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GRADUATE SCHOOL OF HEALTH  
SCIENCES



*Master of Science Thesis*

**KNOWLEDGE AND ATTITUDES  
OF PRIMARY SCHOOL TEACHERS REGARDING AUTISM OF  
SCHOOL AGE CHILDREN AT AL SAMMAWA CITY**

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**ÇANKIRI 2023**

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**BY**

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**ÇANKIRI 2023**

## ACCEPTANCE AND APPROVAL

We testify that the Master student Dheyaa Raheem Naser NASER 208205286 at Çankırı University Institute of Health Sciences Department of public health nursing has been examined and defended his thesis entitled Knowledge and Attitudes of Primary School Teachers regarding autism of School age children At al Sammawa city and after fulfilling all the necessary conditions determined by the relevant regulations, we saw, as jury members whose signatures are below, that the thesis is sufficient to obtain a master's degree in public health nursing.

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## **ETHICS STATEMENT**

The thesis entitled “Knowledge and Attitudes of Primary School Teachers regarding autism of School age children At al Sammawa city” was prepared and presented as a thesis and was written by myself and per the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and me. I researched the thesis; therefore, all of the used sentences and interpretations within the work belong to me.

I declare the issues mentioned above to be correct.

**2023**

**Dheyaa Raheem Naser NASER**

## ABSTRACT

### KNOWLEDGE AND ATTITUDES OF PRIMARY SCHOOL TEACHERS REGARDING AUTISM OF SCHOOL AGE CHILDREN

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February 2023

**Aim:** Autism is a neurodevelopmental disorder characterized by difficulty or weakness in social communication and restrictive behavior patterns. Autism Spectrum Disorders (ASD) were first described in 1943. In addition to early diagnosis and intervention, teachers play a substantial and essential role in the early social environment of a child with ASD. This study aims to find out what classroom teachers know and how they feel about students with autism, as well as how they see those students.

**Methods:** A cross-sectional descriptive study was conducted from April to November 2022 in 20 Samawah, southern Iraq primary schools. The study included a suitable sample of 218 teachers using the G.Power program, with the ages of the majority of the participants between 25 and 35 years old, males and females. A specially designed questionnaire was used to collect data, which included teachers' sociodemographic characteristics and other questions related to knowledge and teachers' attitudes toward children with autism in elementary school. Face-to-face questioning was used to collect data, and SPSS (25) software was used for data entry and analysis.

**Results:** The results showed that the study included 153 males and 65 females, and among 218 teachers, 41.7 percent had a medium knowledge degree, and 40.8 percent had high levels of awareness of autism. However, there was no statistically significant correlation between degrees of awareness and demographic information,  $p$ -value = greater than 0.05, except for the type of exposure to exceptional children, which found a significant  $p$ -value = 0.001. This study showed that only 45.4 percent of the teachers

have average attitudes, while 43.6 percent have good attitudes toward dealing with children with autism.

**Conclusion:** Teachers have a moderate to excellent understanding and attitude toward children with autism in their classrooms. There is no statistically significant relationship between trainers' expertise and demographic data. Training programs for teachers before and during their service can help them learn more about autism and change how they feel about it.

**2023, 103 pages**

**Key Words:** Knowledge, Attitudes, Primary School, Teachers, Autism.

## ÖZET

### Al Sammawa Şehrinde İlkokul Öğretmenlerinin Okul Çağındaki Otizmlili Çocuklara İlişkin Bilgi ve Tutumları

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Şubat 2023

**Amaç:** Otizm, sosyal iletişimde güçlük veya zayıflık ve kısıtlayıcı davranış kalıpları ile karakterize nörogelişimsel bir bozukluktur. Otizm Spektrum Bozuklukları (OSB) ilk olarak 1943'te tanımlanmıştır. Erken teşhis ve müdahaleye ek olarak, öğretmenler OSB'li bir çocuğun erken sosyal ortamında sağlam ve önemli bir rol oynamaktadır. Bu çalışmanın amacı, sınıf öğretmenlerinin otizmlili öğrenciler hakkındaki ne kadar bilgi sahibi olduklarını ne hissettiklerini ve bu öğrencileri nasıl gördüklerini ortaya çıkarmaktır.

**Yöntem:** Kesitsel tanımlayıcı bir çalışma, Nisan-Kasım 2022 döneminde Güney Irak'ın Samawah kentindeki 20 ilköğretim okulunda yapıldı. Araştırmaya, G.Power programını kullanan, katılımcıların büyük çoğunluğunun yaşları 25-35 arasında, erkek ve kadın 218 öğretmenden oluşan uygun bir örneklem alınmıştır. Öğretmenlerin sosyodemografik özelliklerini ve bilgi ve öğretmenlerin ilkokuldaki otizmlili çocuklara yönelik tutumlarıyla ilgili diğer soruları içeren verileri toplamak için özel olarak tasarlanmış bir anket kullanılmıştır. Veri toplamak için yüz yüze sorgulama, veri girişi ve analizi için SPSS (25) yazılımı kullanılmıştır.

**Bulgu:** Araştırmaya 153 erkek ve 65 kadın dahil edilen 218 öğretmenin yüzde 41,7'si orta düzeyde bilgi düzeyine, yüzde 40,8'i ise yüksek düzeyde otizm farkındalığına sahiptir. Bununla birlikte, istisnai çocuklara maruz kalma dışında ( $p=0,001$ ), farkındalık dereceleri ile demografik bilgiler arasında istatistiksel olarak anlamlı bir ilişki yoktu ( $p>0,05$ ). Bu çalışma, öğretmenlerin sadece yüzde 45,4'ünün ortalama tutuma sahip

olduğunu, yüzde 43,6'sının otizmlı çocuklarla ilgilenmeye yönelik iyi tutumlara sahip olduğunu göstermiştir.

**Sonuç:** Öğretmenlerin sınıflarında otizmlı çocuklara karşı orta ile mükemmel arası düzeyde anlayış ve tutumları vardır. Eğitimcilerin uzmanlıkları ile demografik veriler arasında istatistiksel olarak anlamlı bir ilişki yoktur. Öğretmenler için hizmet öncesi ve sırasında eğitim programları, onların otizm hakkında daha fazla bilgi edinmelerine ve bu konuda nasıl hissettiklerini değiştirmelerine yardımcı olabilir.

**2023, 103 sayfa**

**Anahtar Kelimeler :** Bilgi, Tutumlar, İlkokul, Öğretmenler, Otizm .

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**Dheyaa Raheem Naser NASER**

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## INDEX OF ABBREVIATIONS AND SYMBOLS

|               |                                                                        |
|---------------|------------------------------------------------------------------------|
| <b>ASD</b>    | : Autism Spectrum Disorders                                            |
| <b>AT</b>     | : Assistive Technology                                                 |
| <b>UNESCO</b> | : United Nations Educational, Scientific and Cultural Organization     |
| <b>LBW</b>    | : Low Birth Weight                                                     |
| <b>GCC</b>    | : Gulf Cooperation Council                                             |
| <b>DSM-5</b>  | : Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition |
| <b>DSM</b>    | : Diagnostic and Statistical Manual of Mental Disorders                |
| <b>CDC</b>    | : Centers for Disease Control                                          |
| <b>CNVs</b>   | : Copy Number Variations                                               |
| <b>CBT</b>    | : Cognitive behavioural therapy                                        |
| <b>HR</b>     | : Hydroxytryptamine Receptors                                          |
| <b>GABRB3</b> | : Gamma-aminobutyric acid receptor subunit beta-3                      |
| <b>CMV</b>    | : Cytomegalovirus                                                      |
| <b>DM</b>     | : Diabetes Mellitus                                                    |
| <b>AAP</b>    | : American Academy of Pediatrics                                       |
| <b>ADI-OS</b> | : Autism Diagnostic Observation Schedule                               |
| <b>STAT</b>   | : Screening Tool for Autism in Toddlers and Young Children             |
| <b>ADI-R</b>  | : Autism Diagnostic Interview-Revised                                  |
| <b>DISCO</b>  | : Diagnostic Instrument for Social Communication Disorders             |
| <b>IPI</b>    | : Lengthy inter-pregnancy interval                                     |
| <b>CBT</b>    | : Cognitive Behavior Treatment                                         |
| <b>\$</b>     | : Dollar                                                               |
| <b>%</b>      | : Percentage                                                           |
| <b>&amp;</b>  | : And                                                                  |
| <b>£</b>      | : Billion                                                              |
| <b>Σ</b>      | : Sum                                                                  |

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## 1. INTRODUCTION

The term "autism spectrum disorders" (ASDs) refers to a group of different neurological and developmental illnesses, the defining characteristics of which include poor sociability and communication, constrained interests, and recurrent behavioral patterns (Inglese & Elder, 2009). Children with ASD may benefit from early intervention between the ages of 3 and 6 regarding speech and social skills. However, because of the relative length of time, there is usually a delay in knowing the diagnosis and beginning therapy for the condition between when autistic symptoms are first seen and when they are finally diagnosed. The fact that anomalous behavior happens in bouts that could be overlooked in brief clinical examinations is one of the main drawbacks of autism (Helt et al., 2008). Teachers are a significant element of a kid's first social group, so their understanding of the child may be essential for the early detection of autistic children. Teachers' opinions on ASD are crucial for improving long-term results because they play a crucial part in the support services and educational advancement of autistic children (Rodríguez et al., 2012).

Children begin learning to read, write, and do math throughout their early years of development, depending on their age and intellectual aptitude. Even though some kids seem to have average intelligence and average eyesight, hearing, or physical ability, confident kids have trouble learning language and math even when they have access to good learning opportunities. Children with special needs or who have a specific impairment find these situations more challenging (Tony, 2019). The use of assistive tools or technology, a collaboration between teachers and other service providers, and offering individualized attention and assistance for every single child. It is also essential for educators to work together with occupational therapists, speech pathologists, and language experts in order to maximize the potential of children who are handicapped, better understand their needs and help identify solutions to those needs (Alkahtani, 2013). This depends on classroom instructors' preparation, training, and expertise to cope with these children (Chambers, 2011). Assistive technology Tools with a high or low level of technology are also referred to as "AT" (sometimes "middle tech"). Low technology, as its name suggests, refers to tools that are relatively simple to

manufacture and have less complexity. Contrarily, high-tech equipment is more sophisticated, technologically sounder, and efficient. Some examples of these tools are magnifying screens, voice output devices, specially shaped dining utensils, pencil grips, etc. (Takala, 2007).

Within the first or two years of a child's life, parents often become aware of autistic symptoms. These symptoms appear gradually, but some affected kids grow more than usual before they weaken or decrease. Children with autism who get behavioral, cognitive, and speech therapies improve their communicative, social, and self-care abilities (Myers et al., 2007). There are healed patients despite no recognized treatment (Helt et al., 2008). After reaching maturity, many children with this condition cannot live alone, although others have. The culture of autism has grown, and although some people seek treatment, others think that those with the condition should be embraced as unique and not treated as having problems (Newschaffer et al., 2007). Students with autism struggle to interact with others, communicate verbally and nonverbally and engage in repetitive actions, behaviors, hobbies, and activities (American Psychiatric Association, 2013). They are diverse people (Paynter et al., 2017). They have various social, intellectual, behavioral, and other requirements (Brock et al., 2014). For instructors, meeting the requirements of these pupils poses particular difficulties. Because every ASD kid is different, teaching methods that work for some individuals may not necessarily work for all of them (Morrier et al., 2011). Teachers are urged to employ strategies that are supported by research to help their lessons with these pupils to avoid teaching methods that are not scientific and might hinder the development of individuals with ASD (Travers, 2017).

The teacher's understanding of the autism criteria is crucial to assisting the teacher in giving additional care and transferring the child to a facility that can manage these individuals more effectively. To fulfill the needs of these kids in public schools, many instructors do not, however, have the necessary information, awareness, or understanding of autism. Little is known about the elements influencing teachers' understanding, knowledge, and awareness of autism (Schwartz & Drager, 2008). Children, teens, and young people depend heavily on teachers. Teachers must

understand ASD since many of them may serve as information disseminators for societal change in the direction of inclusive education (Galosy et al., 2018). Therefore, a fundamental component of providing kids with special needs with a high-quality education is to provide sustainable education, guarantee that education is inclusive and fair for everyone, and encourage everyone to take advantage of opportunities for lifelong learning (Gómez-Marí et al., 2021). In order to accomplish long-term goals sustainably, educators need access to the appropriate tools to help them navigate this brand-new world. Teachers, who are primary education providers, are responsible for being aware of the benefits of using inclusive instructional strategies. In-depth instruction, ongoing professional growth, and knowledge expansion are necessary for this understanding (Vanderpuye et al., 2020). Another essential factor linked to effective inclusion is knowledge of the practice. Training in instructional strategies and ASD-specific therapies should be provided to lecturers responsible for students with Autism Spectrum Disorder (ASD) (Kisbu-Sakarya & Doenyaş, 2021).

Teachers need to have a correct and sufficient understanding of ASDs to successfully include students with ASDs in their lessons since these are complex disorders with different presentations and a vast array of practices and tactics for teaching (Abdi & Sharyati, 2019). According to a study (Saloviita, 2020), one of the most significant factors influencing the effectiveness of including children with impairments in regular classes is the teachers' ability to keep a positive attitude. Over the last quarter century, there has been a considerable expansion in the corpus of research that investigates educators' perspectives on including and integrating children with special needs into typically developing educational environments. The incidence of autism has been steadily rising over the last several years, and there has been a corresponding rise in the number of children enrolled in public school settings who have ASD (McPartland et al., 2021). Teachers' attitudes toward mainstreaming, integration, and inclusion indicate that they are generally optimistic about the concept (Van Steen & Wilson, 2020). However, several variables, including the kind of impairment, the severity of the condition, the training, the experience, and the knowledge of impairment, the contact with pupils who have disabilities, as well as the availability of resources and support, affect teachers' attitudes (Knight et al., 2019). Teachers' perspectives have a crucial influence in shaping

the kind and level of support given to students with special needs in the classroom (Allday et al., 2013). Park et al. (Park & Chitiyo, 2011) say that teachers' attitudes are fundamental because teachers in general education teaching, most of the time, children with disabilities.

Because of the quick pace of change in the world, those working in the area of education are faced with several issues regarding the requirements of every student (Lindblom et al., 2019). The attitude and actions of the teacher may also facilitate the effective integration of pupils with ASD. According to experts, educators of kids with ASD should be kind, patient, and reliable, as well as able to set an example for and encourage tolerance, acceptance, and understanding among their pupils (Gledhill & Currie, 2020). Additionally, since ASD kids often struggle with social competency development, teachers may act as "social interpreters" in the classroom and must shield kids with ASD from bullying. For instance, a teacher may step in to assist a kid with ASD who is having communication difficulties.

