

The Reported Incidence and Nature of Voice Disorders in the Private Healthcare Context of Gauteng

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SUMMARY

Objectives: The study aimed to determine the incidence and nature of voice disorders, as reported by ear, nose, and throat specialists (ENTs), in the Gauteng private healthcare context.

Study Design: This is a cross-sectional survey design.

Methods: The respondents had to be certified ENTs working in the private healthcare context in Gauteng. The survey was sent out electronically to all 94 ENTs, registered with the ENT Society, working in the private healthcare context; thus, no additional requirements had to be met. The survey inquired about the total number of referrals from January 2015 to January 2016, the total number of referrals who were diagnosed with a voice disorder, as well as information regarding the patients such as the nature of the voice disorders.

Results: Of the 94 surveys sent out, 24 of them were completed (25.5%). The incidence of voice disorders reported was 5.2%. The most commonly diagnosed voice disorder is acute laryngitis (32%). The majority of ENTs (75%) received referrals from general practitioners and referred to speech-language pathologists if the patient presented with a voice disorder.

Conclusions: The results from this study may enable healthcare professionals to adequately plan service delivery resource allocations to provide appropriate services. Additional studies are required to examine the incidence of voice disorders in the public healthcare context as well as the prevalence of voice disorders in Gauteng.

Key Words: Voice disorders; Nature; Incidence; Private healthcare context; ENT

INTRODUCTION

The voice is vital in expressing and sharing thoughts, ideas, emotions, and sentiments.¹ Individuals with voice disorders experience social isolation, depression, and absenteeism from work.² Voice problems affect not only the occupation, but also the quality of life, interfering in the social, emotional, and physical aspects of day-to-day life.³ Being aware of populations at risk of acquiring voice disorders may enable the prevention or early identification and treatment of voice disorders. Once these populations are identified, prevention strategies can be implemented and will create awareness of services available to individuals with voice disorders. Despite the significant impact of voice disorders reported by adults, such as

depression and missing 4 or more days of work, a relative minority effectively sought treatment.^{4, 5} An annual incidence of voice problems of 7.6% (1 in 13 adults) was reported in the United States.⁵ This might indicate that there is a discrepancy between the prevalence (the total number of voice disorders recorded in a specific period of time) and the incidence (the rate of newly diagnosed cases) of voice disorders. The prevalence of voice disorders might be much higher than the incidence, due to the fact that the minority of individuals experiencing a voice disorder seeks treatment. Incidence and prevalence rates of voice disorders are yet to be determined in South Africa, which is evident in the lack of research that is available regarding voice disorders within the South African context.

Apart from establishing the incidence, the nature of voice disorders needs to be described. Understanding the nature of these disorders enables professionals to render effective services. Treatment varies depending on the nature and severity of the voice disorder.⁶ Research conducted in the United States reported that of the 536,943 patients with a voice disorder, the most common diagnoses were acute laryngitis, nonspecific dysphonia, benign vocal fold lesions, and chronic laryngitis.⁷ Another study conducted in the United States also found that in a large treatment-seeking population, acute laryngitis was the most common diagnosis (42%), followed by nonspecific dysphonia (31%).⁵ It has also been found that the most frequently occurring laryngeal pathologies were reflux laryngitis, functional vocal fold paralysis, nodules, laryngitis, polyps, and bowed vocal folds.⁸

An increase of 3.7% in referral rates to ear, nose, and throat specialists (ENTs) has been reported in the United States from 1999 (3.8%) to 2009 (7.5%).⁹ ENTs are among the top three specialists to whom family physicians most commonly refer patients.⁹ A recent study of annual healthcare claims, between January 2004 and December 2008, identified that 1% of the patients (536,943 of the total 54,600,465) presented with a voice disorder. Only 260,095 of the patients presenting with a voice disorder sought healthcare services, of whom 9833 received a referral or self-referred to an ENT. It has also been reported that post diagnosis by the ENT, 7.6% of patients are not seeking additional treatment for their voice disorder.¹⁰

Establishing the prevalence and incidence of conditions, such as voice disorders, enables healthcare professionals to adequately plan service delivery resource allocations.¹¹ Currently, there is no epidemiological data concerning the incidence and nature of voice disorders in South Africa. The incidence of voice disorders in South Africa needs to be established to determine the need for prevention programs, diagnostic assessment, and intervention services at the national level in the private healthcare context. The private healthcare sector was selected as the target population to gain a preliminary understanding of the incidence and nature of voice disorders seen in Gauteng. The findings from this pilot study may foster future research within the public healthcare sector. As a result, the following research question is posed: What is the incidence and nature of voice disorders reported by ENTs in private health care in South Africa?

