oral health literacy is a predictor of oral health is one that has been researched for decades. In his 1974 publication titled 'Health Education as Social Policy', Simonds introduced the concept of health literacy (Liu et al., 2020), where he explored the impact of educational institutions, healthcare systems, and mass media on the knowledge of health information. Health literacy is an emerging concept in the South African primary health care sector and is globally considered a major determinant and predictor of health outcomes. The rise in non-communicable diseases, like dental caries, is

proving to be a financial burden on healthcare spending and accounts for 5-10% of the health budgets of developed countries (World Health Organisation, 2017); which has put an emphasis on patients to take accountability in managing their own health with more effective use of health services (Liu et al., 2020). It is proposed that individuals with high levels of health literacy have a good oral health education such as knowledge of access to oral health care and scheduling of appointments. They are also said to be more compliant with appointment attendance and treatment instructions (Dickson-Swift et al., 2014).

Guo et al., (2014), mentioned that a good patient-dentist communication is an effective tool in improving patients' oral health status by increasing their health literacy and in effect improving service utilisation. It is important to take into account the population literacy rate, and the effect this may have on health literacy Oral health providers are urged to ensure that communication regarding treatment is simple, clear and unambiguous for the patients (Warde et al., 2018). Most health education materials in South Africa, are those available in clinics and hospitals. These materials are prepared for an 8$^{th}$ grade level of schooling or higher (van Rensburg, 2020). All these sources require an ability to read, comprehend and apply health information in order to make positive health decisions. Van Rensburg, (2020) argued that although patients may read and pronounce medical words, it does not necessarily reflect their comprehension of what they have read. Guo et al., (2014) also recommended that to have optimum oral health literacy, education material must be in a language simple enough for patients to comprehend. Therefore, health care workers are advised to deliver health education tailored to the patient's level of comprehension, to assist patient improved health outcomes.

Patients with a high "dental IQ" have shown to demonstrate better oral health practices. This suggests that oral health education is vital in giving patient's better control over their health. Carneiro et al., (2011) cites studies that associates good oral health practices with having a better understanding of oral disease and being aware of the aetiology. This then better informs and motivates patients to seek treatment at the acceptable time. Improving patients "dental IQ" may assist in better appreciating the treatment options presented to them and in deciding what interventions might be best and why. Gbadebo and Adebayo, (2023) suggests that educating patients about what RCT entails may improve acceptance of the treatment, particularly if they are fearful and anxious for treatment.

Similarly, Reddy and Singh (2017), in their study identified a reduction in the burden of oral health diseases in local communities within South Africa after the implementation of oral health promotion programmes. This has proven to be a cost-effective approach to educate patients on prevalent diseases. The effect of oral health education promotion interventions is authenticated by a study by Qasim et al., (2022); that showed a considerable improvement in RCT awareness of the population over the years as a result of school education and also mostly mass media i.e. television, newspapers and the internet.

### 1.2.5. Knowledge, attitudes and practices of patients towards RCT

In the past, the study of endodontic outcomes has solely been based on clinical success. There has been a paradigm shift in the last decade to focus more on patient-centred treatment outcomes. The patient as the end-user of health care, chooses to undergo RCT, bears the cost and lives with the experience of having had the treatment and potentially shares their experience with friends, family and their direct community. These lived experiences inform patients' disposition towards RCT in future. In their study, Neelakantan et al., (2020) recommended that the outcomes of treatment be measured in ways that are more meaningful to the patient. Hamedy et al (2013) qualified the significance of patient-centred treatment outcomes as a feasible and reliable measure for addressing patients' concerns related to dental treatment.

Riley et al. (2006) reported that specific attitudes and beliefs regarding oral health and dental care are predictors of dental service utilisation. Initiatives that aim to improve patients' utilisation of dental services require an understanding of the underlying factors that influence patients' knowledge and attitudes towards oral health (Gbolahan et al., 2019). Studies have found that patients that have a poor attitude towards dental consultations and dental treatments are more likely to report having had more tooth extractions (Gbolahan et al., 2019; Riley et al., 2006). There are multiple factors which are unique to each patient, that influence the choice for extraction over required restorative treatment (Felgner et al., 2022). A KAP survey can identify gaps in knowledge, cultural beliefs, barriers or behavioural problems that inform patients' choices regarding their health and the available treatment procedures (Hartmann et al., 2023).

The KAP theory has been used in studies in several countries to gather information regarding patients' perceptions towards root canal treatment that oral health professionals can utilise to improve on RCT practices (Manasa et al., 2023; Pratheebha et al., 2022; Zheng et al., 2021). For example, Aldawsari and Alamri, (2017) found that patients believed that it was more painful to have a RCT than tooth extraction. A percentage (5,2%) of these patients had previously received RCT. Such information allows oral health care providers to assess and improve on intraoperative techniques to optimise pain control for RCT patients. A significant finding in the literature was that despite RCT being globally prevalent, it is still considered a treatment to be feared by most patients (Qasim et al., 2022). Additionally, some of the knowledge that patients receive regarding RCT was found to be from friends and relatives (Bansal and Jain, 2020). This sheds some insight into where some of the misconceptions about RCT may originate.

Hamasha and Hatiwsh (2013) in their study found that cost of treatment is a significant factor in how patients experience treatment. According to (Ayo-Yusuf and Naidoo, 2016; Ghahramani et al., 2022; Thema and Singh, 2017a), associated treatment costs could influence patient's perception on essential and non-essential dental treatment. The cost of treatment forms part of the important considerations for patients when it comes to their choice of treatment. (Nyamuryekung'e et al., (2023); reported cost to be a significant barrier that prevents patients from using dental restorative services. The total direct cost of a RCT with subsequent restoration, was found to be higher than that of a simple extraction (Wigsten et al., 2023), therefore, a treatment choice like RCT could be a less attractive choice to the patient..

Lower socio-economic population, which in South Africa is comprised of the majority of public service users, may have competing costs of higher priority than accessing a dental facility for alleviation of pain (Ayo-Yusuf and Naidoo, 2016). The cost of transport to the dental facilities could influence the amount of patients returning for RCT completion (Mostert and Postma, 2016). Participants in a study by Smit and Osman (2017) noted that the community consulting at the public dental clinics in the Western Cape preferred dental extractions over restorative treatment. This reflects that patients' treatment preferences may also be influenced by attitudes and beliefs that are modelled from societal norms (Modikoe et al., 2019).

Knowledge and attitudes are thought to have a causal relationship to health-related practices. Contrary to this, Modikoe et al., (2019) in their study cited "The Theory of Planned

Behaviour", (TPB) which hypothesises that some behaviours are largely controlled by the intentions of the individual to perform the behaviour. Gbadebo and Adebayo, (2023), Kunwar et al., (2021) and Sykes and Vorster, (2023) noted that some patients did not opt for RCT even when they were informed about the treatment options and had the financial means to afford the treatment. Modikoe et al. (2019) highlighted that the intention is independently affected by the individual's attitude towards the behaviour or their acquired beliefs and norms. The interactions between knowledge, attitude, behaviour are rather not linear but reflect a multifaceted network.

## 1.3. The motivation for the study/ Significance of the study

Patient-centred factors have become appreciated as an important aspect to determine general oral health and treatment outcomes (Hamedy et al., 2013; Nagendrababu et al., 2023). Patients' knowledge and perceptions towards different treatment options particularly, have been studied across the world (Akinyamoju et al., 2018; Bansal and Jain, 2020; Damilare et al., 2022; Manasa et al., 2023). These factors could potentially influence patient's perceived need for treatment and health care utilisation rate; dental care included (Abera Abaerei et al., 2017; Hamedy et al., 2013). In reference to the currently available literature, determining patient's knowledge, attitudes, and practices towards RCT will give more insight into the choices they make when it pertains to treatment.

South African studies highlighted the high dental extraction rate and the possible short-comings in public health care services in the country (Bhayat and Chikte, 2019; Motloba and Makwakwa, 2018; Thema and Singh, 2017b). There is a gap in the literature about information concerning patients' knowledge and attitudes towards root canal treatment; and this study will be the first to address this topic within the South African context. The results obtained from the study will benefit dental patients as it will assist to identify patient-centred factors that need to be addressed for root canal treatment. This in turn will benefit dental health care givers and local policy makers for the planning and implementation of oral health education programmes in the Mopani District, Limpopo. Furthermore, the results obtained may serve as a reference for similar studies in the future.

# Chapter 2: Aims and Objectives

## 2.1. Aim

The aim of the study is to determine the knowledge, attitudes, and practices of patients towards root canal treatment in the Mopani District, Limpopo.

## 2.2. Objectives

1. To determine the knowledge of patients on RCT, and describe the association between patient's knowledge on RCT and their age, gender, socio-economic status and level of education.
2. To determine the patients' attitudes towards RCT, and describe the association between the patient's knowledge on RCT and their attitudes towards RCT.
3. To determine patients' treatment preference between RCT and extraction, and describe the association between patients' level of knowledge and attitudes towards root canal treatment and their preferred treatment (RCT or extraction).

# Chapter 3: Methods and Materials

## 3.1. Sample size

Sample size calculation was done using the StatCalc function in EpiInfo™ with assistance from a statistician provided by The University of the Witwatersrand. The sample size was calculated based on the sum total of the average pool of patients consulting daily at all the identified hospitals. A significance level of 0.05, a confidence interval of 95% and a presumed expected patient frequency of 50% was used in this study. A sample size of 372 was calculated to be statistically sufficient, and a further 15% of sample was supplemented in order to account for potential incomplete or missing data. The final sample attained for this study was 427.

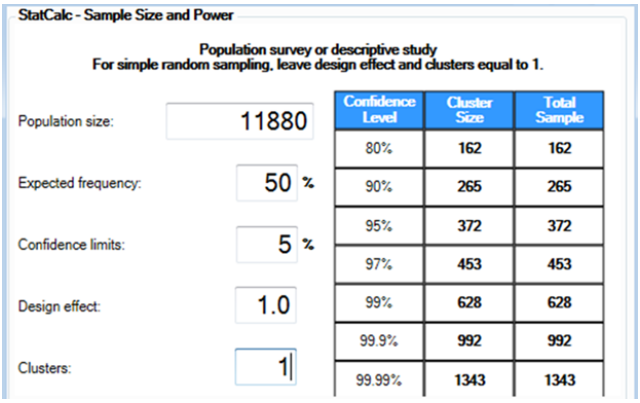


Figure 3.1.: Sample size calculation

## 3.2. The study setting.




The local municipalities of the Mopani District is illustrated in this sectional map (Source: local government handbook, 2016)

Figure 3.2: A map of the Mopani District Municipality

The Mopani District is situated in the south-eastern part of the Limpopo province. It is one of the province's main economic centres along with the Capricorn district. The districts' population is estimated to be at 1,1 million; approximately 20% of the total provincial population of an estimate of 5.5 million (Ramoroka et al., 2013). According to the (Mopani District Municipality, 2023), the population's literacy rate has shown some improvement, with the percentage of individuals without formal education in the district having decreased from 30% (1996) to 22% (2001).

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The Mopani district is made up of five local municipalities, namely Ba-Phalaborwa, Greater Tzaneen, Greater Giyani, Maruleng, and Greater Letaba. Global Insight estimated that 86.5% of the residents of the Mopani District Municipality live in rural areas (Ramoroka et. al, 2013). The remaining 13,5% of the district's residents live in urban areas. The socio-economic profile of the district is below average, with human wellbeing indicators for the district generally falling below the provincial wellbeing indicator averages, suggesting relatively lower quality of life and living standards than for the average person living in Limpopo (Ramoroka et. al, 2013). Poor pipeline reticulation and the need for the optimisation of water plant infrastructure, limits the capacity in which municipalities are able to provide water to local communities. According to (Mopani District Municipality, 2023) free basic water supply only amounts to 25l per person per day; which falls below the RDP service threshold. Although every low-income household is entitled to monthly free basic electricity, many households in the rural areas and low-income households still rely on other sources of energy, like fire wood, to meet their needs.
The provision of health services is particularly an enormous challenge for the Mopani district. The district has six district hospitals, one regional hospital, nine health care centres and eighty-seven clinics. Providing health facilities to every community is a challenge due to the large number and widespread distribution of villages. According to the (Mopani District Municipality, 2023) hospitals provide services to persons even beyond their local municipalities (Mopani District Municipality, 2023).

Dental departments were identified in seven hospitals within the district where patients were recruited for data collection. One dental department was based in Letaba regional hospital, which is found in the Greater Tzaneen Sub district. District level dental departments were found in Sekororo hospital in Maruleng, Kgapane Hospital in Greater Letaba, Nkhensani Hospital in Greater Giyani, Van Velden and Dr CN Phatudi hospitals in Greater Tzaneen Sub district. Maphutha LM Malatjie hospital in Ba-Phalaborwa was not approved by the Limpopo DoH for this study.

### 3.2.1. Inclusion criteria

Patients that are consulting at the dental hospital in the Mopani district.
Patients who agree to participate and give written consent for the survey.
Patients that are 18 years and older.

### 3.2.2. Exclusion criteria

Patients that are completely edentulous were excluded in the study since there were no future prospects for RCT. Some questions in the questionnaire would have not been applicable to edentulous patients resulting in non-response bias.

## 3.3. Materials

This was a cross-sectional, quantitative survey-based study that was conducted among patients visiting the dental departments of the identified hospitals in the Mopani district in Limpopo. A structured questionnaire (Appendix 4) divided into four sections was distributed to patients together with an information sheet (Appendix 2) and an informed consent form (Appendix 3). Similar to (Pratheebha et al., (2022) and Zheng et al., (2021)a convenience sampling technique was used to recruit participants in this study due to limited patient consultations on the allocated data collection dates. The questionnaire was referenced from various published sources by Bansal and Jain (2020), Gilbert et al., (1997), Iyer et al., (2018) and Singla et al., (2014). The questionnaire was created to ensure that the questions were relevant to the level of hypothesised experience of most patients to root canal treatment in our study setting.

Section A of the questionnaire asked information from participants about their socio-demographic details, i.e., age, gender, education, residential location, and socio-economic status. Stats SA, (2011) was used as a classification reference for categorising annual income and residential location.

Section B of the questionnaire consisted of multiple-choice questions relating to participants' knowledge about root canal treatment. Questions 1, 2, 4, 5, 6, 8 and 9 were used to score patients' level of knowledge. A score of '1' was given for a positive/ correct answer and a score of '0' for negative/ incorrect answer and the mean for each participant calculated. The highest score possible was 7. Responses were stratified and coded into a binary category of 'poor' and 'good' knowledge, where 0 - 4 = poor and 5 - 7 = good.

Section C consisted of questions relating to participant's attitude on a five-point Likert scale: where 5 = "Strongly agree", 4 = "Somewhat agree", 3 = "Neutral", 2 = "Somewhat disagree", and 1= "Strongly disagree". Some questions were phrased negatively to avoid response bias. These were reversed during the scoring for data analysis purposes. The highest possible score was 75. The mean for each participant was calculated and categorised as follows: 15 - 50 = 'negative' 51- 75 = 'positive'.

Section D of the questionnaire assessed patient's treatment preference between root canal treatment and extraction. Additionally, patients were to rank, from highest to lowest, their concerns regarding root canal treatment that could potentially deter them from undergoing the treatment.

