ATTITUDES AND KNOWLEDGE OF GENERAL PRACTITIONERS IN NORTHERN JOHANNESBURG, GAUTENG, TOWARDS AUTISM SPECTRUM DISORDERS IN CHILDREN

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DECLARATION

I, **Reshma Patel**, declare that this research is my own, unaided work. It is being submitted for the **Degree of Master in Child Health (Neurodevelopment)** at the **University of Witwatersrand, Johannesburg**. It has not been submitted before for any degree or examination in any other University.

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(Signature of candidate)

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ABSTRACT

CONTEXT: Lack of knowledge on Autism Spectrum Disorder (ASD) in general practitioners (GPs) has an impact on early diagnosis and therefore on early intervention.

AIM OF STUDY: The aim of this study was to determine the knowledge and attitudes of GPs regarding ASD in children in Northern Johannesburg, Gauteng.

DESIGN, SETTING AND PARTICIPANTS: A quantitative descriptive study design was applied using a cross sectional survey. GPs from Northern Johannesburg, were recruited at workshops or approached directly.

METHODS: 52 GPs completed a questionnaire that assessed their knowledge and attitudes of ASD in children.

RESULTS: Significant findings included 78% of respondents did not have a high level of accuracy in diagnosing ASD; 63.5% of respondents had never diagnosed a child with ASD; 52,3% of participants incorrectly believed that a delay in walking at 18 months of age was a red flag for ASD and 76% of participants correctly agreed that ASD holds a social stigma in their community.

CONCLUSION: In this study the majority of GPs had not diagnosed a child with ASD and reported not having a high level of accuracy in diagnosing ASD. However, they were generally accurate with knowing the important symptoms necessary for the diagnosis of ASD. The majority of participants also believed that there is a negative attitude towards children diagnosed with ASD.

DEDICATION

I dedicate this research to my loving husband, Snehal Desai, who has been a great source of inspiration and support and
to my sweet daughter Ella Desai who provided me with the motivation to complete this process

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INTRODUCTION

1.1 Background

Autism Spectrum Disorders (ASD) are neurodevelopmental disorders characterised by impaired socialisation, impaired verbal and non-verbal communication, limited interests and repetitive or stereotypical patterns of behaviour (American Psychiatric Association, 2013). Detecting ASD in infancy and early childhood is of great importance because research demonstrates benefits of early intervention. This will position children with ASD on a better developmental trajectory. (Branson *et al.*, 2008).

The global median prevalence of ASD is 62/10 000, therefore 1 in 160 children have an autism spectrum disorder (World Health Organization, 2016). According to the data released by the CDC (2016), the prevalence of ASD in the United States of America (USA) was 1 in 68 children (1 in 42 boys and 1 in 189 girls) (Christensen *et al.*, 2016). In South Africa, the exact statistics are not known. It has been reported that the potential pool of 270 000 people may have ASD, increasing by 5000 each year. According to Autism South Africa (ASA), research shows that the prevalence of ASD in the country to be 1 in 150 live births (Fewster and Gurayah, 2015).

Psychologists as well as psychiatrists, paediatricians and medical practitioners usually identify ASDs. However general practitioners (GPs) being primary healthcare practitioners have an important role in the early diagnosis of ASD. However, studies have shown that GPs are not always knowledgeable on ASD (Rahbar *et al.*, 2011; Samms-Vaughan, 2014). It has been found that healthcare workers' knowledge or lack thereof about ASDs greatly impacts the average age of diagnosis, as well as the overall prognosis of children with ASDs. Another contributing factor found to influence the delay or misdiagnosis of ASD in developing countries, is the underdevelopment of services (Rhoades *et al.*, 2007; Adak and Halder 2017). Poor epidemiological data and late diagnosis of ASD can be attributed to limited professional and support services, as well as inaccessible services in many regions of developing countries (Adak and Halder 2017). However, knowledge about ASD for all healthcare workers in South Africa is of great importance as many children are

seen by other primary health care providers besides GP's such as clinic sisters and medical officers at state clinics. This is due to insufficient resources (doctors) and the implementation of the hierarchy of health services by the South African government, where in non-emergencies people using public health care (majority of the population) are only able to access higher levels of care (hospitals) once they have been evaluated and referred by health care providers at a lower level (Cullinan, 2006; Scott, 2011)

No research has been conducted evaluating the knowledge and attitudes of GPs regarding ASDs in Gauteng, South Africa. This study aims to fill this gap and therefore contribute in creating a new body of knowledge in this research field in South Africa.

1.2 Aim and objectives

1.2.1 Aim of the study

The aim of this study was to determine the attitude that GPs have towards ASD in children; as well as how knowledgeable they are, about ASD in children in Northern Johannesburg, Gauteng, South Africa.

1.2.2 Study Objectives

The objectives of this study were:

- To investigate, using a modified validated questionnaire from a previous study, what the attitudes of general practitioners are to ASD in children; and
- To investigate the self-reported knowledge of general practitioners in Northern Johannesburg, Gauteng, South Africa in respect of ASD in children using a modified validated questionnaire from a previous study.

CHAPTER 2
LITERATURE REVIEW

2.1 Autism Spectrum Disorders Definition

ASD are persistent disabling neurodevelopmental disorders that are characterised, (as per the Diagnostic and Statistical Manual) by impaired socialisation impaired verbal and nonverbal communication, restricted interests and repetitive or stereotypical patterns of behaviour (American Psychiatric Association, 2013). It presents in the first 3 years of life and persists into adolescence and adulthood. ASD may present with numerous comorbid conditions such as anxiety, depression, attention deficient hyperactivity disorder (ADHD), and epilepsy to name a few. The degree of intellectual impairment varies between individuals, from mild to severe (World Health Organization, 2017).

2.1.1 Prevalence

The amendments in diagnostic practices and classification systems over the years, have contributed to variation and an increase of the prevalence rates of ASD (Wilson *et al.,* 2013). The global median prevalence is 62/10 000, that is 1 in 160 children has an autism spectrum disorder (World Health Organization, 2016). According to the data released by the CDC (2016), the prevalence of ASD in the United States of America (USA) was 1 in 68 children (1 in 42 boys and 1 in 189 girls) (Christensen *et al.,* 2016). In South Africa, the exact statistics are not known. In 2008 the estimated rate of ASD in South Africa reported that 1 in 86 children could be affected by ASD (Autism Western Cape, 2008).

According to the data released by the CDC (2014), the prevalence of ASD in the United States of America (USA) is 1 in 68 children (1 in 42 boys and 1 in 189 girls). The most recent estimated rate of ASD was 1 in 86 children in South Africa (Autism Western Cape, 2008). ASD can occur in all ethnic, racial or socioeconomic groups, however it is five times more common in boys than girls (CDC, 2016). Springer *et al.,* (2013) inferred that there could possibly be over 270 000 people with ASD in South Africa, with a predicted 5 000 new cases per year. The incidence of ASD is growing and is relatively prevalent in South Africa,

where a study indicated between 1996 and 2005 that there had been an 8.2% increase in the number of children presenting with features of ASD to a developmental clinic in Johannesburg (Jacklin, 2006; Springer *et al.,* 2013). The prevalence of developmental disorders or ASD seen by GPs in South Africa is limited and no published statistics were found.

Common indicators for socioeconomic status (SES) such as household income and parental education or occupation are generally correlated to development and health of children. The association of SES and overall child development abilities are found to be inverse; in that the prevalence decreases with increasing SES. However, for prevalence of ASD, there seems to be mixed results. Both clinical and epidemiological studies have shown that there is no link between socioeconomic status and ASD risk, however higher SES may lead to an increase of an efficient and accurate diagnosis of ASD. Although numerous studies have shown that any association between SES and diagnosis of ASD is due to bias (Adak and Halder 2017; Durkin *et al.,* 2010; Qi *et al.,* 2016).

2.1.2 Aetiology

The aetiology of ASDs is multifactorial and can be divided into "idiopathic", which is most common, and "secondary" which includes single gene disorder, chromosome abnormality, environmental agents or potential gene-environment interactions (Qi *et al.,* 2016; Reddy, 2005; Schaevitz and Berger-Sweeney, 2012).

An emerging hypothesis states that a combination of genetic susceptibility and exposure to environmental toxins at critical periods during brain development could be implicated or contribute to autism. Therefore, neurotoxins and the inflammation caused to the brain are often the emphasis for certain therapies for patients with autism (Alabdali *et al.,* 2014).

While certain environmental factors; such as maternal exposure during pregnancy to higher levels of matter contained within air pollution; may influence the risk for ASD (Raz *et al.,*

2015), the method by which such risk factors would interact with an underlying genetic predisposition toward ASD development has not been well explained.

2.1.3 Clinical manifestations

The clinical manifestations of ASD includes symptoms on three levels, namely: social interaction, communication, and behavioural. Below are common symptoms noted on each level (Macario *et al.*, 2012).

- Impairment in social interaction:
    - Impairment in nonverbal behaviours such as eye- to-eye gaze, facial expression;
    - Unable to cultivate relations with peers;
    - Emotionless and unable express emotion e.g. smile; and
    - Lack of social and/or emotional reciprocity.
- Communication impairment:
    - Language skills delayed or not developed;
    - Difficulty in initiating or sustaining conversation;
    - Stereotyped and repetitive use of language; and
    - Obsession with parts of toys or body parts.
- Repetitive and stereotyped patterns of behaviour:
    - Pedantic about lining up objects;
    - Obsessed with an object;
    - Repetitive unusual movements (toe walking, hand flapping); and
    - Ritualistic (Macario *et al.*, 2012).

2.1.3.1 Emotional aspects noted in children with ASD

It was understood that children with ASD are not affectionate. Affectionate communication entails one's expression of feelings of love, gratitude, closeness, and care to another person by using verbal, non-verbal and supportive forms of communication. It has been found that in Asperger syndrome (AS), one may have difficulties with understanding, conveying and receiving appropriate forms and levels of affectionate behaviour. This results in some of these children not expressing enough affection to

satisfy their families and friends, while others may show a great deal of emotion and affection at the wrong intensity (Andrews *et al.;* 2013).

2.1.3.2 Red Flags

As per the CDC (2016) the possible Red flags for a person with ASD are listed below:

- Not responding to their name by 12 months of age;
- Not pointing at objects to show interest (point at an airplane flying over) by 14 months;
- Not playing pretend games (pretend to feed a doll) by 18 months;
- Avoiding eye contact and wanting to be alone;
- Have trouble understanding other people's feelings or talking about their own feelings;
- Have delayed speech and language skills;
- Repeating words or phrases over and over (echolalia);
- Give unrelated answers to questions;
- Get upset by minor changes;
- Have obsessive interests;
- Flapping their hands, rock their body or spin in circles; and
- Have unusual reactions to the way things sound, smell, taste, look, or feel" (CDC, 2016).

2.1.4 Misconceptions about ASD

It has previously been proposed that ASD is a precursor for schizophrenia and that it is hard to distinguish between ASD and schizophrenia clinically in children. However, there has been an increased diagnostic competence on the presentation and characteristics of ASD. Schizoidal and schizotypal symptoms include some of those seen in ASD such as lifelong impairments in social interaction, communication and ritualistic and routine behaviour. The differentiating factors can be found by a developmental history. People with ASD demonstrate an entire clinical picture before age 3 years, whereas those with schizoid or schizotypal personality disorder have fairly typical development as children however they become symptomatic as adolescents. Moreover, people with ASD are not necessarily aloof, unlike those with schizoid or schizotypal personality disorders, but they

may be socially motivated but awkward, immature and inappropriate when engaging with others (Woodbury-Smith *et al.,* 2010).

Theory of Mind (ToM) refers to the ability to ascribe mental states to oneself and others in order to understand and predict their behaviour (Pedreño *et al.,* 2017). The lack of Theory of Mind has been attributed to the presentation of a person with ASD, to being persecutory at times, which may be interpreted as that of psychosis. Lack of ToM leads to difficulty in understanding irony and sarcasm and motivation behind other people's behaviour. Together with the difficulties in understanding non-verbal cues, this leads to misunderstandings and misconceptions that may be interpreted as paranoia. With ASD, there is a possibility of comorbidity schizophrenia, however the prevalence thereof has shown to be low (Woodbury-Smith *et al.,* 2010).

It was previously thought that ASD in children is mostly attributed to neglect in early childhood parenting. However, studies have shown that poor and rejecting parenting does not contribute to the aetiology of ASD (Qi *et al.,* 2016)

Another misconception is that children tend to be psychologically mature and grow out of ASD (where symptoms disappear). This is incorrect as ASD presents with subtle signs in early infancy and continues to be a lifelong disorder (Commons *et al.,* 2017). It is a group of complex lifelong neurodevelopmental conditions affecting social interaction, communication and patterns of behaviour and interests (Magiati *et al.*, 2014).

2.1.5 Co-morbidities

Commonly associated conditions include the following (5-minute Clinical consult, 2012):

- Mental retardation;
- Attention deficit/hyperactivity disorder;
- Phenylketonuria (PKU), tuberous sclerosis, fragile X syndrome, Angelman syndrome, and foetal alcohol syndrome (rare);

- Anxiety;
- Depression;
- Obsessive behaviour; and
- Seizures (increased in severe mental retardation) (5-minute Clinical Consult, 2012).

Other mental and central nervous system disorders are considered as differential diagnoses, these include (Domino *et al.*, 2012):

- Obsessive-compulsive disorder;
- Elective mutism;
- Hearing impairments;
- Language disorder;
- Intellectual disability;
- Stereotyped movement disorder;
- Anxiety disorder;
- Developmental language disorder; and
- Severe early deprivation/ reactive attachment disorder (Domino *et al.*, 2012).

2.1.6 Diagnostic and screening tools for Autism Spectrum Disorders

The diagnosis of ASD can be complicated by numerous factors because there isn't a biomarker available for its diagnosis. The diagnosis of ASD is based on observation of behaviour and certain characteristics, which for ASD continue to change over time. Therefore, in order to find a tool or instrument that can effectively and accurately indicate a diagnosis, it requires those affected to demonstrate the same skills and deficits during the assessment as they exhibit in daily life (Qualls and Corbett, 2017).

The current accepted classification systems for diagnosing ASDs is the Diagnostic and Statistical Manual of Mental Disorders V (DSM-V) (American Psychiatric Association, 2013). The diagnosis/screening of ASD involves using validated instruments or classifications, which may include the: Modified Checklist for Autism in Toddlers (M-

CHAT); Checklist for Autism in Toddlers (CHAT); Infant Toddler Checklist (ITC); Early Screening for Autistic Traits (ESAT); Autism Diagnostic Interview-Revised (ADI-R); Autism Diagnostic Observation Schedule (ADOS) and Childhood Autism Rating Scale 2nd Edition (CARS-2™) (Van Tongerloo *et al.*, 2012; American Psychiatric Association, 2013).

2.1.6.1 General evaluation

A general physical examination forms part of the assessment of ASD and involves a thorough neurological examination, evaluating dysmorphic features (such as long thin face, prominent ears that may identify Fragile X), abnormal skin markings and may include Woods light (ultraviolet light) examination by a dermatologist if there is a suspicion of tuberous sclerosis. Signs of self-injury, self-harm and abuse should be documented. Observation of behaviour in altered settings, e.g. home and school/nursery/playgroup, will allow assessment of the child in various environments and will provide further insights of how the child interacts with peers and adults and how adaptable they are to predictable and less predictable routine (Domino *et al.*, 2012; Yates and Le Couteur, 2016).

2.1.6.2 Checklist for Autism in Toddlers (CHAT)

Checklist for Autism in Toddlers is a 5-minute screening instrument for ASD, from 18 months to 36 months of age and requires minimal training (Kuriakose and Shalev, 2016). It was formulated to predict if children do not exhibit joint attention or pretend play by 18 months of age that they may be at risk of being diagnosed with autism later on in life. The first part of the questionnaire consists of questions for the parent and the second part is an observational aspect for the healthcare provider to complete (Baron-Cohen, 2000).

2.1.6.3 Modified Checklist for Autism in Toddlers (M-CHAT)

The M-CHAT (the subsequent revised version known as the M-CHAT-R/F) is a 10-minute parent-completed screening questionnaire with no observational component and it is different to the CHAT because it covers a broader range of developmental domains, including sensory and motor problems, imitation as well as response to name. It includes two questions from the

important CHAT items, namely: pointing to show and pretending but not gaze monitoring. It was previously used to assess 24-month olds although it has been used in 16-30-month olds; and requires no training (Kuriakose and Shalev, 2016; Seltzer *et al.*, 2011)

The M-CHAT is a validated screening questionnaire to assess the risk of ASD in toddlers (16-30 months). It has shown to accurately identify children with ASD before they are of concern to parents or professionals. The questionnaire however has shown to yield a high rate of false positives because it was devised to have a high sensitivity measure. Therefore, the high detection rate can be reduced by also using the published M-CHAT telephonic follow up interview to reduce the number of unnecessary referrals. Although children who fail the screening and follow up interview should still be evaluated for other developmental disorders and delays. The M-CHAT is used globally and has been translated in more than 40 languages and is continually being developed with the latest version being the M-CHAT R. and M-CHAT-R/F. It has been widely adopted in research conducted on early signs of ASD and is freely available on the internet (Car Autism Roadmap, 2015; Robins *et al.*, 1999).