METHODS

Aim and design

The purpose of this study was to determine the incidence and nature of voice disorders, as reported by ENTs, in the private health context in Gauteng. A cross-sectional survey was conducted in the private health context. Ethical clearance has been obtained prior to data collection.

Setting and respondents

Gauteng is a large urban area with a population of 13,399,724 people, making it the most populated province within South Africa. People between the ages of 0 and 44 years account for 75.9% (10,164,095 people) of the population.¹² The male population in Gauteng comprises 6,753,269 people (50.3%), therefore making it a bigger population than that of females who account for 49.7% (6,646,455 people) of Gauteng's population.¹³

The respondents had to be certified ENTs working in the private health care in Gauteng. The survey was sent out to all 94 ENTs, registered with the ENT Society, working in the private health care in Gauteng. A total of 24 responses were received, of whom 88% were male and 12% were female. All of the respondents reported that they work within an urban environment. However, a number of respondents did not provide complete personal information to maintain anonymity.

Research material

The survey used for the study was generated on *Qualtrics* (https://eu.qualtrics.com/jfe1/preview/SV_6D7vBIS1ioF1F53) and consisted of three components. First, the respondents answered questions related to their personal information and demographics. The survey included questions on personal information such as the age and gender of the respondent, the number of years the respondent has been practicing in the private healthcare context, as well as the area in which the respondent's practice is based. The respondents were not required to provide their name or their practice name; therefore, the survey was anonymous.

Second, questions related to the incidence and nature of voice disorders were posed. The survey inquired about the total number of referrals from January 2015 to January 2016, the total number of referrals who were diagnosed with a voice disorder, as well as information regarding the patients, such as the nature of the voice disorders.

Lastly, questions on the assessment tools and procedures used, as well as the referral practices, were posed. Closed-ended questions were used throughout the survey. The survey could be completed on any smartphone, tablet, laptop, or personal computer with internet connection. Reviewing the patient files and completing the survey took approximately 10–15 minutes in its entirety.

Procedures

Pilot phase

No previous prevalence and incidence studies on voice disorders have been conducted in South Africa, and none have been conducted from an ENT perspective. As a result, a previous survey could not be used for this purpose. The survey was developed by the researchers and was evaluated by an ENT practicing in the field of voice disorders, as well as two independent speech-language pathologists specializing in voice disorders. They were asked to specifically comment on the type of questions asked, the comprehensiveness of the survey, and the ease of answering the questions. The survey was adapted according to their recommendations.

The adapted survey was sent out to an ENT practicing in the private healthcare context in Western Cape. This ENT reported that of the 1750 new referrals in the year time frame, 193 (11%) presented with voice disorders. Of these 193 voice disorders, the most common voice disorders were vocal fold nodules (6.2%), conversion aphonia and functional dysphonias (5.6%), as well as vocal fold paralysis (5.6%). From January 2015 to January 2016, only one case of paradoxical vocal fold motion (PVFM) (0.5%) was reported, making it the most uncommon disorder. It was reported that endoscopes, stroboscopes, and laryngeal mirrors were most commonly used to assess voice disorders. It was also reported that acoustic analysis of voice (CSL, Pentax Medical, Tokyo, Japan) as well as self-rating scales (Voice Handicap Index and Reflux Scale) were seldom used, and that the perceptual analysis of voice was never used during assessments.

Data collection phase

A total of 94 ENTs are listed with the ENT Society in Gauteng. Each individual ENT's e-mail address was then searched online. The ENTs whose e-mail addresses could not be found online were contacted via telephone. The link was sent out individually to all the ENTs practicing in private health care in Gauteng who were willing to share their e-mail addresses. As a last attempt to maximize the response rate, the researchers personally visited the ENTs at their private practices to motivate and request responses.

Data analysis

Descriptive statistics were determined for the data, including means, standard deviation (SD), and median. Frequency tables with percentages were constructed for the categorical variables.

