Original Research

PSYCHIATRY

Profile of autism spectrum disorders in Morocco: cross-sectional retrospective study of parents of children with autism

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Abstract

Context and objective. In Morocco, autism is a frequent disorder and no epidemiological studies have been carried out. The aim of this work is to analyze the characteristics of the onset of autism in children.

Settings and Design. We conducted a cross-sectional retrospective study, spread over a period of 10 months.

Methods. We included in our survey children who, according to the DSM 5 definition, had one of the autism spectrum disorders and had a well-defined diagnosis. For the statistical analysis we used Excel® software. We used the percentages for the description of the qualitative variables.

Results. Of the parents of children with ASD, 49% were biological mothers. Of these, 30% women had their child when they were between 30 and 35 years of age. Males accounted for 61% of children with a sex ratio of 2.6. The first autistic traits appeared at the age of 18 months for 22% of our population. Of mothers with children with ASD, 83% had regular medical follow-up throughout their pregnancy. All autistic children in our population were vaccinated according to the National Immunization Program. According to parent reports, 70% affirmed that the first autistic features appeared after vaccination with the measles-mumps-rubella (MMR) vaccine, knowing that this statement is not based on evidence.

Conclusions. The quality of care depends on the age at which the diagnosis of autism is established.

Keywords: autism spectrum disorders, quality of life, socio-demographic data, vaccines

Background

Autism is a neurodevelopmental disorder characterized by impairment in social interactions, communication and the presence of stereotypical repetitive behaviors and / or very limited interests [1]. Besides these central symptoms, other disorders can coexist and become problematic such as epilepsy, intellectual disability, sensory deficit, motor problems, or even psychiatric disorders, mainly anxiety, depression, blood loss. attention, hyperactivity, sleep or eating disorders [2]. Symptoms usually become evident before the age of three [3], sometimes later around the age of four. Autism occurs in all social classes [4]. Prevalence studies suggest that autism affects up to 1 in 100 children [5] with a marked predominance for boys compared to girls of 4/1 [6,7]. Autism is a complex and poorly understood pathology, the etiology is multi-factorial with a genetic, neurobiological, environmental, neuro-developmental and psycho-affective component [8]. However, only 20% of people diagnosed with Autism Spectrum Disorders (ASD) have a clearly defined etiology [9]. Potential environmental factors such as maternal conditions, pregnancy complications, medications, and exposure to toxic substances affect brain development in the prenatal and perinatal

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stages [10,11]. To date, there is no specific pharmacological treatment for autism that directly targets the cause. Medicines are used to treat certain associated symptoms, in addition to educational therapies. generally off-label [12], depending on the clinician's experience and knowledge of the scientific literature. In Morocco, autism is a frequent disorder and no epidemiological studies have been carried out. The aims of this work are to analyze the hallmarks of the appearance of autistic traits in children through the description of socio-demographic data and the history of this population, the particularities of psychomotor and psycho-emotional development, and decipher the prescribed method of management.

Subjects and methods

Case of autism spectrum disorders

Our study included children with one of the disorders of the autism spectrum and having benefited from a well-defined diagnosis, according to the definition of the DSM 5 (fifth edition of the diagnostic and statistical manual of mental disorders),. It was carried out on 90 autistic children under the age of 15, hospitalized or in consultations, at the child psychiatry center of the Errazi Hospital in Salé, and children benefiting from oxygen therapy sessions at the Mohamed V Military Instruction Hospital of Rabat. These children come from all regions of Morocco and from all social and intellectual classes combined. We excluded from our study children over 15 years of age on the date set, children with a disorder other than autism spectrum disorders such as schizophrenic psychosis in children and adolescents, dysthymic psychoses, acute psychosis and others.