Similarly, if children with ASD cannot understand non-literal language (such as sarcasm), the instructor may interpret the communication aim (Holland. Since UNESCO published its Salamanca Statement, there has been a growing dedication to inclusive education that is accessible to all people, irrespective of whatever disabilities they may have. It has been shown that a commitment to an inclusive, rights-based view is linked to a rise in the number of kids with disabilities, like those with autism, which are included in regular classes (Roberts & Simpson, 2016).

### **1.1. Aim of the Study**

The study aims to:

Determine knowledge and attitudes of primary school teachers regarding autism of school-age children at Al Sammawa city.

Determine the relationship between the Knowledge and attitudes of Primary School Teachers and teachers' demographic characteristics of age, gender, Teachers' educational role, Experience, and The type of exposure to exceptional children.

Determine the relationship between the knowledge of Primary School Teachers and the attitudes of Primary School Teachers.

## **1.2. Statement of the Problem**

Knowledge and Attitudes of Primary School Teachers regarding autism of School-age Children.

## **1.3. Research Question**

What is the amount of primary school teachers' knowledge regarding the autism of school-age children in Al Sammawa city?

What is the attitude of primary school teachers regarding the autism of school-age children in Al Sammawa city?

What is the relationship between the knowledge of primary school teachers and the teachers' demographic characteristics of age, gender, teachers' educational role, experience, and the type of exposure to exceptional children?

What is the relationship between the attitudes of primary school teachers and teachers' demographic characteristics of age, gender, educational role, experience, and the type of exposure to exceptional children?

What is the relationship between the knowledge of Primary School Teachers and the attitudes of Primary School Teachers?

## **2. GENERAL INFORMATION**

### **2.1. Historical and General Background for Autism**

The term “autism” describes a collection of intricate neurological disorders that appear in the earliest stages of brain development. The first definition of autism was a developmental disease with behavioral, category, and dimensional criteria. Autism is now regarded as a spectrum condition. Recent and ongoing scientific and medical advances, on the other hand, have provided a solid foundation for the development of knowledge regarding the biology and neurology nature of autism, which has improved diagnostic precision, therapeutic approaches, patient outcomes, and quality of life (Rapin & Tuchman, 2006). The diagnostic criteria for autism have recently been updated to include confined, repetitive, and stereotyped behavior patterns, interests, and activities, in addition to a disability in social interaction and communication (Frazier et al., 2012).

As populations are physiologically and neurologically diverse, they have a wide range of underlying biological sub-phenotypes. This is because the features that make up the diagnosis of ASD are both pervasive and non-specific. Early historical descriptions of autism, however, revealed a lack of understanding of the biochemical causes of the disorder. Many people still believe that ASD should be considered a mental disorder. This is shown by the fact that ASD is listed as a mental disorder in the DSM, starting with the DSM-III and continuing through the most current revision, the DSM-5 (Widiger et al., 2013). As a result, a diagnosis of ASD might be given without taking into consideration the biological processes, reasons, or contributions that first triggered the condition. Autism is labeled as a mental illness and has had several harmful effects in the real world, including stigmatization, lack of services, research cohorts, and insurance coverage, among other things (F. R. Volkmar et al., 2022).

When describing the symptoms of schizophrenia in 1910, the Swiss psychiatrist Eugen Bleuler was the first to utilize the Latin term autism. The language he used was Latin. He was doing so in order to offer a description of the phenomena that were occurring

(Holaday, 2012). The name "autism" comes from the Greek word *autos*, which means "self," and has come to represent a pathological worship of oneself in modern usage. This term describes conditions in which a person has little or no interaction with others (isolation) (Chown, 2012). Leo Kanner and Hans Asperger, two foremost physicians, or, to put it another way, two significant milestones in the knowledge of the diagnosis and acknowledgment of autism, are shown (Verhoeff, 2013).

**Leo Kanner (1896–1981)** was a psychiatrist and physician born in Austria. He is well remembered for his contributions to the field of autism research. He was a pioneer in the area. It is generally agreed that he was the one who established the field of child and adolescent psychiatry, not just in the United States but also all around the globe. At Johns Hopkins Hospital in Baltimore, specializing in pediatric care, he established the world's first child psychiatric clinic in 1930 (Verhoeff, 2013). Dr. Kanner decided that one of his young patients, Donald T., was a critical case for his results before he started writing his essay, "Autistic Disturbances of Affective Contact." Donald T. was unlike other boys his age, who were five years old. This is how Donald's father characterized his son in the 33-page letter he sent to Dr. Kanner about his son: "happiest when he was alone, retreating into a shell and living inside himself, oblivious to everything around him." Donald was fascinated with spinning toys; he loved spinning himself in circles, tossing his head side to side, and acting out when his pattern was disturbed (Lyons & Fitzgerald, 2007).

In 1943, Kanner published an article titled "Autistic Disturbances of Affective Contact" in which he discussed Donald and eleven other autistic children. The piece was titled "Autistic Disturbances of Affective Contact." In this paper, Kanner also discussed the symptoms of autism. This publication is considered to be an essential foundation for the present research on autism. In this initial description of "infantile autism" by Kanner, a distinct diagnosis was made. This description, later on, became a clinical psychiatric classic. In contrast to prior depictions of such newborns, who were portrayed as schizoid, unintelligent, retarded, or feeble-minded. Eugene Bleuler was the one who first coined the word "autism" to describe the inner, self-absorbed characteristics of autism in adults. Kanner stole the phrase from Bleuler and used it to define autism.

Kanner did not believe infantile autism to be an early type of schizophrenia or a prodromal of the disorder. The clinical signs were distinct from one another, and in contrast to those with schizophrenia, it seemed that Kanner's patients had autism from the time they were born forward (Verhoeff, 2013). A psychiatrist who worked at Johns Hopkins hospital in the 1930s and 1940s and oversaw a clinic there is often credited as the first medical professional to describe autism. He described people as having high intelligence levels, typical language development, substantial social problems with peers, and very restricted interests. He said these kids had substantially narrow interests (F. R. Volkmar et al., 2022).

**Hans Asperger (1906–1980)** It was not long after Kanner's research came out in 1944 that stories began to surface about young children whom he had also called "autistic" but who looked to have high nonverbal intelligence quotients and who seemed to utilize a vast vocabulary acceptably. He did so in a study that was published in 1944. In 1944, Asperger presented a definition of "autistic psychopathy." He found a pattern of behavior and talents in four guys that included "a lack of empathy, minimal capacity to build friendships, one-sided dialogues, strong immersion in a specific subject, and clumsy movements." He found this pattern of behavior and abilities in all four boys (Verhoeff, 2013). Because of their ability to participate in in-depth discussions on subjects that were especially interesting to them, Asperger referred to youngsters diagnosed with this syndrome as "little professors." Asperger observed that a significant number of the children he diagnosed with autism made use of their exceptional abilities as adults and achieved success in their chosen fields. One of them became an astronomy professor and corrected an inaccuracy he had discovered in Newton's work when he was still a student. Elfriede Jelinek, an Austrian author and winner of the Nobel Prize in Literature was another person diagnosed with Asperger's syndrome (Pourre et al., 2012). When Asperger's work was translated into other languages and studied by academics in the early 1990s, it gained considerable notoriety. Over half a century after Asperger's first research, his eponymous condition was finally recognized in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (Diagnostic and Statistical Manual of the American Psychiatric Association). Since its weak connection

to the autistic spectrum, it has made the diagnosis of autism contentious and contested, even after a brief upsurge in interest in his work during the 1990s (Pourre et al., 2012).

Asperger's disorder was kept out of the DSM-5 because its inclusion as a subset of pervasive developmental disorders was controversial during the DSM-IV revision process. When compared to a group of non-verbal learning impairments, Asperger's syndrome has been likened to by some researchers (F. R. Volkmar et al., 2022). In the 1940s, an increasing number of psychiatrists and psychoanalysts began to subscribe to the theory that autistic behavior was nothing more than a manifestation of childhood schizophrenia (F. R. Volkmar et al., 2009). Investigations in neuropathology and neuroradiology conducted afterward and simultaneously have substantiated the presence of brain abnormalities in autistic patients (Herbert & Caviness, 2006). Following the DSM-IV-TR, a diagnosis of autism disorder cannot be made until all three diagnostic criteria have been satisfied. These requirements include difficulties in communicating and interacting with others, as well as engaging in tasks that are routine and uninteresting. The DSM-5 edition, the most recent update to the criteria used to diagnose autism, promises to be more strict and accurate (Widiger et al., 2013).

The diagnosis of autism is still regarded as a mental health problem. The ASD communities are physiologically varied and have significant neurodiversity. However, the diagnosis of ASD does not consider the several known and likely biological origins and factors of the disorder. This is the case even though DSM-5 is more specific than previous versions. However, even the task committee responsible for developing the DSM-5 has acknowledged that diagnostic paradigms for autism spectrum disorder (ASD) would need to develop into sub-phenotypes that have biological significance. Both children and adults who have ASD have a variety of neurological symptoms and indications that point to malfunctions in the central nervous system, the autonomic nervous system, or the peripheral nervous system, in addition to systemic illness. The signs and symptoms of ASDs are comparable to those of various other forms of neurological illness. Therefore, a thorough clinical examination has the potential to provide valuable information about the biological sub-phenol type of a child who has an ASD. In addition to other types of neurodiagnostic information, data from

neurophysiological, laboratory, genetic, neuropsychological, and even neuroimaging (in some instances) may expand and strengthen the biological phenotype and clinical profile of people who have autism (Frazier et al., 2012).

It is possible that many people will not have heard of or been exposed to the biological sub-phenotype method for neurobehavioral disorders. However, this should not come as a surprise. For instance, clinicians would not be content with a cancer diagnosis in a patient without more detailed examinations to identify the kind of cancer, the organ systems implicated, and the breadth and virulence of the illness. No qualified medical practitioner would ever consider treating cancer without a thorough understanding of the biological sub-phenotypes of the disease, which might vary depending on the organ system, histology, radiography, and other factors. Cancer treatments would only be able to address surface symptoms, such as pain or exhaustion if the biological sub-phenotypes of the illness were not understood beforehand. This would prevent any change in the progression of the disease. For far too long, the therapy for autism has been limited to just masking its symptoms, without any real progress in understanding the disease's underlying molecular causes. Diagnosing autism spectrum disorder (ASD) in broad, amorphous, dimensional, and subjective terms is no longer adequate. Instead, knowing the different clinical descriptions and displays, biological, and related co-morbidities of ASDs is crucial for developing targeted and multimodal therapy that will increase the effectiveness of life for afflicted people (Mintz et al., 2014). Researchers from Eapen University have shown that an awareness of the links between genotype and phenotype may even aid in predicting responsiveness to behavioral treatments (Eapen et al., 2013). It is conceivable that a practical, decision-based, and customized medical approach to ASD neuro diagnosis and medical research might decrease or eliminate unnecessary diagnostic tests and inefficient therapies. It has the potential to significantly affect the health of the general population while also reducing costs (Soden et al., 2014).

## **2.2. Epidemiology of the Autism**

Studies based on epidemiology, administration, and the community point to a higher incidence of autism in boys and young men than in young women. The ratios that have been reported fall anywhere between 2.1 and 5.1, and a research study that was carried out in 2010 on the topic of the global burden of illness produced an estimate of 4.1 (Loomes et al., 2017). Studies that test the whole population to identify hidden cases in the community have a somewhat higher sex ratio than the more typical passive case-finding research that uses data collected through already established channels, such as databases or official documents (such as particular educational records). Logicless correlations might arise from this, which would artificially inflate prevalence estimates. It is more typical for studies to go through administrative data to uncover passive instances (T. Brugha et al., 2018). Little difference that can be interpreted in the prevalence of autism across geographic areas or ethnic groups has been observed anywhere in the world. It would be helpful to include a few notes regarding different prevalence estimates from across the globe and how they vary depending on the country's resources (i.e., they reflect access to services rather than geographical differences in prevalence or different environmental circumstances). This may give the article a more international perspective. One large-scale study (Elsabbagh et al., 2012) found that racial, cultural, or socioeconomic factors do not affect the number of people with autism significantly.

While a lot of people and organizations have the assumption that the prevalence of autism is growing over time, this assumption is founded on administrative data rather than information obtained through community-based investigations. When we considered that studies used different methodologies, we discovered that between 1990 and 2010, there was no significant discernible change in ASD in the population (James et al., 2018). In addition, assessments of the general population reveal that there has been no discernible shift in the prevalence rates in children or adults over time and in community-based surveys designed to systematically find cases of the disease (these surveys also included testing of representative populations). There is no substantial evidence to show that autism spectrum disorder is less common in older adults, which is

more evidence against the hypothesis that autism spectrum disorder is becoming more prevalent with time (T. S. Brugha et al., 2016). Even in nations with high incomes and robust autism public and health initiatives, there is evidence that (ASD) in adults remains ignored chiefly. However, the number of administratively documented diagnoses of children with autism continues to rise year after year (Lundström et al., 2015). Tromans et al. (Tromans et al., 2018) think that the number of people with ASD in mental health institutions is much higher than the number of people with ASD in the general population, which is between 4 and 9.9%. This conclusion underlines how important it is to acquire information on the prevalence of ASD in environments where experts may be able to enhance the detection of the condition.

Using real-time tracking with carefully analyzed health and schooling statistics As reported by the Centers for Disease Control and Prevention (CDC), 1.5% of American children aged 8 had autism in 2012. In 2012, this prediction was made (Jin et al., 2018). It was the first time since the CDC monitoring prevalence was initially published in 2002 at 0.66% that an estimate did not surpass a prior one. The estimate for 2012 was comparable to the one for 2010 (Lord & Bishop, 2015). Despite this, an extensive telephone survey relied on parents to report autism spectrum disorder. Their children's diagnoses showed a somewhat higher national prevalence estimate (2.2% in 2011–2014) for children ages 3–17 in the United States (Zablotsky et al., 2015). Multiple studies have been conducted to assess the percentage of people with ASD identified in DSM-IV-TR who also meet DSM-5 criteria. The estimates produced by these studies range from 38% to 93% (Smith et al., 2015). In terms of its frequency throughout the globe, According to a report published by the World Health Organization (WHO), 0.76 percent of the world's youngsters were diagnosed with ASD in the year 2010 (Baxter et al., 2015), even though this estimate was derived from research conducted in nations that make up just 16% of the world's total child population (Erskine et al., 2017).