Significant associations between the number of new voice disorders diagnosed by each ENT during the period, and the frequency of referrals from and to other medical specialists, frequency of type of tool used, and the nature of the voice disorders were evaluated by means of Spearman rank correlation. The incidence of voice disorders was calculated by dividing the total number of new cases of voice disorder by the total number of new referrals received by the respondents within the specified time frame. Correlations between the nature of the voice disorder and frequency of referrals to and from specialists and the tools used were also determined. A Sidak adjustment has been applied to the correlations to account for multiple comparisons.

The correlations were deemed positive if $r > 0$, whereas $r < 0$ implies a negative correlation. A correlation close to 0 implies that there is no linear relationship between the two variables. The closer the correlation coefficient is to -1 or $+1$, the stronger the linear relationship. A value of $P < 0.05$ is deemed a significant correlation.

RESULTS

Of the 94 surveys sent out, 24 of them were completed (25.5%). Three of the respondents (12.5%) reported that they had not seen any patients with voice disorders between January 2015 and January 2016.

The total number of new referrals reported by the 24 respondents was 46,930 patients in the period of 1 year (January 2015–January 2016). The average new referrals in 1 year was 1956

(SD = 1080.6). The incidence of voice disorders reported was 5.2% (n = 2434). On average, each respondent saw 102 patients (SD = 94.4) with voice disorders.

The respondents often received their referrals from general practitioners (75%), self-referrals by patients (58.3%), and audiologists (29.2%). It was reported that 66.7% of the respondents have never received referrals from vocal coaches, 45.8% reported that they have never received referrals from an audiologist, and 41.7% have never received referrals from speech-language pathologists (Table 1). The “other” professionals specified by the respondents included general surgeons (often: n = 1), oncologists (often: n = 1), pediatricians (seldom: n = 1), specialist ENTs (often: n = 4), and by word of mouth (often: n = 1).

Table 1. Professionals From Whom ENTs (n = 24) Received Referrals in Gauteng

Professionals	Never	Seldom	Often
Audiologist	11 (45.8%)	6 (25%)	7 (29.2%)
Gastroenterologist	10 (41.7%)	11 (45.8%)	3 (12.5%)
General practitioner	2 (8.3%)	4 (16.7%)	18 (75%)
Pulmonologist	9 (37.5%)	9 (37.5%)	6 (25%)
Self-referrals	5 (20.8%)	5 (20.8%)	14 (58.3%)
Speech-language pathologist	10 (41.7%)	9 (37.5%)	5 (20.8%)
Vocal coach	16 (66.7%)	8 (33.3%)	0
Other	18 (75%)	1 (4.2%)	5 (20.8%)

Abbreviation: ENTs, ear, nose, and throat specialists.

The respondents most commonly referred to speech-language pathologists (75%). The voice disorders were treated personally (self-referral) by 37.5% of the respondents, and 12.5% referred their patients to gastroenterologists, general practitioners, or vocal coaches. Only 12.5% of the respondents reported that they seldom refer to speech-language pathologists, with three respondents reporting that they had never referred patients with voice disorders to speech-language pathologists. The “other” specified by the respondents included oncologist (often: n = 2) and specialist ENTs (often: n = 4) (Table 2).

Table 2. Professionals to Whom ENTs (n = 24) Referred to in Gauteng

Professionals	Never	Seldom	Often
Audiologist	18 (75%)	5 (20.8%)	1 (4.2%)
Gastroenterologist	17 (70.8%)	4 (16.7%)	3 (12.5%)
General practitioner	20 (83.3%)	1 (4.2%)	3 (12.5%)
Pulmonologist	18 (75%)	4 (16.7%)	2 (8.3%)
Self-referrals	14 (58.3%)	1 (4.2%)	9 (37.5%)
Speech-language pathologist	3 (12.5%)	3 (12.5%)	18 (75%)
Vocal coach	17 (70.8%)	4 (16.7%)	3 (12.5%)
Other	18 (75%)	0	6 (25%)

Abbreviation: ENTs, ear, nose, and throat specialists.

The nature of voice disorders reported by all the respondents, mentioned above, is displayed in Figure 1. Several patients were diagnosed with comorbidities, for instance reflux and granuloma. This is illustrated when comparing the number of new patients with voice disorders—in this case, 2434 patients—and the number of diagnoses (3149) made during the same period. The most common voice disorders reported are acute laryngitis (32%), conversion aphonia and functional dysphonia (9.7%), and vocal fold paralysis or paresis (8.2%).