Study design

This is a retrospective and cross-sectional study, spread over a period of 10 months. Our survey was carried out on children hospitalized or in consultation at the Day Hospital of the Child Psychiatry Service of Errazi Hospital in Salé and children benefiting from oxygen therapy sessions at the Mohammed V Military Instruction Hospital in Rabat. The data were collected by means of a questionnaire sent to the parents of autistic children. This questionnaire, comprising 30 questions, made it possible to study the socio-demographic data and the antecedents of autistic children, the peculiarities of their psychomotor and psycho-emotional development, the characteristics of ASD in these children and the prescribed treatment method. This survey was administered to 90 parents of autistic children. Sampling was done randomly from all parents of children meeting the study inclusion criteria. The responses allowed us to establish a profile of autism spectrum disorders in children with autism in Morocco.

Objectives of the study

The main objective is to establish a profile of autism spectrum disorders in children with autism in Morocco. We analyze the hallmarks of the appearance of autistic traits in children through the description of socio-demographic data and the history of this population, the particularities of psychomotor and psycho-emotional development, and envisage the prescribed method of management.

Data analysis

The results were recorded on a database and then analyzed using Excel® software. We used the percentages for the description of the qualitative variables. The statistical analysis was done using Excel® version 2016.

Results

Socio-demographic data and background

We interviewed 90 parents of children with ASD, 49% of whom were biological mothers, 9% adoptive mothers, 22% biological fathers, 4% adoptive fathers and 16% other accompanying persons. The professional situation of parents was: 40% were in work, 58% without a profession and 2% in retirement. Among parents without a profession, 38% had given up their job because of their children's illness. When the child was conceived, 30% of mothers were between 30 and 35 years old, 26% between 25 and 30 years old, 22% between 35 and 40 years old, 17% between 20 and 25 years old and 6% of the women had their child at an age of less than 20 years (*p-value* = 0.050). Consanguineous marriage was found in 23% of cases. We noted 4 cases where the parents had the same blood group, of which the mother was Rh negative and the father Rh positive. The geographic origin is urban for 87% of parents of children with autism, while 13% of rural origin. Among parents, 78% had some knowledge of their child's illness while 22% had never heard of it. The male sex represented 61% of children with a sex ratio of 2.6. The first autistic traits appeared at the age of 18 months for 22% of our population and at 3 years for 20% (*p-value* = 0.181) (Figure 1). Among children with ASD, 61% were out of school. Only 33% were accompanied by a school assistant. Of all the children included in our study, 34% were an only child while 66% were siblings, of which 44% were the youngest and 34% the eldest of the family (*p-value* = 0.184). Among the siblings of autistic children only 7% also had autism. There were 2 cases that had brothers with Down syndrome.

Particularities of the course of pregnancy and childbirth of the mother

Among mothers of children with ASD, 83% had received regular medical follow-up throughout their pregnancy. Two mothers had recourse to medically assisted procreation, one by means of In Vitro Fertilization and one by the method of Intra Cytoplasmic Sperm Injection. During pregnancy, 33% of mothers had complications, due either to the excessive intake of certain drugs, or to an infectious and febrile episode, or to the occurrence of anemia, diabetes or physical and mental stress. There was also a case of bleeding during the 3rd trimester of pregnancy with an increased risk of miscarriage, a case of a cholecystectomy operation and a case of discovery of cervical cancer. During pregnancy, 56% of mothers had taken drug treatments: corticosteroid,

non-steroidal anti-inflammatory and antidepressant. One case was under chemotherapy. Food supplements during pregnancy concerned 64% of mothers and folic acid supplementation concerned 64%, vitamin C 16%, vitamin D 33% and 30% for others supplements (*p-value* = 0.542). The delivery took place in a hospital environment in 83% of mothers against 17% at home. Almost half of the children (48%) were born by caesarean section while 52% were born vaginally. Spinal anesthesia is the most common method of anesthesia in case of caesarean section, it represents 74% of our population. The general anesthesia represents 19%, epidural anesthesia 9% and rachy and peri combined 7% (*p-value* = 0.862). Only 16% of mothers confirmed the occurrence of complications during childbirth and 24% had pre- and perinatal complications. Birth weight was normal in 80% of children with ASD and abnormal in 20%. Artificial breastfeeding was the most common and represented 50% of breastfeeding. Breastfeeding represented only 22% of cases (*p-value* = 0.551) (Figure 2).