2.1.6.4 Infant Toddler Checklist (ITC)

The Infant Toddler Checklist (ITC) is a parent questionnaire to help detect communication delays. It includes 24 questions with 3-5 choices regarding developmental milestones of social communication. It also explores concerns that parents may have about their child. It identifies children between the ages of 6 to 24 months of age who have any form of communication delay. It is used in both clinical and research settings (Car Autism Roadmap, 2013a; Wetherby and Prizant, 2002).

2.1.6.5 Early Screening for Autistic Traits (ESAT)

The ESAT requires minimal training and is a 5-minute parent rating scale, screening children between ages 14 to 15 months of age in the general population, and is comprised of 14 items; in addition, includes clinician observation (Kuriakose and Shalev, 2016). Prevalence data proposes that the sensitivity of ESAT is relatively low, however sensitivity and specificity

data is not available. A large number of false positive results were also found during its development (Dietz *et al.,* 2006, Kuriakose and Shalev, 2016).

2.1.6.6 CARS-2

The CARS-2 is a rating system utilised by clinicians to detect symptoms of ASD. It consists of two forms, namely the CARS-2ST (standard) and CARS-2HF (high functioning). The former is used for children aged 2-5 years old and for older individuals that have a below average intellectual functioning; the latter is used for children aged 6 years and above who have low average intelligent quotient range or higher and are fluent verbally. Information is obtained from a caregiver and taken from unstructured observation (Kuriakose and Shalev, 2016; Schopler *et al.,* 2010).

2.1.6.7 Autism Diagnostic Interview-Revised (ADI-R)

ADI-R is a diagnostic evaluative measure used to collect a systematic developmental history for children of at least 2 years with suspected ASD, generally 12 months of age and older. It takes 90-250 minutes to administer and requires substantial training (Kuriakose and Shalev, 2016). Scores are found for both "Lifetime" and "Current" for 3 areas of Social Interaction, Communication, and Range of Restrictive, Repetitive, and Stereotyped Behaviours and Interest. Distinct Communication procedures are available for verbal and nonverbal individuals. In addition, scores indicating abnormal development before the age of 3 are also attained. Together with the ADOS, it is considered a 'gold standard' in the diagnosis of ASD. The ADI-R affords a useful standardised approach to collecting diagnostic information, but it does not preclude the need to consider extensive clinical issues. (Car Autism Roadmap, 2013b; Lord *et al.,* 1994; Rutter *et al.,* 2008). Limitations of the ADI-R is that it doesn't respond to the DSM-V and the toddler module is not yet available for clinical use. Strengths however include that it provides guidelines for classification, it is extensively studied and is appropriate for clinical and research purposes (Kuriakose and Shalev, 2016).

2.1.6.8 Autism Diagnostic Observation Schedule (ADOS)

ADOS is considered the 'gold standard' for diagnosing ASD and it utilises direct observation which uses a collection of structured and unstructured activities in order to elicit behaviours that are coded based on their similarity to the characteristics as seen in ASD **(**Zander *et al.*, 2015). The ADOS has evolved and been revised (ADOS-G and ADOS-2) to provide a standardized environment for the behavioural observation of a broad range of ages and developmental stages. The outcome from the ADOS is used together with parental interviews and clinical skills to support a diagnosis of ASD. The ADOS-2 takes 40-60 minutes to administer; is conducted on those that are 12 months of age or older and requires substantial training and administrators need to be certified. It contains four modules, each that aims at a specific stage of verbal and chronological development (Kuriakose and Shalev, 2016, Qualls and Corbett, 2017).

The outline for each module are presented below:

Module 1: designed for use with children who are pre-verbal or speak simple phrases/single words

Module 2: assesses children with flexible phrase speech; however, they do not have the fluency needed to allow the use of Module 3.

Module 3 and 4 are both used for individuals with fluent speech, however Module 4 contains activities and questions, which are more appropriate for older adolescence and adults (Qualls and Corbett, 2017).

Strengths of this instrument includes that: it is appropriate for research as well as clinical purposes; it corresponds to the DSM-V; provides guidelines for classification and severity scores; and it is extensively studied. Limitations of this instrument includes that: the current version is not developmentally appropriate for adults as well as older adolescents with limited speech; severity scores have not been widely studied; and it can only be used by certified and trained professionals (Kuriakose and Shalev, 2016).

2.1.6.9 Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV)

The DSM-IV criteria were used for diagnosing patients with four separate disorders namely: autistic disorder, Asperger's disorder, childhood disintegrative disorder or borderline diagnosis of pervasive developmental disorder not otherwise specified. However, it was found that these individual diagnoses were not consistently applied/utilised across various at heath centres. Due to the difficulty in formulating a suitable diagnostic criterion, the DSM -V was developed in order to provide a more accurate, scientific and medical way to diagnose patients with autism related disorders (American Psychiatric Association, 2013)

2.1.6.10 Diagnostic and Statistical Manual of Mental Disorders V (DSM-V)

The revised diagnosis of fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) for ASD represents a new, more accurate, systematic and medical approach of diagnosing individuals with autism-related disorders.

When diagnosing a patient with ASD, the DSM-IV, diagnosed four separate disorders: autistic disorder, Asperger's disorder, childhood disintegrative disorder, or the all-encompassing diagnosis of pervasive developmental disorder not otherwise specified. Researchers found that these separate diagnoses were not consistently applied across different clinics and treatment centres. Anyone diagnosed with one of the four pervasive developmental disorders (PDD) from DSM-IV would meet the criteria for ASD in DSM-V (American Psychiatric Association, 2013).

Children with ASDs are diagnosed by their clinical history and screenings that include observations and assessments of their abilities using validated diagnostic instruments previously mentioned. This is because there is no specific biological marker available to diagnose ASD (Reddy 2005). The American Psychiatric Association Manual of Psychiatric Diseases, DSM-IV TR (fourth edition Text Revision) has been previously used as a diagnostic reference for ASD. However, the DSM-V was published (18-22 May 2013), and it provides standardised criteria for diagnosing ASD which is now a dyad of symptom collections rather than a triad (Social Interaction, Communication, and Restricted,

Repetitive, and Stereotyped Patterns of Behaviour, Interests, and Activities), the DSM-V criteria is quoted below (Kuriakose and Shalev, 2016).

" *A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by:*

1. *Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.*
2. *Deficits in nonverbal communicative behaviours used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.*
3. *Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behaviour to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.*

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behaviour.

B. Restricted, repetitive patterns of behaviour, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. *Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).*
2. *Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behaviour (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).*
3. *Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).*

4. *Hyper- or hypo- reactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).*

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behaviour.

C. *Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).*

D. *Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.*

E. *These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make co morbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.*

Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or PDD-NOS should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

Specify if:

With or without accompanying intellectual impairment

With or without accompanying language impairment

Associated with a known medical or genetic condition or environmental factor

(Coding note: Use additional code to identify the associated medical or genetic condition.)

Associated with another neurodevelopmental, mental, or behavioural disorder

(Coding note: Use additional code[s] to identify the associated neurodevelopmental, mental, or behavioural disorder[s].

With catatonia *(refer to the criteria for catatonia associated with another mental disorder)*

*(**Coding note**: Use additional code 293.89 catatonia associated with autism spectrum disorder to indicate the presence of the co morbid catatonia.).*" (American Psychiatric Association, 2013).

2.1.6.11 International Classification of Diseases, Tenth Revision (ICD-10)

The current ICD-10 diagnostic criteria as per the World Health Organisation are based on the previous classification and the original triad of impairments. However, the International Classification of Diseases, eleventh Revision (ICD-11) update is expected in 2018 and is likely to be similar to the DSM-V criteria (Yates and Le Couteur, 2016). However, healthcare professionals are compelled to us the ICD-10 coding for medical aid claims; this has therefore caused an issue concerning the accuracy of medical aid claims. The possible advantages of cluster-based organization when considering the meta-structure of the DSM-5 and the ICD-10, is that this type of system could lead to improved clinical practice, public administration, and research (Doernberg and Hollander, 2016).

2.2. General Practitioners

2.2.1. Definition

"A general practitioner is a medical doctor who is trained to provide primary healthcare to patients of either sex or any" (Oxford university press, 2013). Detection of ASD is therefore an important duty for GPs.

In South Africa, GPs qualify with a MBChB (Bachelor of Medicine and Bachelor of Surgery) and practice as family doctors where they diagnose and treat all ages as well as most types of illnesses (Louw, 2006).

A GP is considered a primary healthcare provider. However, in the South African context, other primary healthcare providers such as clinic sisters and medical officers at state hospitals see many children and therefore play an important role in the screening of ASD (Scott, 2011).

2.2.2 General practitioners' scope of practice

According to the Health Profession Council of South Africa (HPSCA), the scope of practice for general practitioners practicing in South Africa is described below.

The following legislation and regulation, under section 33 of the Health Professions Act, No. 56 of 1974 (the "Act"), are deemed to be acts pertaining to the medical profession (Health Professions Council of South Africa, 2009):

"(a) The physical medical and/or clinical examination of any person;
(b) Performing medical and/or clinical procedures and/or prescribing medicines and managing the health of a patient (prevention, treatment and rehabilitation);
(c) Advising any person on his or her physical health status;
(d) On the basis of information provided by any person or obtained from him or her in any manner whatsoever-
(i) Diagnosing such person's physical health status;
(ii) Advising such person on his or her physical health status;
(iii) Administering or selling to or prescribing for such person any medicine or medical treatment;
(e) Prescribing, administering or providing any medicine, substance or medical device as defined in the Medicines and Related Substances Act, 1965 (Act No. 101 of 1965);
(f) Any other act specifically pertaining to the medical profession based on the education and training of medical practitioners as approved by the board from time to time." (Health Professions Council of South Africa, 2009).

It is therefore noted that the diagnosis of ASD or a person's other physical health status is deemed part of the scope of practice for GP's in South Africa. However, the attitudes towards ASD and the diagnostic capabilities/capacities of GP's have not been investigated.

2.2.3. Training of GPs

At medical school, there is not always a focus on the diagnosis and management of ASD (Bateman, 2013). No local studies are available examining the curriculum at medical school for GPs. However, a study conducted in Australia showed that there is a need for educational programmes on ASD for GPs to assist with early identification and referral to specialists. The study suggested that more structural education activities are warranted for GPs in order to enhance their knowledge and awareness on developmental disorders (Garg *et al.*, 2015).

2.3. Assessment of attitude

Attitudes can be defined as acquired characteristics of an individual and can be defined as a organisation of beliefs around a subject, concept or object which influences one to respond in some preferential manner. Attitude can be divided into three components, namely: a tendency to action; a cognitive or knowledge component; and an affective aspect (Raina, 2013). The following aspects according to Rahbar are aspects that should be explored when assessing attitudes in GPs on ASD: *ASD holds a social stigma in the community you work in; Diagnosing a child with ASD will lead to discrimination against the child; In general, there is a negative opinion towards children diagnosed with ASD; The diagnosis of ASD would be of value to the family* (Rahbar, 2011).

2.4. Previous research

Research on ASDs are increasing worldwide, with many studies showing that there is a great discrepancy among healthcare professionals regarding the diagnosis, treatment as well as prognosis of ASDs (Fombonne, 2003).

A survey on the knowledge of autism conducted in the USA showed discrepancies between primary care providers (family physicians, paediatricians and neurologists) as well as specialists (child psychiatrists, speech therapists and psychologists) (Heidgerken *et al.*,

2005). Several studies, conducted on healthcare workers in Sub-Saharan African subcultures, indicated various misconceptions concerning aetiology, treatment and prognosis of ASD's (Bakare *et al.,* 2009; Igwe *et al.,* 2011; Imran *et al.,* 2011). Rahbar *et al.,* (2011) conducted a survey, among practicing GPs in Pakistan, where he identified knowledge deficits regarding autism aetiology and diagnosis. This cross-sectional survey of 348 GPs; showed that only 148 (44.6%) had heard of "autism." GPs less than 30 years of age and those who obtained their Medical Degree in the last 5 years were more likely to report knowledge about ASD. It was also noted that among those that reported knowledge about ASD, many held misconceptions regarding the signs and symptoms and aetiology of ASD (Rahbar *et al.,* 2011).

Only a few studies could be identified nationally, which related to medical practitioners, paediatricians and psychiatrist's knowledge, attitudes and practices of ADHD (Louw, 2006; Venter *et al.,* 2003; Venter *et al.,* 2004). Louw's study was the most comparable conducted a survey amongst general practitioners in South Africa evaluating their familiarity, attitudes and practices with regards to ADHD in children and adults. This study found a need among GP's to increase their knowledge base about ADHD and However, no studies could be located nationally, that investigated general practitioner's attitudes and knowledge of ASD. Therefore, the contribution of this study will be a creation of a new body of knowledge in this research field in South Africa.

The results from Louw's study reported that the majority of the GPs enjoyed treating children with ADHD (37%) and more than 85% of the GPs indicated that they consider it important to be able to diagnose ADHD in both children and adults. In contrast to their overwhelming response to their ability to diagnose ADHD, GPs seemed to be more cautious about the initiation of medical treatment after a diagnosis is made. More than 50% indicated that they should initiate medical treatment of children (59%). Those GPs who indicated that they should not initiate medical treatment would prefer a psychiatrist (36%) or a paediatrician (36%) to initiate medical treatment of children. Approximately half of the GPs would consider medication as the most effective treatment option for children (54%). Almost two-thirds (63%) of the respondents indicated that educational opportunities regarding children with ADHD are insufficient, The GPs considered the main barriers in the effective management of children with ADHD to be uninformed parents (70%), limited funds (61%), uninformed teachers (58%), uninformed patients (57%) and difficult parents (50%). As far as the practices of the GPs were concerned,

74% of the respondents indicated that they always/frequently referred a child with suspected ADHD for a psycho-educational assessment before commencing treatment, which is advisable within a collaborative approach. Almost two-thirds of the GPs often referred children with ADHD to a psychologist, While 74% of the GPs seldom/never refer a child to a psychiatrist (Louw, 2006).

Previous research have also evaluated associations between higher SES variables and increased ASD diagnosis and prevalence. These findings have described differences across ethnic and socioeconomic groups, specifically showing a prevalence being lower in groups with lower income and education (Bhasin and Schendel, 2007; Croen *et al.,* 2002; Durkin *et al.,* 2010; Fountain *et al.,* 2011; Hertz-Picciotto *et al.,* 2010; King and Bearman, 2011; Liptak *et al.,* 2008; Rahbar *et al.,* 2013; Rosenberg *et al.,* 2009; Sasanfar *et al.,* 2010; Windham *et al.,* 2011).

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CHAPTER 3
METHODOLOGY

3.1 Sample

The method of data collection is a survey to investigate the attitudes and knowledge of general practitioners in Northern Johannesburg, Gauteng, about ASD in children. A total of 52 participants that were attending short courses/workshops for continuous professional development completed the study.

3.2 Design

This was a cross sectional study to determine the knowledge and attitudes of GPs by using a survey. This study has descriptive elements. Two hundred and ten GPs practicing in Northern Johannesburg were approached either via email, telephonically (Appendix A) or via direct approach at workshops or at their practices and were invited to take part in the study. The workshops/seminars focused on General Practice and were not related to Child Health. Volunteers were provided with the information sheet (Appendix B) and the questionnaire (Appendix C) which they were requested to complete. The information sheet outlined what was expected of the participants and included the aims of the study. Once the participants had completed the questionnaire they were asked to return it to the researcher. The researcher gave the participants an opportunity to ask any questions that they may have had regarding the study.

3.3 Measurement tool

The survey questionnaire is a reliable tool and was developed and utilised by Rahbar *et al.*, (2011) (used with permission) (Appendix D), which was adapted accordingly and was piloted to a convenient sample size of 10 practitioners in Gauteng. The phrasing or format was altered during this process to make it more understandable where necessary and all amendments were approved by the Wits Human Research Ethics Committee (HREC) (clearance number

M140934) (Appendix E) before the study commenced. The results from this pilot study were not included in the final analysis of this study.

3.4 Data Collection

The questionnaires were completed and returned in person at the selected workshops. Information was collected on the questionnaire that included: medical practitioner information (age, gender, year of graduation etc.); practice information (location, years in practice, hours per day in practice etc.); and ASD information (knowledge, attitudes, practices). There were 50 GPs that were approached directly and 160 practitioners at the seminars not related to child health.