Uncommon voice disorders included traumatic laryngitis (0.4%) and puberphonia (2.1%). Laryngopharyngeal reflux, reported by 484 patients (15.4%), is often a contributing factor to the cause of voice disorders. Foreign bodies that have been lodged in the throat (reported by six respondents) are also another contributing factor to the cause of voice disorders. The “other” specified in Figure 1 includes sulcus vocalis, laryngeal hypersensitivity, presbyphonia, and supraglottal hyperfunction.

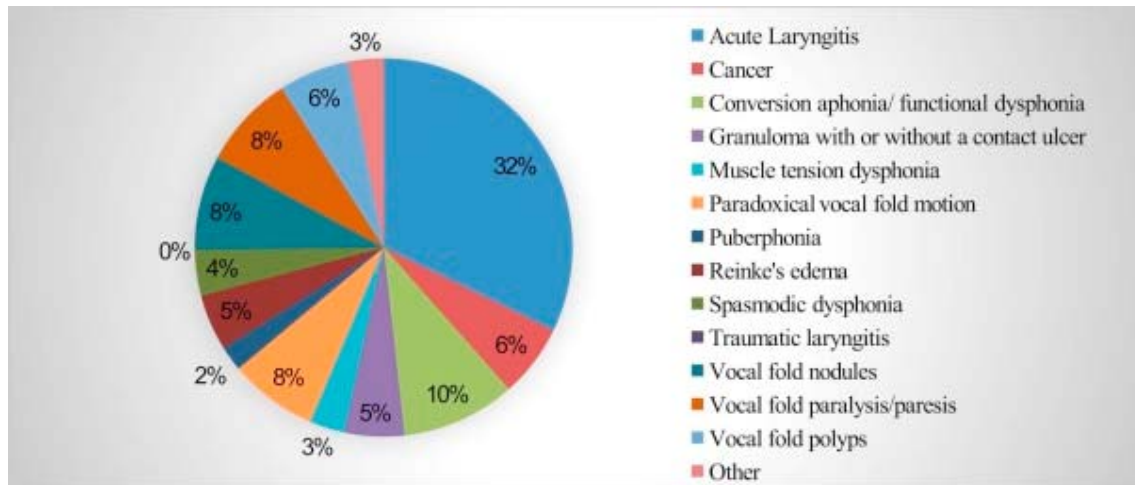


Figure 1. The reported nature of voice disorders in Gauteng (n = 3149).

Significant correlations among diagnoses, number of voice disorders, and referrals made to specialists included when the diagnosis of acute laryngitis made by respondents was high and the number of voice disorders seen by respondents was also high ($r = 0.77, P = 0.001$). Also, when the diagnosis of traumatic laryngitis was made, more referrals received from an audiologist ($r = 0.78, P = 0.001$) and vocal coach ($r = 0.78, P = 0.002$) are seen (Table 3).

Table 3. Correlations Between the Nature of Voice Disorders and Referrals Made From ENTs to Specialists

	Audiologist r (P)	Gastroenterologist r (P)	General Practitioner r (P)	Pulmonologist r (P)	Self r (P)	Speech-Language Pathologist r (P)	Vocal Coach r (P)	Other r (P)
Acute laryngitis	-0.311 (1.00)	0.069 (1.00)	0.346 (1.00)	0.147 (1.00)	0.319 (1.00)	0.597 (0.38)	0.109 (1.00)	-0.063 (1.00)
Cancer	0.179 (1.00)	0.460 (1.00)	0.241 (1.00)	0.314 (1.00)	0.00 (1.00)	0.310 (1.00)	0.056 (1.00)	0.196 (1.00)
Conversion aphonia and functional dysphonia	-0.139 (1.00)	-0.008 (1.00)	-0.115 (1.00)	0.043 (1.00)	0.303 (1.00)	0.391 (1.00)	0.109 (1.00)	0.255 (1.00)
Granuloma with/without contact ulcer	0.166 (1.00)	-0.024 (1.00)	-0.176 (1.00)	-0.005 (1.00)	0.081 (1.00)	0.254 (1.00)	0.048 (1.00)	0.183 (1.00)
Muscle tension dysphonia	0.226 (1.00)	0.210 (1.00)	-0.179 (1.00)	0.304 (1.00)	0.250 (1.00)	0.247 (1.00)	0.280 (0.99)	0.104 (1.00)
Paradoxical vocal fold motion	-0.075 (1.00)	0.383 (1.00)	0.299 (1.00)	0.380 (1.00)	0.576 (0.53)	0.371 (1.00)	0.279 (0.99)	0.136 (1.00)
Puberphonia	-0.068 (1.00)	0.172 (1.00)	0.104 (1.00)	0.171 (1.00)	0.221 (1.00)	0.291 (1.00)	0.161 (1.00)	0.118 (1.00)
Reinke edema	-0.003 (1.00)	-0.222 (1.00)	-0.347 (1.00)	-0.127 (1.00)	0.030 (1.00)	0.213 (1.00)	0.153 (1.00)	0.065 (1.00)