### **2.3. Genetic Epidemiology of Autism Spectrum Disorder**

Recent heritability studies in the United States and Europe range from 50% to 95%, assisting greatly in establishing the hypothesis that heredity plays a significant role in

the development of autism (Colvert et al., 2015). In addition, estimates of the recurrence risk among autistic children's siblings vary from 3% to 18% of the population (Grønberg et al., 2013). Numerous rare genetic variants, including inherited and de novo mutations, copy number variations (CNVs), and others connected to autism or autistic features, have been discovered in the past ten years through genetic research (Bourgeron, 2015). However, findings of certain uncommon de novo and inherited CNVs have only been reported in a tiny fraction (about 10%) of children with autism who have not yet been diagnosed with the condition (de la Torre-Ubieta et al., 2016). There is an increasing body of evidence to support the hypothesis that genetic risk variations found in people with autism spectrum disorder share common genetic pathways. Polygenic risk, which refers to the accumulative impact of numerous common genetic variations, is increasingly becoming a significant indication of risk not just for autism spectrum disorder (ASD) but also for other mental diseases (de la Torre-Ubieta et al., 2016). It is thought (Sharma et al., 2016) that the common polymorphisms that contribute to polygenic risk in autism are also present in other neurodevelopmental and psychiatric disorders.

## **2.4. Pathophysiology of Autism**

Recent research in several methods, including genetic epidemiology, molecular biology, and anatomical studies, has contributed to our understanding. However, the brain processes that underlie the abnormalities seen in ASD are still unclear. Recent studies, including a meta-analysis, lend credence to the idea that people with autism show signs of unusually rapid brain growth in early life. (Sandin et al., 2013). Low connectivity levels across various brain regions are typical in patients with autism, according to imaging studies, suggesting that this disorder may be related to the disorder itself (Di Martino et al., 2014). Anatomical variations in the brain, most often within the cerebral and cerebellum, are still being discovered, even though the direction and degree of these changes are inconsistent among reports (Chen et al., 2015). With the help of recently started longitudinal imaging studies and research on the integrity of white matter in certain brain parts (Elison et al., 2013), we may learn more about the neuroanatomical factors that affect behavior in autism spectrum disorder.

ASD is also typically associated with problems in the functions of the immune system, the gut, and the metabolism. In children diagnosed with ASD, gastrointestinal issues have been linked to an increased likelihood of engaging in problematic behaviors (Chaidez et al., 2014). However, there is no explicit agreement on the incidence of reported gastrointestinal diseases among children with ASD or the probable etiology of such pathologies (Buie et al., 2010). Some instances of autism spectrum disorder have also been linked to mitochondrial dysfunction, redox-sensitive metabolism, and carbon metabolism. However, it is unclear how these comorbidities across several systems could help us better understand the disorder's pathogenesis or identify novel etiologic groupings (Rossignol & Frye, 2012). Although several cognitive models have been offered to explain the social, communicative, and behavioral deficits seen in individuals with autism, there has been less agreement on these explanations' usefulness in the previous decade. The term "global processing deficit theories" includes ideas like attention management as well as "enhanced perceptual processing theories," which include the theory of mind (or mentalizing) and "social, motivational deficit theories," which explain how some people can process information more quickly than others (Velikonja et al., 2019).

Although these theories were informative in their descriptive capacities and offered some plausible explanations for how autistic people may differ from the norm in their processing and experience of the world, they were not developed with an autism spectrum disorder in mind and instead dealt with neurodevelopmental disorders more generally (ASD). In addition, the evidence for these theories' efficacy as explanatory models is scant, and they are often non-developmental. Despite this, they are helpful in clinical practice and form the basis of specific newly suggested therapies, such as treatments for anxiety based on CBT (McNally Keehn et al., 2013). By keeping tabs on groups of kids from prenatal through early childhood, researchers may examine the neurobiological and behavioral manifestations of ASD (that is, when a diagnosis of ASD may be established) (E. J. H. Jones et al., 2014). Indeed, prospective studies of newborns with a relative with autism spectrum disorder (ASD) have produced many insights into the processes that underlie this illness. For instance, newborns that acquire autism spectrum disorder later in childhood show profiles of interest in features and

eyes that are normal (R. M. Jones & Lord, 2013) by the age of 6 months, which has raised questions about social orienting theories that propose a fundamental deficiency causes autism spectrum disorder in intricate patterns of subcortically mediated social orienting (E. J. H. Jones et al., 2014).

## **2.5. Etiology and Genetic Background of Autism**

From the late 1960s onward, researchers established autism as a distinct syndrome by showing that it lasts a person's entire life, setting it apart from intellectual disability, schizophrenia, and other developmental disorders, and showing that therapeutic programs that actively involve parents yield better outcomes. It was not until the mid-1970s that scientists began to see signs that autism could have a genetic component; presently, it is considered one of the most heritable mental disorders (Stoodley et al., 2017). Autism has a significant genetic foundation, even though the genetics of autism is complicated. The likelihood that autism spectrum disorder may be explained by unusual multi-gene combinations of common genetic abnormalities or by rare single-gene alterations with significant implications is uncertain. The interaction of numerous genes with their environments and epigenetic factors, which do not change DNA but are passed down from generation to generation and regulate gene expression, gives rise to complexity (Hazlett et al., 2017). Chromosomal abnormalities such as deletions, duplications, and inversions have all been suggested as possible causes of autism. On the other hand, most mutations known to raise the risk of autism have not yet been found.

In most cases, the lack of evidence for a single gene mutation in the cause of autism or a single chromosomal aberration, and none of the genetic abnormalities linked with autism spectrum disorders have been proven to cause autism (Ruzzo et al., 2019) preferentially. Though many potential genes have been identified, the effects of any one gene are relatively minor. Changes in the number of copies of a gene that are present during meiosis, also known as copy number variations, may account for the high prevalence of autism in families where no members have the disorder. Extensive

searches are now being conducted, despite evidence for additional environmental factors being anecdotal and not substantiated by credible research (Tick et al., 2016).

Specific contaminants in certain foods, viruses, bacteria, fungi, parasites, solvents, diesel exhaust, phenols, pesticides, brominated flame retardants, alcoholic beverages, tobacco products, illegal narcotics, immunizations, and prenatal stress have all been linked to autism or autistic symptoms (Tran et al., 2013). Additionally, it was shown that the abnormalities in the brain's 5-HT systems caused a reduction in the binding of 5-HT transporters and 5-HT receptors that are responsive to antidepressants (Sanders et al., 2012). The key to determining causes, facilitating early diagnosis, calculating spontaneous developmental trajectories, and forecasting responsiveness to treatment seems to lie in elucidating the role of aberrant neurodevelopment in autistic symptoms (Robinson et al., 2016). Many different explanations for what causes autism have been proposed. The original notion linking ASD to cold and emotionless moms, known as the "refrigerator mother" concept, is now discredited. In addition, traditional risk factors for the development of ASD, such as a family's socioeconomic status and level of education, are no longer believed to have a role (Qi et al., 2016). The root causes of ASDs vary widely. Even though many genetic, neurological, and environmental factors have been linked to ASD's cause (Bölte et al., 2019), we still do not know the exact processes that lead to the disorder.

### **2.5.1. Genetic factors**

It is generally agreed that genetics plays a substantial and significant role in the development of ASD (Samsam et al., 2014). Although no single mutation has been identified as unique to ASD, evidence from genome sequencing suggests that the disorder is linked to hundreds of genes. It is believed that anywhere from 400 to 1000 genes might contribute to a person's susceptibility to developing autism (Masi et al., 2017). Genes in autism are involved in a broad range of brain development and function-related biological processes (Samsam et al., 2014). For example, people with autism are more likely to have autism spectrum disorder (AS) and many other

endophenotypes linked to a gene (GABRB3) that has been linked to problems with empathy (Warrier et al., 2013).

Copy number variations (CNVs) are genetic mutations that may take the form of either deletions or duplications and can alter the way genes function. They are found in the DNA of around 9 % of patients diagnosed with autism. The emergence of autism spectrum disorders has been connected to these CNVs. Epilepsy, intellectual disability, and schizophrenia are only neurological, psychiatric, and neurodevelopmental disorders that fall under the autism spectrum and have many common genetic risk factors (Hyman, Levy, & Myers, 2020). According to our current knowledge, these genetic variables interfere with normal brain development by causing essential biochemical processes to become disrupted, ultimately resulting in illness development (de la Torre-Ubieta et al., 2016). Studies using neuroimaging techniques have shown anomalies in many parts of the brain, including the frontal cortex, the hippocampus, the cerebellum, and the amygdaloidal nucleus (Samsam et al., 2014). During infancy, it has been shown that children with ASD have brain growth that is more advanced than average and fast head development. Autism is more common in families where both parents are affected, and genetics plays a significant role in twins. There is strong genetic evidence to show a significant genetic influence on the development of autism, with heritability estimates ranging from 64% to 91% and uneven sex distribution (male preponderance) (Loomes et al., 2017).

### **2.5.2. Environmental factors**

Many potential environmental factors are being investigated for their role in the development of autism. Age of the parents, obstetric and perinatal circumstances, maternal traits, the fetus' surroundings, and exposure to toxins and teratogens are all examples of environmental factors that may increase an individual's risk or alter the way their genetic predisposition is expressed who have a genetic predisposition to disease (Hyman, Levy, & Myers, 2020). There is a substantial amount of data to suggest that an older father or mother is related to an increased likelihood of having a child who has

ASD (Bölte et al., 2019). Finding modifiable risk factors for ASD is crucial for lowering the exposure of newborns and expectant mothers to recognized neurotoxicants.

A higher risk of autism is associated with perinatal factors such as preterm delivery, low birth weight, intrapartum hypoxia, and neonatal encephalopathy, in addition to the impact of the mother's age and genetics (ASD). Short inter-pregnancy intervals, frequent pregnancies, maternal obesity, DM, and prenatal infections like rubella and CMV may increase the chance of autism. A shorter time between pregnancies may also raise the chance of autism (Bölte et al., 2019). Since there is no proof between autism spectrum disorder with adverse reactions to vaccinations, children with ASD must follow the standard recommended schedule. And vaccination as an environmental risk factor. Comprehensive analyses of a large number of major epidemiologic studies determined this. (Hyman, Levy, & Myers, 2020).

## **2.6. Clinical Features and Symptoms of Autism**

Autism is a developmental condition that often presents symptoms for the first time in early childhood and is characterized by a complex set of behavioral and social characteristics (Olson et al., 2020). According to the DSM-5, "ASD is a combined term for a collection of diverse disorders, defined by confined, repetitive patterns of behavior, interests, or activities," as well as chronic deficits in reciprocal social communication. These symptoms lead to considerable challenges in social and vocational settings or other core functioning areas. On the other hand, autism and intellectual impairment often co-occur (Edition, 2013).

According to Mary C. Townsend, DSN (2015), a person who has an autism spectrum disorder (ASD) may exhibit the late indicators and symptoms that are listed below:

1. Inability to form interpersonal connections in early infancy, as shown by a lack of reaction to people and failure to create cooperative play and friendships, are all symptoms of this disorder.

2. Issues with communication and creative issue solving A total lack of language may be present, or an immature grammatical form may suggest it. There may or may not be any nonverbal behavior, and the person may be interested in strange things.

3. There is a tremendous fixation on things that move (e.g., fans, trains). Various things, including body parts, knobs, and water, attracted his interest.

4. Discomfort is intense enough to cause stereotypical movements of the body when even modest changes in the surroundings occur (e.g., when a vase is moved from its customary location).

5. People may do things that hurt themselves, like hitting their heads repeatedly or biting their hands or bodies.

The Autism and Development Disabilities Monitoring Network (2019) reports that disinterest in responding to the child's name at the age of 1 is among the early symptoms of autism spectrum disorder; a lack of interest in pointing out objects, a lack of interest in playing pretend games, an aversion to eye contact, a preference for solitude, a delay in the development of speech and language skills characterized by the use of the exact words or phrases over and over again (Kaat et al., 2013). Secondary symptoms of ASD include a lack of social awareness; an inability to empathize with others; a lack of interest in making friends; a reluctance to start conversations, a preoccupation with unusual objects like car parts; and a lack of imitation or creative play based on the interests or ideas of others (Soto et al., 2016). The American Academy of Pediatrics (AAP) recommends screening all children between 18 and 24 months for autism since the disorder may show signs as young as 18. Many children with autism may not be adequately diagnosed until they are already enrolled due to the difficulties of making friends and instructors' concerns about peer interactions, especially those with modest or restricted speech problems (Reinhardt et al., 2015). Most individuals with autism also experience secondary symptoms, which can include a lack of imaginative play or imitation; indifference to others' feelings, sensitivity to light and sound (the repetition or echoing of a word or phrase just said by another person),

frequent temper tantrums, a lack of interest in making friends, avoiding conversation, social awkwardness, and severe tantrums when routines are disturbed (Soto et al., 2016).

## **2.7. Diagnosis for Autism Spectrum Disorder**

Many professionals, including pediatricians, psychiatrists, and psychologists, can diagnose autism; nevertheless, interdisciplinary collaboration is preferred. Some examples of these standardized diagnostic tools include the Autism Diagnostic Observation Schedule (ADI-OS), which is based on more extensive research, and the Screening Tool for Autism in Toddlers and Young Children (STAT; a 20-minute observation for young children) (ADOS; a 45-minute observation done by a skilled professional, available in different formats for people of different language levels and ages, from 12 months to adulthood). In the context of a suspected autism diagnosis, the doctor and the caregiver may utilize these instruments to observe and characterize the individual's distinctive behavioral patterns. Tools like the Autism Diagnostic Interview-Revised (ADI-R), the Diagnostic Instrument for Social Communication Disorders (DISCO), and the computer-generated Developmental, Dimensional, and Diagnostic Interview (3di) (Lord et al., 2018) are often used to interview the child's caregivers

Several different questionnaires and rating scales, such as the Childhood Autism Rating Scale (CARS), the Social Responsiveness Scale (SRS), and the Social Communication Questionnaire (SQ), were used in the course of this investigation and may be used in order to evaluate the symptoms that are present in children. In addition, adaptive scales are often utilized in the field of measuring day-to-day functioning. It is considered good practice to gather information on the individual's level of receptive concerns relating to physical ability, expressive language, and general behavioral difficulties, as well as an assessment of the individual's intelligence rating (F. R. Volkmar et al., 2014). Although instruments like the Adolescent Developmental Outcomes Scale (ADOS) might be helpful, clinicians should not rely on them alone since combined observation and caregiver reports provide more reliable diagnoses than either method alone. Children who do not have any communication difficulties, who are members of an ethnic

minority, who come from low-income households, or whose parents do not speak English fluently (at least in the United States) require more time to identify (Kim & Lord, 2012).