### 3.3.1. Validity and reliability of instrument

The instrument was developed by adapting studies that were found from the literature and the clinical experiences of the researcher and supervisors. Fifteen random individuals, known personally to the principal investigator, were requested to complete the initial draft of the questionnaire to test its feasibility. It took approximately 8-10 minutes to complete the questionnaire. The fifteen individuals were not patients of any dental department, and their participation was not considered in this survey. Adaptations were made for the final draft of the questionnaire. To assess validity and relevance of the questions, the questionnaire was reviewed and approved by two departmental supervisors.

The three dominant languages spoken by individuals in households across Mopani District, taken from StatsSA, (2018) Census, is English, Xitsonga and Sepedi. The English version of the questionnaire was translated into Xitsonga and Sepedi by qualified translators/linguists. The translations were then back translated by a different set of qualified translator/linguist to ensure that translations were done in context to the original English documents. Furthermore, translated documents were handed out to two fluent Xitsonga and Sepedi speaking colleagues for proofreading.

### 3.3.2. Reliability

An internal consistency reliability of the summative scale used to measure participants attitudes was calculated using Cronbach alpha and yielded an acceptable score (Tavakol and Dennick, 2011).

## 3.4. Methods

Dental departments were identified in seven hospitals in the Mopani district in Limpopo. The Mopani District Municipality is located within the north-eastern quadrant of the Limpopo Province. Data was collected through a quantitative survey-based study among patients visiting the dental departments of the following regional and district hospitals; Letaba hospital found in the Greater Tzaneen Sub district; Maphutha LM Malatjie hospital in Ba-Phalaborwa, Sekororo hospital in Maruleng, Kgapane Hospital in Greater Letaba, Nkhensani Hospital in Greater Giyani, Van Velden and Dr CN Phatudi hospitals in Greater Tzaneen Sub district.

Questionnaires were printed and prepared several days prior to each planned data collection date. This was done to decrease the risk of paper-based covid contagion between participant and researcher. Additionally, all patients were sprayed with an alcohol-based sanitiser before the distribution of instruments and stationery. The study was explained to patients in the waiting area of the dental department and an invitation to participate was offered. A plastic sleeve with the information sheet was handed out to patients as an invitation to learn about the details of the study where language was a barrier between the researcher and patients. Patients that were willing to participate were then handed an informed consent form to sign before completing the questionnaire. Participant's hospital file numbers were noted on the informed consent form to trace patients that had already taken part in the survey. This ensured that patients participated only once in the survey. Patients that were fully edentulous and those that had already participated in the survey were excluded from the survey.

The questionnaires were distributed for manual administration by each participant before or after their dental treatment. Each questionnaire was given a participant number for tracing and record keeping purposes. Challenges of comprehension were noted in a majority of participants early on during data collection. Therefore, assistance in reading and explaining what was being

asked from the questionnaire had to be done by the researcher, along with the assistance of the dental assistants. The necessary stationery was handed out to patients with consideration and adherence to the covid regulations as set out by the Health Research Ethics Committee (HREC) non-medical guidelines for conducting research safely during the COVID-19 pandemic.

Participants were given the option to choose a questionnaire in their language of preference from the three translations. Participants were free to leave the survey at any moment, should they wish to no longer partake. Signed consent forms and completed questionnaires were collected and placed in a separate binder after each end of data collection day. As there was a low patient headcount on most data collection days, some questionnaires were kept at some of the hospitals to be distributed by volunteering dental assistants in absentia of the primary researcher. The researcher conducted a one-on-one tutorial with the volunteering dental assistants on how the questionnaire should be completed and explained the inclusion and exclusion criteria of the study.

## 3.5. Ethical considerations

Approval to conduct the research in the Mopani District was applied for at the Limpopo department of health research committee. Ethics approval for the study was applied for from the HREC of the University of the Witwatersrand. Letters of notice for the study to be conducted was sent to the CEOs of the six identified hospitals prior to data collection; attached to it was the final permission letter from Limpopo department of health and ethical clearance from Wits HREC. The ethics clearance number is M210848.

Participation in the study was completely voluntary, and participants were made aware that they could drop out of the study at any stage if they so wished. Participants were asked to give their written consent before they could partake in the study.
Participants were requested to only write their file numbers on the informed consent form to screen for duplicate participation. Participant confidentiality and anonymity was ensured by assigning numerical codes to the questionnaire. This was to ensure that information gathered could not be attributed to a particular participant. Covid regulations were followed during data collection as prescribed by the HREC's non-medical guidelines for conducting research safely during the COVID-19 pandemic.

# Chapter 4. Data management and analysis

Three participants were excluded from the final sample due to failure to meet the inclusion criteria for age. Hence the final sample size utilised for this study was 424.
Once the completed questionnaires were collected, the raw data was captured onto a Microsoft Excel® spreadsheet using a data coding process. Accuracy and correctness of the captured data was checked by the principal researcher by checking 10% of the captured data on several different days after capturing the data.

The data collected was recoded as follows during data capturing:

Table 4.1: Recoding of collected data

| Data collected | Recoding |
|---|---|
| Gender | Female = 1<br>Male = 2 |
| Age | Captured as a range and categorised into:<br>18-24<br>25-34<br>35-44<br>45-54<br>≥55 |
| Education | Primary school = 1<br>High school = 2<br>Graduate = 3<br>Postgraduate = 4 |
| Residential | Semi-urban = 1<br>Rural = 2 |
| Income range | Categorised according to STAT SA, 2011 census:<br>No income = 1<br>R1-19200 = Low income = 2<br>R19201-307200 = Middle income = 3<br>≥R307201 = High income earner = 4<br>Pension = 5 |

| | | |
|---|---|---|
| | Social grant = 6 | |
| B1 First dental visit? | Yes= 1 | No= 2 |
| B2 Heard of RCT | Yes= 1 | No= 2 |
| B3 Source of RCT | Dental clinic= 1<br>TV/radio/ Internet = 2<br>Relatives/Friends = 3<br>No RCT = 4 | |
| B4 What is RCT? | Use of medication to relieve pain = 1<br>Remove and return nerve and restore tooth with filling = 2<br>I don't know = 3<br>Drill tooth and restore with filling = 4<br>Remove nerve and restore tooth with filling = 5 | |
| B5 Advised for RCT before | Yes = 1<br>No = 2<br>Don’t remember = 3 | |
| B6 Treated for RCT before | Yes = 1<br>No = 2<br>Don’t remember = 3 | |
| B7 Treating dentist | Public health dentist = 1<br>No RCT = 2<br>Private dentist = 3<br>Doesn’t remember = 4 | |
| B8 Indication for RCT | Only when pain = 1<br>Indicated even in non-painful but infected tooth = 2<br>I don’t know = 3 | |
| B9 RCT teeth weaker | Yes =1<br>No =2<br>I don’t know =3 | |
| Knowledge | Composite score calculated:<br>Poor= 0<br>Good = 1 | |
| Attitude | Negative = 0<br>Positive = 1 | |

| | |
|---|---|
| Preference | RCT= 0<br>Extraction = 1 |
| RCT treatment choice determinants | Cost of treatment=1<br>Painful treatment=2<br>Fear of complications=3<br>Multiple X-rays =4<br>Lengthy treatment time=5 |

A composite knowledge score was calculated from questions 2, 3, 4, 5, 6, 7, 8 and 9. A score of '1' was given for a positive/ correct answer and a score of '0' for a negative/ incorrect answer. Responses were then stratified and coded into binary categories where a score of 0-3= poor knowledge and 4-8 = good knowledge. Additionally, the composite scores were stratified and coded into binary categories where a score of 1-8 = some knowledge and 0 = no knowledge.

It was noted during analysis that some participants gave multiple scores on the same question in the section assessing for attitudes. These answers were not included in the calculation for the participant's attitudes. Also, a score of 0 was given for questions that had no answer given. A composite attitude score was calculated and stratified into binary categories 0-37 = negative attitude and 38-75 = positive attitude.

Upon analysis, the data was presented in graphic and text to reflect the frequencies and percentages. Chi-square test was used to compare the differences in the distribution between those with good or poor knowledge, positive and negative attitude, and treatment preferences. Logistic regression analysis was used to examine the association between the participants' sociodemographic characteristics and knowledge, and treatment preference towards RCT. Odd ratios with their 95% confidence intervals and p-values were reported. Logistic regression for knowledge and attitude were not included in the results of this report because no statistically significant data was yielded.

The primary researcher liaised with a biostatistician that was provided by the University of the Witwatersrand during the formulation of the research proposal, who provided ongoing statistical support during the data analysis.

# Chapter 5. Results

The findings of the survey are presented below under the following headings:

- Socio-demographic data
- Knowledge of the participants regarding root canal treatment
- The attitudes of the participants towards root canal treatment
- Participants' treatment preference between root canal treatment and dental extraction
- Factors influencing participants' choice for RCT
- Comparison of the participant's knowledge, attitudes and practices towards root canal treatment across the different socio-demographic profile
- Logistic regression for participants treatment preference

## 5.1. Socio-demographic data

It is important to have a comprehensive understanding of the sample that participated in this study, as this will enable us to appreciate why the results present in the way that they have (Maphupha, 2018). Table 5.1 shows the socio-demographic data of participants in this study.

Among the 424 participants who consented to do the survey, (69.71%) were female with a median age of 36 years (IQR 28-46 years) and 30.29% were male with a median age of 35 years (IQR 28-46 years). Majority of the participants were from a rural setting (91.3 %) and had no source of income (54.1%), and 8.0% and 15.3% of the participants reported that they were relying on government pensions and social grants respectively. Secondary school was reported to be the highest education level reached by 59.9% of participants, while only 14.9% responded to having acquired graduate-level education. Majority of the participants (58.25%) had previously consulted a dentist and 41.27% were first-time dental patients.

Table 5.1.1: Socio-demographic data

| Variable | Number | % |
|---|---|---|
| **Gender** | | |
| Female | 293 | 69.1 |
| Male | 129 | 30.42 |

| | | |
|---|---|---|
| No response | 2 | 0.47 |
| **Age** | | |
| 18-24 years | 50 | 11.79 |
| 25-34 years | 151 | 35.61 |
| 35-44 years | 99 | 23.35 |
| 45-54 years | 62 | 14.62 |
| 55-65 years | 48 | 11.32 |
| No response | 14 | 3.30 |
| **Residential area** | | |
| Semi-urban | 35 | 8.3 |
| Rural | 369 | 87.0 |
| No response | 20 | 4.7 |
| **Annual income** | | |
| No income | 210 | 49.53 |
| Low-income earners | 74 | 17.45 |
| Middle-income earners | 13 | 3.07 |
| Pensioner | 33 | 7.78 |
| Social grant | 60 | 14.15 |
| No response | 34 | 8.02 |
| **Education** | | |
| Primary school | 103 | 24.29 |
| High school | 238 | 56.13 |
| Graduate level | 59 | 13.92 |
| No response | 24 | 5.66 |
| **First Dental Visit** | | |
| Yes | 175 | 41.27 |
| No | 247 | 58.25 |
| No response | 2 | 0.47 |

## 5.2. Knowledge of the participants regarding root canal treatment

Table 5.2.2 shows a summary of the participants' knowledge of RCT. A total of eight questions from Section B of the questionnaire were utilised to assess participants' current level of knowledge regarding RCT. The questions were aimed to test participants' awareness, previous history and basic knowledge of RCT. Majority (89.86%) of the participants reported that they primarily consult a dental clinic for any dental concerns. Media and relatives or friends were reported to be the primary source of information for a dental concern by 3.77% and 4.95% of participants' respectively. Only seventy-seven participants (18.16%) reported to have heard about RCT, and majority of participants' (79,48%) had not heard about RCT before. There

were only 16,04 % of participants who have been advised to undergo RCT in the past. However, only 8,96% responded to have undergone RCT in the past.

Table 5.2.1: Knowledge of the participants regarding root canal treatment

| **Variable** | **Responses** | **n (%)** |
|---|---|---|
| Have you heard about RCT before? | Yes | 77 (18.16) |
| | No | 337 (79.48) |
| | No response | 10 (2.36) |
| Source of OHE for dental concerns | Dental Clinic | 381 (89.86) |
| | Media | 16 (3.77) |
| | Relatives/Friends | 21 (4.95) |
| | No response | 6 (1.42) |
| What do you know or think RCT to be? | Correct | 34 (8.02) |
| | Incorrect | 127 (29.95) |
| | Not sure | 244 (57.55) |
| | No response | 19 (4.48) |
| Have you been advised to undergo RCT before? | Yes | 68 (16.04) |
| | No | 346 (81.60) |
| | No response | 10 (2.36) |
| Have you undergone RCT before? | Yes | 38 (8.96) |
| | No | 344 (81.13) |
| | Not sure | 36 (8.49) |
| | No response | 6 (1.42) |
| Where did you get the RCT? | Public dentist | 31 (7.31) |
| | Private Dentist | 3 (0.71) |
| | Not sure | 36 (8.49) |
| | Never had RCT before | 346 (81.60) |
| | No response | 8 (1.89) |
| When do you think RCT should be performed? | Correct | 50 (11.79) |
| | Incorrect | 159 (37.50) |
| | Not sure | 204 (48.11) |
| | No response | 11 (2.59) |
| Do teeth become weaker after RCT? | Yes | 46 (10.85) |
| | No | 119 (28.07) |
| | Not sure | 246 (58.02) |
| | No response | 13 (3.07) |

The lack of knowledge is reflected in the participants' inability to define RCT. Figure 5.1 shows participants' responses to the definition of RCT and what it entails. Only 8.4% of participants correctly defined RCT to be '*the drilling of the tooth and removal of the nerve of the tooth, and then restoring it with a filling*'. 60,25% were not sure how to define RCT and the other 29.95% of participants answered incorrectly, either defining RCT to be '*the use of some medication to*

*relieve pain*', '*the removal of the nerve of the tooth and then returning it back into the tooth, and then restoring it with a filling'* or '*drill the tooth then restore it with a filling'*.

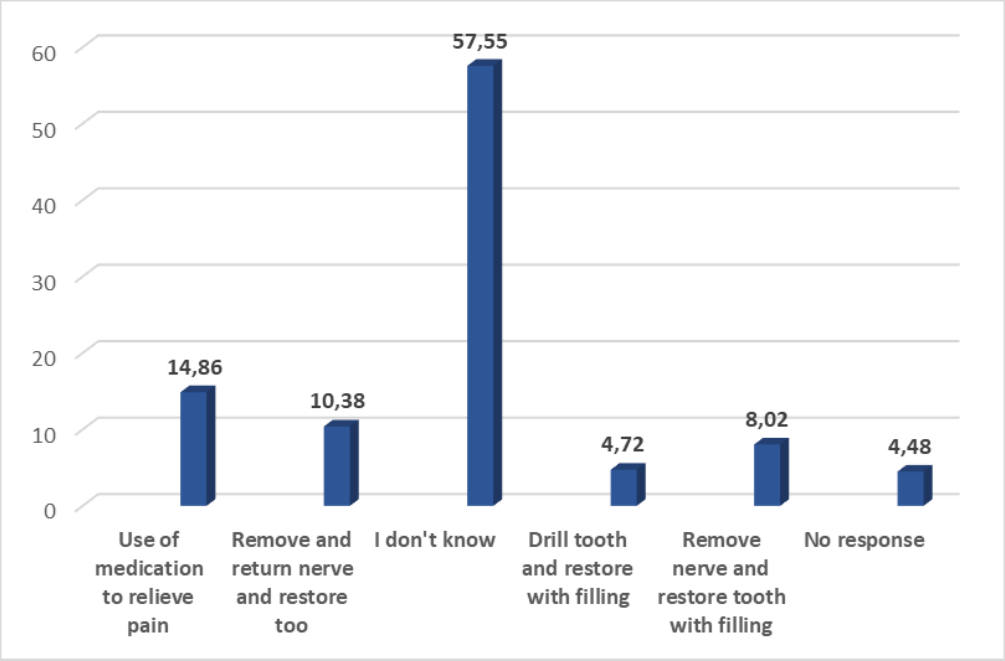


Figure 5.1.1: Participants' definition of RCT

Figure 5.2.2 shows participants' perception of when a tooth may be indicated for RCT. 11.79% of the participants correctly responded that '*the tooth might need RCT, even if it doesn't hurt'*. 37.5% of participants believe that a tooth would only require RCT only when pain associated with the tooth is present. The majority of participants (48,11%) were not sure of when a tooth might require RCT.