3.5 Analysis

The statistical analysis was performed using software, SPSS 23.0. Data was captured to excel and then imported to SPSS 23.0. It was cleaned and checked for any duplicates and missing data. Tabulations were used to describe the data. Categorical data were presented as proportions and percentages.

3.6 Ethical Consideration

Practitioners were invited to take part in the study and voluntarily participated in the questionnaire process. They were given an information form to read through, which allowed them the option of withdrawing from the study at any time. Participants were instructed not to enter their names on their questionnaire to ensure anonymity. No identifying data was used when publishing the results of the study. Ethical clearance was granted by the WITS HREC (clearance number M140934) (Appendix E).

CHAPTER 4
RESULTS

4.1 Introduction

This study aimed to establish the knowledge and attitudes that GP's have regarding ASD. The data was obtained through the ASD questionnaire, and a pilot study was conducted prior to the commencement of the study, pre-testing the questionnaire. Adjustments were made to the following questions: 2.5, 3.11, 4.6, 4.9, 6.2, 6.3.9, 6.3.10, 6.4.2 and 6.4.8 to allow for easier understanding and statistical data collection. These amendments were approved by HREC (Appendix E).

In this study, a total of 52 participants completed the questionnaire and were included in the results of the study. The survey was conducted between July and December 2016. Tabulations were used to describe the data. Categorical data was presented as proportions and percentages. The following results of significance were identified and presented below.

4.2 Demographic data and basic information

Chi squared tests of independence were conducted and the findings showed that there were no distinct patterns indicating relationships between demographical variables (number of years participants were in practice or how many children they saw in a week) and the level of knowledge in participants (Appendix G).

4.2.1 Age

The participants were asked about their age. Table 4.1 shows that the majority of participants were older than 40 years old making up 80.8% (42); then 11.5% (6) were between 30 and 40 years old; and 7.7 % (4) of respondents were under 30 years old.

Table 4.1 Age group

Age group	Frequency	Valid Percent
Under 30 years	4	7.7
Between 30 and 40 years	6	11.5
Older than 40 years	42	80.8
Total	52	100.0

4.2.2 Gender

Participants were asked what gender they were. Table 4.2 shows that 65.4% (34) were female and 34.6% (18) of respondents were male.

Table 4.2 Gender

Gender	Frequency	Valid Percent
Male	18	34.6
Female	34	65.4
Total	52	100.0

4.2.3 Number of years in practice

Participants were asked about the number of years they were in practice. Table 4.3 shows that 80.8% (42) of respondents were in practice for more than 10 years, 7.7% (4) between 5 and 10 years; 9.6% (5) between 1 and 5 years and 1.9% (1) less than 1 year.

Table 4.3 Number of years in practice

Number of years in practice	Frequency	Valid Percent
Less than 1 year	1	1.9
Between 1 and 5 years	5	9.6
Between 5 and 10 years	4	7.7
More than 10 years	42	80.8
Total	52	100.0

4.2.4 Number of adults and children seen in a typical day

Participants were asked about the number of adults and children they generally see in a typical day. Table 4.4 shows that of the 51 respondents that answered this question, 82.4% (42) saw more than 10; 15.7% (8) saw between 5 and 10 and 2% (1.9) saw between 1 and 5 patients in a typical day.

Table 4.4 Number of adults and children seen in a typical day

Number of adults and children seen in a typical day		Frequency	Valid Percent
	Between 1 and 5	1	2.0
	Between 5 and 10	8	15.7
	More than 10	42	82.4
	Total	51	100.0
Missing	System	1	
Total		52	

4.2.5 Number of children, between ages 2 and 12 years old, are treated on a weekly basis

Participants were asked about the number of children, between ages 2 and 12 years old that they would typically treat on a weekly basis. Table 4.5 shows that from the 50 respondents that answered this question, 60.0% (30) saw more than 10; 20% (10) saw between 3 to 6; 12.0% (6) saw between 6 to 10; and 8% (7.7) saw between 1 to 3 children on a weekly basis

Table 4.5 Number of children, between ages 2 and 12 years old, are treated on a weekly basis

Number of children, between ages 2 and 12 years old, are treated on a weekly basis		Frequency	Valid Percent
Valid	Between 1 to 3	4	8.0
	Between 3 to 6	10	20.0
	Between 6 to 10	6	12.0
	More than 10	30	60.0
	Total	50	100.0
Missing	System	2	
Total		52	

4.3 Exposure to information about ASD

4.3.1 Have you heard of the term "Autism Spectrum Disorders (ASD)"?

Participants were asked if they had heard of the term Autism Spectrum Disorders (ASD). There were 52 respondents that answered this question. Table 4.6 shows that 92.3% (48) of respondents had heard of the term ASD, whereas 7.7% (4) said that they hadn't heard of the term ASD;

4.3.2 At medical school, were you exposed to the topic of autism or Autism Spectrum Disorders (ASD)?

Participants were asked if they were exposed to the topic of ASD at medical school. There were 52 respondents that answered this question. Table 4.6 and Figure 4.1 shows that 57.7% (30) of respondents said that they had; whereas; 42.3% (22) of respondents said that they were not exposed to the topic of autism or ASD at medical school.

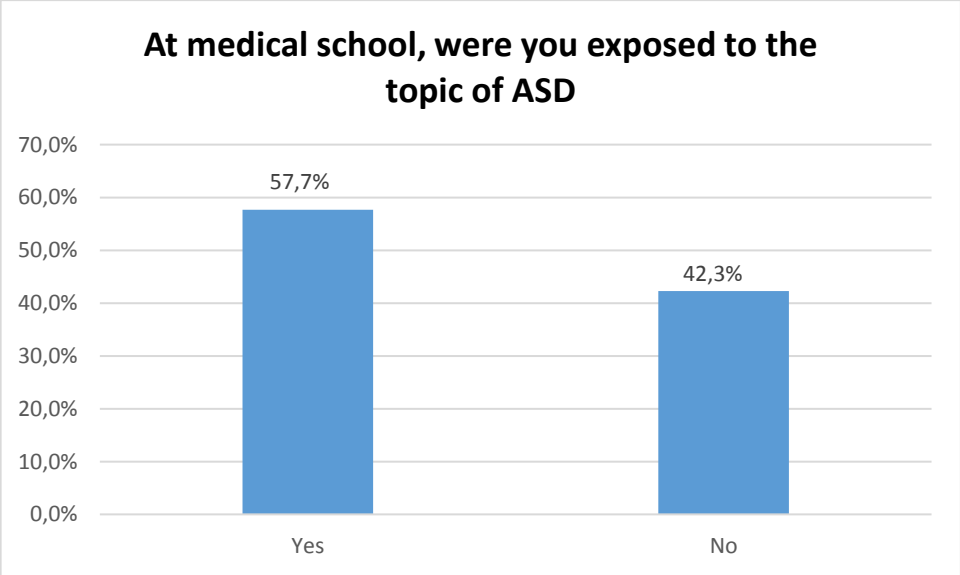

Figure 4.1 At medical school, were you exposed to the topic of ASD

4.3.3 Have you been exposed to ASD at a symposium or seminar?

Participants were asked if they were exposed to the topic of ASD at a symposium or seminar. There were 52 respondents that answered this question. As seen in Table 4.6 shows that 80.8% (42) of respondents said that they were not exposed to ASD at a symposium or seminar; whereas 19.2% (10) said that they had.

Table 4.6 Exposure to information about ASD part one

Exposure to information about ASD part one		Yes	No	Total
Have your heard of the term "Autism Spectrum Disorders (ASD)"?	Count	48	4	52
	N %	92.3%	7.7%	100.0%
At medical school, were you exposed to the topic of autism or Autism Spectrum Disorders (ASD)?	Count	22	30	52
	N %	42.3%	57.7%	100.0%
Have you been exposed to ASD at a symposium or seminar?	Count	10	42	52
	N %	19.2%	80.8%	100.0%

4.3.4 Have you read about ASD in medical journals?

Participants were asked if they had read about ASD in medical journals. There were 52 respondents that answered this question. Table 4.7 shows that 61.5% (32) of respondents had read about autism in medical journals whereas 38.5% (20) had not.

4.3.5 Have you been contacted by any national or international organizations regarding autism or ASD?

Participants were asked if they had been contacted by any national or international organizations regarding autism or ASD. As seen in Table 4.7 all of the respondents 100%

(52) had said that they had not been contacted by any national or international organizations regarding autism or ASD.

Table 4.7 Exposure to information about ASD part two

Exposure to information about ASD part two		Yes	No	Total
Have you read about ASD in medical journals?	Count	32	20	52
	N %	61.5%	38.5%	100.0%
Have you been contacted by any national or international organizations regarding autism or ASD?	Count	0	52	52
	N %	0.0%	100.0%	100.0%

4.3.6 Have you been exposed to autism or ASD via national or international media?

Participants were asked if they had been exposed to autism or ASD via national or international media. There were 51 respondents that answered this question. In Table 4.8 it is noted that 56.9% (29) of respondents had been exposed to autism or ASD via national or international media, whereas 43.1% (22) said that they hadn't.

Table 4.8 Have you been exposed to autism or ASD via national or international media?

Have you been exposed to autism or ASD via national or international media?		Frequency	Valid Percent
Valid	Yes	29	56.9
	No	22	43.1
	Total	51	100.0
Missing	System	1	
Total		52	

4.3.7 If yes, which mode of communication

If participants answered 'yes' to the previous question, they were then asked to state which form of communication they had been exposed to ASD; more than one answer was accepted. There were 29 respondents that answered the previous question as 'yes'. Table 4.9 shows which mode of communication they had been exposed to ASD: 36.5% (33) of respondents marked television; 7.7% (4) marked radio; 30.8% (16) marked internet; 30.8% (16) marked print media; and 5.8% (3) marked other

Table 4.9 If yes, which mode of communication

If yes, which mode of communication		Unmarked	Marked	Total
Television	Count	33	19	52
	N %	63.5%	36.5%	100.0%
Radio	Count	48	4	52
	N %	92.3%	7.7%	100.0%
Internet	Count	36	16	52
	N %	69.2%	30.8%	100.0%
Print Media	Count	36	16	52
	N %	69.2%	30.8%	100.0%
Other	Count	49	3	52
	N %	94.2%	5.8%	100.0%

4.3.8 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children worldwide?

Participants were asked if they had an estimate of the prevalence of Autism Spectrum Disorder in children worldwide. There were 50 respondents that answered this question. Table 4.10 and Figure 4.2 shows that 84.0% (42) of respondents did not have an estimate of the prevalence of ASD in children worldwide while 16.0% (8) said that they had.

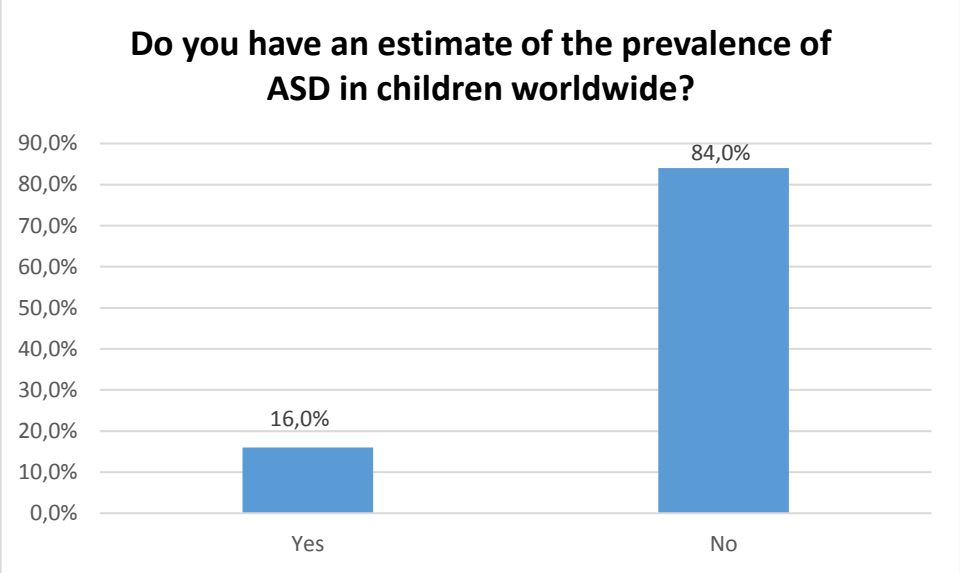

Figure 4.2 Do you have an estimate of the prevalence of ASD in children worldwide?

Table 4.10 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children worldwide?

Do you have an estimate of the prevalence of Autism Spectrum Disorder in children worldwide?		Frequency	Valid Percent
Valid	Yes	8	16.0
	No	42	84.0
	Total	50	100.0
Missing	System	2	
Total		52	

4.3.9 If yes, what is that estimate?

There were 7 of the 8 respondents from the previous question that answered this question relating to the estimate of the prevalence of ASD in children worldwide. As seen in Table

4.11, 42.9% (3) got the correct answer that 1 in 160 children suffer from ASD worldwide; while 28.6% (2) chose the options 1 in 80 as well as 1 in 320.

Table 4.11 If yes, what is that estimate?

If yes, what is that estimate?		Frequency	Valid Percent
Valid	1 in 80	2	28.6
	1 in 160	3	42.9
	1 in 320	2	28.6
	Total	7	100.0
Missing	System	1	
Total		8	

4.3.10 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in South Africa?

Participants were asked if they had an estimate of the prevalence of ASD in children in South Africa. From Table 4.12 and Figure 4.3 below it can be seen that 51 respondents answered this question, where 90.2% (46) of these participants said that they had not known the estimate of the prevalence of ASD in children in South Africa; whereas 9.8% (5) said that they did know the estimate.

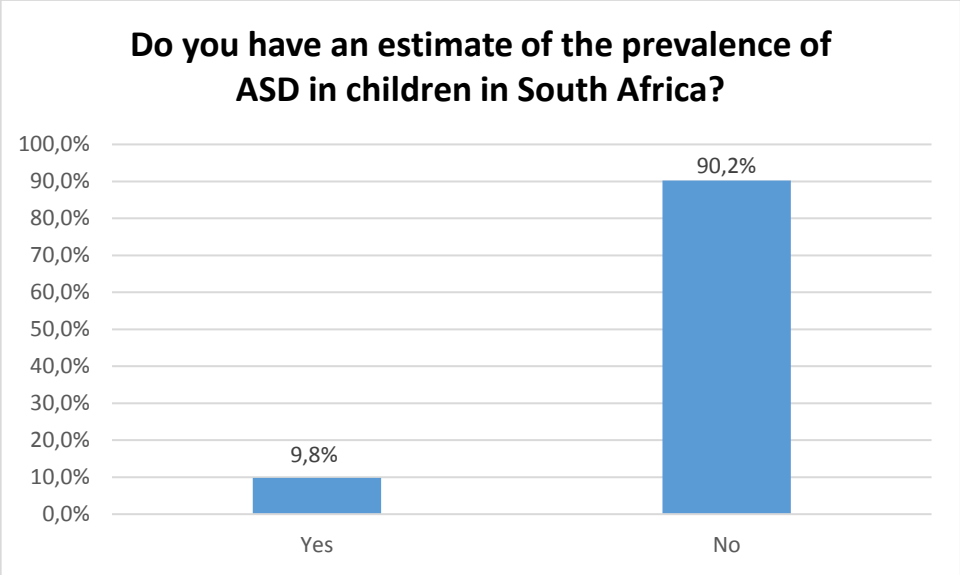

Figure 4.3 Do you have an estimate of the prevalence of ASD in children in South Africa?

Table 4.12 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in South Africa?

Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in South Africa?		Frequency	Valid Percent
Valid	Yes	5	9.8
	No	46	90.2
	Total	51	100.0
Missing	System	1	
Total		52	

4.3.11 If yes, what is that estimate?

There were 7 respondents that answered this question, although only 5 responded positively in the first part of this question. As seen in Table 4.13, 60% (3) answered this question correctly by choosing the option of 1 in 86 children suffer from ASD in South Africa, whereas 20% (1) chose the answers 1 in 43 as well as 1 in 172.

Table 4.13 If yes, what is that estimate?

If yes, what is that estimate?	Frequency	Valid Percent
1 in 43	1	20.0
1 in 86	3	60.0
1 in 172	1	20.0
Total	5	100.0

4.3.12 Have you ever diagnosed a child with Autism Spectrum Disorder?

Participants were asked if they had ever diagnosed a child with ASD. There were 52 respondents that answered this question. As seen in Figure 4.4 and Table 4.14 below, 63.5% (33) said that had not and 36.5% (19) of respondents said that they had diagnosed a child with ASD.