### **2.7.1. Diagnosis of ASD and intellectual disability**

One aspect that adds to the stress that may develop when trying to provide a simple explanation is that the association between ASD and intellectual disability varies by geographical location and chronological age but may be mitigated by following clear guidelines for the diagnosis and treatment of ASD. Because children with autism are more likely to be referred for therapy or expert assessment than children without such problems, it is essential to take special care not to dismiss overly talkative young children with ASD. Very young children have evident developmental abnormalities (Baio, 2014). In most cases, it is not feasible to make accurate forecasts of eventual intellectual deficits in children aged 2–3 years who have been referred for potential ASD, except for children with substantial delays. Many, but not all (or, in certain countries, not the majority), preschool-aged children with autism also have intellectual disabilities. However, this is not always the case (Wetherby et al., 2014).

Children with ASD who are already in school are found to have intellectual impairment in 11-65 percent of cases, with the exact percentage varying wildly depending on the diagnostic criteria used (IQ less than 70) (Hus & Lord, 2014). Even more, diversity exists across clinic populations of children and between adult populations. This is because people who self-advocate for autism spectrum disorder tend to be well-spoken and eloquent, whose lives seem pretty different from those with autism spectrum disorder and intellectual handicaps. Having such variation appear when parents of young children have no idea what is ahead for their children can be pretty perplexing. Also, it's essential to know that the relationship between a person's intelligence level and ASD changes as they age (Cukier et al., 2014). Since the link between intelligence level and ASD changes depending on the community and the age of the person being evaluated, doctors and families must have a dialogue about the cognitive and linguistic skills of children as they mature.

### **2.7.2. Diagnosis in older children and adolescents**

Parents who suspect their kid has autism may have distinct concerns about whether they have an older child (one already in middle or high school) or an adult child. This is because the person usually has a background of experiencing challenges (Lord et al., 2018). Children with autism in northern Europe and North America are often identified and treated by the time they enter primary school. Although this is not always the case, some children go undiagnosed for a long time (Havdahl et al., 2016). The same variables—female sex, ethnicity, multilingualism, socioeconomic circumstances, and more advanced language—and co-occurring disorders like anxiety—were present in cases with ASD that were subsequently diagnosed with ADHD or mood disorders that may have aggravated or concealed the ASD. The same facts regarding any pertinent mental conditions should be included in assessments of older children just as they are for younger ones, together with information on the child's linguistic, motor, verbal, and nonverbal cognitive and adaptive abilities. Ashwood et al. say that the self-reporting methods for ASD and other illnesses are inaccurate. This is a big problem for the validity. (Ashwood et al., 2016).

### **2.7.3. Diagnostic criteria of autism**

Repetitive behaviors and difficulties with social communication and engagement are the two primary categories of autistic symptoms, according to the DSM-5, which includes verbal and nonverbal communication impairments. An obsession with doing the same things repeatedly defines the realm of repetitive conduct (American Psychiatric Association, 2013).

## **2.8. Classification of Autism**

Clinical professionals use the Diagnostic and Statistical Manual of Mental Illnesses, Fifth Edition (DSM-5), to diagnose and classify mental disorders like autism. It was released by the American Psychiatric Association (APA) in May 2013. Also released in

May 2013 was the DSM-5 (Posar et al., 2015). Disorders such as autism, Asperger's syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), childhood disintegrative disorder, and Rett syndrome are all conditions classified as ASD according to the DSM-5, which is a grouping of these conditions. These conditions are distinguished from others of a similar kind by widespread and usually severe impairments in one's capacity to connect with others and by deviations in communication and minimally stereotyped patterns of conduct. This improvement (Khalifeh et al., 2016) eliminated the problems when people tried to tell the difference between different situations.

### **2.8.1. Autistic disorders (AD)**

A confined and repetitive activity pattern and difficulties in social communication are the defining characteristics of autism disorder and interaction, and the presence of autistic traits may identify it. This disorder may also create difficulties in interacting with other people. Even though one of the hallmarks of autism is difficulties in social interaction and communication, there is accumulating evidence to suggest that the disease is often connected with impairments in motor development (Jun et al., 2019).

### **2.8.2. Retts syndrome**

The neurodevelopmental condition called Rett syndrome is a severe condition that cannot be cured and is responsible for a broad range of neurological and behavioral symptoms. It has an incidence of 1:10 000 - 15 000, and a substantial proportion of patients with Rett syndrome satisfy diagnostic criteria for autistic spectrum disorder throughout their developmental regression. It is the second most common reason women have serious mental health issues (Banerjee et al., 2019).

### **2.8.3. Pervasive developmental disorder – not otherwise specified (PDD-NOS)**

Since pervasive developmental disorder-not otherwise specified (PDD-NOS) does not have clear diagnostic criteria, it is often used as a catch-all diagnosis for kids who do not show signs of the more common developmental disorders (Köse et al., 2017).

### **2.8.4. Childhood disintegrative disorder (CDD)**

An uncommon disorder that is marked by delays in the development of motor abilities, social interactions, and language production (in children above the age of three), In the year 1908, an Austrian educator by the name of Thomas Heller was the first person to characterize the disintegrative disease in children. It is a challenging condition that may have a variety of different impacts on the growth and maturation of a kid throughout their life. This condition has been linked to the less severe form of pervasive developmental disorder not otherwise specified and the more severe and well-known type of autism. These forms of autism are more common (Al-Mosawi, 2019).

### **2.8.5. Asperger syndrome**

A potentially erroneous noetic category characterized by restricted, stereotyped, and repetitive interests and activities, as well as the same qualitative deficits in reciprocal social interaction that characterize autism. The main thing differentiating it from autism is that there are no significant delays or slowdowns in language or thinking development (World Health Organization, 2015).

## **2.9. Risk Factors for the Autism Spectrum Disorder**

There have been many hypotheses put forth on the causes of ASD. Several different systematic reviews have been carried out, and the results of these studies have been used to characterize prenatal and perinatal influences, in addition to maternal nutritional and lifestyle factors. Those hoping to have a child in the future might take steps to lower their risk (after having previously had a kid with ASD). The immediate practical consequences of most environmental variables are now restricted to detecting possibly causing genetic defects in a small number of instances. This is because most families that have had a child with ASD also now have an ASD-affected kid (Mandy & Lai, 2017). Autism is a complicated neurodevelopmental impairment that various hereditary and non-genetic causes may bring on. Many elements in a person's lifestyle, including their diet, exercise routine, and sleep patterns, have been related to an increased risk of autism. These risk factors are known to change the functional capacity of the brain. The precise causes of autism have not been uncovered as of yet (Bai et al., 2019). There is still much research that must be done to understand better the genetic, biochemical, and neural circuit abnormalities that occur in the etiology of autism. Conventional medical thought says that both pathological and non-pathological factors can cause autism. The most important of these is a weak immune system, a problem with the mitochondria, an unfavorable environment, and bad genes (Hughes et al., 2018).

The most critical risk factor for ASD is thought to be a person's gender. We are aware that diagnoses of autism are given to males more often than to females. Although it is generally acknowledged that the sex ratio is around 4:1, the specific mechanism by which sex acts as a risk factor is still not entirely known. It has been suggested that a multifactorial, multiple threshold model, which includes genetic, hormonally mediated, and environmental factors, are commonly recognized (Lai et al., 2015). Another hereditary disorder that runs in families is autism. An estimated 10% of siblings of children with autism also have the condition, according to well-conducted studies that used demographic data (Risch et al., 2014). Twin studies suggest that genetic factors may account for more than 90% of the phenotypic diversity in ASD (Tick et al., 2016). Recent studies using microarrays and whole exome sequencing have shown that an

increasing percentage of cases with ASD seem to be caused by multiple unusual de novo and (fewer) inherited genetic abnormalities. De Rubeis and Buxbaum say this happens against a background of common genetic differences that have not yet been found (De Rubeis & Buxbaum, 2015).

Denovo genetic variants include single nucleotide alterations, insertions, deletions, and copy number variations. Numerous studies have shown that risk factors for ASD include hundreds of unusual de novo genetic variants. Synapse function, chromatin regulation, and neuronal signaling and development comprise most of these risk factors (Weiss et al., 2014). The fact that organizations are now employing whole genome sequencing to implicate non-exonic parts of the genome also suggests that this number will most likely continue to rise. There is additional evidence from research on twins suggesting that shared environmental influences may have a significant role, even though the precise nature of these factors is not fully known. It is probable that the onset of these environmental risk factors occurs during pregnancy, including diabetes in the mother, premature birth, obesity in the mother, a lack of vitamin D or folic acid, or exposure to air pollution (Schmidt et al., 2014).

## **2.10. Environmental Risk Factors**

Autism may be caused by several environmental factors, most of which are:

### **2.10.1. Prenatal and perinatal factors**

There are more than 20 individual, family, prenatal, perinatal, and neonatal risk factors that have some degree of convergent evidence for autism, according to systematic reviews and meta-analyses (For instance, substantial positive correlations between two or more distinct research) (Guinchat et al., 2012).

### **2.10.2. Parental age**

The most common prenatal risk factor for ASD is older parents, who are more likely to have the condition, according to several studies examining the connection between ASD risk and parental age, especially maternal age (Idring et al., 2014). A recent worldwide study has shown heterogeneity in risk across parental age combinations. ASD risk seems to be independently increased by advanced maternal and paternal ages. Furthermore, there is proof that this difference in risk exists (Sandin et al., 2016). These relationships could be caused by several different things, such as epigenetic change, confusion caused by genetic susceptibility or sociocultural factors relevant to reproductive age, or the way age-related pregnancy risks are mediated (Lee & McGrath, 2015).

### **2.10.3. Inter-pregnancy interval**

Despite the evidence being relatively sparse, it has been frequently demonstrated that IPIs of 12 months or less increase the risk of ASD. Three studies found an elevated risk with a lengthy inter-pregnancy interval (IPI) (>60–84 months). Even though it is unclear what causes these relationships, Cheslack-Postava et al. think that they have something to do with depleted maternal nutritional stores, inflammation, stress, infertility, or other reproductive factors (Cheslack-Postava et al., 2014).

### **2.10.4. Immune factors**

Recent studies have indicated that a woman hospitalized for an illness when pregnant is connected with a greater risk of ASD. Nevertheless, the most considerable research ever conducted, which included more than 2 million participants, revealed indications of increased risk related to bacterial and viral illnesses that occur during pregnancy; these infections are common. The literature is inconsistent in addressing the possible influences of disease type (such as bacterial vs. viral) and time of illness (Cheslack-Postava et al., 2014). These epidemiological findings align with those obtained from

animal models, which show that stimulation of the immune system in the mother may lead to abnormalities in children similar to autism. As we have already discussed, research has also shown that copy number variations (CNVs) linked to ASD may change the effect of prenatal exposure (Mazina et al., 2015).

The presence of an autoimmune illness in one's family tree has also been associated with an increased incidence of autism. These results may point to the existence of some common genetic predisposition. However, immune-mediated diseases in the mother and autoimmune responses might potentially increase the risk of ASD via the effects of antibodies passed via the bloodstream and other immunological indicators on the maturing brain. According to a recent study, many studies with small samples have shown maternal anti-fetal brain antibodies in subgroups of autism spectrum disorder patients, but there was no evidence of these antibodies in controls (Fox-Edmiston & Van de Water, 2015). Singer et al. (Singer et al., 2009) found that in animal experiments, the offspring of dams who were given human IgG from mothers whose children had autism spectrum disorder showed abnormal neurobehavioral activity.

#### **2.10.5. Medication use**

Antidepressant use during pregnancy has been connected to ASD, anti-asthmatics [particularly  $\beta_2$  adrenergic receptor agonists (B2ARs),] and anti-epileptics. This is in addition to previous reports of elevated ASD risk after exposure to specific drugs having teratogenicity qualities. Even though their pharmacological effects are somewhat distinct from one another, all of these medications can pass through the placenta and the brain barrier. They may be passed on to the baby through the mother's breast milk. Data from animal models suggest that children exposed to the substance before birth may have neurological damage (Bercum et al., 2015).

The medications that have been studied the most are antidepressants and especially selective serotonin reuptake inhibitors (SSRIs). Despite this, the findings are conflicting, with six studies pointing to higher risk and five showing no correlation. According to recent studies (Christensen et al., 2013), exposure to antiepileptic drugs

and B2ARs has repeatedly shown an increased risk of autism or autistic symptoms when exposed during pregnancy.

#### **2.10.6. Other prenatal and perinatal factors**

Even while these variables may also function as indicators or mediators of other pregnancy-related disorders, preterm delivery and a shorter gestational age seem to elevate the risk of ASD independently. Maternal metabolic abnormalities, such as prenatal weight gain, DM, and hypertension, and maybe their interaction, are associated with an elevated risk of ASD, as shown by the study's findings. Symptoms of these diseases might manifest in ways that contribute to ASD (for instance, chronic inflammation, fetal hypoxia, oxidative stress, and insulin resistance) (Y.-M. Li et al., 2016).

#### **2.11. Management of Children with Autism**

Treatment options for people who have ASD might vary depending on the condition, the patient's age, the patient's strengths and limitations, the patient's requirements, the mode of delivery, and the goals of intervention. The treatment's objectives are to reduce fundamental deficiencies as much as possible, improve functional independence as much as possible, and eliminate problematic behaviors that may inhibit one's ability to do functional tasks (Hyman, Levy, Myers, et al., 2020). It is challenging to provide effective therapeutic care for people who have ASD. The pharmacological treatment of the fundamental symptoms of autism is, for the most part, brutal. This is because of how complicated it is for ASD to start and because it often comes with other disorders, and people's responses change as they age (Pandina et al., 2020).

Many different kinds of therapies are helpful for people with ASD, but many of them lack a solid evidence base. None of them are the best. F. Volkmar et al. say that when practitioners know intervention terminology, they can talk to families in a way that is

acceptable and effective, and they can also give advice about the different kinds of therapy available (F. Volkmar et al., 2014).

#### **2.11.1. Cognitive behavior treatment (CBT)**

Focusing on cognitive-behavioral therapy, a complicated treatment based on a model that explains human relationships based on concepts, is essential due to the difficulties, burdens, and tensions that parents have encountered since their kid was diagnosed with autism. Cognitive behavioral therapy, or CBT, is to modify how a person's reaction to a given circumstance may be altered by reflective thought. CBT is a psychiatric treatment focusing on determining how thoughts, emotions, and actions are connected (Clark et al., 2019).

Cognitive behavior therapy (CBT), which teaches patients how their thoughts influence their behavior, may be helpful for children with autism. The child is taught by a therapist how to recognize, comprehend, and manage emotions like anxiety. This kind of therapy may assist children in learning how to handle challenging social situations and other life challenges. The public has widely used cognitive-behavioral treatments since the middle of the 19th century, and they are regarded as evidence-based (Kazantzis et al., 2018). Teaching them these skills enhances their social and communication habits while reducing their autistic tendencies. Children with autism have a range of talents that impact their ability to interact with others. Among these services, the most crucial are intentional action, visual action, verbal communication, social narrative, image-based communication, verbal communication, and motor movements. All of these tactics and actions assist kids with ASD in controlling their condition (Thabtah, 2019).