Spasmodic dysphonia	0.188 (1.00)	0.342 (1.00)	0.072 (1.00)	0.342 (1.00)	0.351 (1.00)	0.125 (1.00)	0.291 (1.00)	0.109 (1.00)
Traumatic laryngitis	0.783 (0.001)*	0.507 (0.93)	-0.198 (1.00)	0.590 (0.43)	0.344 (1.00)	0.254 (1.00)	0.780 (0.002)*	-0.257 (1.00)
Vocal fold nodules	0.109 (1.00)	0.015 (1.00)	-0.154 (1.00)	0.106 (1.00)	0.023 (1.00)	0.355 (1.00)	-0.121 (1.00)	0.295 (1.00)
Vocal fold paralysis/paresis	0.273 (1.00)	0.242 (1.00)	-0.230 (1.00)	0.186 (1.00)	0.080 (1.00)	0.306 (1.00)	0.277 (1.00)	0.112 (0.99)
Vocal fold polyps	0.211 (1.00)	0.242 (1.00)	0.211 (1.00)	0.381 (1.00)	0.258 (1.00)	0.573 (0.55)	0.146 (1.00)	0.00 (1.00)
Other	0.084 (1.00)	0.135 (1.00)	0.175 (1.00)	0.229 (1.00)	-0.020 (1.00)	0.360 (1.00)	0.017 (1.00)	-0.364 (1.00)

Abbreviation: ENTs, ear, nose, and throat specialists.

* $P < 0.05$ is deemed as a significant.

It was reported that 83.3% of the respondents use an endoscope to assess the vocal folds, 54.2% use a stroboscope, and only 45.8% of the respondents use laryngeal mirrors when assessing voice (Table 4). Of the five respondents (20.9%) who indicated that they use acoustic analysis to assess voice, three (60%) use *Praat* (Free software developed by Boersma & Weenink, University of Amsterdam) and four (80%) use *CSL*. Perceptual analysis was used by six respondents (25%) to assess voice. Of these six respondents, five (83.3%) use the Grade, Roughness, Breathiness, Asthenia, Strain, Instability (GRBASI) scale and four (66.6%) use the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) scale. Self-rating scales were used by seven respondents (29.1). All seven respondents use the Voice Handicap Index and Reflux Scale, and one (14.2%) uses the Quality of Life Index and Glottal Function Index.

Table 4. Tools Used When Assessing Voice as Reported by Respondents (n = 24)

Assessment Tools	Never	Seldom	Often
Acoustic analysis of voice	19 (79.2%)	1 (4.2%)	4 (16.7%)
Endoscope	4 (16.7%)	0	20 (83.3%)
Laryngeal mirrors	13 (54.2%)	8 (33.3%)	3 (12.5%)
Perceptual analysis	18 (75%)	1 (4.2%)	5 (20.8%)
Self-rating scales	17 (70.8%)	3 (12.5%)	4 (16.7%)
Stroboscope	11 (45.8%)	0	13 (54.2%)

DISCUSSION

In the United States, the annual incidence rate of voice disorders, in the general population, was reported to be 7.6%.⁵ The current study reported a lower incidence of 5.2%; however, only the treatment-seeking population in private health care from January 2015 to January 2016 was considered. The prevalence rate can be expected to be much higher than the incidence rate, as the majority of individuals experiencing a voice disorder do not seek treatment.^{4, 5}