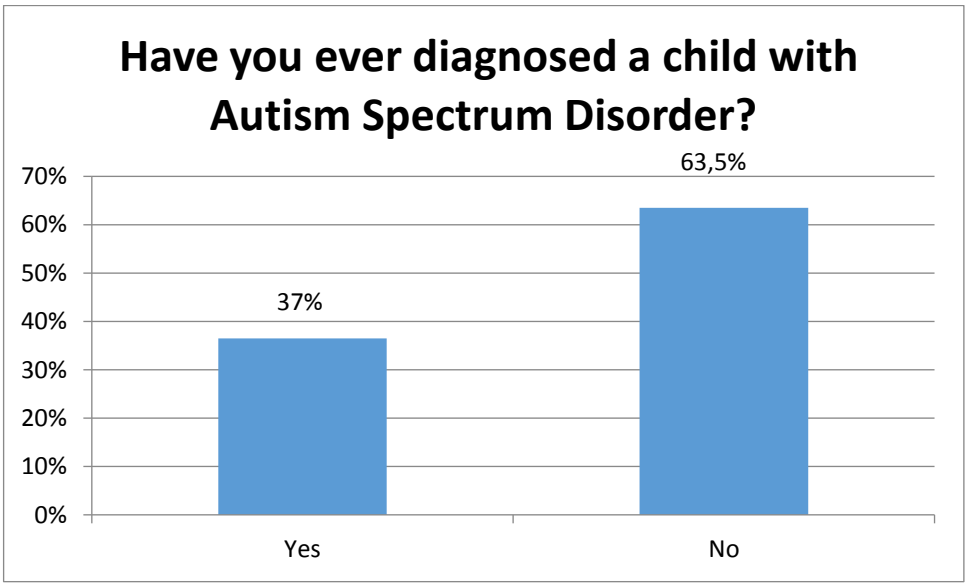

Figure 4.4 Have you ever diagnosed a child with Autism Spectrum Disorder?

Table 4.14 Have you ever diagnosed a child with Autism Spectrum Disorder?

Have you ever diagnosed a child with Autism Spectrum Disorder?	Frequency	Valid Percent
Yes	19	36.5
No	33	63.5
Total	52	100.0

4.4 Knowledge about ASD

4.4.1 Autistic children show detachment from their parents

There were 49 respondents that answered this question. As seen in Table 4.15, 10.2% (5) strongly agreed, 53.1% (26) agreed, 12.2% (6) were undecided, 22.4% (11) disagreed and 2.0% (1) strongly disagreed with this statement.

4.4.2 ASD is more prevalent in higher socio-economic classes

There were 50 respondents that answered this question. As seen in Figure 4.5 and Table 4.15, 0% (0) strongly agreed, 18.0% (9) agreed, 44.0% (22) were undecided, 36.0% (18) disagreed and 2.0% (1) strongly disagreed with this statement.

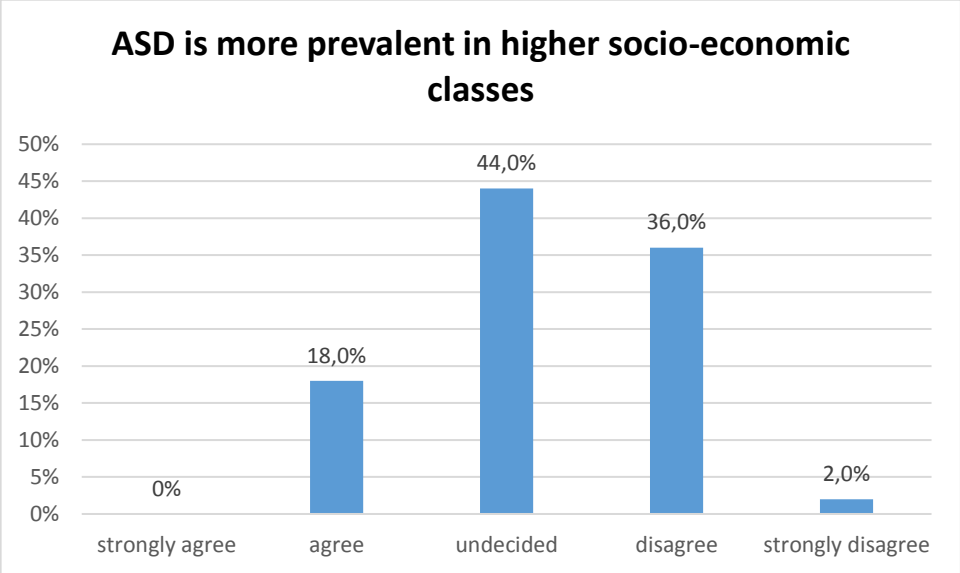

Figure 4.5 ASD is more prevalent in higher socio-economic classes

4.4.3 ASD is more prevalent in higher educational classes

There were 50 respondents that answered this question. As seen in Figure 4.6 and Table 4.15, 0% (0) strongly agreed, 14.0% (7) agreed, 42.0% (21) were undecided, 42.0% (21) disagreed and 2.0% (1) strongly disagreed with this statement.

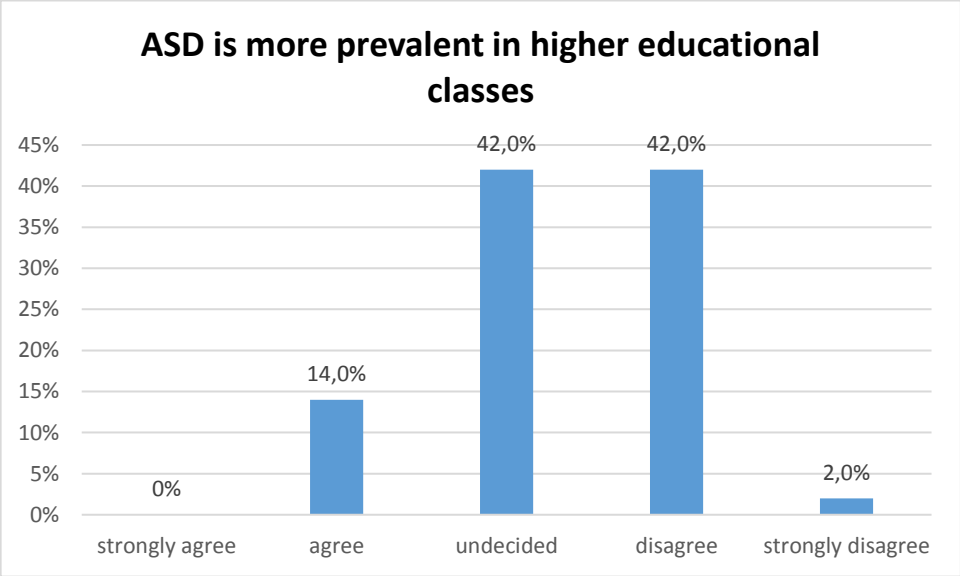

Figure 4.6 ASD is more prevalent in higher educational classes

4.4.4 Autistic children are not affectionate

There were 50 respondents that answered this question. As seen in Table 4.15, 6% (3) strongly agreed, 34.0% (17) agreed, 10.0% (5) were undecided, 42.0% (21) disagreed and 8.0% (4) strongly disagreed with this statement.

4.4.5 ASD is a precursor for schizophrenia

There were 50 respondents that answered this question. As seen in Table 4.15, 0% (0) strongly agreed, 4.0% (2) agreed, 40.0% (20) were undecided, 46.0% (23) disagreed and 10.0% (5) strongly disagreed with this statement.

4.4.6 It is hard to distinguish between ASD and schizophrenia clinically in children

There were 50 respondents that answered this question. As seen in Table 4.15 and Figure 4.7, 0% (0) strongly agreed, 18.0% (9) agreed, 46.0% (23) were undecided, 30.0% (15) disagreed and 6.0% (3) strongly disagreed with this statement.

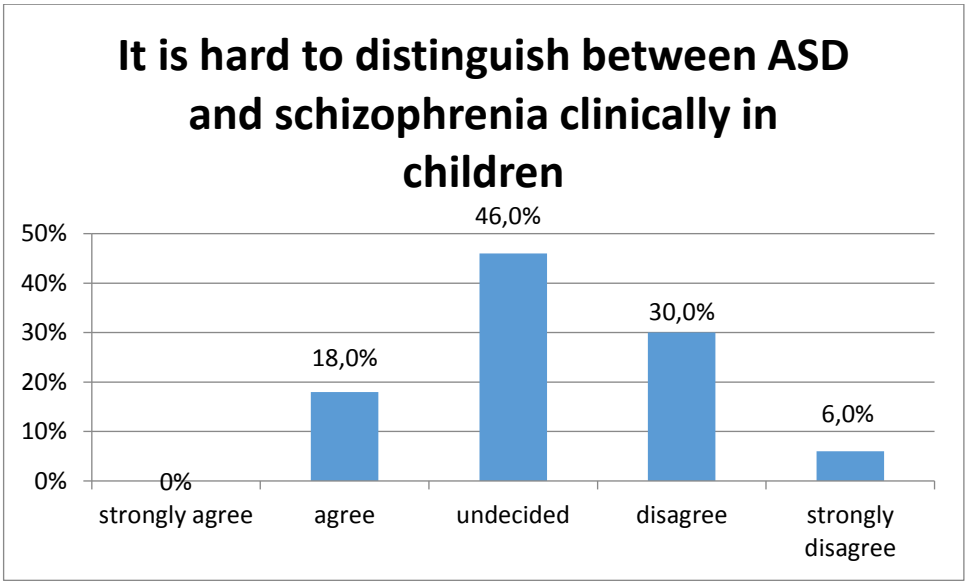

Figure 4.7 It is hard to distinguish between ASD and schizophrenia clinically in children

4.4.7 I have a high level of accuracy in diagnosing autism spectrum disorders

There were 50 respondents that answered this question. As seen in Table 4.15 and Figure 4.8, 0% (0) strongly agreed, 6.0% (3) agreed, 16.0% (8) were undecided, 46.0% (23) disagreed and 32.0% (16) strongly disagreed with this statement.

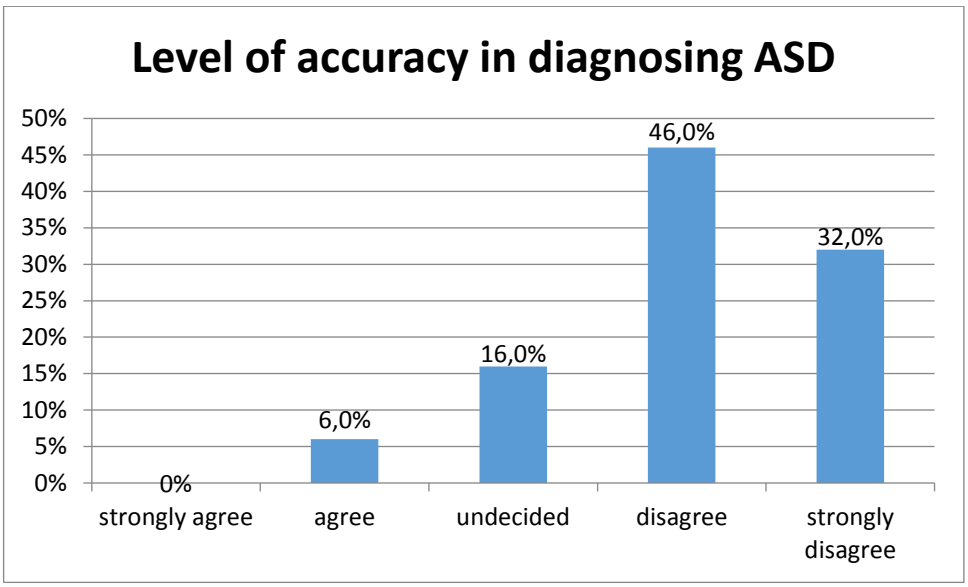

Figure 4.8 Level of accuracy in diagnosing ASD

4.4.8 ASD in children is mostly attributed to neglect in early childhood parenting

There were 49 respondents that answered this question. As seen in Table 4.15, 6.1% (3) strongly agreed, 2.0% (1) agreed, 6.1% (3) were undecided, 40.8% (20) disagreed and 44.9% (22) strongly disagreed with this statement.

4.4.9 Children tend to be psychologically mature and grow out of ASD (where symptoms disappear)

There were 50 respondents that answered this question. As seen in Table 4.15, 2% (1) strongly agreed, 4.0% (2) agreed, 18.0% (9) were undecided, 54.0% (27) disagreed and 22.0% (11) strongly disagreed with this statement.

Table 4.15 Knowledge about ASD

		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Autistic children show detachment from their parents	Count	5	26	6	11	1	49
	N %	10.2%	53.1%	12.2%	22.4%	2.0%	100.0%
ASD is more prevalent in higher socio-economic classes	Count	0	9	22	18	1	50
	N %	0.0%	18.0%	44.0%	36.0%	2.0%	100.0%
ASD is more prevalent in higher educational classes	Count	0	7	21	21	1	50
	N %	0.0%	14.0%	42.0%	42.0%	2.0%	100.0%
Autistic children are not affectionate	Count	3	17	5	21	4	50
	N %	6.0%	34.0%	10.0%	42.0%	8.0%	100.0%
ASD is a precursor for schizophrenia	Count	0	2	20	23	5	50
	N %	0.0%	4.0%	40.0%	46.0%	10.0%	100.0%
It is hard to distinguish between ASD and schizophrenia clinically in children	Count	0	9	23	15	3	50
	N %	0.0%	18.0%	46.0%	30.0%	6.0%	100.0%
I have a high level of accuracy in diagnosing autism spectrum disorders	Count	0	3	8	23	16	50
	N %	0.0%	6.0%	16.0%	46.0%	32.0%	100.0%
ASD in children is mostly attributed to neglect in early childhood parenting	Count	3	1	3	20	22	49
	N %	6.1%	2.0%	6.1%	40.8%	44.9%	100.0%
Children tend to be psychologically mature and grow out of ASD (where symptoms disappear)	Count	1	2	9	27	11	50
	N %	2.0%	4.0%	18.0%	54.0%	22.0%	100.0%

4.5 Attitudes

4.5.1 ASD holds a social stigma in the community you work in

There were 50 respondents that answered this question. As seen in Table 4.16 below, 6.0% (3) strongly agreed, 70.0% (35) agreed, 8.0% (4) were undecided, 16.0% (8) disagreed and 0% (0) strongly disagreed with this statement.

4.5.2 Diagnosing a child with ASD will lead to discrimination against the child

There were 50 respondents that answered this question. As seen in Table 4.16, 2.0% (1) strongly agreed, 40.0% (20) agreed, 28.0% (14) were undecided, 26.0% (13) disagreed and 4% (2) strongly disagreed with this statement.

4.5.3 In general, there is a negative opinion towards children diagnosed with ASD

There were 50 respondents that answered this question. As seen in Table 4.16, 6.0% (3) strongly agreed, 66.0% (33) agreed, 18.0% (9) were undecided, 10.0% (5) disagreed and 0% (0) strongly disagreed with this statement.

4.5.4 The diagnosis of ASD would be of value to the family

There were 50 respondents that answered this question. As seen in Table 4.16, 42.0% (21) strongly agreed, 54.0% (27) agreed, 2.0% (1) were undecided, 2.0% (1) disagreed and 0% (0) strongly disagreed with this statement.

4.5.5 Autism is preventable

There were 50 respondents that answered this question. As seen in Table 4.16, 2.0% (1) strongly agreed, 4.0% (2) agreed, 26.0% (13) were undecided, 48.0% (24) disagreed and 20% (10) strongly disagreed with this statement.

Table 4.16 Attitudes

		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
ASD holds a social stigma in the community you work in	Count	3	35	4	8	0	50
	N %	6.0%	70.0%	8.0%	16.0%	0.0%	100.0%
Diagnosing a child with ASD will lead to discrimination against the child	Count	1	20	14	13	2	50
	N %	2.0%	40.0%	28.0%	26.0%	4.0%	100.0%
In general, there is a negative opinion towards children diagnosed with ASD	Count	3	33	9	5	0	50
	N %	6.0%	66.0%	18.0%	10.0%	0.0%	100.0%
The diagnosis of ASD would be of value to the family	Count	21	27	1	1	0	50
	N %	42.0%	54.0%	2.0%	2.0%	0.0%	100.0%
Autism is preventable	Count	1	2	13	24	10	50
	N %	2.0%	4.0%	26.0%	48.0%	20.0%	100.0%

4.6 Practices

4.6.1 Have you heard of any of the following diagnostic/screening tools?

- **ADI-R or ADOS (Autism Diagnostic Interview-Revised or Autism Diagnostic Observation Schedule)**

  There were 30 respondents that completed this item. As seen in Table 4.17, 6.7% (2) said that they had heard of this diagnostic tool, whereas 93.3% (28) said that they had not heard of this tool.