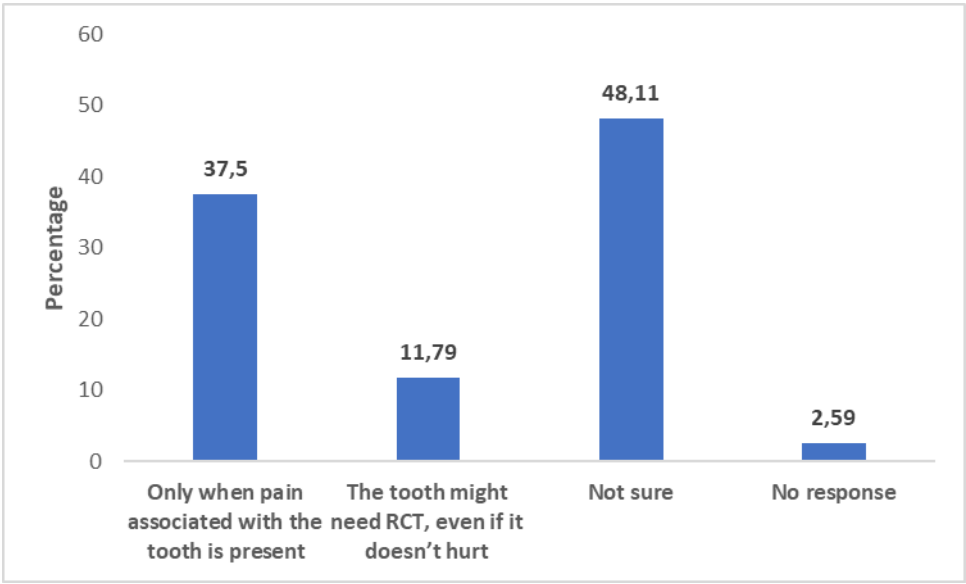

Figure 5.2.2: Participants' response to when RCT is indicated.

Figure 5.3.3 shows a comparison of the distribution of participants' level of knowledge. Majority of participants (91.51%) had poor knowledge of RCT and only 8.49% had good knowledge (median score of 0 and IQR 0-2). 58.96% of the participants reported to have no knowledge of RCT and 41.04% reported to have some knowledge of RCT.

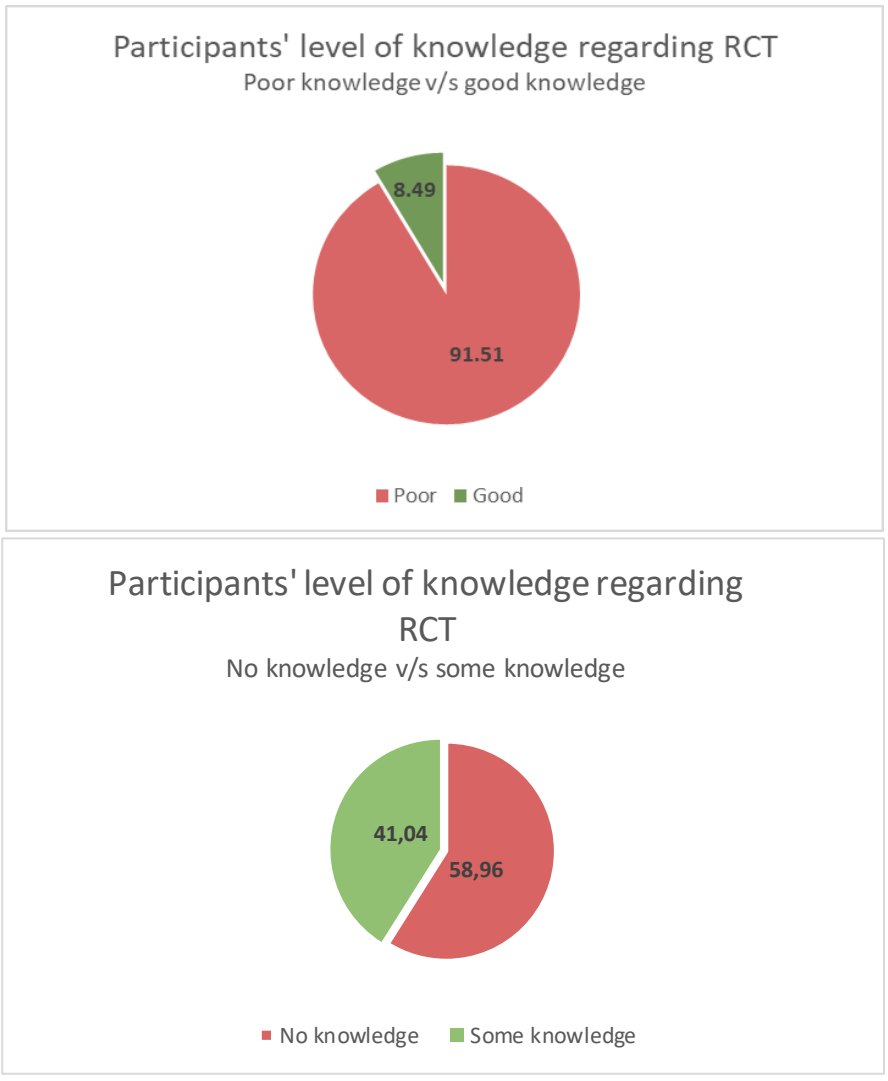


Figure 5.3.3: Participant's level of knowledge

5.3.The attitudes of the participants towards root canal treatment

The third section of the questionnaire surveyed participants' attitudes towards RCT. Table 3 presents the participants attitude towards RCT. Participants' attitude was assessed using 15

Likert scale-based questions. The validity of this section of the questionnaire was tested. The internal consistency reliability yielded an acceptable result, with a Cronbach alpha of 0,7446.

Majority of participants (63,45%) responded to consult the dentist within 1-3 days of experiencing a dental infection. However, participants were polarised in their response to the question "*I first wait for infection and swelling near a tooth to resolve before consulting the dentist*", with 36.55% of participants answering, 'strongly agree' and 30.96% of participants answering, 'strongly disagree'. 49,87% of participants 'strongly agree' that "*in case of infection and swelling near a tooth, the best option is to extract it"* and only 5,65% and 9,30% responded to 'disagree' and strongly disagree' respectively.

43,88% participants responded to 'strongly agree' that '*it is cheaper to extract a tooth than to perform an RCT'* compared to 9.18% participants who answered, 'strongly disagree'.
Similarly, 40,98% participants answered that '*even after an injection, I am afraid to have the nerve of my tooth removed'* and 23.20% of participants 'strongly disagree'.

Table 5. 3.2: Attitudes of Participants towards root canal treatment

| | SA n (%) | A n (%) | N (%) n | D (%) n | SD (%) n | NR (%) n | Cronbach α | Median (IQR) |
|---|---|---|---|---|---|---|---|---|
| I consult the dentist within 1-3 days when I experience a tooth infection | 250 (63,45) | 33 (8,38) | 51 (12,94) | 16 (4.06) | 44 (11.17) | 30 (7.08) | 0.7394 | 5 (3-5) |
| You can get over almost any dental problem if you just wait long enough | 91 (23,27) | 65 (16,62) | 53 (13,55) | 41 (10.49) | 141 (36.06) | 33 (7.78) | 0.7390 | 3 (1-4) |
| I first wait for infection and swelling near a tooth to resolve before consulting a dentist | 44 (36,55) | 61 (15,48) | 39 (9,90) | 28 (7.11) | 122 (30.96) | 30 (7.08) | 0.7367 | 4 (1-5) |
| It is important to save a front tooth | 261 (66,58) | 45 (11,48) | 56 (14,29) | 9 (2.30) | 21 (5.36) | 32 (7.55) | 0.7288 | 5 (4-5) |
| It is important to save a tooth in the back of the mouth | 215 (54,71) | 53 (13,49) | 76 (19,34) | 22 (5.60) | 27 (6.87) | 31 (7.31) | 0.7348 | 5 (3-5) |
| Some dental treatment can be painful, but it's worth it in the long run | 247 (63,33) | 69 (17,69) | 45 (11,54) | 9 (2.31) | 20 (5.13) | 34 (8.02) | 0.7386 | 5 (4-5) |
| I am concerned about long treatment times | 138 (36,13) | 79 (20,68) | 72 (18,85) | 37 (9.69) | 56 (14.66) | 42 (9.91) | 0.7307 | 4 (3-5) |
| I don't mind coming into the dental clinic more than once for one treatment procedure | 202 (52,47) | 80 (20,78) | 41 (10,65) | 19 (4.94) | 43 (11.17) | 39 (9.20) | 0.7301 | 5 (3-5) |
| Maintaining my natural teeth is important to me | 292 (74,68) | 45 (11,51) | 27 (6,91) | 13 (3.32) | 14 (3.58) | 33 (7.78) | 0.7323 | 5 (4-5) |
| Keeping false teeth needs less effort compared to taking care of my natural teeth | 108 (27,48) | 51 (12,98) | 90 (22,90) | 37 (9.41) | 107 (27.23) | 31 (7.31) | 0.7401 | 3 (1-5) |
| The tooth that aches must be extracted | 239 (62,24) | 54 (14,06) | 51 (13,28) | 14 (3.65) | 26 (6.77) | 40 (9.43) | 0.7169 | 5 (4-5) |
| A root -treated tooth becomes fragile and is lost easier. I might as well opt to remove the tooth instead | 215 (55,13) | 75 (19,23) | 50 (12,82) | 19 (4.87) | 31 (7.95) | 37 (8.73) | 0.7123 | 4 (3-5) |
| In case of infection and swelling near a tooth, the best option is to extract it | 193 (49,87) | 54 (13,95) | 82 (21,19) | 22 (5.68) | 36 (9.30) | 34 (8.02) | 0.7216 | 5 (3-5) |
| It is cheaper to extract a tooth than to perform an RCT | 172 (43,88) | 58 (14,79) | 103 (26,28) | 23 (5.87) | 36 (9.18) | 32 (7.55) | 0.7310 | 4 (3-5) |
| Even after an injection, I am afraid to have the nerve of my tooth removed | 159 (40,98) | 67 (17,27) | 41 (10,57) | 31 (7.99) | 90 (23.20) | 36 (8.49) | 0.7338 | 4 (2-5) |

SA= Strongly agree; A= Agree; N= Neutral

A large proportion of participants 'strongly agree' that '*it is important to save a front tooth*' (66,58%) and that '*it is important to save a tooth in the back of the mouth'* (54,71%). 74,68% of participants responded to 'strongly agree' that '*maintaining my natural teeth is important to me'*. The question of '*keeping false teeth needs less effort compared to taking care of my natural teeth'* also yielded polarising responses, with 27,48% answering 'strongly agree' and 27,23% answering 'strongly disagree'. 62,24% of participants responded to 'strongly agree' that '*the tooth that aches must be extracted',* and 55,13% participants 'strongly agree' that '*a root-treated tooth becomes fragile and is lost easier. I might as well opt to remove the tooth instead'*.

Majority of participants showed to have a good attitude towards RCT with a median score of 45 (IQR=40-50). Figure 4 shows that 84.91% of participants were found to have a positive attitude and 15.09 % were found to have a negative attitude towards RCT.

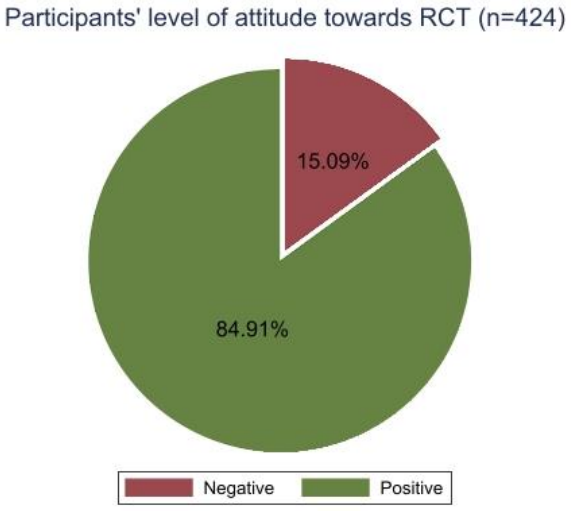


Figure 5.4.4: Participants' level of attitude towards RCT

A Spearman correlation test was utilised to analyse the association between participants' knowledge and attitudes towards RCT. A non-linear association was found between participants' knowledge and attitudes in this study ($p$ = 0.1980). Additionally, Spearman rank coefficient *rho*= 0.0626 denotes a weak positive relationship between the two variables in this study.

### 5.4. Participants' treatment preference between root canal treatment and dental extraction

The fourth section of the survey asked participants to indicate their preferred treatment of choice between RCT or extraction if advised by a dentist that RCT is indicated upon consultation. Figure 5 shows that majority of the participants opted for dental extraction (60.85%) over RCT (33.02%).

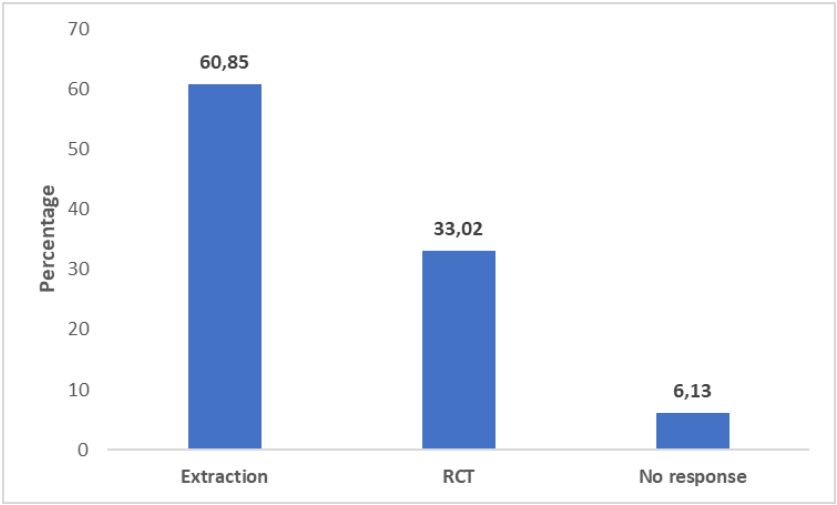


Figure 5.5.5: Participant's treatment preference between RCT and dental extraction

A Mann-Whitney Wilcoxon test was utilised to assess the association between participants knowledge and attitudes and their preferred choice of treatment between RCT and dental extraction. The results show that participants' preferred treatment is independent to their level of knowledge ($p = 0.1795$). The level of knowledge of participants who preferred dental extraction is no different to the level of knowledge of participants who preferred RCT. Therefore, we fail to reject the hypothesis. The results show that participants' preferred treatment is dependent on their level of attitudes ($p < 0.001$). Participants' that preferred RCT had a different attitude to participants that preferred dental extraction. Therefore, we reject the hypothesis.