#### **2.11.2. Speech-language therapy**

Speech-Language Pathology (sometimes spelled "Speech Pathology") It has been shown that a variety of therapies may help assist children with ASDs in improving their

ability to communicate with others. The Denver model and communication in the social, emotional regulation, and ongoing transactional support have received the most attention. However, significant empirical evidence has also been found for developmental-pragmatic techniques such as the Denver model and communication in social, emotional regulation, and ongoing transactional support. In contrast, educational and naturalist approaches to behavior (like verbal behavior, the natural language paradigm, and crucial response training) have gotten much attention (Ganz & Simpson, 2019).

Speech-language pathologists are usually recommended to help people with autism spectrum disorders (ASDs) since these individuals typically suffer from social communication difficulties. Most children with ASD can learn to speak at their chronological age. A child should not be denied speech-language therapy because they did not respond to previous language therapy or because there is no correlation between language ability and intelligence quotient (Friedman & Sterling, 2019). Traditional speech-language pathologists are more likely to help (Van Volkenburg, 2021). They work closely with teachers, support staff, caregivers, and the child's classmates throughout the day to encourage good communication in real-life settings.

### **2.11.3. Physical therapy**

Children with autism spectrum disorders (ASD) may benefit from physical therapy (PT) because it helps them improve their physical skills and eliminate the dysfunctions that prevent them from maturing properly. Various exercises may be categorized as either negative, resistive, active, or aerobic. Exercises often include using apparatus like balls, weights, and balancing boards. These exercises are combined with the use of the apparatus to build muscular strength and endurance while enhancing body awareness and coordination. The processor collaborates directly with water exercises, schedules, and swirls individually. The youngsters made it take forty-five minutes to complete. Doing physical treatment at school or home is possible (Zhang et al., 2019).

Although variations in motor development are not a core diagnostic category for ASD, there is a growing acknowledgment that people with ASD have motor issues, which has led to more studies examining motor functioning and general motor impairments in children with ASD. In addition, evidence shows that motor impairments are common and persistent in people at all levels of functioning. The main parts of motor control affected by impairments are posture, movement, coordination, and tone (Neophytou, 2020). Children with ASD must have comprehensive developmental tests that must be done to provide children with ASD with a comprehensive intervention program.

#### **2.11.4. Play therapy**

Play therapy benefits children with ASD because it helps them acquire the skills necessary to engage in interactive play. It is beneficial since it may be difficult for children with ASD to form meaningful interpersonal relations with other children. During the therapy session, the therapist uses games and activities to assist the children in comprehending and expressing their feelings. For example, the children are allowed to play in order to convey their feelings. This more practical play type also helps kids understand and talk about their feelings and figure out how to deal with them (Seach, 2012).

#### **2.11.5. Art therapy**

Art therapy can help children with ASDs in many ways, such as by helping them build relationships, deal with sensory integration problems, improve their communication skills, grow as people, gain a better understanding of their emotions, identify problems, and come up with ways to solve them (Hanna et al., 2021).

#### **2.11.6. Music therapy**

Increased social interaction, verbal communication, initiating activities, socio-emotional compatibility, enhanced social adaptation, and parent-child connections have all been

connected with music therapy (Wimpory & Gwilym, 2019). It is common knowledge that listening to music helps improve our mood. However, that music is also utilized as a kind of therapy for those dealing with cognitive dissonance, emotional tension, and physical and mental relaxation (Ansdell, 2016).

#### **2.11.7. Behavioral therapy**

Behavioral therapy has grown significantly over the last several years in many contexts. It is one of the treatments for autism symptoms, with the most substantial body of research. The standard behavioral treatment for people with autism is applied behavior analysis (ABA). Ashcroft et al. stated that ABA tries to help children learn a wide range of skills by encouraging the good ones and discouraging the bad ones (Ashcroft et al., 2021).

The bulk of treatment options for children who have autism revolve around behavior modification techniques. Researchers have been studying the benefits of applied behavioral techniques for more than 30 years, and they have found that they help children with autism learn, interact, and behave in a socially appropriate way, while also reducing their lousy behavior (Larsson & LP, 2013).

#### **2.11.8. Social communication intervention**

This technique includes creating communication patterns based on children's best interests in events, repeating or extending what the children say and sympathizing with them, sitting close to them, maintaining excellent eye-to-eye contact, and imitating children's behaviors (Howes et al., 2018).

#### **2.11.9. Pharmacologic interventions**

Currently, no medicine can cure the early signs and symptoms of an autism spectrum condition, which include difficulties with social interaction and communication. The

Food and Drug Administration (FDA) in the United States has given its blessing to using two medications to treat symptoms linked to ASD. These symptoms include aggression, self-harm, impatience, and tantrums (Masi et al., 2017). Risperidone and aripiprazole are two drugs that may be used in the short-term treatment of signs and symptoms of autism in children. Both of these medications are approved for use in the United States.

## **2.12. Theoretical Framework for Autism**

The Extreme Male Brain Theory: The remarkable male brain idea offers a mystery unrivaled by most other explanations. The study conducted by Professor Simon Baron-Cohen (2002) indicates that the male brain has a natural tendency toward organizing information in a hierarchical structure. The female brain has a different cognitive profile than the male brain; this profile may be associated with a greater inclination for empathy. Furthermore, they may view autism as an extreme version of the typical male profile, which can be referred to as the extreme male brain hypothesis (Baron, 2002). Differentiating between two things and then generalizing about them both often results in controversy, and defending himself against charges of sexism and neurosexism, he uses the following argument, Professor Baron Cohen has been compelled to take the stand. There will always be exceptions to any rule, but it is important to stress that this idea only applies to averages. In addition, according to this view, autistic people, whether male or female, often have a brain profile that is more severe in the male gender. According to the findings of one study, girls with more masculine brains are three times as likely to develop autism (Ecker et al., 2017)

The extreme masculine idea was tested in a study (van Eijk & Zietsch, 2021) that compared autistic people to control subjects and found that the autistic group had a higher mean brain maleness score than the controls. However, here is where things start to get interesting; the researchers found that the reason autistic people and masculine people have larger male-type brains than other people is that autistic people and masculine people have much larger brains (van Eijk & Zietsch, 2021).

### **2.13. Teachers' Knowledge of ASD and Experience**

It has been hypothesized that it could be helpful to have previous experience or involvement with people who have ASD, and this hypothesis has been supported by several studies, in addition to giving introductory information about ASD, which has good consequences for a teacher's knowledge (Haimour & Obaidat, 2013). Consequently, in-service teachers often have a more comprehensive knowledge and understanding of autism than pre-service teachers. Individuals who want to become special education teachers must do an internship as part of their pre-service training. This is done to mitigate the adverse effects of existing disparities. During the final year of their training, they should participate in a practicum that lasts for one month and requires them to work full-time. They will be able to obtain experience in effective teaching techniques, assess themselves to determine whether or not they are suitable for the job path they have chosen, broaden their knowledge, and deepen their understanding of education thanks to this opportunity. Experiences such as practicums, courses, and volunteer opportunities are essential mechanisms that give preservice teachers a chance to use the teaching abilities they have just received in actual classroom situations (Hong et al., 2020).

A study conducted with Greek educators found that those with prior experience working with children who have ASD had a better understanding of how to work with pupils who have ASD. White et al. also say that the bonds between professors and students have grown stronger over time. (White et al., 2019).

### **2.14. Teachers' Knowledge of ASD and Moderators That Possibly Influence ASD**

Teachers need to have an awareness of ASD in order to provide a suitable educational environment in which children with ASD can participate. Constructive knowledge positively impacts daily activities in both regular education and unique education settings. This is true regardless of the kind of education provided (Van Herwegen et al., 2019). Teachers who work with autistic students are given resources to learn about the origins of autism, the disorder's diagnostic criteria, how to assess and diagnose autistic

students, the difficulties autistic students experience in school and their social interactions, and practical strategies for early classroom inclusion (Low et al., 2021).

On the other hand, according to conventional wisdom, the ideal environments are the experts in caring for, educating, and understanding children of any kind with special needs. They are placed since they are the only ones who are aware of the particular types of assistance that are required. This thinking must be abandoned since inclusion impacts all instructors, not just experts (Schewe, 2017). In light of the circumstances, it is of the utmost importance to give teachers more autonomy and to instruct them in communication skills and social activities, in addition to providing them with the knowledge necessary to improve negative views about pupils in order to (ASD) and other conditions (Keen et al., 2016). In general, instructors are required to have professional, behavioral, and scientific training on inclusive education for children with autism at every educational level and in every conceivable field of study, including majors. This includes special education credentialing. In order to support and help these kids achieve more access to the screening, early detection, and diagnosis processes, instructors must know that it is necessary to offer comprehensive learning opportunities for students with ASD (Busby et al., 2012). In this way, some of these studies have focused on the beginning of teacher training and education prior to joining the service in order to educate and prepare them for a comprehensive educational idea, or they have examined whether teachers specialize in ASD or mass education (Harrison et al., 2017).

Other research looked at the possible connection between experience and knowledge and the question of whether or not the phase of a teacher's career influences their level of awareness and understanding of autism (Lessner Listiakova & Preece, 2020). In conclusion, some studies are being done to investigate whether or not there is a connection between culture and knowledge, as well as whether the method used to evaluate knowledge is relevant (Cappe et al., 2021).

### **2.15. Teachers' Knowledge of ASD and Specialization**

Expertise and teacher preparation are essential to the success and continuity of inclusive education. After graduation, specializing in ASD is a beneficial approach to gaining a deeper understanding of the disease and significantly impacts student outcomes. Even the ASD training given to newly hired teachers made those teachers more aware of the condition (Leblanc et al., 2009).

Real inclusion may be made much simpler with the help of teachers who are enthusiastic about the concept of inclusion and who have received an adequate amount of training. In addition, typical instructors at the elementary and secondary levels presume a lack of information regarding the education of kids with special needs and have misconceptions about the subject. When it comes to instructing kids who have ASD, they do not consider themselves qualified or confident. It is possible because there is not enough specialization. Because of this, some people go to specialized courses to learn more, while others may find it helpful to get more professional training (Martin et al., 2021).

### **2.16. Teachers' Knowledge of ASD and Stages**

Educators need to have solid or basic knowledge of ASD to improve their students' educational experience by providing adaptive settings, aid with time management, and assistance in identifying possible sources of stress. In addition, there is a relationship between the teachers' level of expertise and the suitable stage in which they work. From this perspective, elementary school environments have more resources than secondary high school settings for incorporating students with ASD (Garnier, 2019).

According to the findings of specific studies, transitions are among the most significant opportunities to foster inclusion. It seems that teachers working in elementary schools have a deeper understanding and knowledge of ASD. However, the understanding of instructors in post-primary schools is somewhat lacking. Moving on from elementary

school to secondary school is a significant paradigm change that comes with a plethora of social, emotional, intellectual, and organizational problems. Because of this, educators need the training to assist and support kids with ASD (Able et al., 2015). Regarding the higher education level, there is a growing population of university students with autism, and these students must have access to the appropriate assistance. On the other hand, a survey's findings revealed that students on campuses, including faculty academics, had a basic understanding of ASD (Tipton & Blacher, 2014).

### **2.17. Teachers' Knowledge of ASD and Culture**

Evaluating a teacher's knowledge must consider the culture and country in which it will be carried out. Some research has revealed that instructors in different countries have different levels of knowledge of ASD. This is probably because of variations in the accessibility of educational resources, which has led to a lack of knowledge. Teachers who work with children who have (ASD) in France and Quebec have been the subject of studies examining their self-efficacy, anxiety, social and cultural support, coping, and burnout. These studies revealed wide variation in these factors (Cappe et al., 2021).

In Hong Kong (China), only 10% of primary and secondary school teachers have completed special education training in the last ten years. In France, this number is much higher. This means that most of these instructors are unprepared to interact with pupils with special needs, but in France, instructors are required to do a year-long course. In addition, the education and social professionals in Ethiopia have a minimal understanding of autism spectrum disorder (ASD) because they still give precedence to traditional practices and beliefs in areas such as health (responding to spiritual, cosmological, ecological, or social factors, for example) (Zelege et al., 2021). In another examination, Malaysian teachers were found to lack the expertise necessary to serve pupils in regular classrooms who had been diagnosed with ASD. When researching the teachers' understanding of ASD, it is necessary to consider both the educational system and the cultural context (Low et al., 2021).

## **2.18. Teachers' Attitudes Towards Children with Autism**

When it comes to the education of children with autism, the attitude of their instructors is one of the most important things to consider, just as it is with all of the other components that contribute to the development of the student. Teachers' beliefs and expectations about their students' abilities may significantly impact those students' performance in class, self-expectations, self-image, degree of academic motivation, and attractiveness or avoidance of specific tasks (Demirok & Baglama, 2015). Children who have unique educational requirements, such as ASD, rely on the positive behavior of their teachers in order to have an excellent educational experience. It has been established that autistic children's academic performance suffers when instructors in regular schools behave in a discriminatory manner toward them. This effect has a detrimental impact on the academic performance of autistic pupils. Furthermore, children diagnosed with autism risk being rejected by their classmates if those children do not have any specific requirements and if the teachers and other pupils in the school have a negative relationship with one another (Chung et al., 2015).

When assessing the efficacy of a teacher, the instructor's attitude is an essential component to take into account since it serves as the primary motivator for classroom activities and the whole instructional process. Positive or destructive, the teacher's attitude substantially impacts the outcomes of any classroom activity. This is because teachers' mental frames impact their interactions with students, the atmosphere they create in the classroom, and the quality of instruction overall. The presence of unfavorable attitudes creates an obstacle to interactions between instructors and students, which, in turn, has a deleterious effect on the learning process. On the other hand, positive attitudes like acceptance, understanding, and tolerance may contribute to changes in instructional methods, positive views held by teachers, and satisfying relationships between teachers and students (Ekom-Idorenyin, 2020). According to the opinion of Marzano (2012), "without good attitudes, children have a limited chance of learning well." (Rodríguez et al., 2012). The approach in which teachers interact with children and teenagers who have autism is an essential component of the overall treatment of these pupils. Teachers who lack the required training may acquire a range

of attitudes toward pupils who have ASD because they are unable to satisfy the needs of the children in their classrooms. This is especially likely to occur when teachers have not received adequate training.