- **CHAT (Checklist for Autism in Toddlers)**

  There were 47 respondents that completed this item. As seen in Table 4.17, 8.5% (4) said that they had heard of this diagnostic tool, whereas 91.5% (43) said that they had not heard of this tool.

- **M-CHAT Modified Checklist for Autism in Toddlers)**

  There were 46 respondents that completed this item. As seen in Table 4.17, 8.7% (4) said that they had heard of this diagnostic tool, whereas 91.3% (42) said that they had not heard of this tool.

- **ITC (Infant Toddler Checklist)**

  There were 46 respondents that completed this item. As seen in Table 4.17, 13.0% (6) said that they had heard of this diagnostic tool, whereas 87.0% (40) said that they had not heard of this tool.

- **ESAT (Early Screening for Autistic Traits)**

  There were 46 respondents that completed this item. As seen in Table 4.17, 13.0% (6) said that they had heard of this diagnostic tool, whereas 87.0% (40) said that they had not heard of this tool.

- **DSM-IV (Diagnostic and Statistical Manual of Mental Disorders 4)**

  There were 51 respondents that completed this item. As seen in Table 4.17, 82.4% (42) said that they had heard of this diagnostic tool, whereas 17.6% (9) said that they had not heard of this tool.

- **DSM-V (Diagnostic and Statistical Manual of Mental Disorders 5)**

  There were 47 respondents that completed this item. As seen in Table 4.17, 70.2% (33) said that they had heard of this diagnostic tool, whereas 29.8% (14) said that they had not heard of this tool.

Table 4.17 Have you heard of any of the following diagnostic tools?

Tool		Yes	No	Total
ADI-R or ADOS (Autism Diagnostic Interview-Revised or Autism Diagnostic Observation Schedule)	Count	2	28	30
	N %	6.7%	93.3%	100.0%
CHAT (Checklist for Autism in Toddlers)	Count	4	43	47
	N %	8.5%	91.5%	100.0%
M-CHAT Modified Checklist for Autism in Toddlers)	Count	4	42	46
	N %	8.7%	91.3%	100.0%
ITC (Infant Toddler Checklist)	Count	6	40	46
	N %	13.0%	87.0%	100.0%
ESAT (Early Screening for Autistic Traits)	Count	6	40	46
	N %	13.0%	87.0%	100.0%
DSM-IV (Diagnostic and Statistical Manual of Mental Disorders 4)	Count	42	9	51
	N %	82.4%	17.6%	100.0%
DSM-V (Diagnostic and Statistical Manual of Mental Disorders 5)	Count	33	14	47
	N %	70.2%	29.8%	100.0%

4.6.2 Which diagnostic tool/s do you utilise to diagnose Autism Spectrum Disorders?

As seen in Table 4.18 and Figure 4.9, he following options were marked by the respondents regarding the diagnostic tool that they utilised: 0% (0) marked ADI-R or ADOS; 46.2% (24) marked general evaluation, 7.7% (4) marked M-CHAT; 11.5% (6) used a questionnaire for the parents to fill out and note observation; 30.8% (16) marked DSM-IV; 21.2% (11) marked DSM-V; and 7.7% (4) said other.

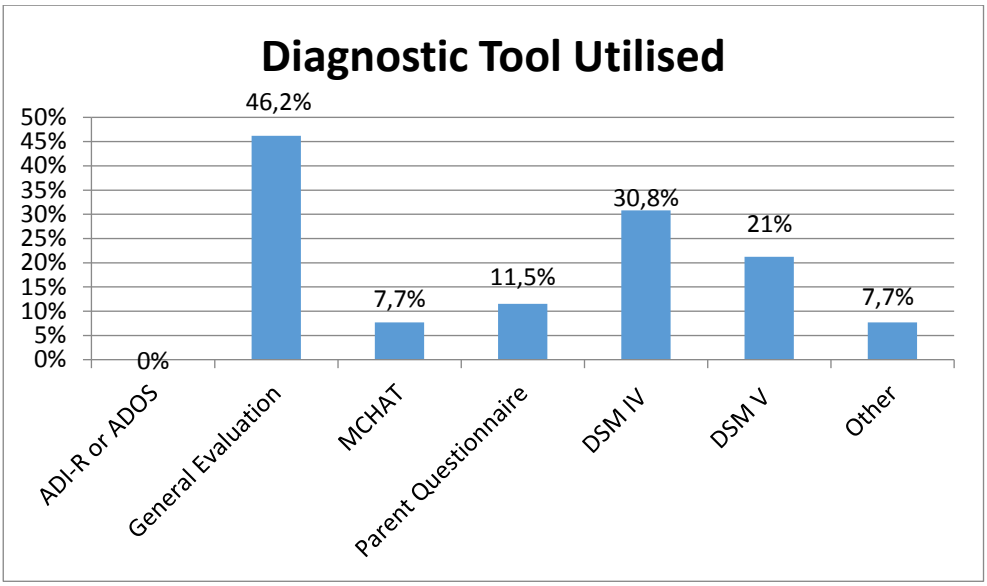

Figure 4.9 Diagnostic tools utilised

Table 4.18 Which diagnostic tool/s do you utilise to diagnose Autism Spectrum Disorders?

Tool		Unmarked	Marked	Total
Use ADI-R or ADOS	Count	52	0	52
	N %	100.0%	0.0%	100.0%
General evaluation	Count	28	24	52
	N %	53.8%	46.2%	100.0%
M-CHAT	Count	48	4	52
	N %	92.3%	7.7%	100.0%
Parents are given a questionnaire to fill out and note observation	Count	46	6	52
	N %	88.5%	11.5%	100.0%
DSM IV criteria	Count	36	16	52
	N %	69.2%	30.8%	100.0%
DSM V criteria	Count	41	11	52
	N %	78.8%	21.2%	100.0%
Other	Count	48	4	52
	N %	92.3%	7.7%	100.0%

4.6.3 If Other, please specify

As seen in Table 4.18, of the 4 respondents that marked “other”, 3 of these respondents said that they would refer their patients to a child psychiatrist for further evaluation, as noted in Table 4.18.

Table 4.19 If Other, please specify

If Other, please specify	Frequency	Valid Percent
Child Psychiatrist Evaluation	1	1.9
Referral	1	1.9
Would refer To Psychiatrist	1	1.9
Total	52	100.0

4.7 'Red Flags' for ASD

4.7.1 Does not respond to their name by 12 months of age

There were 45 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Does not respond to their name by 12 months of age". As seen in Table 4.20, 84.0% (38) agreed and 15.6% (7) disagreed that this statement is a 'Red flag' for ASD

4.7.2 Delay in walking at 18 months of age

There were 44 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Delay in walking at 18 months of age". As seen in Figure 4.10 and Table 4.20, 52.3% (23) agreed and 47.7% (21) disagreed that this statement is a 'Red flag' for ASD

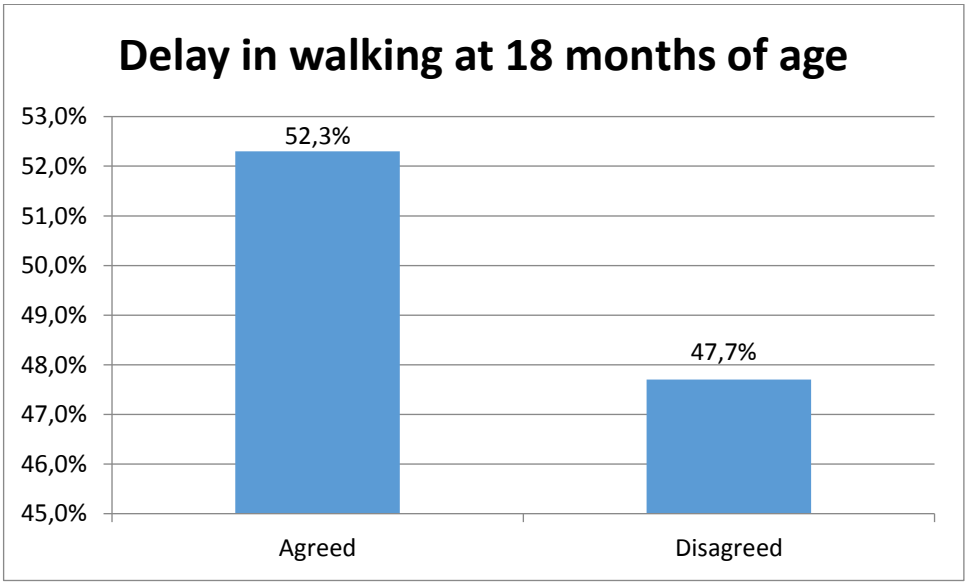

Figure 4.10 Delay in walking at 18 months of age

4.7.3 Not pointing at objects to show interest (e.g. not point at an airplane flying over) by 14 months

There were 45 respondents that answered the following statement as a possible ‘Red Flag’ for ASD: “Not pointing at objects to show interest (e.g. not point at an airplane flying over) by 14 months”. As seen in Table 4.20, 88.9% (40) agreed and 11.1% (5) disagreed that this statement is a ‘Red flag’ for ASD

4.7.4 Not able to play "pretend" games (e.g. pretend to "feed" a doll) by 18 months

There were 45 respondents that answered the following statement as a possible ‘Red Flag’ for ASD: “Not able to play "pretend" games (e.g. pretend to "feed" a doll) by 18 months”. As seen in Table 4.20, 82.2% (37) agreed and 17.8% (8) disagreed that this statement is a ‘Red flag’ for ASD

4.7.5 Avoids eye contact and wants to be alone

There were 48 respondents that answered the following statement as a possible ‘Red Flag’ for ASD: “Avoids eye contact and wants to be alone”. As seen in Table 4.20, 95.8% (46) agreed and 4.2% (2) disagreed that this statement is a ‘Red flag’ for ASD

4.7.6 Has trouble understanding other people's feelings or talking about their own feelings

There were 47 respondents that answered the following statement as a possible ‘Red Flag’ for ASD: “Has trouble understanding other people's feelings or talking about their own feelings”. As seen in Table 4.20, 95.7% (45) agreed and 4.3% (2) disagreed that this statement is a ‘Red flag’ for ASD

4.7.7 Has delayed speech and language skills

There were 45 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Has delayed speech and language skills". As seen in Table 4.20, 88.9% (40) agreed and 11.1% (5) disagreed that this statement is a 'Red flag' for ASD

4.7.8 Fear of causing harm to themselves or others

There were 44 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Fear of causing harm to themselves or others". As seen in Table 4.20, 25.0% (11) agreed and 75.0% (33) disagreed that this statement is a 'Red flag' for ASD

4.7.9 Gives unrelated answers to questions

There were 45 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Gives unrelated answers to questions". As seen in Table 4.20, 64.4% (29) agreed and 35.6% (16) disagreed that this statement is a 'Red flag' for ASD

4.7.10 Willing to approach a complete stranger for comfort e.g. to be picked up

There were 43 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Willing to approach a complete stranger for comfort e.g. to be picked up". As seen in Table 4.20, 20.9% (9) agreed and 79.1(34) disagreed that this statement is a 'Red flag' for ASD

4.7.11 Has obsessive interests

There were 47 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Has obsessive interests". As seen in Table 4.20, 91.5% (43) agreed and 8.5% (4) disagreed that this statement is a 'Red flag' for ASD

4.7.12 Flap their hands, rock their bodies, or spin in circles

There were 48 respondents that answered the following statement as a possible 'Red Flag' for ASD: "Flap their hands, rock their bodies, or spin in circles". As seen in Table 4.20, 95.8% (46) agreed and 4.2% (2) disagreed that this statement is a 'Red flag' for ASD

Table 4.20 'Red Flags' for ASD

		Yes	No	Total
Not respond to their name by 12 months of age	Count	38	7	45
	N %	84.4%	15.6%	100.0%
Delay in walking at 18 months of age	Count	23	21	44
	N %	52.3%	47.7%	100.0%
Not pointing at objects to show interest (e.g. not point at an airplane flying over) by 14 months	Count	40	5	45
	N %	88.9%	11.1%	100.0%
Not able to play "pretend" games (e.g. pretend to "feed" a doll) by 18 months	Count	37	8	45
	N %	82.2%	17.8%	100.0%
Avoids eye contact and wants to be alone	Count	46	2	48
	N %	95.8%	4.2%	100.0%
Has trouble understanding other people's feelings or talking about their own feelings	Count	45	2	47
	N %	95.7%	4.3%	100.0%
Has delayed speech and language skills	Count	40	5	45
	N %	88.9%	11.1%	100.0%
Fear of causing harm to themselves or others	Count	11	33	44
	N %	25.0%	75.0%	100.0%
Gives unrelated answers to questions	Count	29	16	45
	N %	64.4%	35.6%	100.0%
Willing to approach a complete stranger for comfort e.g. to be picked up	Count	9	34	43
	N %	20.9%	79.1%	100.0%
Has obsessive interests	Count	43	4	47
	N %	91.5%	8.5%	100.0%
Flap their hands, rock their bodies, or spin in circles	Count	46	2	48
	N %	95.8%	4.2%	100.0%

4.8 Diagnosis of ASD

When diagnosing children with autism the following symptoms are necessary; not necessary but helpful; or not necessary for diagnosis

4.8.1 Impaired social interaction

There were 49 respondents that answered the statement “Impaired social interaction” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 87.8% (43) said it was necessary; 12.2% (6) said it was not necessary but helpful and 0% (0) said it was not necessary for the diagnosis of ASD.

4.8.2 Impaired communication

There were 49 respondents that answered the statement “Impaired communication” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 71.4% (35) said it was necessary; 26.5% (13) said it was not necessary but helpful and 2.0% (1) said it was not necessary for the diagnosis of ASD.

4.8.3 Hallucinations

There were 49 respondents that answered the statement “Hallucinations” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 2.0% (1) said it was necessary; 22.4% (11) said it was not necessary but helpful and 75.5% (37) said it was not necessary for the diagnosis of ASD.

4.8.4 Restricted and repetitive behaviour

There were 49 respondents that answered the statement “Restricted and repetitive behaviour” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 63.3% (31) said it was necessary; 34.7% (17) said it was not necessary but helpful and 2.0% (1) said it was not necessary for the diagnosis of ASD.

4.8.5 Lack of eye contact

There were 49 respondents that answered the statement “Lack of eye contact” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 59.2% (29) said it was necessary; 40.8% (20) said it was not necessary but helpful and 0% (0) said it was not necessary for the diagnosis of ASD.

4.8.6 Confirmed Schizophrenia

There were 47 respondents that answered the statement “Confirmed Schizophrenia” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 2.1% (1) said it was necessary; 23.4% (11) said it was not necessary but helpful and 74.5% (35) said it was not necessary for the diagnosis of ASD.

4.8.7 Hearing voices

There were 47 respondents that answered the statement “Hearing voices” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 4.3% (2) said it was necessary; 19.1% (9) said it was not necessary but helpful and 76.6% (36) said it was not necessary for the diagnosis of ASD.

4.8.8 Hypersensitivities to certain environments

There were 49 respondents that answered the statement “Hypersensitivities to certain environments” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 57.1% (28) said it was necessary; 34.7% (17) said it was not necessary but helpful and 8.2% (4) said it was not necessary for the diagnosis of ASD.

4.8.9 Depression

There were 47 respondents that answered the statement “Depression” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 10.6% (5) said it was necessary; 46.8% (22) said it was not necessary but helpful and 42.6% (20) said it was not necessary for the diagnosis of ASD.

4.8.10 Anxiety

There were 48 respondents that answered the statement “Anxiety” as being necessary; not necessary but helpful; or not necessary for the diagnosis of ASD. As seen in Table 4.21, 27.1% (13) said it was necessary; 45.8% (21) said it was not necessary but helpful and 29.2% (14) said it was not necessary for the diagnosis of ASD.

Table 4.21 When diagnosing children with autism the following symptoms are necessary; not necessary but helpful; or not necessary for diagnosis

		Necessary	Not necessary but helpful	Not necessary	Total
Impaired social interaction	Count	43	6	0	49
	N %	87.8%	12.2%	0.0%	100.0%
Impaired communication	Count	35	13	1	49
	N %	71.4%	26.5%	2.0%	100.0%
Hallucinations	Count	1	11	37	49
	N %	2.0%	22.4%	75.5%	100.0%
Restricted and repetitive behaviour	Count	31	17	1	49
	N %	63.3%	34.7%	2.0%	100.0%
Lack of eye contact	Count	29	20	0	49
	N %	59.2%	40.8%	0.0%	100.0%
Confirmed Schizophrenia	Count	1	11	35	47
	N %	2.1%	23.4%	74.5%	100.0%
Hearing voices	Count	2	9	36	47
	N %	4.3%	19.1%	76.6%	100.0%
Hypersensitivities to certain environments	Count	28	17	4	49
	N %	57.1%	34.7%	8.2%	100.0%
Depression	Count	5	22	20	47
	N %	10.6%	46.8%	42.6%	100.0%
Anxiety	Count	13	21	14	48
	N %	27.1%	43.8%	29.2%	100.0%

CHAPTER 5
DISCUSSION

5.1 Introduction

In this study, 210 questionnaires were distributed to GPs in Northern Johannesburg, Gauteng, attending short courses/workshops for continuous professional development. A total of 52 general practitioners completed the study; the response rate was 24.8%. The following areas were explored further as they were identified to be significant.