5.5. Concerns associated with participants' choice for RCT

The final section of the questionnaire asked participants about their primary concerns associated with root canal therapy that would deter them from undergoing RCT. Figure 6 illustrates participants concerns associated with the choice for RCT. A total of 97 participants failed to properly respond to this section of the questionnaire, therefore leaving 327 participants for data analysis. Out of the 327 participants, 33 had no response.

From those who responded, their greatest concern regarding RCT was the cost of treatment (32.11%), followed by the potential of pain during treatment (19.57%) and fear of possible complications after treatment (15.90%). Participants were least concerned about the length of time required to complete RCT (11.93%) and the need to take more than one X-ray (10.40%).

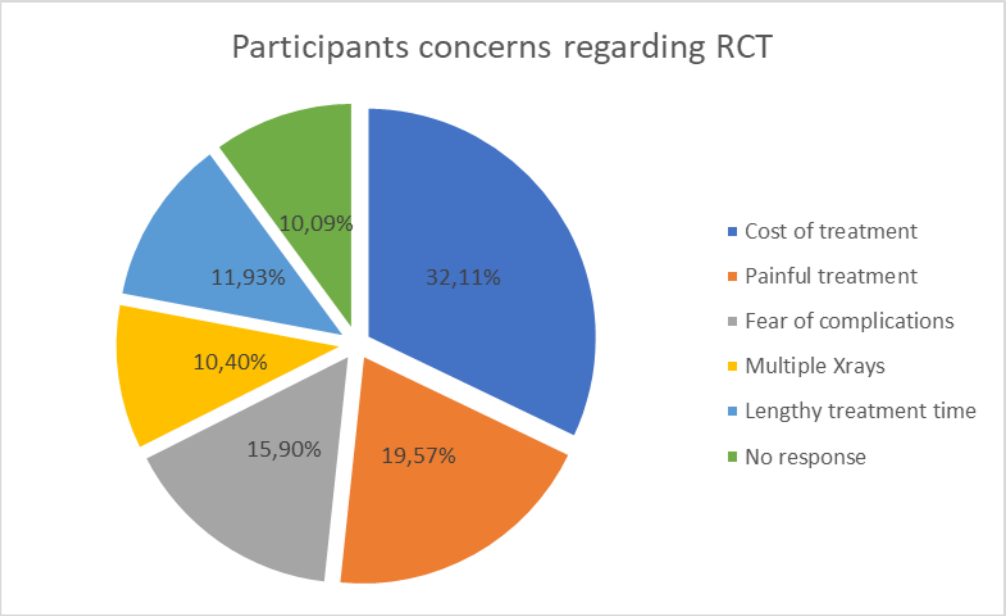


Figure 5.6.6: Participants' concerns regarding RCT

5.6. Comparison of the participant's knowledge, attitudes and treatment preference towards root canal treatment across the different socio-demographic profile

- Comparison between participants socio-demographic profile and their level of knowledge towards RCT

A higher proportion of females (93.17%) showed to have poorer knowledge regarding RCT than males (87.60) but no significant association was found between gender and the level of knowledge about RCT ($p = 0.059$). A larger proportion of participant with a primary (92.23%) and high school (91.60%) level of education showed poor knowledge compared to participants with graduate-level (88.14%) education. There was no statistically significant association found between knowledge and participants education level ($p = 0.645$). Middle-income earners (23.08%) showed to have greater knowledge of RCT. No statistically significant association was found between knowledge and income range ($p = 0.342$).

Table 5.4.3: Comparison between participants socio-demographic profile and their level of knowledge towards RCT

| Variable | | Poor n (%) | Good n (%) | P-value |
|---|---|---|---|---|
| Gender | Male | 113 (87.60) | 16 (12.04) | 0.059 |
| | Female | 273 (93.17) | 20 (6.83) | |
| Age | 18-24 years | 49 (98.00) | 1 (2.00) | 0.193 |
| | 25-34 years | 132 (87.42) | 19 (12.58) | |
| | 35-44 years | 91 (91.92) | 8 (8.08) | |
| | 45-54 years | 58 (93.55) | 4 (6.45) | |
| | 55-65 years | 44 (91.67) | 4 (8.33) | |
| Education | Primary | 95 (92.23) | 8 (7.77) | 0.645 |
| | High school | 218 (91.60) | 20 (8.40) | |
| | Graduate | 52 (88.14) | 7 (11.86) | |
| Income range | No income | 190 (90.48) | 20 (9.52) | 0.342 |
| | Low-income earners | 69 (93.24) | 5 (6.76) | |
| | Middle-income earners | 10 (76.92) | 3 (23.08) | |
| | Pensioner | 31 (93.94) | 2 (6.06) | |
| | Social grant | 56 (93.33) | 4 (6.67) | |

- Comparison between participants' socio-demographic profile and their level of attitude

It was found that more males (86.82%) had a positive attitude compared to female (84.30%) participants in this study. However, no significant association was found between attitude and gender ($p = 0.503$). A larger proportion of graduates (93.22%) showed to have a positive attitude compared to the lower-level education groups. No significant association was found between attitude and participants' level of education. Middle-income earners (100%) and lower-income earners (94.59%) showed to have a positive attitude compared to participants with no income and those relying on government financial assistance. There was a

statistically significant association found between participants attitude and level of income ($p$ = 0.036).

Table 5.5.4: Comparison between participants socio-demographic profile and their level of attitudes

| Variable | | Negative | Positive | P-value |
|---|---|---|---|---|
| Gender | Male | 17 (13.18) | 112 (86.82) | 0.503 |
| | Female | 46 (15.70) | 247 (84.30) | |
| Age | 18-24 years | 6 (12) | 44 (88) | 0.298 |
| | 25-34 years | 20 (13.25) | 131 (86.75) | |
| | 35-44 years | 20 (20.20) | 79 (79.80) | |
| | 45-54 years | 6 (9.68) | 56 (90.32) | |
| | 55-65 years | 5 (10.42) | 43 (89.58) | |
| Education | Primary | 16 (15.53) | 87 (84.47) | 0.266 |
| | High school | 32 (13.45) | 206 (86.55) | |
| | Graduate | 4 (6.78) | 55 (93.22) | |
| Income range | No income | 33 (15.71) | 177 (84.29) | **0.036** |
| | Low-income earners | 4 (5.41) | 70 (94.59) | |
| | Middle-income earners | 0 (0.00) | 13 (100.00) | |
| | Pensioner | 7 (21.21) | 26 (78.79) | |
| | Social grant | 11 (18.33) | 49 (81.67) | |
| | | | | |

- Comparison between participants' socio-demographic profile and their treatment preference

There was a larger proportion of females (65.94%) who opted for extraction than males (62.30%), but no significant association was found between gender and treatment preference ($p$ = 0.482). Majority of the younger age groups (<35 years) opted for RCT, and a larger proportion of the older participants (35+ years) opted for dental extraction. There was a statistically significant association found between age and treatment preference ($p$ < 0.001). A large proportion of participants that are graduates (60.34%) opted for RCT compared to the lower education groups, a statistically significant association was found between treatment preference and education level ($p$ < 0.001). A significant association was found between income range and treatment preference ($p$ = 0.001), with a majority (76.92%) of participants in the middle-income range opting for RCT instead of dental extraction.

Table 5.6.5: Comparison between participants socio-demographic profile and their treatment preference

| Variable | | Extraction | RCT | P-value |
|---|---|---|---|---|
| First visit | Yes | 112 (69.14) | 50 (30.86) | 0.150 |
| | No | 146 (62.13) | 89 (37.87) | |
| Gender | Male | 76 (62.30) | 46 (37.70) | 0.482 |
| | Female | 182 (65.94) | 94 (34.06) | |
| Age | 18-24 years | 22 (44.90) | 27 (55.10) | **<0.001** |
| | 25-34 years | 83 (57.24) | 62 (42.76) | |
| | 35-44 years | 62 (70.45) | 26 (29.55) | |
| | 45-54 years | 47 (78.33) | 13 (21.67) | |
| | 55-65 years | 37 (78.72) | 10 (21.28) | |
| Education | Primary | 79 (83.16) | 16 (16.84) | **<0.001** |
| | High school | 141 (62.39) | 85 (37.61) | |
| | Graduate | 23 (39.66) | 35 (60.34) | |
| Income range | No income | 131 (64.85) | 71 (35.15) | **0.001** |
| | Low-income earners | 41 (58.57) | 29 (41.43) | |
| | Middle-income earners | 3 (23.08) | 10 (76.92) | |
| | Pensioner | 26 (89.66) | 3 (10.34) | |
| | Social grant | 39 (70.91) | 16 (29.09) | |

## 5.7. Logistic regression for participants' treatment preference

A binary logistic regression analysis was used to examine the association between participants socio-demographic profile and their treatment preference. A logistic regression analysis was done for knowledge and attitudes, but none of the factors were statistically significant and were thus not included in the results.

Table 7 illustrates factors associated with participants treatment preference for RCT.
In the univariate analysis, participants of an older age 35-44 years (odds ratio (OR) = 0.34; 95% confidence interval (CI) = 0.17-0.71), 45-54 years (OR= 0.23; 95%CI =0.10-0.52) and 55-65 years (OR=0.22; 95%CI= 0.10-0.54) were significantly associated with reduced odds of preferring to have RCT as compared to those of a younger age. Participants with a higher education level high school (OR=2.98; 95% CI= 1.63-5.43) and graduates (OR= 7.51; 95% CI= 3.54-15.94) were significantly associated with increased odds of preferring to have RCT as compared to those with only a primary school education. Earning a middle-income (OR= 6.15; 95% CI= 1.64-23.07) was significantly associated with increased odds of preferring to

have RCT as compared to those with a lower income. Additionally, participants relying on pension (OR= 0.21;95% CI= 0.06-0.73) were significantly associated with reduced odds of preferring to have RCT as compared to other income brackets.

When adjusted for potential confounders in the multivariate analysis, those of an older age were still significantly less likely to prefer RCT; 35-44 years (adjusted odds ratio (AOR) = 0.41; 95%CI = 0.18-0.93), 45-54 years (AOR = 0.29; 95% CI = 0.12 - 0.74) and 55-65 years (AOR = 0.23; 955 CI = 0.08-0.68). Participants with a high education level were still likely to prefer RCT; high school (AOR = 2.75; 95% CI= 1.39-5.42) and graduate (AOR = 4.85; 95% CI = 2.04-11.54). Middle income earners were still likely to prefer RCT above the lower income earners (AOR = 4.70; 95% CI = 1.14-19.15). However, being a pensioner was no longer found to be significant in the multivariate analysis. Other factors were not statistically significantly associated to treatment preference.

Table 5.7.6: Factors associated with participants' treatment preference.

| Variable | | OR (95%CI) | p-value | AOR (95%CI) | p-value |
|---|---|---|---|---|---|
| Gender | Female | Ref | | | |
| | Male | 1.17 (0.75- 1.82) | 0.483 | 1.09 (0.65-1.85) | 0.743 |
| Age | 18-24 years | Ref | | | |
| | 25-34 years | 0.61 (0.32-1.169) | 0.136 | 0.55 (0.27-1.12) | 0.099 |
| | 35-44 years | 0.34 (0.17-0.71) | **0.004** | 0.41 (0.18-0.93) | **0.033** |
| | 45-54 years | 0.23 (0.10-0.52) | **<0.001** | 0.29 (0.12-0.74) | **0.009** |
| | 55-65 years | 0.22 (0.10-0.54) | **0.001** | 0.23 (0.08-0.68) | **0.008** |
| Education | Primary | Ref | | | |
| | High school | 2.98 (1.63-5.43) | **<0.001** | 2.75 (1.39-5.42) | **0.004** |
| | Graduate | 7.51 (3.54-15.94) | **<0.001** | 4.85 (2.04-11.54) | **<0.001** |
| Income range | | | | | |
| | No income | Ref | | | |
| | Low-income earners | 1.31 (0.75-2.28) | 0.348 | 1.40 (0.74-2.62) | 0.299 |
| | Middle-income earners | 6.15 (1.64-23.07) | **0.007** | 4.70 (1.14-19.15) | **0.032** |
| | Pensioner | 0.21 (0.06-0.73) | **0.014** | 0.37 (0.10-1.35) | 0.134 |
| | Social grant | 0.76 (0.40-1.45) | 0.401 | 0.90 (0.44-1.83) | 0.776 |

# Chapter 6. Discussion

## 6.1. Introduction

A high dental extraction statistic can be a reflection of the population's general oral health status. An individual patient that primarily undergoes dental extraction is suggestive of poor dental health practices and dental service utilisation (Gbolahan et al., 2019). Determinants of patients' utilisation of health services, as highlighted by 'The behaviour model of Anderson', fall under three main headings, namely: predisposing (patient demographic, knowledge and attitudes), enabling (financial resources, medical insurance) and need variables. The model has been universally accepted, and has been referred to in similar studies (Azarpazhooh et al., 2013).

In South Africa, while the prevalence of caries has remained high, the restorative intervention is scarce (Chikte et al., 2020; Smit et al., 2017). RCT is offered for teeth that are irreversibly inflamed and can still be restored. RCT is globally prevalent, however, studies still find that patients have no understanding of the nature of root canal treatment and what the treatment involves (Qasim et al., 2022). Developed countries were found to have the highest level of knowledge on endodontic treatment (Qasim et al., 2022). This could be attributed to the availability of resources to provide the necessary education and treatment across the different health care sectors.

This study aimed to assess the knowledge of patients utilising public dental services and to determine their attitudes and practice towards root canal treatment. So far, no such study has been conducted in a South African population. Our study can contribute positively towards the attainment of the proposed *'tooth loss goal'*; as it was found that oral health promotion initiatives are more targeted and relevant when the knowledge, attitudes and practices of a population are known (Modikoe et al., 2019). Factors related to the patients concerns of having to undergo RCT were identified, which may contribute to developing strategies to improve on their knowledge and attitudes towards root canal treatment.

## 6.2. Participants knowledge regarding RCT.

Only a small proportion (8.49%) of participants showed to have good knowledge of RCT, while the majority of participants (91.51%) had poor knowledge of RCT (median score of 0 and IQR 0-2). Further analysis showed that 58.96% of the participants presented to have no knowledge of RCT and 41.04% presented to have some knowledge of RCT. A large proportion of participants had no awareness of RCT (79.48%) nor had they had any previous experience with RCT (81.13%). The lack of knowledge by participants in this study was further reflected by the inability to describe RCT. Whilst 8.40% of the participants managed to correctly describe RCT; 31,35% incorrectly described the treatment and 60.25 % of the participants answered that they did not know to describe RCT.

The lack of awareness about RCT by a majority of participants in this study suggests that RCT as a treatment option is limited in the public health sector. RCT is offered for teeth that meet specific clinical criteria, i.e., irreversibly inflamed and restorable. Although determining the reason for visiting the dentist was not within the parameters of this study, participants in our study might have not required RCT previously. Participants having limited knowledge of RCT or never having undergone the treatment could be the result of good oral health practices. Alternatively, participants' lack of knowledge could be explained by the possibility that the extent of dental pathology in most patients attending public hospitals might be too extensive for RCT, as most patients present to the dentist due to pain or sepsis, as highlighted in a study by Mthethwa et al., (2020). Extraction or RCT are the two primary treatment alternatives given for the teeth with an irreversible inflammatory condition.