The reported nature of voice disorders in the current study reflects previous research findings. A study conducted on the treatment-seeking population in the United States reported that the most common voice disorder diagnosis was acute laryngitis (42%), followed by nonspecific dysphonia (31%).⁷ The current study's data also concluded that the most common voice disorder is acute laryngitis (32%), followed by functional dysphonias (9.7%). As 17.6% of South Africa's population are smokers,¹⁴ it was expected that there would be a high reported incidence of Reinke edema; however, only 5% of the voice disorders were reported to be

diagnosed with Reinke edema. PVFM is an uncommon disorder.¹⁵ In the results of this study, 7.5% of the cases were reported to be diagnosed with PVFM; thus, PVFM was reported to be more commonly diagnosed than disorders such as spasmodic dysphonia (3.9%) and vocal fold polyps (6%). Further, it was found that a high frequency of acute laryngitis cases is associated with a high number of new voice disorder diagnoses ($r = 0.77, P = 0.001$). From the results of this study, it could be deduced that voice disorders have various causes and contributions. Comorbidities exist within voice disorders as the number of annual voice diagnoses ($n = 3149$) is more than the number of patients seen annually ($n = 2343$).

In the United States, the referral rate to speech-language pathologists from ENTs is 12.5%. In Gauteng, ENTs reported that they most commonly refer to speech-language pathologists (75%). Consequently, there is a discrepancy between referral rates in previous studies conducted in other countries and with the current study. The high percentage (75%) of referrals to speech-language pathologists could be due to a respondent bias, as the survey was conducted by speech-language pathologists. This bias may have swayed the ENTs to report that they do refer to speech-language pathologists even if they do not. On the contrary, a high percentage (41.7%) of ENTs reported to have never received referrals from speech-language pathologists. This is concerning as organic factors that cause voice disorders must be identified by an ENT in collaboration with a speech-language pathologist. It was found that referrals most often made to an audiologist or vocal coach are associated with the diagnosis of most of the cases of traumatic laryngitis.

The current study reported on voice disorders found within the private healthcare context; however, in South Africa, 84% of the population is served by the public healthcare context.¹⁶ As the majority of the population is served by the public healthcare context, diseases such as HIV/AIDS and tuberculosis, which have a negative impact on the voice, may be expected to be more prevalent in the population served by the public healthcare sector. The current study only focused on the incidence of voice disorders in the private healthcare context so it can be expected that the incidence rate of voice disorders in Gauteng will be much higher if the public healthcare context is also taken into consideration. Future studies should consider the effect that interdisciplinary service delivery models may have on referral rates. The variability of the outcome of assessment protocols should also be considered in future research.

In future, it is recommended that ENTs are visited personally to improve the response rate, as contacting them electronically has proven to be challenging, which in turn may avoid a possible nonresponse bias. It is also recommended that further studies explore the incidence rates and treatment-specific processes as reported by speech-language pathologists to determine follow-up adherence. Even though this study provided valuable statistics, factors such as a strong regional focus might have caused an impact limitation. This study's results are beneficial; however, because the study was only conducted in Gauteng, these findings might not apply to patients in other provinces. This research is relevant as the results on the incidence and nature correlate to previous studies conducted, and is the first study on incidence rates and nature of voice disorders in South Africa.

Voice disorders can have adverse effects on an individual's quality of life and occupation. The incidence rates can enable healthcare professionals to adequately plan service delivery resource allocations, as treatment depends on the nature and severity of the voice disorder.¹¹ Appropriate services can then be provided to patients with voice disorders, therefore possibly improving their quality of life.

CONCLUSION

The results of this study provide valuable information regarding the prevalence and nature of voice disorders. The reported incidence rate of voice disorders in the private healthcare context, in Gauteng, is 5.2%. The most commonly diagnosed voice disorder is acute laryngitis (32%). The majority of ENTs (75%) received referrals from general practitioners and referred to speech-language pathologists if the patient presented with a voice disorder. The results from this study may enable healthcare professionals to adequately plan service delivery resource allocations¹¹ to provide appropriate services and to improve quality of life in patients with voice disorders. Additional studies are required to examine the incidence of voice disorders in the public healthcare context as it is expected to be higher than the incidence rate in the private healthcare context. Prevalence studies in Gauteng will also be beneficial as there might be discrepancies between the prevalence and incidence rates.

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