Characteristics of onset of ASD symptoms and method of management and treatment

All autistic children in our population have been vaccinated according to the national immunization program. According to 70% of parents, the first autistic traits appeared after vaccination and the MMR vaccine (Measles, Mumps and Rubella vaccines) is the only one incriminated by all parents. All children with ASD are followed by a professional, 72% by child psychiatrists, 56% by psychologists, 100% by therapists and 50% by other professionals. The most prescribed management methods in children with ASD are behavioral methods including "Applied Behaviour Analysis" (ABA) (94%) and the "Picture Exchange Communication System" (PECS) (78%) (p-value = 0.339) (Figure 3).

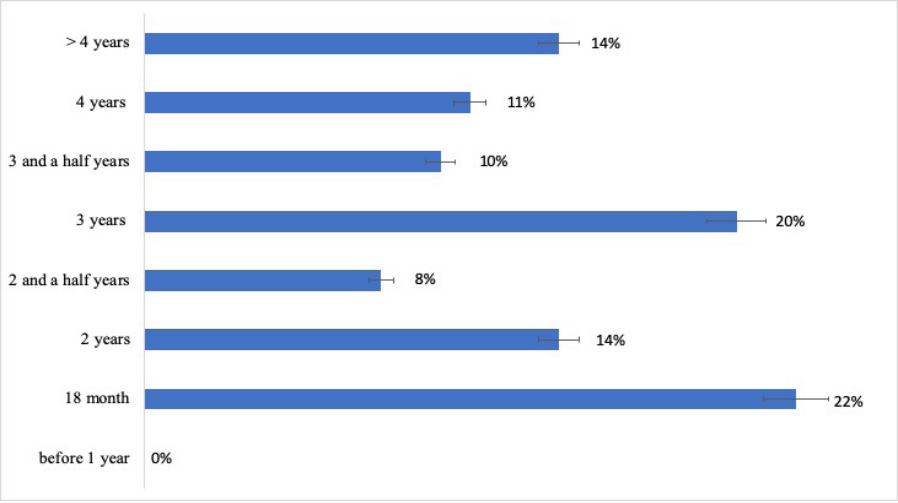

Figure 1. Distribution of autistic children by age of onset of autism.

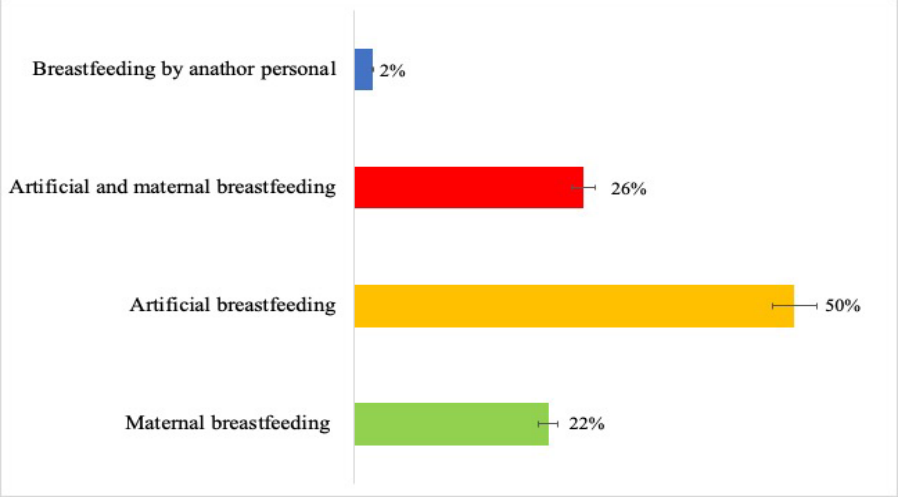

Figure 2. Distribution of children by breastfeeding method.