Our study had a similar response outcome to the findings of Satpathy and Gupta, (2022), whereby a majority of participants had a limited awareness and experience of RCT. They found that 72% of participants had not heard of RCT, and that only 28% responded to have previously undergone RCT (Satpathy and Gupta, 2022). Contrary to our study, Bansal and Jain, (2020) reported that 52.22% of the patients were familiar with the term RCT, and another study by Manasa et al., (2023) reported that 30% had previously undergone RCT and 40% of participants showed an average knowledge of the treatment.. In their Saudi Arabian study, Qasim et al., (2022) reported that 51% of participants had a previous experience of RCT and 22% showed an average knowledge of the treatment. An Australian study conducted by Chandraweera et al., (2019) reported that 71% of participants had prior RCT. A Pakistani study

by Qasim et al., (2022) found that 51% had previously undergone RCT while 49% of the participant's had not experienced the treatment.

It is worth noting that majority of studies that are similar to our current study were conducted in an academic dental hospital where endodontics usually has its own dedicated department. This difference in the study setting might be one of the reasons for the different results, where patients indicated for RCT, and thus educated about the treatment and those that had previously undergone RCT had likely formed part of the study sample.

It was interesting to discover that of the 16.04% participants that had been previously advised for RCT, only 8.96% of those participants went ahead with the treatment. Whilst the other 7,08% participants that responded to have been advised for RCT, later responded to never having undergone the treatment. From those participants that have had RCT, 7.31% indicated that they had their RCT done at a public hospital, and 0.71% was at a private dentist.

Our findings further shed some light on the rarity of RCT delivery within the Mopani district. This finding is authenticated by a study conducted in the Limpopo province by Thema and Singh (2017a), who discovered that restorative treatment accounted for less than 16% of the total monthly headcount in most districts, including the Mopani district. In their study Mthethwa et al. (2020) interpreted the high dental extraction statistic in KwaZulu Natal partly to poor access and service delivery from the dental facility in the treatment and restoration of dental caries of patients. This may also be a factor as to why most participants had poor knowledge about RCT. The resources and capacity to provide the service to patients indicated for the treatment are scarce. Future surveys could perhaps be conducted to probe the capacity to provide RCT in the district hospitals and the dentists' willingness to provide the treatment.

Knowledge is defined as an acquired comprehension and perception to ideologies, either through learning or experience, that informs our beliefs and consciousness (Daud et al., 2019; National Academies of Sciences and Medicine, 2016). When participants were tested on some basic knowledge relating to RCT, only 11.79% of the participants correctly responded that '*the tooth might need RCT, even if it doesn't hurt',* while 37.5% of participants believed that a tooth would only require RCT when there is pain in the offending tooth. The majority of participants (48,11%) were not sure of when a tooth might require RCT. On another

question, relating to basic knowledge about RCT, few participants (10.85%) correctly answered that root treated teeth become weaker overtime.

Patients' knowledge regarding root canal treatment is attained from several sources, including visits to the dental clinic, print and online media, as well as their immediate community (Manasa et al., 2023). A study conducted on a South Indian population by Pratheebha et al., (2022) discovered a notable proportion (84%) of participants were aware of RCT as a tooth-saving procedure, indicating a basic knowledge of RCT. Qasim et al., (2022), reported that the awareness of people regarding RCT has shown a significant improvement over the years. This was owed to school education programmes, but also mostly due to media - television, newspapers and the internet.

Bansal and Jain, (2020) reported that 52.22% of participants were familiar with the term RCT primarily through passive information received from friends and relatives and social media, but they lacked adequate knowledge about the treatment. In our study, only a few participants reported to primarily seek information about dental concerns from media (3.77%) or friends and relatives (4.95%). Although a small % of 3.77 & 4.95 reported their primary source of information to be media & friends respectively, this can be detrimental as the information may be incorrect, leading to inaccurate or biased perceptions and a delay in oral care. Therefore, it was good to discover that 89.86% of the participants in our study reported to primarily consult a dental facility for dental problems. Media or print material educating about RCT were however not found, during this study, in the dental clinics of the hospitals during data collection. Oral health education given by dental clinicians is mainly focused on preventative care. However, the curative options available to the patient should be considered in the oral health education talk; particularly because a high dental extraction statistic has been highlighted in several local studies.

## 6.3. Participants' attitudes towards RCT

The majority of participants surprisingly showed to have a positive attitude towards RCT with a median score of 45 (IQR=40-50). We hypothesised that participants in this study will have a poor knowledge and a negative attitude towards RCT. The results were mostly positive for the level of attitude towards preserving their natural dentition. However, inconsistencies were

found in the manner participants responded to some of the questions assessing their attitude towards preserving their natural dentition through RCT. This observation may be attributed to participants' lack of knowledge about the treatment. Another reason might be a display of social desirability bias (Bispo Júnior, 2022), whereby participants respond to questions relating to tooth preservation in a socially acceptable manner rather than their honest opinion and beliefs.

The majority (63,45%) of participants strongly agreed that they consult a dentist within 3 days of experiencing toothache. However, there were polarising responses from participants to whether tooth problems and diseases can be overcome without dental intervention if they waited it out long enough; 46,55% disagreed, and 39,89% agreed whilst 13,55% were neutral. The literature corroborates the latter finding where dental patients delay treatment until unbearable symptoms arise. In a study by Qasim et al., (2022), 60% of participants used home remedies to alleviate toothache instead of consulting a dentist. Ayo-Yusuf and Naidoo, (2016) contributed the decision to delay in seeking dental intervention to the majority of public service users being from a lower socio-economic standing. Participants, therefore may prioritise other competing expenses rather than accessing a dental facility for the alleviation of what they experience as manageable pain.

The response from participants on their attitude towards maintaining their natural teeth was positive overall. The questions that assessed this were questions 4, 5 and 9. A majority of participants strongly agreed that '*it is important to save a front tooth*' (66,58%) and that '*it is important to save a tooth in the back of the mouth'* (54,71%). However, a discrepancy was observed in the desire to maintain their natural teeth and their level of willingness for extraction above a tooth saving procedure. Although 74,68% of participants strongly agreed that maintaining their natural teeth was important, it's interesting that 55,13% 'strongly agreed' when asked '*a RCT-treated tooth becomes fragile and is lost easier. I might as well opt to remove the tooth instead'*. This finding is similar to that of Satpathy and Gupta, (2022), who found that a majority of participants in their study believed that despite the treatment given, a tooth will eventually require extraction. Our finding is validated by a South African study by Motloba and Makwakwa, (2018), where they acknowledge the acceptance and demand of dental extraction by patients as having become the social norm, even when alternative treatment exists.

Another interesting observation was the polarising response to the question of '*keeping false teeth needs less effort compared to taking care of my natural teeth'* whereby 27,48% of participants answered to 'strongly agree' and 27,23% answered to 'strongly disagree, whilst 22,90% were 'neutral'.

Participants showed to have a positive attitude towards questions that assessed their willingness to undergo dental treatment comparable to RCT. These questions included questions 6,7 and 8. '*Some dental treatment can be painful, but it's worth it in the long run'*.

*'I am concerned about long treatment times'*

*'I don't mind coming into the dental clinic more than once for one treatment procedure'*

This suggests that when indicated, participants can be motivated to undergo RCT through better education about the benefits of the treatment and what it entails.

The general perception toward RCT is that it's a procedure to be feared. RCT is often associated with pain, and it is cited as the main deterrent for most patients (Hamedy et al., 2013). Responding to the question of whether they were afraid to undergo RCT even though anaesthesia is used, 40,98% of participants strongly agreed that they would still be afraid to undergo the treatment, whereas 23,20% of participants responded that they would not be afraid to undergo the treatment knowing that anaesthesia is given. Pain during intraoperative treatment has been noted in patients who present with symptomatic AP, despite signs of successful anaesthesia (Nusstein et al., 2010a). The term "hot tooth" is used to describe this phenomenon. The trend of anaesthesia failure in patients with AP requires that clinicians acquire strategies to optimise anaesthesia in patients when initial attempts prove unsuccessful (Nusstein et al., 2010b). Prescription of NSAIDS pre- and post-treatment have been shown to be effective in combating the occurrence of pain intraoperatively (Hamedy et al., 2013).

The proportion of participants who believed that any tooth that aches must be extracted is alarming. 62,24% of participants responded to 'strongly agree' that '*the tooth that aches must be extracted'. In addition,* 43,88% participants responded to 'strongly agree' that '*it is cheaper to extract a tooth than to perform a RCT'* compared to 9.18% participants that answered 'strongly disagree'. Our findings are similar to those discovered by Motloba et al., (2022), that most dental patients still believe extraction to be the most effective treatment for dental pain. Ayo-Yusuf and Naidoo, (2016) and Thema and Sing, (2017b) found that associated treatment

costs could influence patient's perception on essential and non-essential dental treatment. Daud et al., (2019) argues that patients with lower income bracket may not prioritise saving their natural teeth. Their limited financial resources may serve as a barrier to seeking RCT in order to avoid financial strain. Umanah et al, (2012), as cited by Gbadebo and Adebayo, (2023), reported that patients in South Nigeria usually opted to extract posterior teeth instead of undergoing RCT due to financial restrictions,. Only 10% of patients in Limpopo indicated the ability to pay for treatment received at district hospitals (Thema and Singh, 2017b). This might explain the attitudes displayed by participants in this study, as a large proportion indicated that they have no income, or responded to earning what is categorised by Stats SA, (2011) as a low-income bracket in South Africa.

## 6.4. Treatment preference between RCT and dental extraction

A majority of the participants (60.85%) indicated that they would opt for extraction over RCT (33.02%) if the treatment was advised for an infected restorable tooth. This is a cause for concern, as this finding shows a lack of awareness by participants of the importance of conserving their natural teeth. Similar to studies conducted by Gbadebo and Adebayo, (2023), Sadasiva et al., (2018), Satpathy and Gupta, (2022) and Sykes and Vorster, (2023), it has been noted in clinical practice that some patients reject the option for RCT despite the tooth being restorable.. A Canadian study by Azarpazhooh et al., (2013) found that participants that reported to have undergone RCT and had frequent dental visits showed a greater preference for saving their teeth rather than opting for extraction. A large proportion of participants (79.48%) in our study had no awareness of RCT nor had they (81.13%) had any previous experience of RCT. Moreover, a large proportion (62,24%) showed to have the attitude that dental pain is best relieved through extraction. This low placement of the importance on tooth preservation reflects a poor dental IQ among the participants of this study.

Another plausibility for the preference for tooth extraction could be that participants have experienced extensive dental decay that results in pulpal infection. Hamedy et al., (2013) describes endodontic pain as a severe, aching and sharp sensation that has a significant psychological effect on patients. The behavioural impact is as far reaching as affecting the ability to perform normal activities such as work, sleep, and social life. The participants' choice for extraction above RCT could be motivated by the fact that in most cases, lesions of

endodontic origin will heal after dental extraction. Dental extraction completely eliminates the diseased pulp and thereby the source of irritation to the surrounding apical tissue.
Our findings on treatment preference reflect the findings in recent studies in South Africa. A study done in Limpopo showed that preventative and restorative treatment was done in relatively fewer patients (15%) when compared to dental extractions (64%); a majority of which are done on permanent teeth (Thema and Singh, 2017a). Several other studies conducted in South Africa have found that the mainstay of dental treatment remains extractions (Chikte et al., 2020; Motloba and Makwakwa, 2018; Smit et al., 2017). It cannot be ignored that this may be a consequence of a historically underfunded and under resourced, often-overcrowded public health care system. Motloba and Makwakwa, (2018) suggested that these circumstances have resulted in the desensitisation of dental professionals towards the impact of extractions; and that patients have become socialised to accept or demand extractions even when alternatives exist.

## 6.5. Participants' concerns regarding RCT.

Although 97 of the participants failed to correctly respond to this section of the questionnaire, some useful data could still be extracted from those that responded accordingly. A total of 327 participants were included in the analysis, including the 33 participants that gave a non-response to this section.

Participants' (32,11%) greatest concern regarding RCT in our study was the cost of treatment. A majority of participants had no income or were low-income earners. A significant association was found between income range and treatment preference, with majority of middle-income earners preferring RCT above extraction. Therefore, this raises the possibility of financial limitations being the cause of not seeking more complex, tooth-saving treatment, like RCT.
A study by Hamedy et al., (2013) reported that patient's treatment choices are informed by the cost, which can be a significant barrier to receiving treatment for toothache. McLaren et al., (2014) mentioned travel costs (monetary and time) as a deterrent from seeking health care for those living in rural areas with a low income.

Majority of participants in our study were from rural areas, with 87.03 % of them responding to being from a rural setting and only 8.7% reporting to be from a semi-urban setting. People from deeply rural areas often experience poor accessibility to the oral health services because of geographic isolation (Guo et al., 2014). Although participants were not asked the distance, they were required to travel to reach the nearest hospital, chances are the distance travelled is further than what they travel to reach their local clinics which was found to be a distance of at least 5-7 km (McLaren et al., 2014). Although the costs of RCT is subsidised in public institutions, the fact that it might require multiple visits may be a deterrent for participants in this study, especially among those that have little to no income with difficult accessibility to oral health care institutions.

Secondly, participants feared the potential of pain during treatment (19,57%). In their study, Manasa et al., (2023) found that pain associated with RCT was a cause of greatest concern for patients. This view is mentioned by Hamedy et al., (2013), who reported that patients customarily associate pain with RCT. It may be helpful to offer patients the perspective that RCT offers relief from pain that results from pulpal disease. Engaging tools used for oral disease education may help enhance treatment acceptability as patients decide among different options that are presented to them by their treating dentist (Sorrell et al., 2009).

Fear of possible complications after treatment was the third greatest concern, noted by 15,9% of participants. In their study Manasa et al., (2023) reported that, after pain, participants responded that another major deterring factor would be posttreatment complications that would require removal of the tooth despite undergoing RCT. Tooth survival is reported to be the most critical outcome measure of RCT for patients'(Fransson and Dawson, 2023; Lee et al., 2012). Fransson and Dawson, (2023) acknowledged that tooth retention is especially significant for RCT, considering that its primary objective is prevention of tooth loss.
In this study participants were least concerned about the length of time (number of visits) required to complete RCT (11,93%) and the need to take more than one X-ray (10,4%).

# Chapter 7. Conclusion and Recommendations

## 7.1. Conclusion

- Participants' knowledge of RCT was poor, however, they demonstrated a positive attitude towards RCT. In comparison to other studies, participants in our study had poorer knowledge and awareness of RCT.
- A non-linear association was found between knowledge and attitudes, and between attitudes and treatment preference towards root canal treatment. This finding is similar to that of an Indian study by Selvaraj et al., (2021), who found that patients' knowledge was independent of attitudes and behaviour towards oral health.
- Socioeconomic disparities (age, education and income range) appear to be part of the major factors responsible for poor knowledge and treatment preferences among the study participants. Younger, less educated and lower income participants displayed poorer knowledge and negative treatment preference to RCT.
- It was interesting to note that participants who were attending the dental clinic for the second time and more had the same treatment preference as first-time attenders for dental extraction above a tooth-saving treatment. Even though our study did not assess participants frequency and purpose of previous visits, it is expected that some oral health education during previous consultation would have been given. In practice, even the return dental attender mostly seeks the same emergency treatment. This indicates that the OHE given at the different hospitals is not effective for the improvement of the dental IQ of patients. The methods of education to patients might require re-evaluation.