Furthermore, according to the World Health Organization (2018), people with autism have signs and symptoms that put them at a disadvantage in social interactions and communication. This disadvantage may lead to unfavorable reactions from the others with whom they engage, including teachers. This is because the symptoms place them in a position where they are perceived as less capable of understanding and responding to others' emotions. Such adverse reactions increase their issues by hindering their social and communication abilities, which affects their learning and development. As for medical disorders that coincide, such as sensory integration disorder and allergies, they often accompany severe forms of ASD, which complicates their care and treatment and may increase the risk that they may get unfavorable social feedback, particularly from teachers. This study's basis is teachers' attitudes toward ASD youngsters (Ekomi-Idorenyin, 2020). An Australian study found that educators' perspectives on teaching students with autism have changed for the better. It is possible that this is because of the inclusion movement, improved before-service and during-service teacher training, or just more extraordinary experience teaching kids with autism in an inclusive context. Researchers also discovered that elementary school educators had a generally favorable outlook on their students with autism (Garrad, T. A., Rayner, C., & Pedersen, 2019) .

Recently, findings from studies carried out in the United States suggest that educators there were less accepting of pupils with autism and more prone to avoiding them than they were of students with typically developing brains. Most instructors' attitudes toward students with ASD did not change, despite the newly inclusive classroom atmosphere (Chung et al., 2015). Physical education educators' attitudes toward including kids with autism are a significant factor in determining how successful inclusive physical education will be (Healy et al., 2013). One individual's predisposition to favor or dislike a sure thing when evaluating that entity, such as incorporating kids with autism into physical education, is an example of an attitude the Students with autism benefit from having physical educators who have a good teaching attitude

because it helps these students enhance their motor and social skill development (Ryan et al., 2014).

On the other hand, the opposing views that physical education teachers hold toward kids with autism spectrum disorders may have adverse impacts (Park et al., 2010). It has been observed that the negative attitudes maintained by physical education instructors provide a barrier to promoting learning for students with and without autism and inclusive movement (C. Li et al., 2010). Unfortunately, a large proportion of preservice and in-service physical education instructors have concerns about and continue to hold adverse views about the inclusion of children with autism (Wilhelmsen & Sørensen, 2017). It may be difficult to change one's negative attitude, partly because of the fundamental cognitive processes that lie under the surface. It is possible for attitudes to be developed due to previous experiences and to be impacted by certain items and situations, such as individuals, groups, and prevalent social trends. It is possible for some circumstances, such as interaction with and understanding of students with ASD, to impact the attitudes of teachers toward enrolling kids with autism (Low et al., 2018).

Educators with more familiarity with pupils with autism due to their extensive work with and study of the disease (ASD) tend to have more favorable views about such pupils. Certain demographic factors may be used to explain teachers' views; for example, female instructors are more likely to have a positive outlook than male instructors do on the inclusion of pupils with ASD (Park & Chitiyo, 2011). Teachers' perspectives on including students with autism may have an outsized effect on classroom dynamics, influencing not just the way students with ASD to interact with one another but also how other members of the school community see those with ASD. Since the instructional activity carried out by teachers has the potential to foster inclusive behaviors, they must have positive attitudes about the disorder. As a result, they serve as an essential component in turning inclusive policies into actual inclusive behaviors. Failures in the psychological, social, and academic development of students with autism may result from a negative attitude towards including kids with ASD and low expectations of what children with ASD are capable of learning (Solís et al., 2019).

## **2.19. Importance of Teachers' Attitudes**

Teachers' attitudes determine whether or not children with impairments are thriving academically. In order to successfully instruct pupils who have a variety of different educational requirements, instructors need to be committed and competent. Because interaction between students and teachers is an integral part of the educational process, teachers' attitudes are essential in achieving students with disabilities in inclusive settings (Ernst & Rogers, 2009). According to research, there is a sense of inadequacy among instructors when instructing children in inclusive classrooms. This occurs when teachers have inadequate preservice training and a lack of awareness about inclusive practices. Therefore, to effectively adopt inclusive practices, it is necessary to investigate and address teachers' viewpoints about inclusion. While many educators are aware of the advantages of inclusive education, it is not always practiced appropriately (Hernandez et al., 2016). According to the results of a number of studies, some educators do not provide the fundamental changes and accommodations required for students with disabilities to achieve academic success in their classrooms. However, instructors who are more knowledgeable about inclusion tend to have more positive attitudes and believe that they can educate kids with disabilities in a successful and efficient way (Cook et al., 2007).

There are some things that show whether a teacher will have a good or bad attitude, and Cameron and Cook say that these attitudes could affect how well children with disabilities do in general education classrooms (Cameron & Cook, 2013). When teachers maintain unfavorable views about inclusion, this will probably result in lowered expectations on the part of educators and poor performance on the part of students with disabilities. Consequently, low expectations may result in fewer learning opportunities for students and fewer possibilities for students to explore further learning options, which can create a climate in which students lack confidence in their own talents. In addition, teachers with low expectations for their students are less likely to devote a significant amount of time to teaching, which leads to lower levels of student accomplishment.

## **2.20. Factors That Affect Teachers' Attitudes**

Many factors affect teachers' attitudes, and Most challenging behavior variables are teacher-related:

### **2.20.1. Disability and experience**

The fact that some pupils had disabilities was a recurrent theme in the research that was done. According to the study's findings, the severity of the handicap was correlated with the degree to which educators were unwilling to involve children (Logan & Wimer, 2013). Teachers generally had good views about working with children with modest impairments but had negative attitudes toward those with more severe disabilities due to worries about improper conduct. On the other hand, studies have shown that instructors with previous job experience with people with impairments are more likely to have a positive attitude when instructing pupils with disabilities (Pierson & Howell, 2013).

### **2.20.2. Knowledge and preparation**

Determining variables in teachers' perspectives on inclusion included their familiarity with the impairments of their students as well as their training in inclusive teaching strategies (Fuchs, 2010). Several educators have voiced concerns over their ignorance about the features of specific impairments (Alfaro et al., 2015). Negative views toward students with disabilities were more common among teachers with less training and experience. In contrast, positive attitudes toward inclusion were more common among those with more training and experience (Schultz & Simpson, 2013). For example, Fuchs (2010) discovered that teachers felt they lacked the necessary previous preparation to educate children with disabilities in a general education setting. This was a perception shared by the teachers they surveyed. This was based on the teachers' perceptions of their own training and experience. When teachers were given enough training, they felt more confident that they could teach kids with disabilities (Fuchs, 2010).

Even though research demonstrates that most educators are receptive to professional development, many teachers received inadequate training and were not effectively prepared to instruct children with impairments (Kahn & Lewis, 2014). Teachers believe they need more training and education on disability-related problems to help pupils with severe support requirements adequately. There might be a detrimental effect on students' academic performance when teachers lack understanding and preparation in inclusive pedagogy (Fuchs, 2010).

### **2.20.3. Resources and supports**

The extent to which teachers feel they are provided with resources and assistance from other school officials was another factor that influenced their perspectives on inclusion. In several studies, educators were asked about the essential variables in effective inclusion, and they said that resources and support were vital (Cambridge-Johnson et al., 2014). Some teachers have the impression that they do not have enough time to handle the requirements of students with disabilities. The educators also had the impression that there was insufficient assistance from the school's administration, parents, and experts. In inclusive classrooms, teachers are often unhappy because they lack resources and help (Fuchs, 2010).

### **3. METHODOLOGY**

Many strategies are employed in this chapter: the research's organizational structure, how it is set up, and how the study instrument is constructed, among other things.

#### **3.1. Design of the Study**

This is a descriptive cross-sectional study. This study was used to assess the knowledge and attitudes of primary school teachers regarding the autism of school-age children in Al Sammawa City, Iraq. Its study started from April 2022 to October 2022.

#### **3.2. Administrative Arrangements**

The researcher submitted the study project to the Institute of Health Sciences at Çankırı Karatekin University in Turkey. After obtaining the institute's approval, an official application was submitted that included the study protocol, objectives, and importance to the Ethics Committee of Çankırı Karatekin University. The approval was obtained. Acceptance of the draft questionnaire (Appendix 1). An assignment facilitation letter was obtained from the Al Muthanna Education Department for the governorate's schools (Appendix 2), as well as the approval of school principals for sample collection. The visits were face-to-face, and permission was obtained from all teachers to participate in the study.

#### **3.3. Ethical Consideration**

This is an essential part of the study as it is concerned with the ethical issues of scientific analysis at the beginning of the sample selection period, as shown below:

1. Anonymity: teachers' names were not obtained.
2. The researchers will hold a special meeting with school teachers according to the schedule to remind them of the research and its objectives.
3. All teachers in this study received full knowledge of their mission
4. The survey results will only be used to study, the teachers have been told.
5. All teachers should be informed that everyone here is independent and has the right to refuse to participate.
6. It is entirely up to participants whether they choose to participate in the research. They can decline to participate in the research or quit participating at any point after beginning participation.
7. Keep personal information obtained from these forms in strict confidence and use it for research purposes only.

### **3.4. Setting of the Study**

This study was conducted on elementary school teachers in 20 primary schools in al Sammawa city: Syed Al Kunin elementary School, Al Zainabiya elementary School, Al-Bayariq elementary School, Buratha elementary School, Al Affe elementary School, Al-Hawra elementary School, Al Huda elementary School, Al-Ethar elementary School, Star elementary School, Al Fayhaa elementary school, Al Safa elementary School, Ibn Rushd elementary School, Al Shamael elementary School, Halima Al Saadia elementary School, Tabuk elementary School, Al Suhab elementary school, Al Shuaa elementary school, Saba elementary School, Omar Bin Abdulaziz elementary School, and Al-Imam Al-Mahdi elementary school.

### **3.5. Sample of the Study**

A purposeful “non-probability” sample of 218 teachers was selected for this study. This sample was recruited from 20 primary schools. The total number of teachers in these schools has reached 500. Using G.Power analysis, the number of teachers in the sample was set at 218 based on the 95% confidence interval.

### **3.6. Inclusion Criteria**

The samples were selected according to the following criteria:

All teachers agree to participate in the study.

The samples include both sexes (males and females).

### **3.7. Exclusion Criteria**

Questionnaires with incomplete answers and more than one answer for the same question were excluded from the study.

### **3.8. Instrument of The Study (Questionnaire)**

A questionnaire was adopted to measure the knowledge and attitudes of primary school teachers toward children with autism in primary schools. The author obtained the study instrument in both Arabic and English (Al-Amri and Tyler Wood, 2016), and permission was obtained from the author to use the questionnaire. The study tool consists of three parts: the first part includes general information, the second part includes teachers' attitudes toward children with autism, and the third part includes teachers' knowledge of autism.

### **3.8.1. Part one: Demographic characteristics**

The first part is related to the socio-demographic characteristics of the sample. The form contains five questions: To specify teachers' educational role, teachers' experience, the type of training with exceptional children, and teachers' age and gender.

### **3.8.2. Part two: Teachers' attitudes**

A scale called Autism Attitude Scale for Teachers (AASST) was used in this study, as this tool was used to measure teachers' attitudes in Saudi Arabia as well as in the United States of America by the researcher (Alamri & Tyler-Wood, 2016). This scale measures teachers' attitudes toward students with autism. The survey scale consists of 9 questions about teachers' attitudes toward children with autism in schools. It uses a 5-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree. Survey questions have been translated into Arabic (Alamri & Tyler-Wood, 2016). Cronbach's alpha coefficient for scale and total sub-dimensions is 0.789.

### **3.8.3. Part three: Teachers' knowledge**

This scale measures teachers' knowledge of students who have autism. The survey scale consists of 5 questions about teachers' knowledge of children with autism in schools. It uses a 5-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree. The survey questions are translated into Arabic (Alamri & Tyler-Wood, 2016). Cronbach's alpha coefficient for the scale and overall sub-dimensions is 0.789.

## **3.9. Validity of the Instrument**

This questionnaire was prepared by a Saudi researcher (Alamri & Tyler-Wood, 2016). The researcher mentioned in his article that the questionnaire was translated into Arabic and reviewed by three professors who hold doctorate degrees and teach in colleges of

education in Saudi Arabia. It was used in his research in 2016. Permission to use this questionnaire was obtained from the researcher by sending him an email via email, and permission to use the questionnaire was obtained. This questionnaire was used for this study unchanged (Appendix 4).

### **3.10. Data Collection**

Data was collected through a questionnaire (Arabic version) and an interview with all primary school teachers (20 primary schools were included in the current study). The researcher interviewed the teachers and obtained their consent to participate in the study and to clarify the study form. Data was collected through a face-to-face interview and by distributing a questionnaire to teachers. The interview lasted about 20-40 minutes. Data collection continued from 10 April 2022 to 1 July 2022.

### **3.11. Statistical data Analysis**

Science (version 25) and Excel (2010) were used for data analysis. In order to reach the goals of this study, the following statistical data analysis methods were used to look at and interpret the results:

#### **3.11.1. Descriptive data analysis**

This includes measurement of the following:

**- Frequency (F)**

**- Percentage:**

The formula used to calculate the percentage is:

$$\% = \left( \frac{\text{frequency}}{\text{sample size}} \right) \times 100\%$$

**- The mean:**

Is the arithmetic average of the distribution, And The formula used to calculate the Mean is:

$$\bar{x} = \frac{\sum x_i}{n}$$

(Munro, 2005)

**- Mean of score:**

$$(M.S) = \frac{\sum Xi}{n}$$

(Munro, 2005)

### 3.11.2. Inferential analysis

#### 3.11.2.1. Independent sample T-test (T):

It is a statistical technique used to analyze the comparative mean of two independent groups. It was used in this study to compare demographic factors with the knowledge and attitudes of teachers in primary schools, and it was used as follows:

$$t = \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{\frac{\sum D^2 - \frac{(\sum D)^2}{n}}{n(n-1)}}$$

(Myers & Goddard, 2014).