5.2 Demographic data and basic information

There were no distinct patterns indicating a relationship between the number of years participants were in practice or how many children they saw in a week and participants level of knowledge.

5.3 Exposure to information about ASD

Various questions were asked regarding exposure to information about ASD. The results indicated that the majority of participants said that they had heard of the term ASD (4.3.1). Bateman explains that most physicians have a low awareness of autism and thus fear and avoid making the diagnosis. Exposure to the topic of ASD is important for continuous professional development, although participants reported to have read about ASD in medical journals, it was also reported that 80% of participants had not been exposed to the topic of ASD at symposiums or seminars, this leads to concerns of continuous professional development. As per the HPCSA Continuing Professional Development programme, healthcare practitioners are required and responsible to maintain and update their clinical skills and knowledge continually. Although this programme outlines that each practitioner has to accumulate 30 Continuous Educational Units (CEUs) per year, it is only required that 5 of those CEUs are for ethics, medical law and human rights (Health Professions Council of South Africa, 2018). Therefore, child health or neurodevelopment CEUs which may cover ASD, are optional. This would lead to less exposure on this topic and therefore possibly less awareness or knowledge regarding ASD.

At medical school, there is not always a great deal of exposure on ASD. No local studies were found on the curriculum of GPs currently or in the past, however a study conducted in Australia showed that there is a need for educational programmes on ASD for GPs in order to assist with early identification and referral to specialists. This study suggested that more structural education activities are warranted for GPs in order to enhance their knowledge and awareness on developmental disorders (Garg *et al.,* 2015). Although participants said that they were exposed to the topic of ASD, the degree or amount of information taught at medical school was unfortunately not explored. Studies have shown that due to lack of knowledge or false information on ASD, there is a less accurate diagnosis of ASD, which unfortunately leads to late diagnosis and poor prognosis (Bateman, 2013).

It was noted that there were over half of the participants that said that they had been exposed to ASD via national or international media (4.3.6), where the mode of communication in which they had been exposed to ASD was distributed between the following: television; internet and print media. With the huge impact of technology in this era, the use of internet and access to information such as journals, websites and databases regarding medical issues is understandable, with approximately 72.2% of Gauteng's population having access to internet in 2016, this result is expected (Statistics South Africa, 2016). Consumers of print media have been shown to be more likely educated as seen in this sample group and the consumption of print media is likely to have a similar weight to television when highlighting health issues (Gugsa *et al.,* 2016).

5.3.1 Prevalence of ASD

The results regarding the prevalence of ASD indicated that the majority of respondents did not have an estimate of the prevalence of ASD in children worldwide or in South Africa (4.3.8 and 4.3.10). Of the few that said that they had an estimate of the prevalence of ASD in children worldwide (4.3.9), less than half of them got the correct answer that 1 in 160 or 1 in 86 children suffer from ASD worldwide and in South Africa respectively (Word Health Organisation, 2016; Autism Western Cape, 2008; CDC, 2016). However, the exact statistics of prevalence rates of ASD in South Africa are not available and limited, therefore support the finding in this study.

Bateman reported that the Star Academy of Learning in Johannesburg, gets 10 tentatively or newly diagnosed children with ASD (Bateman, 2013). Whereas in the Western Cape, 10 children a week are collectively diagnosed with ASD between Red Cross Children's Hospital, Lentegeur and Tygerberg Hospitals. Accurate national autism statistics in South Africa are difficult to find, which may account for the lack in knowledge about the prevalence by participants in this study. Bateman further states that with 9 specifically tailored schools in the entire country, an estimated 135 000 autistic children are not getting the specialised education they need (Bateman, 2013). This supports the need for all healthcare practitioners including GPs to assist with the diagnosis/screening for ASD with appropriate referrals.

5.3.2 Diagnosing a child with Autism Spectrum Disorder

The majority of respondents that said that had not diagnosed a child with ASD (4.3.12). ASD is commonly diagnosed by psychologists, neurodevelopmental paediatricians or psychiatrists. If red flags for ASD are noticed during a consultation with a healthcare professional, they are generally referred to these professionals mentioned above. However, GPs being primary healthcare practitioners have an important role in early diagnosis of ASD. It has been found that healthcare workers' knowledge or lack thereof about ASDs greatly impacts the average age of diagnosis, as well as the overall prognosis of children with ASDs (Adak and Halder 2017; Bateman, 2013; Rhoades *et al.*, 2007).

5.4 Knowledge about ASD

5.4.1 Autistic children show detachment from their parents

When respondents were asked if autistic children show detachment from their parents (4.4.1), results indicated that the majority agreed with this statement. This is in line with the literature in that children with ASD do not respond appropriately emotionally to situations. They may present with total detachment or giggling, sobbing or hysterical behaviour (Glass, 2016). These finding were similar to Rahbar's study which found that the majority of his participants agreed with the same statement (Rahbar, 2011).

5.4.2 Socioeconomic classes and educational classes

Interestingly when respondents were asked whether they agreed with the false statement, ‘‘Autism is more prevalent among higher socioeconomic classes,’’ (4.4.2) most respondents disagreed or remained undecided. The results indicate that approximately only one third of respondents were aware that higher SES is not related to the prevalence of ASD. These results are similar to Rahbar’s findings that indicated that 43.4% of his participants disagreed with this statement (Rahbar, 2011).

Similarly, when participants were asked whether they agree with the false statement, ‘‘Autism is more prevalent among higher educational classes,’’ (4.4.3) the majority disagreed or remained undecided. These results are similar to Rahbar’s findings where 46,6% disagreed with this statement (Rahbar, 2011).

This reported knowledge is contrary to epidemiological research findings that state autism is prevalent among all socioeconomic and educational classes (Volkmar et al. 1997). Common indicators for SES such as household income and parental education or occupation are generally correlated to development and health of children. The association of SES and overall child development abilities are found to be inverse; in that prevalence decreases with increasing SES. However, in the case of ASD with its association of SES, there seems to be mixed results. Both clinical and epidemiological studies have shown that there is no link between socioeconomic status and ASD prevalence. However higher SES may lead to an increase of an efficient and accurate diagnosis of ASD (Adak and Halder 2017; Durkin *et al.,* 2010; Qi *et al.,* 2016).

5.4.3 Autistic children are not affectionate

The results indicated that, half of the respondents disagreed with the false statement 'Autistic children are not affectionate' (4.4.4). These results are similar but slightly lower to Rahbar’s findings where 57,3% disagreed with this statement (Rahbar, 2011).

Children with autism present differently with regards to showing affection, as do most people. Affectionate communication entails ones expressing feelings of love, gratitude, closeness, and care to another person by using verbal, non-verbal and supportive forms of communication. Some children like to show affection by hugging or cuddling and some may show their affection by a short squeeze of a hand. Some children with ASD may prefer not to be touch or approached, however if they want to be close they will reach out to parents or caregivers. Affectionate behaviour varies throughout the spectrum and is individualised to each child (Andrews *et al.,* 2013; Dundon, 2017). It has been found that children with Asperger syndrome (AS) have difficulty understanding, expressing and receiving appropriate forms and levels of affectionate behaviour. Some children with AS do not express enough affection to satisfy their families and friends, while others engage in too much affection and at the wrong intensity (Andrews *et al.,* 2013). This variation in presentation accounts for the results found in this study.

5.4.4 Schizophrenia

Results indicate that more than half of the respondents disagreed when asked if they agree with the false statement, ‘‘Autism is a precursor for schizophrenia.’’ (4.4.5). These results are positive and are higher than Rahbar’s findings where only 37.7% disagreed with this statement (Rahbar, 2011). These views on autism and its link to schizophrenia are not current and reflect the description of autistic children by the American Psychiatric Association in 1952 and 1968 (Volkmar *et al.,* 1997).

Of the respondents, the majority were undecided, with the false statement: “It is hard to distinguish between ASD and schizophrenia clinically in children (4.4.6). These results are lower than Rahbar’s findings where 61.3% disagreed with this statement (Rahbar, 2011). Findings in recent research shows that patients with schizophrenia are significantly less likely to show symptoms of autism disorder (Konstantareas and Hewitt 2001).

It has previously been proposed that ASD is a precursor for schizophrenia and that it is hard to distinguish between ASD and schizophrenia clinically in children. However, there has been an increased diagnostic competence on the presentation and characteristics of ASD.

Schizoidal and schizotypal symptoms include some of those seen in ASD such as lifelong impairments in social interaction, communication and ritualistic and routine behaviour. The differentiating factors can be found by a developmental history. People with ASD demonstrate an entire clinical picture before age 3 years, whereas those with schizoid or schizotypal personality disorder have fairly typical development as children however they become symptomatic as adolescents. Moreover, people with ASD are not necessarily aloof, unlike those with schizoid or schizotypal personality disorders, but they may be socially motivated but awkward, immature and inappropriate when engaging with others (Woodbury-Smith et al., 2010). Schizophrenia is associated with hallucinations and delusions which is one of the differentiating symptoms when comparing it to ASD (Konstantareas and Hewitt 2001).

5.4.5 I have a high level of accuracy in diagnosing autism spectrum disorders

The results reflect that a very high portion of respondents (78%) disagreed with the statement "I have a high level of accuracy in diagnosing autism spectrum disorders" (4.4.7). These results are higher than Rahbar's findings where 41% disagreed with this statement (Rahbar, 2011). GPs, being primary health care practitioners, have an important role in early diagnosis of ASD. It has been found that health care workers' knowledge or lack thereof about ASDs greatly impacts the average age of diagnosis, as well as the overall prognosis of children with ASDs (Adak and Halder 2017; Rhoades *et al.*, 2007).

5.4.6 ASD in children is mostly attributed to neglect in early childhood parenting

The results showed that a very high percentage of respondents (85.7%) disagreed with the false statement, ''Autism in children is mostly attributable to neglect in early childhood by parents.'' These results are much higher than Rahbar's findings where only 48.4% disagreed with this statement (Rahbar, 2011). This view reflects an outdated theory introduced by Kanner in 1943. Most recent studies suggest that autism is a multi-factorial disorder, perhaps a result of both genetic and environmental factors. Therefore, autism cannot be simply explained by cold parental interaction and neglect in childhood (Johnson *et al.*, 2007; Luleci, 2016; Udhya, 2014; Volkmar *et al.* 1997).

5.4.7 Children tend to be psychologically mature and grow out of ASD (where symptoms disappear)

A high percentage of respondents (76%) disagreed with the statement “Children tend to be psychologically mature and grow out of ASD (where symptoms disappear)". These results are higher than Rahbar’s findings where only 48.4% disagreed with this statement (Rahbar, 2011).

These results correlate to the information that ASD is a pervasive disorder, that is lifelong, where symptoms show from infancy/early childhood and has an impact throughout life (American Psychiatric Association, 2013).

5.5 Attitudes

5.5.1 ASD holds a social stigma in the community you work in

A high portion of respondents (76.0%) agreed, with this statement “ASD holds a social stigma in the community you work in”. This result was slightly higher than the findings in Rahbar's study conducted on GPs in Karachi, where 61.3% agreed with this statement (Rahbar, 2011). Various other studies also found that parents of children with ASD and their children experience increased levels of stigmatization (Fewster and Gurayah, 2015; Shamsudin *et al.*, 2014; Gurayah, 2015; Luleci *et al.*, 2016;). It is also reported that people with ASD are often subjected to discrimination and stigma (World Health Organization, 2017).

5.5.2 Opinion towards children diagnosed with ASD

The results indicate that less than half of the respondents agreed, with the statement “Diagnosing a child with ASD will lead to discrimination against the child”. These results are similar but slightly lower than those found in Rahbar's study, where 40.3% agreed and 9.7%

strongly agreed with this statement (Rahbar, 2011). As noted above children with ASD are subject to discrimination (World Health Organization, 2017).

The results also indicated that over two thirds of the respondents agreed with the statement "In general, there is a negative opinion towards children diagnosed with ASD". These results are similar to Rahbar's study, where 84.2% agreed with this statement (Rahbar, 2011).

Negative views about ASD can be combated by social awareness and education regarding the presentation and symptoms of ASD. Autism is regarded as a differing cognitive style rather than a disorder according to the social model. The autism rights movement draws from this model and hopes for society acceptance that ASD be referred to a neurological variation with the human population. Researchers have acknowledged the stigmatisation and discrimination potential in the diagnosis of ASD and therefore calls for the term to be referred to as 'conditions' instead of 'disorders' (Luleci *et al.*, 2016; Russell and Norwich, 2012).

5.5.3 The diagnosis of ASD would be of value to the family

Majority of participants (96%) agreed, with the statement "The diagnosis of ASD would be of value to the family". This response is positive as research has indicated that early detection of ASD is crucial to maximise the child's potential, target interventions and provide appropriate support for ASD. Early recognition and diagnosis allows for improving the prognosis and would therefore be of value to the family (Yates and Le Couteur, 2016).

5.5.4 Autism is preventable

The results indicated that approximately two thirds of the respondents strongly disagreed with the false statement that 'Autism is preventable'. These results are higher compared to Rahbar's study, where only 45% disagreed with this statement (Rahbar, 2011).

These results are positive and can be correlated to the literature that indicated that the aetiology of ASD is accepted to be biological with evidence suggesting that it has a complex genetic basis with strong heritability. However, continuing research has not found an exact aetiology and therefore definitive steps to ensure prevention are obscured (Bakare, 2009; Yates and Le Couteur, 2016).

5.6 Practices

5.6.1 Have you heard of any of the following diagnostic tools?

The most common diagnostic tools heard by participants (4.6.1) was DSM-IV (82.4%) and DSM-V (70.2%). These results can be attributed due to the DSM-V and DSM-IV being classification systems which have greatly contributed to the reliability of the diagnosis of psychiatric disorders, therefore they are more commonly referenced in the literature as they are extremely valuable in clinical practice. Furthermore, there is no training or costs involved for its use by medical practitioners.

5.6.2 Which diagnostic tool/s do you utilise to diagnose Autism Spectrum Disorders?

The most common diagnostic tools utilised by participants (4.6.2) are stated was general evaluation (46.2%); DSM-IV (30.8%); and DSM-V (21.2%).

These results may be attributed by general evaluation involving history and examination as being one of the most commonly used means of finding a diagnosis in clinical practice for certain conditions (Heneghan *et al.,* 2009). Interestingly the DSM-IV option was utilised more than the DSM-V, where the former is an outdated classification and was replaced by the DSM-V classification in 2013 (American Psychiatric Association, 2013).

It is evident that the respondents were not able to identify or utilise current diagnostic classification systems in order to diagnose ASD, this may be attributed to lack of training on the diagnosis of ASD or lack of updating their knowledge on this topic via CEUs, but also

because a high percentage said that they do not feel that they have a high accuracy in diagnosing ASD (4.4.7).

5.7 'Red Flags' for ASD

When participants were asked about the ‘red flags’ of ASD, majority of the respondents agreed with the following true statements:

- ‘Not respond to their name by 12 months of age’ (4.7.1), (84.0%);
- ‘Not pointing at objects to show interest (e.g. not point at an airplane flying over) by 14 months’ (4.7.3), (88.9 %);
- ‘Not able to play "pretend" games (e.g. pretend to "feed" a doll) by 18 months’ (4.7.4), (82.2 %);
- ‘Avoids eye contact and wants to be alone’ (4.7.5), (95.8 %);
- ‘Has trouble understanding other people's feelings or talking about their own feelings’ (4.7.6), (95.7 %);
- ‘Has delayed speech and language skills’ (4.7.7), (88.9 %);
- ‘Gives unrelated answers to questions’ (4.7.9), (64.4 %);
- ‘Has obsessive interests’ (4.7.11), (91.5 %); and
- ‘Flap their hands, rock their bodies, or spin in circles’ (4.7.12), (95.8%).

Respondents agreed with the following false statement and regarded them as a red flag for ASD:

- ‘Delay in walking at 18 months of age’ (4.7.2), (52.3%) agreed with this statement. Research has shown that a portion of children with ASD may suffer from hypotonia, causing delays in motor skills such as rolling, sitting, standing and walking. Although there may be a slight delay in walking in children with ASD, they do not meet the criteria for “delayed walking” which is set at 18 months of age (Shetreat-Klein et al., 2014).