## 7.2. Recommendations

- In order to reduce the rate of dental extractions among patients reliant on the public health sector, it is essential to address issues such as cost, lack of oral health information, and other concerns that are barriers to accessing comprehensive dental services. Actively involving higher stakeholders is crucial in developing strategies that improve access to both preventative and restorative dental services, and to regularly evaluate their effectiveness.

- Oral health education provided by dental clinicians primarily emphasizes preventative care. Patient education talks should also cover the restorative treatment options available in the public sector, especially in light of the high rate of dental extractions reported in local studies.
- The prevalence of dental extractions in public oral health settings may be attributed to patients postponing treatment for dental decay. It is imperative to improve communication and collaboration among healthcare providers in order to streamline the referral process and deliver more comprehensive care to patients. Establishing interdepartmental meetings within hospitals where clinical cases are presented, can aid colleagues in identifying patients requiring dental care, particularly in units that serve as frequent points of contact for patients, such as nursing and medical departments. This proactive approach can ensure timely intervention and improve overall patient outcomes.
- Utilise social media networks to effectively disseminate information to patients about RCT. Additionally, local radio stations can serve as a valuable platform for reaching a wide audience to emphasise the importance of restorative dental care. Leveraging these communication channels can significantly enhance patient education about treatment options that can preserve their natural dentition and to encourage proactive dental care.
- The focus should remain on addressing structural barriers in the public health sector, despite findings in this study about patient demand for root canal treatment. Further research is needed to evaluate the capacity of dental clinics to provide RCT and the motivation of dentists to offer the service. Collaboration among dental professionals, policy experts and public health authorities is essential in order to develop effective strategies and secure funding that will improve access to this restorative treatment in public dental clinics.

# Chapter 8. Limitations of the study

The nature of the study is cross-sectional, and only presents a baseline of patient's knowledge, attitudes and treatment preference relating to RCT in the Mopani district. Additionally, data was collected at dental departments of several district hospitals and a convenience sampling technique was used due to a limited number of patient consultations. Therefore, interpretation of the findings in this study should be made with some caution, as

causality cannot be inferred to the wider population. Albeit the results found in this study still gives a reflection of patients RCT status in the public sector.

The data collection process came with some challenges on the level of participants' reading and comprehension abilities, which yielded some incorrect or partial responses in the questionnaires. In this study, questionnaires were distributed to personal contacts, all of whom were graduates, to test that the format was comprehensible and that it asked questions that would generate useful results. A pilot study could be conducted in a similar future study on the target population to ascertain that participants are asked question at a level that they can comprehend.

The assessment for participants' practices towards RCT was limited to one question in section D. In retrospect, some questions were identified from section C that may be utilised to assess for participants' practices in future studies.

Regardless of these limitations, the study has yielded data that can be useful in informing initiatives and programmes that are targeted at reducing dental extraction in public oral health care. Root canal treatment is one of the treatment option available to patients that meet the criteria for restorable treatment.

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# Chapter 9. Appendices

Appendix 1.1: Letter to Limpopo Department of Health Research Committee

37 Uitzicht Drive
Duiwelskloof
Limpopo
0835
15/10/2021

Dr. N.J. Ramalivhana
The Research Department of Health
Limpopo Province
18 College Street
Polokwane
0700

Dear Dr. Ramalivhana

Re: Permission to conduct research at hospitals in the Mopani district, Limpopo

My name is Dr Mokgadi Sefomolo and I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am seeking permission to do research at hospitals that provide dental services in the Mopani district for the fulfilment of the research component of my studies.

I am conducting research on the knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo. There is a gap of this information in the literature and this study will be the first to address this topic within a South African context. The results obtained from the study will assist in identifying patient-centred issues towards root canal treatment that need to be addressed. The results from this study may also be beneficial for the planning and implementation of oral health education programmes within the Mopani district.

The research will entail inviting patients aged 18 years and above consulting at the dental departments of the seven identified hospitals to participate in a questionnaire-based survey. The distribution of questionnaires will be done by the principal investigator. The questionnaire will be self-administered and should take patients that agree to participate 8-10 minutes to complete before their dental treatment. The patients' will be approached as they arrive at the dental departments' waiting area before the start of the days clinical work or after the patients'

dental consultation before they leave the dental department waiting area to avoid disruption of registration at reception and service delivery at the dental department.

Participation in the study will be completely voluntary. Participants will be asked to give their written consent before the research begins.
Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey. The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.
.

There are no anticipated risks in participating in this study; nor will participants be advantaged or disadvantaged in any way. The participants will be reassured of their right to withdraw consent at any stage of the study without penalty. No payment will be made for participant involvement.

Please let me know if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,



Dr. Mokgadi Sefomolo
0843407724
366069@students.wits.ac.za

Supervisors:

Dr. Matshediso Mothopi-Peri
Matshediso.mothopi@wits.ac.za

Dr. Ebrahim Patel
Ebrahim.patel@wits.ac.za

Appendix 1.2. Letter to the CEO of Dr.CN Phathudi hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (Dr. CN Phathudi Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at Dr. CN Phathudi hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 1.3. Letter to the CEO of Letaba hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (Letaba Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at Letaba hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 1.4. Letter to the CEO of Sekororo hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (Sekororo Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at Sekororo hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 1.5. Letter to the CEO of van Velden hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (van Velden Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at van Velden hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 1.6. Letter to the CEO of Kgapane hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (Kgapane Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at Kgapane hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey: ***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 1.7. Letter to the CEO of Nkhensani hospital

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

To: The CEO (Nkhensani Hospital)
CC: Clinical manager (Dental)

**Re: Notice of intent to conduct research at Nkhensani hospital**

My name is Mokgadi Sefomolo and I am employed as a dentist by the Limpopo department of health at Kgapane hospital. I am pursuing my Master of Science in Dentistry (Endodontics) at the University of Witwatersrand in the Department of Paediatric and Restorative Dentistry. I am required to conduct research as part of the fulfilment of my studies.

The tile of the research is ***'The knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo.'***

This letter serves as a notice of intention to conduct a questionnaire-based survey on patients consulting at the dental department of the hospital.

The results will be communicated in a research report and the opportunity to publish in professional journals will be applied for.

Participant confidentiality and anonymity will be ensured as no personal identifiable questions will be asked at any point of the study. All the answers given on this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey.

Approval to conduct the study has been granted by the Health Research Ethics Committee, University of the Witwatersrand and the Research Committee of the Limpopo department of health. The supporting letter from the province has been attached.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 084 340 7724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
Matshediso.Mothopi@wits.ac.za

Yours sincerely,

Dr. MMV Sefomolo
(Researcher)

23/05/2022
Date

Appendix 2.1: Participant information sheet_ English

Dear sir/madam,

Thank you for taking the time to go through this information sheet. This serves as an invitation for your participation in this survey.

My name is Dr Mokgadi Sefomolo and I am pursuing my Master of Science in Dentistry at the University of Witwatersrand. This survey is for the fulfilment of the research component of my studies. My supervisors are Dr. Ebrahim Patel & Dr. Matshediso Mothopi-Peri.

This survey aims to determine the knowledge, attitudes and practices of patients towards root canal treatment, in the Mopani district, Limpopo. The results obtained from the study will assist in identifying patient-centred issues towards root canal treatment that that need to be addressed.

Please kindly assist by completing the attached short questionnaire. Participation in this survey is completely voluntary.
Participant confidentiality and anonymity are ensured as the survey does not ask for any personal identifiable questions. All the answers given in this questionnaire will be reviewed by the researcher and supervisors of this study, and used solely as data to carry out the survey. No answered questionnaire will be shared with a third party.

Please note that there will be no personal cost or any direct benefits to you for participating.

Completing the questionnaire will take a few minutes of your time, but it will be of extreme value to us. Please be advised that should you wish to no longer partake in this survey, you are welcome to drop out at any moment with no penalty to you.

Please contact me on the following, should you need further details concerning the survey:
***Email: 366069@students.wits.ac.za***
***Cell no.: 0843407724***

For your reference, my supervisors can be contacted at:
Email: ***Ebrahim.Patel@wits.ac.za***
***Matshediso.Mothopi@wits.ac.za***

Regards,

Dr. Mokgadi Sefomolo (BCHD) 07/2021

Appendix 2.2: Participant information sheet_ Sepedi translation

**Letlakala la boitšebiso bja motšeakarolo**

Morena/Mohumagadi yo a rategago,

Ke leboga ge o iphile nako ya go hlahloba boitsebišo bja letlakaleng le. Se ke taletšo ya gore o tšee karolo nyakišišong ye.

Ke nna Ngaka Mokgadi Sefomolo gomme ke ithutela go hwetša lengwalo la Master of Science in Dentistry Yunibesithing ya Witwatersrand. Nyakišišo ye e sepedišana le go phethagatšwa ga dithuto tša ka. Baokamedi ba ka ke Ngaka Ebrahim Patel le Ngaka Matshediso Mothopi-Peri.

Morero wa nyakišišo ye ke go hwetša seo balwetši ba se tsebago, dikgopolo tša bona le mekgwa ya bona ka go alafiwa ga bokagare bja meno (root canal treatment), Seleteng sa Mopani, Limpopo. Dipoelo tše di hwetšwago nyakišišong ye di tla thuša gore go tsebjwe ka mathata ao a swanetšego go lokišwa ao balwetši ba nago le wona ka kalafo ya bokagare bja meno.

Hle, ke kgopela gore o arabe dipotšišo tše dikopana tše di lego mo. O tšea karolo nyakišišong ye ka go ithaopa.
Re ka se utolle diphiri tša gago goba boitsebišo bja gago ka ge nyakišišong ye re sa botšiše selo ka boitsebišo bja gago. Dipotšišo ka moka tše o tlo di neago di tlo sekasekwa ke banyakišiši le baokamedi ba nyakišišo ye, gomme tša šomišwa feela go phethagatša nyakišišo ye. Dikarabo tša gago di ka se newe batho ba bangwe.

Hle tseba gore o ka se lefišwe selo nyakišišong ye e bile o ka se newe moputso.

Go tlo go tšea metsotso e sego kae go araba dipotšišo tše, eupša o tla be o re thušitše kudu. Hle, tseba gore ge e ba o kgetha go kgaotša go tšea karolo nyakišišong ye, o ka dira bjalo ka nako le efe goba efe e bile o ka se otlwe ka baka la seo.

Ge o ka nyaka go tseba se sengwe ka nyakišišo ye, hle ikgokaganye le nna go:
***Imeile: 366069@students.wits.ac.za***
***Mogala: 0843407724***

Ge o nyaka go tseba ka nna, ikgokaganye le baokamedi ba ka go:
Imeile: ***Ebrahim.Patel@wits.ac.za***
***Matshediso.Mothopi@wits.ac.za***

Wa potego,

Ngaka Mokgadi Sefomolo (BChD) 07/2021

Appendix 2.3: Participant information sheet_ Xitsonga translation

Eka tatana kumbe manana,

Ndza ku khensa hikuva u tinyika nkarhi wo kambisisa timhaka leti nga eka papila leri. Papila leri i xikombelo eka wena leswaku u hi pfuna eka ndzavisiso lowu hi nga eku wu endleni.

Hi mina Dokodela Mokgadi Sefomolo ndzi le ku dyodzeni dyondzo ya *Master of Science* eka swa vutshunguri bya meno eYunivhesiti ya Witwatersrand. Ndzavisiso lowu wu ta ndzi pfuna ku hetisisa tidyondzo ta mina. Ndzi tirha ehansi ka nkongomiso wa Dokodela Ebrahim Patel na Dokodela Matshediso Mothopi-Peri.

Xikongomelo xa vulavisisi lebyi i ku twisisa vutivi ni mavonelo ya vavabyi loko swi ta emhakeni ya ku tshugula misiha ya meno (root canal treatment), eXifundzeni ntsongo xa Mopani laha Limpopo. Vuyelo lebyi hi nga ta byi kuma byi ta hi pfuna ku twisisa swiphiqo leswi vavabyi va langutanaka na swona loko swi ta emhakeni yo tshungula misiya ya meno.

Hi kombela u hi pfuna hi ku hlamula swivutiso leswi fambisanaka na papila leri. Tsundzuka leswaku a wu sindzisiwi ku hlamula swivutiso leswi.

Tiyiseka leswaku vuxokoxoko bya wena a byi nge hundziseriwi kun'wana tanihileswi, swivutiso swa hina swi nga kombeliki vuxokoxoko lebyi nga xihundlha. Tinhlamulo ta wena hinkwato ti ta kambisisiwa hi loyi a endlaka vulavisisi ni va kongomisi vakwe naswona a ti nge tirhiseriwi swin'wana handle ko pfuna eka dyondzo leyi. Tinhlamulo ta wena a ti nge hundziseriwi eka vanhu van'wana.

Hi kombela u xiya leswaku a swi nge ku koxi nchumu kumbe ku vuyeriwa hi ndlela yo karhi loko u hi pfuna eka ndzavisiso lowu.

Ku hlamula swivutiso leswi swi ta teka timinete tingari tingani, kambe i swa nkoka swinene eka hina. Tsundzuka leswaku loko u nga ha swi tsakeli ku ya emahlweni u hlamula swivutiso, u nga tshika naswona a wu nge koxiwi nchumu.

Loko u lava vuxokoxoko byin'wana hi ndzavisiso lowu, u nga tihlanganisa na mina eka:
***Email: 366069@students.wits.ac.za***
***Cell no.: 0843407724***

Loko u swi tsakela u nga tihlanganisa ni vakongomisi va mina eka:
Email: : ***Ebrahim.Patel@wits.ac.za***
***Matshediso.Mothopi@wits.ac.za***

Hi mina,

Dokodela Mokgadi Sefomolo (BChD) 07/2021

Appendix 3.1: Informed consent sheet_ English

Dear sir/madam

I am pursuing my Master of Science in Dentistry degree at the University of Witwatersrand, in the field of Endodontics. As you have read from the Information letter handed to you, I am conducting this survey to determine the knowledge and attitudes of patients, attending the Wits Oral Health Centre, towards root canal treatment.

To collect the necessary data for this survey, I need you to kindly fill out a questionnaire which will take a few minutes of your time and return it to me during your visit at the department today.
Should you decide to participate in the survey, please read and sign the form below.

**INFORMED CONSENT**

By signing this form, I am declaring that I have read and understand the information provided to me regarding this survey and I freely give my consent to participate.

*I acknowledge that:*

- I was given the opportunity to ask questions where clarity was needed

*I understand that:*

- Participation in this survey is completely voluntary
- There will be no cost or benefit to me should I decide to participate
- There will be no negative consequence to me should I decide not to participate
- I can decide to drop out of this survey at any moment
- I confirm that I am 18 years or older in age

Name: _____

Surname: _____

Hospital file number:_____

Date: _____

Signature of participant: _____

Signature of researcher: _____

Appendix 3.2: Informed consent sheet_ Sepedi translation

**Letlakala la go go thuša go dumela go ba motšeakarolo**

Morena/Mohumagadi yo a rategago,

Ke ithutela go hwetša lengwalo la Master of Science in Dentistry Yunibesithing ya Witwatersrand, lefapheng la go šoma ka go alafa meno (*Endodontics*). Ka ge o badile lengwalong la boitsebišo leo o le neilwego, ke dira nyakišišo ye gore ke hwetše seo balwetši ba se tsebago, dikgopolo tša bona le mekgwa ya bona ka go alafiwa ga bokagare bja meno (root canal treatment), Seleteng sa Mopani, Limpopo

Gore ke hwetše boitsebišo bjo bo nyakegago nyakišišong ye, ke kgopela gore le arabe dipotšišo tša letlakaleng le. Di tla go le tšea metsotso e sego kae, gomme le le bušetše go nna ge le etla lefapheng la meno.