### 3.11.2.2. One-Way ANOVA(F)

A one-way test (ANOVA) is used to see if there are any significant differences between the means of three or more independent (unrelated) groups. It was employed in this study to determine whether there is a statistically significant relationship between demographic variables, knowledge, and attitudes of primary school teachers. It has the following form:

| Source of variance | Sum of square                                                | d.f          | Mean square         | F                   |
|--------------------|--------------------------------------------------------------|--------------|---------------------|---------------------|
| Between Groups     | $SS_B = \sum \frac{(\sum xPl)^2}{n} - \frac{(\sum xP)^2}{N}$ | $df_B = K-1$ | $\frac{MS_B}{MS_W}$ | $\frac{MS_B}{MS_W}$ |
| Within Groups      | $SS_W = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$ | $df_W = N-k$ | $\frac{SS_W}{DF_W}$ |                     |
| Total              | $SS_T = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$ | $df_T = N-1$ |                     |                     |

Shortcuts for measuring necessary compared to the level are used as follows:

**NS:** *Non-significantly at probability-value >0.05.*

**S:** *Significantly at probability-value <0.05.*

#### 4. RESULTS OF THE STUDY

This chapter presents the finding of the data analysis in tables and their correspondence with the objectives of the study as shown below:

**Table 4.1.** Educational role distribution of teachers working at a school for students with autism

| Teachers' educational role |                           |           |             |
|----------------------------|---------------------------|-----------|-------------|
|                            |                           | Frequency | Percent (%) |
| Items                      | General Education Teacher | 119       | 54.6        |
|                            | Special Education Teacher | 58        | 26.6        |
|                            | Teacher aide              | 7         | 3.2         |
|                            | Principal                 | 20        | 9.2         |
|                            | School psychologist       | 3         | 1.4         |
|                            | Other                     | 11        | 5.0         |
|                            | Total                     | 218       | 100.0       |

The result showed that the Teachers' educational role of the majority of teachers (54.6%) was general education teacher.

**Table 4.2.** Experience distribution of teachers working at a school for students with autism

| Teachers' Experience |                    |           |             |
|----------------------|--------------------|-----------|-------------|
|                      |                    | Frequency | Percent (%) |
| Items                | Less than one year | 1         | 0.5         |
|                      | 1-2 years          | 122       | 56.0        |
|                      | 3-5 years          | 47        | 21.6        |
|                      | 6-10 years         | 27        | 12.4        |
|                      | More than 10 years | 21        | 9.6         |
|                      | Total              | 218       | 100.0       |

The result showed that the Teachers' Experience of the majority of teachers (56%) was 1-2 years.

**Table 4.3.** Training distribution of teachers working at a school for students with autism

| The type of training with exceptional children |                                                                 |           |             |
|------------------------------------------------|-----------------------------------------------------------------|-----------|-------------|
|                                                |                                                                 | Frequency | Percent (%) |
| Items                                          | Taught a special class                                          | 39        | 17.9        |
|                                                | Taught some exceptional children who were mainstreamed          | 109       | 50.0        |
|                                                | Volunteered to work with exceptional children                   | 16        | 7.3         |
|                                                | Had indirect contact with exceptional children in others' class | 21        | 9.6         |
|                                                | Learned about exceptional children in college courses           | 22        | 10.1        |
|                                                | None                                                            | 11        | 5.0         |
|                                                | Total                                                           | 218       | 100.0       |

The result showed that the type of training with exceptional children of most teachers (50%) was taught to some exceptional children who were mainstreamed.

**Table 4.4.** Age distribution of teachers working at school for students with autism

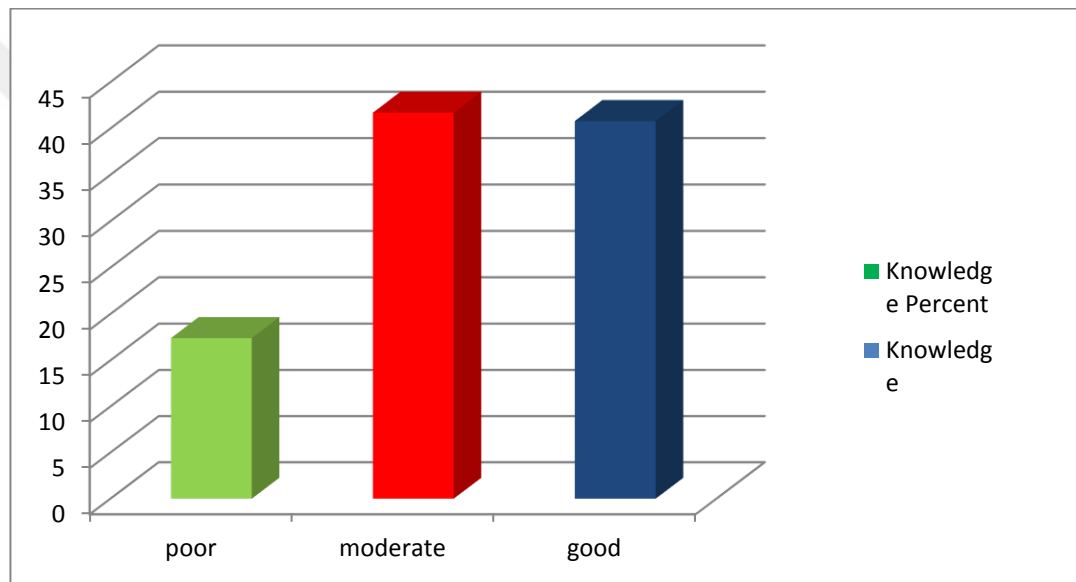
| Teachers' age |                    |           |             |
|---------------|--------------------|-----------|-------------|
|               |                    | Frequency | Percent (%) |
| Items         | 20-25 years        | 11        | 5.0         |
|               | 26-35 years        | 102       | 46.8        |
|               | 36-45 years        | 68        | 31.2        |
|               | 46-55 years        | 33        | 15.1        |
|               | more than 55 years | 4         | 1.8         |
|               | Total              | 218       | 100.0       |

The result showed that the teachers' age of the majority of teachers (46.8%) was 26-35 years.

**Table 4.5.** Gender distribution of teachers working at school for students with autism

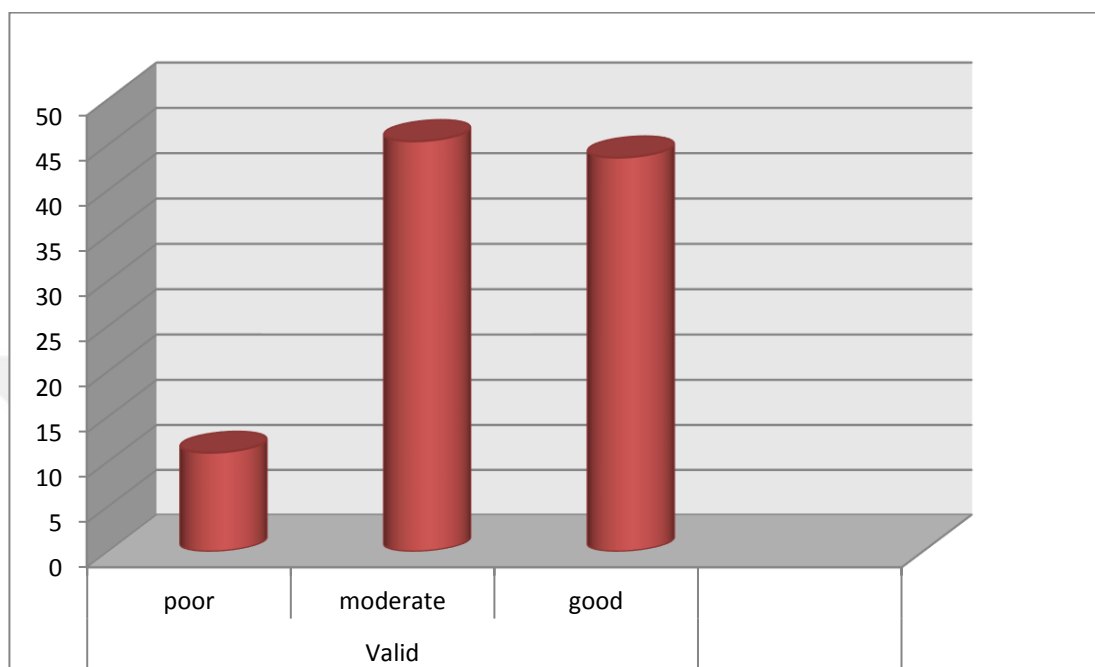
| Gender |        |           |             |
|--------|--------|-----------|-------------|
|        |        | Frequency | Percent (%) |
| Items  | Male   | 65        | 29.8        |
|        | Female | 153       | 70.2        |
|        | Total  | 218       | 100.0       |

The result showed that the Gender of the majority of teachers (70.2%) was Female.

**Figure 4.1.** Amount of knowledge primary school teachers regarding autism of school-age children at Al-Sammawa city.**Table 4.6.** Amount of knowledge primary school teachers regarding autism of school-age children at Al-Sammawa city.

| Knowledge |          |           |             |
|-----------|----------|-----------|-------------|
|           |          | Frequency | Percent (%) |
| Items     | Poor     | 38        | 17.4        |
|           | Moderate | 91        | 41.7        |
|           | Good     | 89        | 40.8        |
|           | Total    | 218       | 100.0       |

The result showed that the Knowledge of most teachers tended from (41.7%) moderate to good (40.8%) Knowledge regarding autism of school-age children in Al-Sammawa city.



**Figure 4.2.** Amount of attitude primary school teachers regarding autism of school-age children at Al-Sammawa City

**Table 4.7.** Amount of attitude primary school teachers regarding autism of school-age children at Al-Sammawa City

| Attitude |          |           |             |
|----------|----------|-----------|-------------|
|          |          | Frequency | Percent (%) |
| Items    | Poor     | 24        | 11.0        |
|          | Moderate | 99        | 45.4        |
|          | Good     | 95        | 43.6        |
|          | Total    | 218       | 100.0       |

The result showed that the attitude of the majority of teachers tends from moderate (45.4%) to good (43.6%) attitude regarding autism of school-age children in Al-Sammawa city.

**Table 4.8.** The difference between demographic data, knowledge, and attitude of primary school teachers regarding autism of school-age children at Al-Sammawa City

| Scale            | Gender                                            | N   | Mean±SD   | P0                  | P1     | P2     | P3    |
|------------------|---------------------------------------------------|-----|-----------|---------------------|--------|--------|-------|
| <b>Knowledge</b> | Male                                              | 65  | 2.24±0.66 | 0.872 <sup>a</sup>  |        |        |       |
|                  | Female                                            | 153 | 2.22±0.75 |                     |        |        |       |
| <b>Attitude</b>  | Male                                              | 65  | 2.36±0.65 | 0.530 <sup>a</sup>  |        |        |       |
|                  | Female                                            | 153 | 2.30±0.67 |                     |        |        |       |
| Scale            | Age                                               | N   | Mean±SD   | P0                  | P1     | P2     | P3    |
| <b>Knowledge</b> | 20-35                                             | 113 | 2.18±0.70 | 0.365 <sup>b</sup>  |        |        |       |
|                  | 36-45                                             | 68  | 2.33±0.72 |                     |        |        |       |
|                  | more than 45years                                 | 37  | 2.18±0.81 |                     |        |        |       |
| <b>Attitude</b>  | 20-35                                             | 113 | 2.11±0.66 | <0.001 <sup>b</sup> | <0.001 | <0.001 | 1.000 |
|                  | 36-45                                             | 68  | 2.52±0.58 |                     |        |        |       |
|                  | more than 45years                                 | 37  | 2.59±0.59 |                     |        |        |       |
| Scale            | Experience                                        | N   | Mean±SD   | P0                  | P1     | P2     | P3    |
| <b>Knowledge</b> | 1-2                                               | 170 | 2.20±0.73 | 0.368 <sup>b</sup>  |        |        |       |
|                  | 3-5                                               | 21  | 2.28±0.71 |                     |        |        |       |
|                  | more than 5 years                                 | 27  | 2.40±0.69 |                     |        |        |       |
| <b>Attitude</b>  | 1-2                                               | 170 | 2.27±0.66 | 0.046 <sup>b</sup>  | 0.069  | 0.611  | 1.000 |
|                  | 3-5                                               | 21  | 2.61±0.49 |                     |        |        |       |
|                  | more than 5 years                                 | 27  | 2.44±0.69 |                     |        |        |       |
| Scale            | Type of Training                                  | N   | Mean±SD   | P0                  | P1     | P2     | P3    |
| <b>Knowledge</b> | Taught a special class                            | 39  | 1.97±0.84 | <0.001 <sup>b</sup> | 0.506  | 0.001  | 0.005 |
|                  | Taught exceptional children who were mainstreamed | 109 | 2.15±0.66 |                     |        |        |       |
|                  | Other                                             | 70  | 2.50±0.67 |                     |        |        |       |
| <b>Attitude</b>  | Taught a special class                            | 39  | 2.46±0.68 | 0.012 <sup>b</sup>  | 0.086  | 1.000  | 0.027 |
|                  | Taught exceptional children who were mainstreamed | 109 | 2.19±0.64 |                     |        |        |       |
|                  | Other                                             | 70  | 2.45±0.65 |                     |        |        |       |

Abbreviations: N: Number, SD: Standart deviation, <sup>a</sup> student t-test, <sup>b</sup>One way ANOVA, p1: posthoc test (Bonferroni correction) for pairwise comparison of the first and second groups, p2: posthoc test (Bonferroni correction) for pairwise comparison of the first and third groups, p3: posthoc test (Bonferroni correction) for pairwise comparison of the second and third groups.

According to the results of the comparative table, male and female teachers were similar in terms of knowledge ( $p = 0.872$ ) and attitudes ( $p = 0.530$ ). When the teachers' knowledge was examined according to age, it was observed that age did not affect their knowledge ( $p > 0.05$ ). When comparing teachers' attitudes according to age, it was found that teachers whose ages ranged between (20-35) as well as teachers whose ages ranged between (36-45) showed more attitudes than teachers whose ages were more than 45 ( $p < 0.001$ ).

When comparing teachers' knowledge according to experience, it was observed that experience did not affect their knowledge ( $p > 0.05$ ). Also, when examining teachers' attitudes according to experience, it was found that the experience did not affect their attitudes ( $p > 0.05$ ).

When comparing the teachers' knowledge according to The type of training with exceptional children, it was found that the teachers who (taught a particular class) showed more knowledge than others ( $p = 0.001$ ). When comparing teachers' attitudes according to the type of training with exceptional children, it was found that teachers who (Taught some exceptional children who were mainstreamed) showed more attitudes than others ( $p = 0.027$ ).

**Table 4.9.** What is the relationship between the knowledge and attitude of primary school teachers regarding the autism of school-age children in Al-Sammawa city?

|           | Attitude | R      | Sig. (2-tailed) |
|-----------|----------|--------|-----------------|
| Knowledge |          | .261** | <0.001          |

\*\*. Correlation is significant at the 0.01 level (2-tailed),  $r =$  Spearman's rho, Sig. (2-tailed) = probably

The result showed a high relationship associated between knowledge and attitude of primary school teachers regarding autism of school-age children in Al-Sammawa city because the p-value was less than 0.05

## **5. DISCUSSION OF THE STUDY RESULTS**

This chapter presents a detailed and systematically organized presentation of the discussion of the results concerning the study objectives. Supportive evidence is presented as being available in the literature.