Respondents disagreed with the following false statements and didn't regarded it as a red flag for ASD:

- 'Fear of causing harm to themselves or others' (4.7.8), (75.0%) disagreed with this statement. This is a clinical feature of OCD, and therefore not considered a red flag for ASD (Vale and Roberts, 2014).
- 'Willing to approach a complete stranger for comfort e.g. to be picked up' (4.7.10), (20.9%) disagreed with this statement. This is characteristic of attachment disorders and not ASD, as primary behavioural features of attachment disorders include inappropriate approach to unacquainted adults and lack of wariness of strangers, and an inclination to go astray with strangers (Zeanah and Gleason, 2014).

5.8 Diagnosis of ASD

When diagnosing children with autism the following symptoms were evaluated and participants were asked whether they thought these symptoms were are necessary; not necessary but helpful; or not necessary for diagnosis.

5.8.1 Impaired social interaction

The results indicated that a high percentage (87.8%) of respondents that answered the statement "Impaired social interaction" (4.8.1), said it was necessary for the diagnosis of ASD. These results are in agreement with the DSM-V criteria and the definition of ASD; ASDs are neurodevelopmental disorders characterised by impaired socialisation (American Psychiatric Association, 2013)

5.8.2 Impaired communication

The results indicated that a high percentage (71.4%) of respondents "Impaired communication" (4.8.2), said it was necessary for the diagnosis of ASD. As per the DSM-V criteria and the definition of ASD the majority of participants answers this statement correctly. ASDs is characterised by impaired verbal and non-verbal communication (American Psychiatric Association, 2013). However, impaired communication is a non-specific finding and all the criteria should be met.

5.8.3 Hallucinations

The results indicated that a high percentage (75.5%) of respondents that answered the statement "Hallucinations" (4.8.3), said it was not necessary for the diagnosis of ASD. The diagnosis of schizophrenia in children with ASD requires the DSM-V classification present with the presence of distinct hallucinations and delusions appearing for at least one month. Hallucinations are not necessary for the diagnosis of ASD and therefore majority of participants were correct (Kaba *et al.,* 2017).

5.8.4 Restricted and repetitive behaviour

The results indicated that just under two thirds of respondents that answered the statement "Restricted and repetitive behaviour" (4.8.4), said it was necessary for the diagnosis of ASD. This result correlates to the literature that states that as per the DSM-V criteria and the definition of ASD; ASDs are neurodevelopmental disorders characterised by impaired socialisation, impaired verbal and non-verbal communication, limited interests and repetitive or stereotypical patterns of behaviour (American Psychiatric Association, 2013)

5.8.5 Lack of eye contact

The results indicated that the majority of (59.2%) of respondents that answered the statement "Lack of eye contact" (4.8.5), said it was necessary for the diagnosis of ASD. These results are congruent with the DSM-V which states that deficits in nonverbal communicative behaviours which are utilised for social interaction, such as abnormalities in eye contact may be present (American Psychiatric Association, 2013).

5.8.6 Confirmed Schizophrenia

The results indicated that a high percentage (74.5%) of respondents answered the statement "Confirmed Schizophrenia" (4.8.6), said it was not necessary for the diagnosis of ASD. This can be confirmed by the literature available which states that schizophrenia is diagnosed later in life and affects mainly young adults; while ASD is a neurodevelopmental disorder of

childhood. Both disorders share genetic influences with impairments in social communication, however they present with distinct developmental profiles of their genetic links, which is in line with their onset and clinical features (Prata *et al.*, 2017).

5.8.7 Hearing voices

The results indicated that a high percentage (76.6%) of respondents answered the statement "Hearing voices" (4.8.7), said it was not necessary for the diagnosis of ASD. These results can be corroborated by the available literature that shows despite the similar clinical features of very early onset schizophrenia and ASD, the differential diagnosis can be determined in terms of both age of onset and clinical presentation. The diagnosis of schizophrenia in children with ASD requires the DSM-V classification present with the presence of distinct hallucinations (which may be auditory) and delusions appearing for at least one month. (Kaba *et al.*, 2017).

5.8.8 Hypersensitivities to certain environments

The results indicated that the majority (57.1%) of respondents that answered the statement "Hypersensitivities to certain environments" (4.8.8), said it was necessary for the diagnosis of ASD. These results are in line with the literature available. Hyper- or hypo-activity to sensory stimuli/input (touch, sound, light) is said to be experienced in those with ASD which leads to either an over-responsiveness or under-responsiveness to sensory stimuli respectively. This is the reason that these children may either seek sensory stimulating behaviours (finger flicking, rocking) or eliminating behaviours (aversion to certain food, noises, and being touched) (American Psychiatric Association, 2013; Autism South Africa, 2014).

5.8.9 Depression and Anxiety

Most participants said that 'depression' (4.8.9) (75.0%) and 'anxiety' (4.8.10) (88.4%) was not necessary but helpful or was not necessary for the diagnosis of ASD, which is in line with the literature. Children with ASD may suffer with numerous comorbid features such as anxiety, depression, other behavioural problems such as ADHD (van Steensel *et al.*, 2012).

5.9 Limitations and assumptions

There were a few factors that may have influenced the results of this study negatively.

The section in the questionnaire exploring "Practices" was not clear or accurate regarding the diagnostic tools for ASD. The tools listed in these sections were a combination of diagnostic and screening tools and this may have affected the answering of these questions and therefore the outcome for this section. Although if participants answered the question incorrectly by choosing a screening tool or non-diagnostic evaluation, it may be regarded as them not being able to identify the difference between them.

There were 210 questionnaires distributed to practitioners in Northern Johannesburg, with only a total of 52 responses, this low response rate caused a major challenge and affected the duration of this study. Various factors may have contributed to this poor response rate, it may have been due to time constraints that GPs experience or that their area of special interest may have not been in paediatrics and therefore they were disinterested in participating in this study.

This survey was based on self-reported knowledge about ASD. Several questions in this survey may have been influenced by recall bias depending on the specific length of time since the graduation of each GP.

This study did not look at the change over time in medical knowledge of GPs and also used a small number of participants that cannot be generalised to all GPs in Gauteng but only those based in Northern Johannesburg, Gauteng.

Face-to-face interviews with GPs may have allowed for more rich data collection, which would allowed for further discussion and relationships to be made regarding various variables.

This study was also limited to GPs in private practice, however it would have been useful to investigate the views of GPs in the public sector. Patients seen by GPs in the private sector often have easier access to information, a higher SES and higher levels of education which may have an impact on their awareness of ASD symptoms. Future studies may want to explore the attitudes and views that GPs have in the public sector/rural settings towards ASD.

CHAPTER 6
CONCLUSION

6.1 Conclusions

ASD are neurodevelopmental disorders characterised by impaired socialisation, impaired verbal and non-verbal communication, limited interests and repetitive or stereotypical patterns of behaviour (American Psychiatric Association, 2013). Detecting ASD in children is of great importance because research demonstrates that the benefits of intervention involve early identification ensuring early intervention. This will position children with ASD on a better developmental trajectory (Branson *et al.,* 2008; Zwaigenbaum *et al.,* 2015).

The aim of this study was to determine the knowledge and attitudes that GPs have towards ASD in children, in Northern Johannesburg, Gauteng.

In conclusion, it was found that GPs in Northern suburbs of Gauteng lacked knowledge with regards to the prevalence rates of ASD in children both worldwide and in South Africa. Participants were however knowledgeable with regards to most aspects evaluated related to the presentation of ASD except for the able to distinguish between ASD and schizophrenia clinically and they also incorrectly believed that a delay in walking at 18 months of age was considered a red flag for ASD.

Based on the results of this study a high percentage of respondents reported that they did not have a high level of accuracy in diagnosing ASD and approximately two thirds had never diagnosed a child with ASD. Respondents also utilised the incorrect methods of diagnosing ASD namely general evaluation and the outdated DSM-IV criteria. However, they generally reported to know the pertinent symptoms necessary for the diagnosis of ASD such as impaired social interaction; impaired communication; and restricted and repetitive behaviour.

When participants were asked about their views and attitudes towards ASD, a vast majority believed that: ASD holds a social stigma in the community in which they work in; that there is a negative attitude towards children diagnosed with ASD; and the diagnosis of a child with ASD would lead to discrimination against the child. They also correctly agreed that the diagnosis of ASD would be of value to the family.

6.2 Recommendations

Future recommendations for further studies and considerations may be of value:

- A similar study can be conducted in various regions of Gauteng to ascertain the knowledge and attitudes of ASD in children;
- A similar survey can be conducted assessing knowledge and attitudes of ASD in children, in various other health care professionals;
- Recruitment of participants should involve both direct approach and advertisements at workshops simultaneously to allow for a higher and faster response rate;
- In order to avoid any degree of misunderstanding, loss of meaning as to the intent of the questions, more time can be dedicated to each participant to explain the questionnaire more thoroughly;
- Differentiating between diagnostic tools and screening tools in the questionnaire utilised in this study will result in more reliable findings and outcomes;
- The questionnaire can be translated into multiple languages for future studies to facilitate the participants understanding; and
- Continuous professional development programmes for medical practitioners should incorporate a variety of topics including child health neurodevelopment and ASD.

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Appendix A

Communication telephonically

"My name is Reshma; I am undertaking this study in completion of my Postgraduate Master's Degree in Child Health Neurodevelopment. I am a postgraduate student studying at the University of Witwatersrand (WITS).

I would like to invite you to participate in a research project that I am conducting that will be investigating General Practitioners knowledge and attitudes with regard to Autism Spectrum Disorders in children in Gauteng, South Africa using a questionnaire.

"It is my hope that your response will help in the better understanding of the current role of General Practitioners in South Africa as a member of the multidisciplinary, as well as highlight possible limitations that may need to be addressed. The study of General Practitioners knowledge of Autism Spectrum Disorders is limited, internationally as well as locally."

"Would you be interested in taking part in this study?"

If answer is yes, " Thank you for willing to participate in this study, It will be conducted over email with a Questionnaire that should take approximately 10-15 minutes to complete, thereafter if you could please save it and email it back to me at wits.research2014@gmail.com."

Communication via Email:

Dear prospective participant

My name is Reshma; I am undertaking this study in completion of my Postgraduate Master's Degree in Paediatric Neurodevelopment. I am a student studying at the University of Witwatersrand (Wits).

This study is: Investigating General Practitioners familiarity, and attitudes with regard to Autism Spectrum Disorders in children in Gauteng, South Africa and you are kindly invited to participate in this research project.

Please could you reply 'YES' to this email if you so wish to take part in this study, shortly after your reply you will be sent the Questionnaire, that you will be kindly requested to complete. It should

take you approximately 10-15 minutes to complete. It is to be emailed back to myself (**wits.research2014@gmail.com**) on completion. The questionnaire will be attached together with a information letter.

It is my hope that your response will help in the better understanding of the current role of General Practitioners in South Africa as a member of the multidisciplinary, as well as highlight possible limitations that may need to be addressed. The study of General Practitioners knowledge and attitude of Autism Spectrum Disorders is limited, internationally as well as locally.

Your consideration to take part in this study is extremely appreciated and results from this study will contribute to the body of knowledge on Autism Spectrum Disorders in South Africa.

Thank you

Reshma Patel

Appendix B

Information form

Dear Volunteer

My name is Reshma; I am undertaking this study in completion of my Postgraduate Master's Degree in Paediatric Neurodevelopment. I am a student studying at the University of Witwatersrand (Wits).

This study is: Investigating general practitioners' knowledge and attitudes with regard to Autism Spectrum Disorders in children in Gauteng, South Africa and you are invited to participate in this research project.

Thank you for willing to participate in this survey.

Please do not enter your name or contact details on the questionnaire. Your personal details will remain anonymous, and your email address will be kept confidential. Participation is completely voluntary and you may withdraw at any time. You may request feedback of the findings of the study from the researcher after the research has been completed. Please indicate to the researcher should you require feedback regarding the research.

Should you have any queries or comments regarding this survey, you are welcome to contact myself:

Researcher: Reshma Patel 0833439931
or
wits.research2014@gmail.com

Appendix C

Questionnaire

ATTITUDES AND KNOWLEDGE OF GENERAL PRACTITIONERS IN NORTHERN JOHANNESBURG, GAUTENG, TOWARDS AUTISM SPECTRUM DISORDERS IN CHILDREN

Please answer the following questions, by either marking your answer with a "X" where applicable or filling in your answers:

Medical Practitioner Information

1.1	Age group	Under 30 year	
		Between 30 and 40 years	
		Older than 40 year	
1.2	Gender	Male	
		Female	
1.3	Place of residence for majority of your childhood	South Africa	
		Other	
1.4.1	What is the name of the medical school you attended?		
1.4.2	What is the location of the medical school you attended?		

1.5 What year did you graduate from medical school?

1.6 Have you received any further training post medical school?

Yes	
No	

If you answered "yes" please specify

1.7 Although you are in general practice, do you have a current field of personal interest in medicine?

Surgery	
General Practice	
Obstetrics/Gynaecology	
Paediatrics	
Psychiatry	
Internal Medicine	
Geriatrics	
Emergency Medicine	
Other	

Practice and Patient Information

2.1 Where in Johannesburg is your practice?

Northern suburbs	
Southern suburbs	
Johannesburg CBD	
Eastern suburbs	
Western suburbs	

2.2 How long have you been practising?

Less than 1 year	
Between 1 and 5 years	
Between 5 and 10 years	
More than 10 years	

2.3 On a typical day, how many hours do you spend practising?

Less than 5 hours	
Between 5 and 8 hours	
More that 8 hours	

2.4 How many patients, including both adults and children, do you see on a typical day?

Between 1 and 5	
Between 5 and 10	
More than 10	

2.5 On average how many children, between ages 2 and 12 years old, are treated in your practice on a weekly basis?

Between 1 to 3	
Between 3 to 6	
Between 6 to 10	
More than 10	

2.6 Generally, from what setting do your patients come?

Urban	
Rural	
Periurban	

2.6.1 Generally, which socioeconomic class do your patients come from?

Lower class	
Middle class	
Upper class	

2.7 On average, how much time do you spend with each patient?

Less than 30 minutes	
Between 30 and 60 minutes	
More than 60 minutes	

Autism Spectrum Disorder ("ASD") Information

3. ***Exposure to information about ASD***

3.1 Have your heard of the term “Autism Spectrum Disorders (ASD)”?

Yes	
No	

3.2 At medical school, were you exposed to the topic of autism or Autism Spectrum Disorders (ASD)?

Yes	
No	

3.3 Have you been exposed to autism at a symposium or seminar?

Yes	
No	

If yes, exactly who organized it:

3.4	Have you read about autism in medical journals?	Yes	
		No	
3.5	Have you been contacted by any national or international organizations regarding autism or ASD?	Yes	
		No	
	If yes, which organization?		
3.6	Have you been exposed to autism or ASD via national or international media?	Yes	
		No	
3.7	If yes, which mode of communication	Television	
		Radio	
		Internet	
		Print Media	
		Other	
3.8	Do you have an estimate of the prevalence of Autism Spectrum Disorder in children *worldwide?*	Yes	
		No	
3.8.1	If yes, what is that estimate?	1 in 80	
		1 on 160	
		1 in 320	

3.9 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in *South Africa*?