Ge le ka kgetha go tšea karolo nyakišišong ye, ke kgopela le baleng le go saena fomo ye.

**TUMELELANO**

Ka go saena fomo ye, ke bontšha gore ke badile le go kwešiša boitsebišo bjo ke bo neilwego ka nyakišišo ye gomme ke dumela go tšea karolo.

*Ke a dumela gore:*

- Ke neilwe sebaka sa go botšiša dipotšišo moo ke bego ke sa kwešiše

*Ke a kwešiša:*

- Gore ke tšea karolo nyakišišong ye ka go ithaopa
- Gore nka se lefišwe goba go newa moputso ge nka kgetha go tšea karolo
- Gore go ka se be le ditlamorago tše mpe ge nka kgetha go se tšee karolo
- Gore nka kgetha go kgaotša go tšea karolo nyakišišong ye ka nako le ge e le efe
- Gore ke tiišeditše gore ke na le mengwaga ye 18 goba go feta moo

Leina:_____

Sefane: _____

Nomoro ya Sepetlele ya Faele: _____

Letšatši-kgwedi:_____

Mosaeno wa motšeakarolo: _____

Mosaeno wa monyakišiši:_____

Appendix 3.3: Informed consent sheet_ Xitsonga translation

Eka tatana kumbe manana

Ndzi le ku dyodzeni dyondzo ya *Master of Science* eka swa vutshunguri bya meno eYunivhesiti ya Witwatersrand, ndzi langutane ngopfu ni mavabyi lama hlaselaka misiha endzeni ka meno *(Endodontics).* Hi laha u hlayeke ha kona eka papila leri nga ni vuxokoxoko leri u nyikiweke rona, ndzi le ku endleni vulavisisi ku twisisa vutivi ni mavonelo ya vavabyi loko swi ta emhakeni ya ku tshugula misiha ya meno (root canal treatment), eXifundzeni ntsongo xa Mopani laha Limpopo. Leswaku ndzi ta kuma vuxokoxoko lebyi lavekaka, ndzi kombela leswaku u hlamula swivutiso leswi nga eka phepha leri u nyikiweke rona.

Swi ta lava nkarhinyana wa wena ntsena ivi u ndzi nyiketa rona loko u hi endzerile namutlha. Loko u swi tsakela ku hoxa xandla eka ndzavisio lowu.
Hi kombela u hlaya u tlhela u sayina fomo leyi nga laha hansi.

**MPFUMELELO**

Hi ku sayina fomo leyi, ndzi tiyisisa leswaku ndzi hlayile ndzi tlhela ndzi twisisa vuxokoxoko lebyi ndzi nyikiweke byona mayelana ni ndzavisiso lowu naswona ndzi pfumela ku wu endla.

*Ndzi tiyisekisa leswaku:*

- Ndzi nyikiwe nkarhi wo vutisa swivutiso laha ndzi nga swi twisisiki

*Ndza swi twisisa leswaku:*

- Ndzi ta hlamula swivutiso leswi hi ku va ndzi swi lava
- Loko ndzi hlamula swivutiso leswi, a ndzi nge koxiwi kumbe ku kuma swo karhi
- A ndzi nge onhakeriwi hi nchumu loko ndzo tshika ku hlamula swivutiso
- Ndzi nga tshika ku hlamula swivutiso loko ndzi nga ha swi tsakeli
- Ndza tiyisekisa leswaku ndzi ni malembe ya 18 kumbe ku tlula

Vito: _____

Xivongo: _____

Nomboro ya fayili ya le xibedlele :_____

Siku: _____

Nsayino wa loyi a hlamulaka swivutiso: _____

Nsayino wa loyi a endlaka vulavisisi: _____

Appendix 4.1: Participant questionnaire_ English

| **Participant no.** | |
|---|---|

# Questionnaire: Knowledge and attitudes of patients towards root canal treatment in the Mopani district, Limpopo

*Please answer all questions as honestly as possible. A tick-box will be presented with each question; please mark the appropriate box with a tick* þ*, unless stated otherwise:*

**Section A: Demographic data**

1. Gender

| Female | | Male | |
|---|---|---|---|

2. How old are you?
*(please fill in your age in numbers)*

| |
|---|
| |

3. Education
(*please indicate highest level achieved)*

| | |
|---|---|
| Primary | |
| Matric | |
| Graduate (Degree, Diploma) | |
| Postgraduate | |

4. Residential location

| | |
|---|---|
| Urban | |
| Non-urban/Rural | |

5. Annual income

| | | |
|---|---|---|
| No income | | |
| R1-R19200 | | |
| R19201-R307200 | | |
| R307201 and above | | |
| Other, please indicate: | Pensioner | |
| | Social grant | |

**Section B: Knowledge about root canal**

*The following section asks questions relating to your level of knowledge about root canal treatment (RCT). Please read the questions and tick* þ *the appropriate answer.*

1. Is this your first visit to the dentist or a dental department?

   ☐ Yes

   ☐ No

2. Have you heard about root canal treatment before?

   ☐ Yes

   ☐ No

3. When you have a dental concern, which **one** of the following do you first consult? *(Please select one option.)*

   ☐ Dental clinic/practice/hospital

   ☐ Internet/social media

   ☐ Relatives/Friends

   ☐ TV/Radio

4. What do you know **or** think root canal treatment is? *(Please choose the **one** you believe to be the correct answer)*

   ☐ The use of some medication to relieve pain

   ☐ The removal of the nerve of the tooth and then returning it back into the tooth, and then restoring it with a filling

   ☐ I don't know about root canal treatment

   ☐ Drill tooth then restore it with a filling

   ☐ The drilling of the tooth and removal of the nerve of the tooth, and then restoring it with a filling

5. Have you ever been advised, by a dentist, to undergo root canal treatment before?

☐ Yes

☐ No

6. Have you ever been treated for root canal treatment before?

☐ Yes

☐ No

☐ I don't remember

7. Based on your answer in '*question 6*', who performed the root canal treatment?

☐ Dentist in public hospital

☐ I have never had root canal treatment

☐ Private practice dentist

☐ I don't remember

8. When do you think root canal treatment should be performed?

☐ Only when pain associated with the tooth is present

☐ The tooth might need RCT, even if it doesn't hurt

☐ I don't know

9. Do you think teeth become weaker after root canal treatment?

☐ Yes

☐ No

☐ I don't know

**Section C: Attitudes towards root canal**

*The following table contains statements that relate to attitudes towards root canal treatment (RCT). Please read each statement and tick* þ *the one box closest to what is true*

*for you, where 5 means **"Strongly agree"**, 4 means **"Somewhat agree"**, 3 means **"Neutral"**, 2 means **"Somewhat disagree"**, and 1 means **"Strongly disagree".***
*There is no 'right' or 'wrong' answer. Wherever possible, let your past experiences assist in answering this section.*

| **Statement** | **5** | **4** | **3** | **2** | **1** |
|---|---|---|---|---|---|
| 1. I consult the dentist within 1-3 days when I experience tooth infection | | | | | |
| 2. You can get over almost any dental problem if you just wait long enough | | | | | |
| 3. I first wait for infection and swelling near a tooth to resolve before consulting a dentist | | | | | |
| 4. It is important to save a front tooth | | | | | |
| 5. It is important to save a tooth in the back of the mouth | | | | | |
| 6. Some dental treatment can be painful, but it's worth it in the long run | | | | | |
| 7. I am concerned about long treatment times | | | | | |
| 8. I don't mind coming in to the dental clinic more than once for one treatment procedure | | | | | |
| 9. Maintaining my natural teeth is important to me | | | | | |
| 10. Keeping false teeth needs less effort compared to taking care of my natural teeth | | | | | |
| 11. The tooth that aches must be extracted | | | | | |
| 12. An RCT-treated tooth becomes fragile and is lost easier. I might as well opt to remove the tooth instead | | | | | |
| 13. In case of infection and swelling near a tooth, the best option is to extract it | | | | | |
| 14. It is cheaper to extract a tooth than to perform a RCT | | | | | |
| 15. Even after an injection, I am afraid to have the nerve of my tooth removed | | | | | |

**Section D: Treatment preference**

*The following section asks questions relating to your preferred treatment of choice based on your knowledge and attitudes towards root canal treatment (RCT). Please read the questions and tick* þ *the box that reflects your choice.*

1. Will you undergo RCT, if indicated for any tooth or will you prefer extraction??

   ☐ Extraction

   ☐ RCT

2. Please rank, from 1 to 5, what reason would ***stop*** you from agreeing to have a root canal treatment? With '1' being the most likely reason, and '5' being the least likely reason.
   (*Please give each reason its own ranking; 1,2,3,4 and 5* ***must*** *be used just once)*

   ☐ The cost of treatment

   ☐ Painful treatment

   ☐ Fear of complications

   ☐ More than one X-rays must be taken

   ☐ Treatment takes too long

Thank you for your time and cooperation in completing the questionnaire

Appendix 4.2. Participant questionnaire_ Sepedi translation

| **Participant no.** | |
|---|---|

# Dipotšišo: seo balwetši ba se tsebago, dikgopolo tša bona le mekgwa ya bona ka kalafo ya bokagare bja meno (root canal treatment), Seleteng sa Mopani, Limpopo

*Hle leka go araba dipotšišo tše ka moka ka botshepegi. Potšišo e nngwe le e nngwe e na le lepokisana leo o swanetšego go swaya ka gare ga lona; swaya lepokisi la maleba ka leswawana le þ, ntle le ge o botšwa se se fapanego:*

**Karolo A: Boitsebišo bja motho**

1. Bong

| Mosadi | | Monna | |
|---|---|---|---|

2. O na le mengwaga e mekae? *(hle ngwala mengwaga ya gago ka dinomoro)*

| |
|---|
| |

3. Thuto (*hle ngwala dithuto tša gago tše phagamego)*

| | |
|---|---|
| Phoraemari | |
| Marematlou | |
| Mangwalo (Degree, Diploma) | |
| Postgraduate | |

4. Lefelo la bodulo

| | |
|---|---|
| Motse-setoropong (ka mohlala, Toropo/Motse) | |
| Motse-magaeng (ka mohlala, Lefelo/Motse) | |

5. Mogolo wa ngwaga le ngwaga

| | | |
|---|---|---|
| Ga ke hwetše mogolo | | |
| R1-R19200 | | |
| R19201-R307200 | | |
| R307201 le go feta | | |
| O mongwe, hle bontšha: | Ke tšwile phenšene | |

| | | |
|---|---|---|
| | Ke gola mphiwa feela | |

**Karolo B: Seo o se tsebago ka kalafo ya bokagare bja leino (root canal treatment)**

*Karolong ye go nyakwa tsebo ya gago ka kalafo ya bokagare bja leino. Hle bala dipotšišo, gomme o swaye ka leswawana le* þ *karabong ya maleba.*

1. Naa ke la mathomo o etla ngakeng ya meno goba lefapheng la meno?

   ☐ Ee

   ☐ Aowa

2. Naa sale wa kwa ka kalafo ya bokagare bja leino?

   ☐ Ee

   ☐ Aowa

3. Ge o na le bothata bja leino, o kitimela kae **pele** gore o hwetše boitsebišo? *(Hle kgetha karabo e tee.)*

   ☐ Kliniking ya meno /ngaka ya meno e ikemetšego/sepetlele

   ☐ Inthaneteng/dikgokaganyong tša leago

   ☐ Go ba leloko/Go bagwera

   ☐ Thelebišeneng/Radiong

4. O tseba eng ka kalafo ya bokagare bja leino, goba o nagana gore ke eng? *(Hle kgetha **karabo** ye o naganago gore ke yona)*

   ☐ Ke ge ba diriša sehlare se itšego go okobatša bohloko bja leino

   ☐ Ke ge ba ntšha tšhika ya leino le go e bušetša ka leinong, ke moka ba tswalela leino leo ba šomiša samente ya meno

   ☐ Ga ke tsebe selo ka kalafo ye

   ☐ Ke ge ba bora leino ke moka ba thiba lešobana leo ka samente ya meno

☐ Ke ge ba bora leino, ba ntša tšhika ya lona ke moka ba le tswalela ba šomiša samente ya meno

5. Naa ngaka ya meno e kile ya go botša gore o swanetše go alafiwa bokagare bja leino?

   ☐ Ee

   ☐ Aowa

6. Naa o kile wa alafiwa bokagare bja leino?

   ☐ Ee

   ☐ Aowa

   ☐ Ga ke gopole

7. Go ya ka karabo ya gago go *'potšišo 6*', ke mang a go alafilego leino leo?

   ☐ Ke ngaka ya meno sepetleleng sa batho bohle

   ☐ Ga sa nka ka alafiwa bokagare bja leino

   ☐ Ke ngaka ya meno yeo e ikemetšego (Private Dentist)

   ☐ Ga ke sa gopola

8. O nagana gore kalafo ya bokagare bja leino e swanetše go dirwa neng?

   ☐ Ge feela leino la gago le le bohloko

   ☐ Leino le ka hloka kalafo ye le ge le se bohloko

   ☐ Ga ke tsebe

9. Naa o nagana gore meno a thoma go fokola ge motho a se no alafiwa bokagare bja leino?

   ☐ Ee

   ☐ Aowa

   ☐ Ga ke tsebe

**Karolo C: Dikgopolo ka kalafo ya bokagare bja leino**

*Lepokisi le le na le dikgopolo tša batho ba bangwe ka kalafo ya bokagare bja leino. Hle bala kgopolo e nngwe le e nngwe gomme o swaye ka leswawana le þ kgauswi le kgopolo yeo wena o naganago gore ke ya nnete. Nomoro 5 e ra gore **"Ke tloga ke dumela"**, 4 e ra gore **"Ke a dumelanyana"**, 3 e ra gore **"Ke magareng"**, 2 e ra gore **"Ke a gananyana"**, ke moka 1 e ra gore **"Ke gana nnang".***

*Re ka se re go na le karabo ya nnete goba ya maaka. Mo go kgonegago, diriša maitemogelo a gago go go thuša go araba.*

| | **Kgopolo** | **5** | **4** | **3** | **2** | **1** |
|---|---|---|---|---|---|---|
| 1. | Ge ke eba le bothata bja leino, ke ya ngakeng ya meno pele go feta matšatši a mararo | | | | | |
| 2. | O ka fola bolwetšing le ge e le bofe bja leino ge o ka no leta nako e teletšana | | | | | |
| 3. | Pele ke eya ngakeng ya meno, ke emela marinini a ka a phohlela pele | | | | | |
| 4. | Go bohlokwa go phološa leino la ka pele | | | | | |
| 5. | Go bohlokwa go phološa leino la mohlagareng | | | | | |
| 6. | Dikalafo tše dingwe tša meno di ka ba bohloko, eupša di hola kudu | | | | | |
| 7. | Ke tshwenyega ka dinako tše telele tša kalafo | | | | | |
| 8. | Ga ke na bothata bja go ya kliniking ya meno gantši bakeng sa mohuta o tee wa kalafo | | | | | |
| 9. | Go boloka meno a ka a tlhago go bohlokwa go nna | | | | | |
| 10. | Go hlokomela meno a maitirelo (False teeth) ga go boima go swana le go hlokomela meno a tlhago | | | | | |
| 11. | Leino la go opa le swanetše go ntšhiwa | | | | | |
| 12. | Leino le le alafilwego bokagare ga le tie e bile le robega gabonolo. Go kaone ke no le ntšha | | | | | |
| 13. | Ge marinini a kgauswi le leino a bola le go ruruga, go kaone leino la moo le no ntšhiwa | | | | | |
| 14. | Go ntšha leino ga go ture kudu go swana le go le alafa | | | | | |
| 15. | Le ge ke hlabilwe tšhwana, ke tšhaba go ntšhiwa tšhika ya leino la ka | | | | | |

**Karolo D: Kalafo yeo o e kgethago**

*Karolo ye e na le dipotšišo tše di bolelago ka kalafo yeo o e kgethago go ithekgile ka tsebo le kgopolo ya gago ka kalafo ya bokagare bja leino. Hle bala dipotšišo tše, gomme o swaye ka leswawana le þ ka lepokisaneng la kgetho ya gago.*

1. Ge o ka bolawa ke leino, naa o ka kgetha gore le alafiwe goba o ka kgetha go le ntšha?

   ☐ Go le ntšha

   ☐ Gore le alafiwe

2. Hle šomiša dinomoro 1, 2, 3, 4 le 5 go mešara gore ke eng se se ka go thibelago go kgetha go alafiwa bokagare bja leino? Ka mohlala, nomoro '**1**' e emela *lebaka la pelepele le le ka go thibelago go kgetha kalafo ye*, gomme nomoro '**5**' e emela *lebaka la mafelelofelelo le le ka go thibelago go kgetha kalafo ye*.