### **5.1. Discussion of the Distribution of the Teachers' Demographic Characteristics**

The result showed that the majority of teachers' (54.6%) educational role was to teach general education. The study's results agree with those of (Alamri, 2016) in Saudi Arabi, who indicated that most participating teachers (46.4%) fulfilled their pedagogical role as general education teachers. Also study by (Jones, 2015) noted in his study of 172 teachers that the majority of participating teachers, 58.7%; another study by (Tyler-Wood, 2016), conducted in the United States on 43 teachers, indicated that the majority of participants teachers (55.8%) were performing their pedagogical role as general education teachers other studies by (Park & Chitiyo, 2011) noted in his study that the majority of participating teachers (83%) had a teaching role as a general education teacher and it supports the current study. Also (Garrad et al., 2019) indicated that most of the participating teachers (89%) were performing their educational role as general education teachers.

The result showed that the experience of most teachers (56%) was 1-2 years. The study's results agree with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan, in which he indicated that the majority of the participating teachers (38.4%) had less than three years of service, and this supports the current study.

The result showed that type of training with exceptional children of most teachers (50%) taught some exceptional children who were mainstreamed. The results of the study agree with (Tyler-Wood, 2016), which indicated that the majority of participating teachers (67.4%) studied some exceptional children, another study by (Park & Chitiyo,

2011) indicated that the majority of participating teachers (73.2%) studied some exceptional children.

The result showed that the teachers' age of the majority of teachers (46.8%) was 26-35 years. The results of the study agree with (Omolayo et al., 2020) in Nigeria, where most of the participating teachers were between 26-35 years old, with a percentage of 43.9%, another study by (Aihie & Uwaoluetan, 2022), which indicated that the majority of the participating teachers were between 25–35 years old, at a rate of 50%, also with the study (Low et al., 2018) in Malaysia, which indicated that the majority of the participating teachers were between 26-35 years old, at a rate of 58.6%, other studies by (Ayub et al., 2017) in Pakistan, indicated in his study that the majority of participating teachers are between 20 and 34 years old and this supports the current study.

The result showed that the gender of the majority of teachers (70.2%) was female. These results agreed with (Selvaganapathi et al., 2019) in Malaysia, who stated in the study that the number of female participants was more compared to males, other studies by (Low et al., 2018) indicated in his study in Malaysia that the percentage of female teachers participants was higher compared to males, with the percentage of females reaching 69% and this supports the current study, also study by (Omolayo et al., 2020), where the proportion of females teachers was more excellent than males, where the proportion of females was 71%, and this supports the current study, another study by (Lu et al., 2020) revealed in his study that the majority of the participating teachers were female (78.6%) and this supports the current study.

## **5.2. Discussion Primary School Teachers' Knowledge**

The result showed that the knowledge of the majority of teachers tends from moderate to good (moderate (41.7%) to good (40.8%)) knowledge regarding autism of school-age children in Al-Sammawa city.

The study results agreed with (Selvaganapathi et al., 2019) in Malaysia. The study indicated that the teachers' knowledge was moderate to good; other studies by (Aihie & Uwaoluetan, 2022) indicated that primary school teachers have a good level of knowledge of autism, and this supports the current study, also by (Ayub et al., 2017) in Pakistan indicated in his study that the majority of teachers (71%) had good knowledge of autism and this supports the current study.

The results of this study disagreed with those of (Rakap et al., 2018), which was conducted in Turkey and indicated the poor knowledge of Turkish teachers about autism; also disagreed with (Khalil et al., 2020), conducted in Saudi Arabia, and showed that the majority of teachers, 82.3%, have poor knowledge of autism spectrum disorder, other study disagreed with (Alharbi et al., 2019), who conducted his study in Saudi Arabia and pointed out the common knowledge of the participating teachers with autism, other study disagreed with by (Tiwari & John, 2017) in India, which showed poor knowledge of teachers about autism, also disagreed with Audu and Egbochuku (2010) and (Odunsi et al., 2017), who found that knowledge of autism among primary school teachers in Nigeria is low.

In this study, the teachers' good knowledge of autism came through teachers' intensive courses on autism and the exceptional cases of students with disabilities in service or through dealing with children with autism. It is also believed that teachers studied autism during the study period.

### **5.3. Discussion Primary School Teachers' Attitudes**

The result showed that the attitude of the majority of teachers tends from moderate (45.4%) to good (43.6%) attitude regarding autism of school-age children in Al-Sammawa city.

The results of the study agreed with the study of (Garrad et al., 2019), which indicated that the attitudes of the participating teachers were positive (from moderate to good),

also agreed with (Selvaganapathi et al., 2019) in Malaysia, which indicated in his study that the participating teachers had positive attitudes towards autistic children, another study by (Lu et al., 2020). indicated in his study that the attitudes of the participating teachers were moderate, also by (Park et al., 2010) found that the majority of teachers had positive views about the children they educate who have autism, as mentioned in his research.

The study disagreed with (Alamri, 2016), which indicated in his study in Saudi Arabia that the participating teachers have negative attitudes towards dealing with autistic children, also by (Low et al., 2021) in Malaysia indicated in his study that the participants' teachers had poor attitudes towards dealing with children with autism, and this disagreed with the current study, another study, it was found that teachers in Malaysia lack an understanding of scholastic diversity (Ahmed, Zainal Abidin, Muhammad Gilas, Salha, 2011). For instance, the present research contradicts the findings of previous studies indicating that average education instructors are opposed to co-teaching because they believe it would be detrimental to their pupils and undermine their authority and professionalism in the classroom.

In this study, teachers' positive attitudes toward dealing with autistic children stem from their sense of responsibility in educating students and their parental feelings toward autistic children. Also, teachers' attitudes towards children with autism are based on knowledge of autism and its symptoms, which indicates their keenness and interest in exceptional children.

#### **5.4. Discussion of the Relationship Between Demographic Data and Primary School Teachers' Knowledge**

Results showed no relationship between demographic and knowledge for primary school teachers regarding the autism of school-age children in Al-Sammawa city, except for knowledge and training with exceptional children.

Results of the study showed that there is no relationship between the teachers' educational role and knowledge; this result agreed with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan, also agreed with (Khalil et al., 2020) study conducted in Saudi Arabia, which indicated that there is no relationship between knowledge and the teachers' educational role.

The results of the study showed that there is no relationship between the age of teachers and knowledge because the p-value was more than 0.05; this result agreed with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan; it also agreed with (Khalil et al., 2020) study conducted in Saudi Arabia, which indicated that there is no relationship between knowledge and age.

Results of the study also disagreed with those (Selvaganapathi et al., 2019) in Malaysia in his study, which indicated that there is a relationship between knowledge and age.

Results of the study showed that there is no relationship between the gender of teachers and knowledge. This result agreed with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan.

Results of the study also disagreed with (Selvaganapathi et al., 2019) in a study conducted in Malaysia where he indicated a relationship between knowledge and gender.

Results of the study showed no relationship between teacher experience and knowledge; this result agreed with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan. It also agreed with (Khalil et al., 2020) study conducted in Saudi Arabia, which indicated no relationship between knowledge and experience.

Results of the study also disagreed with (Selvaganapathi et al., 2019) in a study conducted in Malaysia where he indicated a relationship between knowledge and experience.

Results of the study showed that there is a relationship between the type of training with exceptional children and knowledge; this result disagreed with (Ayub et al., 2017) in a cross-sectional study conducted in Pakistan, It also disagreed with (Khalil et al. 2020) study conducted in Saudi Arabia, which indicated that there is no relationship between knowledge and The type of exposure to exceptional children.

Results of the study also agreed with (Selvaganapathi et al., 2019) in a study conducted in Malaysia where he indicated a relationship between knowledge and The type of exposure to exceptional children.

### **5.5. Discussion of the Relationship Between Demographic Data and Primary School Teachers' Attitudes**

The result showed no relationship between demographic data and the attitude of primary school teachers regarding autism of school-age children in Al-Sammawa city, except attitude and teachers' educational roles, were found to be significantly associated with teachers' age high significant. The results showed relationship between the type of training with exceptional children and their attitudes. The study's results agreed with those of (Park et al., 2010). conducted in the United States, indicated in his study that there is a relationship between the type training with exceptional children and the attitudes of teachers toward children with autism and pointed out the impact of this relationship on teachers' attitudes. The results showed no relationship between the gender of the teachers and their attitudes. The study's results disagreed with those of (Park et al., 2010). conducted in the United States, indicated in his study that there is a relationship between the gender of the teachers and the attitudes of teachers toward children with autism.

The results showed no relationship between the experience of the teachers and their attitudes. The study's results disagreed with those of (Park et al., 2010). conducted in the United States indicated in his study that there is a relationship between teachers' experience and teachers' attitudes toward children with autism. The results showed a

relationship correlation between the age of the teacher and the attitudes of primary school teachers towards autism among school-age children in the city of Samawa.

The study results agreed with (Park et al., 2010) in the United States. The study indicated in his study that teachers' attitudes were affected by age. Teachers over 50 recorded less positive attitudes compared to teachers under 50 years of age, also by (Abu-Hamour & Muhaidat 2013) in Jordan; in his study, he indicated a relationship between age and teachers' attitudes. The study found that teachers between the ages of 20 and 35 have positive attitudes toward autistic children, supporting the current study.

The results of the study disagreed with the study (Aihie & Uwaoluetan, 2022), which indicated in his study that there is no statistically significant relationship between teachers' attitudes and their ages, so there is no significant difference between age groups indicating teachers' attitudes towards children with autism in general. Also study disagreed with (Ekom-Idorenyin, 2020), which indicated in his study that there is no statistically significant relationship between teachers' attitudes and their ages, so the attitudes of elementary school teachers toward students with ASD are not significantly affected by the age of the teacher; other study disagreed with (McCray & McHatton, 2011) which indicated in their study that teachers' attitudes are not necessarily age-dependent.

In this study, younger teachers have more positive attitudes toward dealing with children with autism than older teachers because they are still at the beginning of their careers and have many ambitions.

The results showed a correlation between the teachers' educational role and the attitudes of primary school teachers toward autism among school-age children in the city of Samawa.

The results showed a relationship between teachers' educational role and their attitudes. The study's results agreed with those of (Park et al., 2010). conducted in the United

States indicated in his study that there is a relationship between teachers' educational role and attitudes toward children with autism.

In this study, most general education teachers have positive attitudes towards dealing with children with autism because they have complete knowledge and experience in dealing with all student cases, not just exceptional ones.

#### **5.6. Discussion of the Relationship Between Knowledge and Attitude Among Primary School Teachers Regarding the Autism of School-Age Children**

The result showed a high relationship between the knowledge and attitude of primary school teachers regarding the autism of school-age children in Al-Sammawa city.

The results of the study disagreed the study of (Omolayo et al., 2020) in Nigeria, who indicated in their study the weak relationship between knowledge and attitudes of teachers towards autism, also disagreed with the study of (Jones, 2015), which stated in its study that the relationship between knowledge and teachers' attitudes was weak, other studies shown that there is the low relationship between teachers' knowledge of autism and attitudes toward students with autism (Matthews et al., 2015);(White et al., 2016), and this disagreed the current study.

The study agreed with (Gómez-Marí et al., 2021) pointed out in his study that there is a relationship between teachers' knowledge of autism and their attitudes toward dealing with children with autism. The fact that a higher level of knowledge has a positive effect on teachers' attitudes, another study by (Low et al., 2021), who conducted research in Malaysia and reported that there is a statistically significant association between teachers' understanding of autism and their perspectives on caring for children with autism, also agreed with (Chung et al., 2015), who indicated in his study that there is a relationship between teachers' knowledge of autism and their attitudes towards dealing with children with autism. Chung suggested that broad knowledge of autism spectrum disorder enhances teachers' understanding, confidence, experience, skills, and resources

in working with students with autism, ultimately contributing to a more positive attitude toward these students, other studies agreed with this (Lu et al., 2020) in china, who indicated in his study that there is a significant correlation between teachers' knowledge of autism and their attitudes towards dealing with children with autism.

This research showed that having in-depth knowledge about autism spectrum disorder improves teachers' comprehension, confidence, experience, abilities, and resources while dealing with autistic kids, which eventually results in a more favorable attitude toward these individuals.



## **6. CONCLUSIONS AND RECOMMENDATIONS**

### **6.1. Conclusions**

In order to summarize the findings of this research, it is anticipated that they would broaden instructors' present perspectives on their attitudes regarding working with autistic pupils.

Most of the participating teachers were female and general education teachers, and their ages ranged between 26-35 years. Most of the participating teachers had one to two years of experience.

Teachers' knowledge of autism was moderate to good, and teachers' attitudes were positive toward children with autism in schools.

There was no statistical relationship between teachers' knowledge and demographic information, and there is also no statistical relationship between demographic information and teachers' attitudes toward dealing with children with autism, except for teachers' age, concerning dealing with autistic children.

The most important takeaway from this research is that primary school teachers' views on working with autistic pupils in their classrooms are highly influenced by the level of scientific knowledge they possess regarding autism spectrum disorder. Therefore, a study on future attitudes toward inclusive education is essential to properly evaluate the necessity of educating, training, and equipping special education instructors in a theoretical and practical manner to deal with kids with autism.

It is possible to increase the knowledge and attitudes held by primary school teachers by implementing pre-service and in-service teacher training programs that focus on autism at each stage of education.

## 6.2. Recommendations

The following are some suggestions made by the researcher after the completion of the study based on the findings:

- Integrating autism training programs more deeply into the curriculum of pre-service teacher education programs, whether they are offered in a public or a private setting, and providing for their ongoing maintenance via an in-service training program.
- To raise primary school teachers' familiarity with and ability to identify these conditions, the Ministry of Education should take the initiative to develop and provide targeted in-service training programs.
- Continuing education and training for teachers who deal with children who have ASD.
- A diverse variety of qualities and experience are required of educators who work in inclusive classroom settings with kids with autism spectrum disorders. In addition, regardless of their credentials, all educators working in schools must undergo training in the instructional methods essential to assist pupils in this demographic adequately.
- Future research should focus on replicating this study with a larger sample size and a mix of genders since it indicates that this component may impact knowledge, views, and competence when employing behavioral methods in managing children with autism.
- Even though media was shown to be the most common source of information, we still think it is essential for journalists to double-check their work before releasing it to the public.

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## **APPENDICES**

### **APPENDIX 1. Approval the Ethics Committee of the Institute of Health Sciences, University of Cankiri**



## **APPENDIX 2. Approval of the Iraq Ethics Committee**





**APPENDIX 3 : Approval of the Institute of Health Sciences at the University of  
Çankiri KARATEKİN**





## **APPENDIX 4. Questionnaire**







## **APPENDIX 5. Similarity Report**



## **CURRICULUM VITAE**

**Surname :** DHEYAA RAHEEM NASER