Yes	
No	

3.9.1 If yes, what is that estimate?

1 in 43	
1 in 86	
1 in 172	

3.10 Have you ever diagnosed a child with Autism Spectrum Disorder?

Yes	
No	

4 ***Knowledge about ASD***

Mark a 'X' under the option you select

Do you agree with following statements from ***1 (strongly agree) to 5 (strongly disagree)***

(1) ---------- (2) ----------(3) ---------- (4) ---------- (5)

Strongly Agree Agree Undecided Disagree Strongly Disagree

		1 Strongly Agree	2 Agree	3 Undecided	4 Disagree	5 Strongly Disagree
4.1	Autistic children show detachment from their parents					
4.2	ASD is more prevalent in higher socio-economic classes					
4.3	ASD is more prevalent in higher educational classes					
4.4	Autistic children are not affectionate					
4.5	ASD is a precursor for schizophrenia					
4.6	It is hard to distinguish between ASD and schizophrenia clinically in children					
4.7	I have a high level of accuracy in diagnosing autism spectrum disorders					
4.8	ASD in children is mostly attributed to neglect in early childhood parenting					
4.9	Children tend to be psychologically mature and grow out of ASD (where symptoms disappear)					

5. ***Attitudes***

Do you agree with following statements from ***1 (strongly agree) to 5 (strongly disagree)***

Mark a 'X' under the option you select

(1) ---------- (2) ----------(3) ---------- (4) ---------- (5)

Strongly Agree Agree Undecided Disagree Strongly Disagree

		1	2	3	4	5
		Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
5.1	ASD holds a social stigma in the community you work in					
5.2	Diagnosing a child with ASD will lead to discrimination against the child					
5.3	In general, there is a negative opinion towards children diagnosed with ASD					
5.4	The diagnosis of ASD would be of value to the family					
5.5	Autism is preventable					

6. ***Practices***

6.1 Have you heard of any of the following diagnostic tools? **Mark a 'X' under the options you select**

		Yes	No
6.1.1	ADI-R or ADOS (Autism Diagnostic Interview-Revised or Autism Diagnostic Observation Schedule)		
6.1.2	CHAT (Checklist for Autism in Toddlers)		
6.1.3	M-CHAT Modified Checklist for Autism in Toddlers)		
6.1.4	ITC (Infant Toddler Checklist)		
6.1.5	ESAT (Early Screening for Autistic Traits)		
6.1.6	DSM-IV (Diagnostic and Statistical Manual of Mental Disorders 4)		
6.1.7	DSM-V (Diagnostic and Statistical Manual of Mental Disorders 5)		

6.2 Which diagnostic tool/s do you utilise to diagnose Autism Spectrum Disorders?

Mark a 'X' under the options you select

Use ADI-R or ADOS		
General evaluation		
MCHAT		
Parents are given a questionnaire to fill out and note observation		
DSM IV criteria		
DSM V criteria		
Other (Specify)		

6.3 Mark with '**X**' ***(Yes/No)***, if the following **are** possible 'Red Flags' for ASD

		Yes	No
6.3.1	Not respond to their name by 12 months of age		
6.3.2	Delay in walking at 18 months of age		
6.3.3	Not pointing at objects to show interest (e.g. not point at an airplane flying over) by 14 months		
6.3.4	Not able to play "pretend" games (e.g. pretend to "feed" a doll) by 18 months		
6.3.5	Avoids eye contact and wants to be alone		
6.3.6	Has trouble understanding other people's feelings or talking about their own feelings		
6.3.7	Has delayed speech and language skills		
6.3.8	Fear of causing harm to themselves or others		
6.3.9	Gives unrelated answers to questions		
6.3.10	Willing to approach a complete stranger for comfort e.g. to be picked up		
6.3.11	Has obsessive interests		
6.3.12	Flap their hands, rock their bodies, or spin in circles		

6.4 When diagnosing children with ASD the following symptoms are

necessary; not necessary but helpful; or ***not necessary*** for diagnosis

	Mark a 'X' under the option you select	Necessary	Not necessary but helpful	Not necessary
6.4.1	Impaired social interaction			
6.4.2	Impaired communication			
6.4.3	Hallucinations			
6.4.4	Restricted and repetitive behaviour			
6.4.5	Lack of eye contact			
6.4.6	Confirmed Schizophrenia			
6.4.7	Hearing voices			
6.4.9	Hypersensitivities to certain environments			
6.4.10	Depression			
6.4.11	Anxiety			

The end, thank you for completing the questionnaire!

For any further questions or queries, please contact me on 578507@students.wits.ac.za

Appendix D

Permission Letter for Use of Survey

Dear Dr. Patel,

Thank you for agreeing to collaborate with me on this project.

Attached is a DRAFT copy of the paper and the questionnaire that was used for this study.

Though this will give you an idea as how to start, I am sure we can make improvements before using this questionnaire for your setting.

I look forward to collaborating with you on this project and your other colleagues.

Best wishes,

Mohammad Hossein Rahbar, PhD
Professor of Epidemiology and Biostatistics The University of Texas School of Public Health at Houston and
Director, Division of Clinical and Translational Sciences Department of Internal Medicine, Medical School and
Director, Biostatistics/Epidemiology/Research Design (BERD) Core
Center for Clinical and Translational Sciences
The University of Texas Health Science Center at Houston
UT Professional Building, Room 1100.05
6410 Fannin Street
Houston, TX 77030

Phone: (713) 500-7901

Fax: (713) 500-0766

E-mail: Mohammad.H.Rahbar@uth.tmc.edu

From: Patel, Reshma [mailto:rpatel@uj.ac.za]

Sent: Monday, November 25, 2013 7:32 AM

To: Rahbar, Mohammad Hossein

Subject: Re: Research

Thank you so much for your reply, I am very happy to collaborate with you on this project.

I have two supervisors in South Africa as well, I'm sure together we can make this project a success.

On 19 Nov 2013, at 18:00, "Rahbar, Mohammad Hossein"
<Mohammad.H.Rahbar@uth.tmc.edu> wrote:

Dear Dr. Patel,

Thank you for your interest in our paper "Knowledge and Attitude of General Practitioners Regarding Autism in Karachi, Pakistan".

I have received several requests from investigators from several countries for implementing this survey in their countries. In all those instances I have offered myself to collaborate because we have learned so much by conducting the survey that if we need to redo that the questionnaire will certainly change. Therefore, I am willing to share the questionnaire as long as you are willing to consider me as a collaborator on this project. Hopefully, this collaboration will lead to a stronger collaboration with your institution and research team to write an autism grant in collaboration with you and other faculty in your institution in South Africa. This is an effort for developing collaborations with faculty in the developing world as part of Brain Disorders in Developing Countries funded by Fogarty International Center(FIC)/NIH, National Institutes of Health in the US. I have currently a funded project to do autism research in Jamaica. I have also submitted a new grant last Feb. to conduct autism research in Pakistan. I look forward to developing a projects focused on autism in South Africa.

I hope this is acceptable to you. I look forward to collaborating with you on this project.

Best wishes,

Mohammad Hossein Rahbar, PhD
Professor of Epidemiology and Biostatistics The University of Texas School of Public Health at Houston and
Director, Division of Clinical and Translational Sciences Department of Internal Medicine, Medical School and
Director, Biostatistics/Epidemiology/Research Design (BERD) Core
Center for Clinical and Translational Sciences
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Phone: (713) 500-7901

Fax: (713) 500-0766

E-mail: Mohammad.H.Rahbar@uth.tmc.edu

Appendix E

Human Research Ethics Committee Clearance

R14/49 Dr Reshma Patel

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140934

NAME: (Principal Investigator)	Dr Reshma Patel
DEPARTMENT:	Paediatrics
PROJECT TITLE:	Attitudes and Knowledge of General Practitioners in Gauteng , South Africa, towards Autism Spectrum Disorders in Children
DATE CONSIDERED:	03/10/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Lorna Jacklin
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	24/06/2015

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

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 resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix F

Turnitin Report

Final Dissertation ASD

ORIGINALITY REPORT

20%	14%	12%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Mohammad Hossein Rahbar. "Knowledge and Attitude of General Practitioners Regarding Autism in Karachi, Pakistan", Journal of Autism and Developmental Disorders, 07/15/2010 Publication	3%
2	Qualls, Lydia R., and Blythe A. Corbett. "Examining the relationship between social communication on the ADOS and real-world reciprocal social communication in children with ASD", Research in Autism Spectrum Disorders, 2017. Publication	1%
3	www.sldc.net Internet Source	1%
4	link.springer.com Internet Source	1%
5	autismhomesupport.com Internet Source	1%
6	Comprehensive Guide to Autism, 2014. Publication	1%

Appendix G

Chi Squared Test Results

Q2_2 How long have you been practising? * Q3_8 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children worldwide?

Crosstab

			Q3_8 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children worldwide?		
			Yes	No	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	1
		% within Q2_2 How long have you been practising?	0,0%	100,0%	100,0%
	Between 1 and 5 years	Count	0	5	5
		% within Q2_2 How long have you been practising?	0,0%	100,0%	100,0%

	Between 5 and 10 years	Count	3	1	4
		% within Q2_2 How long have you been practising?	75,0%	25,0%	100,0%
	More than 10 years	Count	5	35	40
		% within Q2_2 How long have you been practising?	12,5%	87,5%	100,0%
Total		Count	8	42	50
		% within Q2_2 How long have you been practising?	16,0%	84,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.868[a]	3	0,008
Likelihood Ratio	9,327	3	0,025
Linear-by-Linear Association	0,021	1	0,885
N of Valid Cases	50		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .16.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,487	0,008
	Cramer's V	0,487	0,008
N of Valid Cases		50	

Q2_2 How long have you been practising? * Q3_9 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in South Africa?

Crosstab

			Q3_9 Do you have an estimate of the prevalence of Autism Spectrum Disorder in children in South Africa?		
			Yes	No	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	1
		% within Q2_2 How long have you been practising?	0,0%	100,0%	100,0%
		Count	2	3	5

	Between 1 and 5 years	% within Q2_2 How long have you been practising?	40,0%	60,0%	100,0%
	Between 5 and 10 years	Count	1	3	4
		% within Q2_2 How long have you been practising?	25,0%	75,0%	100,0%
	More than 10 years	Count	2	39	41
		% within Q2_2 How long have you been practising?	4,9%	95,1%	100,0%
Total		Count	5	46	51
		% within Q2_2 How long have you been practising?	9,8%	90,2%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)

Pearson Chi-Square	7.434[a]	3	0,059
Likelihood Ratio	5,506	3	0,138
Linear-by-Linear Association	4,507	1	0,034
N of Valid Cases	51		

a. 7 cells (87.5%) have expected count less than 5. The minimum expected count is .10.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,382	0,059
	Cramer's V	0,382	0,059
N of Valid Cases		51	

Q2_2 How long have you been practising? * Q3_10 Have you ever diagnosed a child with Autism Spectrum Disorder?

Crosstab

			Q3_10 Have you ever diagnosed a child with Autism Spectrum Disorder?		
			Yes	No	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	1
		% within Q2_2 How long have you been	0,0%	100,0%	100,0%

		practising?			
	Between 1 and 5 years	Count	3	2	5
		% within Q2_2 How long have you been practising?	60,0%	40,0%	100,0%
	Between 5 and 10 years	Count	2	2	4
		% within Q2_2 How long have you been practising?	50,0%	50,0%	100,0%
	More than 10 years	Count	14	28	42
		% within Q2_2 How long have you been practising?	33,3%	66,7%	100,0%
Total		Count	19	33	52
		% within Q2_2 How long have you been practising?	36,5%	63,5%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.261[a]	3	0,520
Likelihood Ratio	2,529	3	0,470
Linear-by-Linear Association	0,493	1	0,483
N of Valid Cases	52		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .37.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,209	0,520
	Cramer's V	0,209	0,520
N of Valid Cases		52	

Q2_2 How long have you been practising? * Q4_2 ASD is more prevalent in higher socio-economic classes

Crosstab

			Q4_2 ASD is more prevalent in higher socio-economic classes				
			Agree	Undecided	Disagree	Strongly Disagree	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	0	0	1
		% within Q2_2 How long	0,0%	100,0%	0,0%	0,0%	100,0%

		have you been practising?					
	Between 1 and 5 years	Count	0	1	4	0	5
		% within Q2_2 How long have you been practising?	0,0%	20,0%	80,0%	0,0%	100,0%
	Between 5 and 10 years	Count	1	0	2	0	3
		% within Q2_2 How long have you been practising?	33,3%	0,0%	66,7%	0,0%	100,0%
	More than 10 years	Count	8	19	12	1	40
		% within Q2_2 How long have you been practising?	20,0%	47,5%	30,0%	2,5%	100,0%
Total		Count	9	21	18	1	49
		% within Q2_2 How long have you been practising?	18,4%	42,9%	36,7%	2,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.750[a]	9	0,461
Likelihood Ratio	10,789	9	0,290
Linear-by-Linear Association	1,838	1	0,175
N of Valid Cases	49		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .02.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,423	0,461
	Cramer's V	0,244	0,461
N of Valid Cases		49	

Q2_2 How long have you been practising? * Q4_3 ASD is more prevalent in higher educational classes

Crosstab

		Q4_3 ASD is more prevalent in higher educational classes				
		Agree	Undecided	Disagree	Strongly Disagree	Total
Q2_2 How long have you been practising?	Count	0	1	0	0	1

	Less than 1 year	% within Q2_2 How long have you been practising?	0,0%	100,0%	0,0%	0,0%	100,0%
	Between 1 and 5 years	Count	0	1	4	0	5
		% within Q2_2 How long have you been practising?	0,0%	20,0%	80,0%	0,0%	100,0%
	Between 5 and 10 years	Count	1	0	2	0	3
		% within Q2_2 How long have you been practising?	33,3%	0,0%	66,7%	0,0%	100,0%
	More than 10 years	Count	6	18	15	1	40
		% within Q2_2 How long have you been practising?	15,0%	45,0%	37,5%	2,5%	100,0%
Total		Count	7	20	21	1	49
		% within Q2_2 How long have you been	14,3%	40,8%	42,9%	2,0%	100,0%

	practising?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.346[a]	9	0,601
Likelihood Ratio	9,319	9	0,408
Linear-by-Linear Association	0,954	1	0,329
N of Valid Cases	49		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .02.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,387	0,601
	Cramer's V	0,224	0,601
N of Valid Cases		49	

Q2_2 How long have you been practising? * Q4_6 It is hard to distinguish between ASD and schizophrenia clinically in children

Crosstab

			Q4_6 It is hard to distinguish between ASD and schizophrenia clinically in children				
			Agree	Undecided	Disagree	Strongly Disagree	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	0	1	0	1
		% within Q2_2 How long have you been practising?	0,0%	0,0%	100,0%	0,0%	100,0%
	Between 1 and 5 years	Count	1	2	2	0	5
		% within Q2_2 How long have you been practising?	20,0%	40,0%	40,0%	0,0%	100,0%
	Between 5 and 10 years	Count	0	2	1	0	3
		% within Q2_2 How long have you been practising?	0,0%	66,7%	33,3%	0,0%	100,0%
	More than 10 years	Count	8	18	11	3	40
		% within Q2_2 How	20,0%	45,0%	27,5%	7,5%	100,0%

	long have you been practising?					
Total	Count	9	22	15	3	49
	% within Q2_2 How long have you been practising?	18,4%	44,9%	30,6 %	6,1%	100, 0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.118 [a]	9	0,903
Likelihood Ratio	5,200	9	0,816
Linear-by-Linear Association	0,235	1	0,628
N of Valid Cases	49		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .06.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,290	0,903
	Cramer's V	0,167	0,903
N of Valid Cases		49	

Q2_2 How long have you been practising? * Q4_7 I have a high level of accuracy in diagnosing autism spectrum disorders

Crosstab

			Q4_7 I have a high level of accuracy in diagnosing autism spectrum disorders				
			Agree	Undecided	Disagree	Strongly Disagree	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	0	0	1
		% within Q2_2 How long have you been practising?	0,0%	100,0%	0,0%	0,0%	100,0%
	Between 1 and 5 years	Count	0	0	4	1	5
		% within Q2_2 How long have you been practising?	0,0%	0,0%	80,0%	20,0%	100,0%
	Between 5 and 10 years	Count	0	0	2	1	3
		% within Q2_2 How long have you been practising?	0,0%	0,0%	66,7%	33,3%	100,0%
	More than 10 years	Count	3	7	17	13	40
		% within Q2_2 How	7,5%	17,5%	42,5%	32,5%	100,0%

	long have you been practising?					
Total	Count	3	8	23	15	49
	% within Q2_2 How long have you been practising?	6,1%	16,3%	46,9 %	30,6 %	100, 0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.897 [a]	9	0,447
Likelihood Ratio	8,980	9	0,439
Linear-by-Linear Association	0,005	1	0,941
N of Valid Cases	49		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .06.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,426	0,447
	Cramer's V	0,246	0,447
N of Valid Cases		49	

Q2_2 How long have you been practising? * Q6_3_2 Delay in walking at 18 months of age

Crosstab

			Q6_3_2 Delay in walking at 18 months of age		
			Yes	No	Total
Q2_2 How long have you been practising?	Less than 1 year	Count	0	1	1
		% within Q2_2 How long have you been practising?	0,0%	100,0%	100,0%
	Between 1 and 5 years	Count	4	0	4
		% within Q2_2 How long have you been practising?	100,0%	0,0%	100,0%
	Between 5 and 10 years	Count	2	1	3
		% within Q2_2 How long have you been practising?	66,7%	33,3%	100,0%
	More than 10 years	Count	17	18	35
		% within Q2_2 How long have	48,6%	51,4%	100,0%

	you been practising?			
Total	Count	23	20	43
	% within Q2_2 How long have you been practising?	53,5%	46,5%	100,0 %

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.178 [a]	3	0,159
Likelihood Ratio	7,090	3	0,069
Linear-by-Linear Association	1,057	1	0,304
N of Valid Cases	43		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,347	0,159
	Cramer's V	0,347	0,159
N of Valid Cases		43	