   *(Ka kopo, lebaka le lengwe le le lengwe ga le be le nomoro ya lona gare ga 1,2,3,4, goba 5. Šomiša nomoro 1,2,3,4* ***le*** *5 ga* ***tee*** *mo karabong ya gago, ya o mešara se se ka go thibelago go kgetha go alafiwa bokagare bja leino)*

   ☐ Go bitša ga kalafo

   ☐ Bohloko bja kalafo

   ☐ Go boifa mathata ao a ka bago gona

   ☐ Taba ya gore go swanetše go tšewe X-ray e fetago e tee

   ☐ Kalafo e tšea nako e telele kudu

Re leboga nako le tirišano ya gago go arabeng dipotšišo tše

Appendix 4.3: Participant questionnaire_ Xitsonga translation

| **Participant no.** | |
|---|---|

# Swivutiso: vutivi ni mavonelo ya vavabyi loko swi ta emhakeni ya ku tshugula misiha ya meno (root canal treatment) eXifundzeni ntsongo xa Mopani eLimpopo

*Hi kombela u hlamula swivutiso leswi hilaha u nga swi kotaka ha kona. Ku ta va ni xibokisana eka xivutiso ha xin'we; hi kombela leswaku u fungha hi ndlela leyi kombisiweke laha þ, handle ka loko u komberiwe ku fungha hi ndlela yin'wana:*

**Xiyenge A: Vuxokoxoko**

1. Rimbewu

| Wansati | | Wanuna | |
|---|---|---|---|

2. U ni malembe ma ngani?
*(hi kombela u tsala tinomboro ntsena)*

| |
|---|
| |

3. Tidyondzo (*hi kombela u fungha tidyondzo ta wena ta le henhla ntsena)*

| | |
|---|---|
| Primary | |
| Matric | |
| Graduate (Degree, Diploma) | |
| Postgraduate | |

4. Laha u tshamaka kona

| | |
|---|---|
| Dorobeni (e.g. Town/ City) | |
| Matikoxikaya (e.g. Location/ Village) | |

5. Muholo wa lembe

| | | |
|---|---|---|
| A ndzi holi/tirhi | | |
| R1-R19200 | | |
| R19201-R307200 | | |
| R307201 no tlula | | |
| Swin'wana, hi kombela u hlawula: | Mudende | |
| | Peceni | |

**Xiyenge B: Vutivi mayelana ni misiha ya meno (root canal treatment)**

*Xiyenge lexi landzelaka xi lava ku tiva loko u tiva swo karhi mayelana ni ku tshungula misiha ya meno. Hi kombela u hlamula swivutiso hi ku fungha hi ndlela leyi* þ *laha ku faneleke.*

1. Xana i ro sungula ku va u ta vona dokodela wa meno?

   ☐ Ina

   ☐ E-e

2. Xana u tshame u twa hi ku tshunguriwa ka misiha ya meno?

   ☐ Ina

   ☐ E-e

3. Loko u pandziwa hi meno, xana hi kwihi laha u yaka kona ku ya kuma mpfuno? *(Hi kombela u hlawula ndhawu yin'we ntsena.)*

   ☐ Tliliniki/Dokodela wa meno/Xibendlhele

   ☐ Intanete/social media

   ☐ Maxaka/Vanghana

   ☐ TV/Rhadiyo

4. Xana u ehleketa leswaku, ku tshungula misiha ya meno swi vula yini? *(Hi kombela u hlawula nhlamulo **yin'we** leyi u ehleketaka leswaku hi yona)*

   ☐ Ku tirhisiwa ka mirhi yo karhi leswaku yi hunguta ku vava

   ☐ Ku susiwa ka nsiha wa tino wu tlhela wu tlheriseriwa etinweni kutani tino ri tlhela ri pfariwa

   ☐ A ndzi tivi nchumu hi ku tshungula misiha ya meno

   ☐ Ku bora tino u tlhela u ri siva

   ☐ I ku bora tino u susa nsiha wa rona u tlhela u pfala

5. Xana u tshama u byeriwa ku ya tshunguriwa misiha ya meno hi dokodela?

☐ Ina

☐ E-e

6. Xana u tshama u tshunguriwa misiha ya meno?

☐ Ina

☐ E-e

☐ A ndzi tsundzuki

7. Hi ku ya hi leswi u swi hlamuleke eka '*xivutiso 6*', xana u tshunguriwe hi mani?

☐ Dokodela wa meno exibendlele

☐ A ndzi se tshama ndzi tshunguriwa misiha ya meno

☐ Dokodela wa meno loyi a ti tirhaka (Private dentist)

☐ A ndzi tsundzuki

8. Xana u ehleketa leswaku misiha ya meno yi nga tshunguriwa loko swi te yini?

☐ Loko ndzi pandiwa hi tino

☐ Swi nga lava ri tshunguriwa hambiloko ri nga vavi

☐ A ndzi swi tivi

9. Xana u ehleketa leswaku meno a ya ha tiyi loko ku tshunguriwe misiha ya yona?

☐ Ina

☐ E-e

☐ I ndzi swi tivi

**Xiyenge C: Mavonelo hi ku tshungula misiha ye meno**

*Xiyenge lexi xi ni swiga leswi vulavulaka hi mavonelo ya vanhu mayelana ni ku tshungula misiha ya meno. Hi kombela u hlaya xiga ha xin'we kutani u fungha hi ku tsala* þ *eka bokisi leri fambisanaka ni mavonelo ya wena, 5 yi vula ku* ***"Ndza pfumela swinene"****, 4 yi vula ku* ***"Ndza pfumela"****, 3 yi vula ku* ***"Ndzi le xikarhi"****, 2 yi vula ku* ***"Ndza kanakana"****, naswona 1 yi vula ku* ***"A ndzi pfumeli nikatsongo".*** *Tinhlamulo hinkwato ta amukeleka. U nga ha hlamula hi ku ya hi leswi u nga tshama u swi vona.*

| Xiga | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| 1. Ndzi ya eka dokodela loko ndzi pandziwa hi meno ku nga si hela masiku manharhu | | | | | |
| 2. Ku pandziwa hi meno swa nyamalala loko wo tiyisela | | | | | |
| 3. Ndzi rhanga ndzi vona ku pfimba enon'wini ku ri kona ndzi yaka eka dokodela | | | | | |
| 4. I swa nkoka ku sirhelela meno lama nga emahlweni ka nomu | | | | | |
| 5. I swa nkoka ku sirhelela meno lama nga endzhaku ka nomu | | | | | |
| 6. Ku tshunguriwa meno swa vava, kambe swa pfuna swinene | | | | | |
| 7. Swa ndzi karhata loko vutshunguri byi teka nkarhi wo leha | | | | | |
| 8. A swi ndzi karhati ku ta etliliniki ko tala leswaku ndzi ta tshunguriwa | | | | | |
| 9. I swa nkoka eka mina ku va ni meno ya mina ya ntumbuluko | | | | | |
| 10. Swa antswa ku va ni meno yo xava (False teeth), ku ri ni ku khathalela meno ya mina ya ntumbuluko | | | | | |
| 11. Tino leri pandzaka ri fanele ri susiwa | | | | | |
| 12. Tino leri tshunguriwaka a ra ha tiyi. Swa antswa ku namba ndzi ri susa | | | | | |
| 13. Loko ndzi twa tino kumbe ndzi pfimba, leswi antswaka i ku ri susa | | | | | |
| 14. Swi chipile ku susa tino ku ri ni ku ri tshungula | | | | | |
| 15. Hambiloko ndzi tlaviwe nayiti, ndza chava ku susiwa nsiha wa tino | | | | | |

**Xiyenge D: Matshungulelo lama u ma tsakelaka**

*Xiyenge lexi xi ni swivutiso leswi lavaka ku tiva leswi u swi tsakelaka loko swi ta eka ndlela leyi u lavaka ku tshunguriwa ha yona, leswi se u tivaka ku misiha ya meno ya wena swi nga koteka ku yi tshunguriwa. Hi kombela u hlaya swivutiso kutani u fungha nhlamulo ya wena hi ndlela leyi þ eka xibokisana lexi nga ekusuhi ni nhlamulo.*

1. Loko wo pandziwa hi tino, xana u nga lava leswaku ri tshunguriwa kumbe ri susiwa?

   ☐ A ri susiwe

   ☐ A ri tshunguriwe

2. Hi kombela u kombisa ku sukela eka 1,2,3,4 ku ya eka 5, leswaku hi wihi nchumu lowu nga endlaka leswaku u ala ku tshunguriwa misiha ya meno? '1' yi vula ku swi nga ku tshikisa, kasi '5' yi vula ku a swi na mhaka.

   *(A hi fanelanga ku vuyelerisa nomboro yinwe ka mbhiri)*

   ☐ Loko vutshunguri byi durha

   ☐ Loko vutshunguri byi ndzi twisa ku vava

   ☐ Ndzi chava switandzhaku swo vava

   ☐ Loko swi lava ti-*X-ray* to tala

   ☐ Loko vutshunguri byi teka nkarhi wo leha swinene

Hi khensa nkarhi wa wena ni ku hi hlamulela swivutiso leswi

Appendix 5: Ethics attendance certificate



TRREE

Zertifikat
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Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
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Clinical Trials Centre
The University of Hong Kong

**Certificat de formation - Training Certificate**

Ce document atteste que - this document certifies that

Mokgadi Sefomolo

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2021/02/21
CID : L5BYJ27OQZ

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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[REV : 20170310]

Appendix 6: Research title approval letter

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

03 January 2022
Person No: 366069
PAG

Dr MMV Sefomolo
PO Box 798
Duiwelskloof
0835
South Africa

Dear Dr Mokgadi Sefomolo

**Master of Science in Dentistry: Approval of Title**

We have pleasure in advising that your proposal entitled *Knowledge, attitudes and practices of patients towards root canal treatment in the Mopani District, Limpopo* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

100 1922 2022

Appendix 7: Ethical clearance certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R49 Dr M Sefomolo

## HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
## CLEARANCE CERTIFICATE NO. M210848

| | |
|---|---|
| **NAME:** (Principal Investigator) | Dr M Sefomolo |
| **DEPARTMENT:** | School of Oral Health Sciences<br>Department of Paediatric and Restorative Dentistry<br>Dental School<br>University |
| **PROJECT TITLE:** | *Knowledge, attitudes and practices of patients towards root canal treatment in the Mopani District, Limpopo* |
| **DATE CONSIDERED:** | 2021/08/27 |
| **DECISION:** | Approved unconditionally |
| **CONDITIONS:** | |
| **NOTE:** | If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za> |
| **SUPERVISOR:** | Drs E Patel and M Mothopi-Peri |
| **APPROVED BY:** | Dr CB Penny, Chairperson, HREC (Medical) |
| **DATE OF APPROVAL:** | 2022/03/02 |

**This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.**

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **August** and therefore reports and re-certification will be due in the month of **August** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

Date 07/03/2022

Scanned with CamScanner

Appendix 8: Limpopo DoH approval letter

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

## Department of Health


Ref : LP_2022-03-008
Enquires : Ms PF Mahlokwane
Tel : 015-293 6028
Email : Phoebe.Mahlokwane@dhsd.limpopo.gov.za


**Mokgadi Michille Veronica Sefomolo**

**PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES**

Your Study Topic as indicated below;

**Knowledge, attitude and practices of patients towards root canal treatment in the Mopani District, Limpopo**

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
   a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
   b. Permission is ONLY for Dr CN Phathudi Hospital; Kgapane hospital; Letaba Hospital; Nkhensani Hospital; sekororo Hospital and Van velden Hospital
   c. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
   d. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   e. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   f. The approval is only valid for a 1-year period.
   g. If the proposal has been amended, a new approval should be sought from the Department of Health
   h. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

**Head of Department** 14/03/2022 **Date**

pp

Appendix 9.1: Confirmation letter of translation to Sepedi

**12 July 2023**

TO WHOM IT MAY CONCERN

**TRANSLATION: PARTICIPANT INFORMATION SHEET AND INFORMED CONSENT**

I, the undersigned, declare that I have translated the abovementioned document for client **MOKGADI SEFOMOLO** from English into Sesotho (South Africa) on 20 July 2021.

Yours faithfully

M Mahase

Tsebo Translators & Associates

SATI MEMBER: 1002000

No. 58 Nerina Street, Gardenia Park, Bloemfontein 9301 RSA.

Cell. No: +27(0)83 456 5640 / +27(0)74 162 9571

E- mail: mmahase1@mweb.co.za

Appendix 9.2: Confirmation letter of translation to Xitsonga

# Zikhata Translation Services

Box 340
MAFEMANI
1285
info@zikhata.co.za

06 July 2023

**Primary researcher:** Mokgadi Nkosi
**Research study title:** Knowledge, attitude and practices of patients towards root canal treatment in the Mopani District, Limpopo
**Ethical clearance number:** M210848.

I Elvis Nxumalo declare that the translated document titled "Swivutiso: vutivi ni mavonelo ya vavabyi loko swi ta emhakeni ya ku tshugula misiha ya meno (root canal treatment) eXifundzeni ntsongo xa Mopani eLimpopo" is an accurate Tsonga interpretation of the English version "Knowledge, attitude and practices of patients towards root canal treatment in the Mopani District, Limpopo" dated 05/10/2021.

This is also to confirm that I am a professional translator and proofreader with over 15 years of experience. I have been involved over the years with various local and international companies focusing on Meaning Based Translation. If you require more details please do not hesitate to write or call.

To the best of my knowledge, the translations carried out for the English version of the document are accurate and correct.

Other than my role as a translator, I have no additional involvement or affiliation with the above-referenced research study.

Sincerely,



Elvis Nxumalo

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