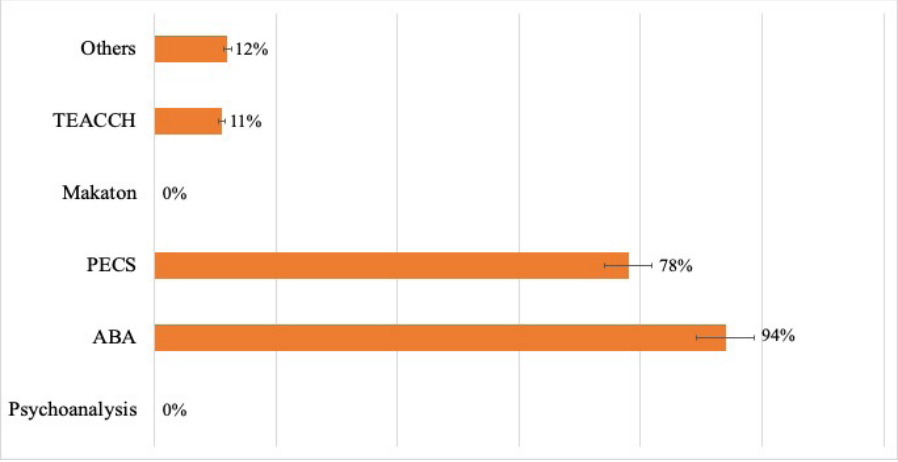

Figure 3. Distribution of autistic children according to the prescribed behavioral management methods.

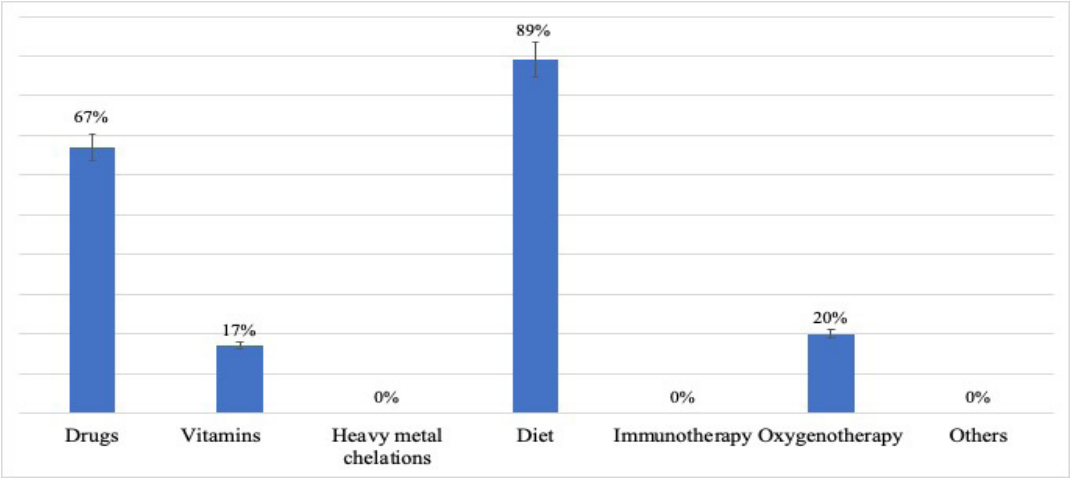

Figure 4. Method used for the management of ASD in children.

Among autistic children, 67% received medication for their therapeutic management and 89% also had an associated diet (p-value = 0.418) (Figure 4). The therapeutic classes prescribed for the management of autism and associated pathologies in children are antiepileptic (65%), antipsychotic (63%), antidepressant (48%), psychostimulant (24%), normothymic (9%), anxiolytic (7%), anticholinergic (4%), antibiotic (9%), antifungal (15%), vitamin (22%), laxative / purgative (39%), antidiarrheal (26%), antiemetic (9%). During a community illness, all the children were taking medicine. According to the parents, 67% of these children presented with a worsening of autistic behavior following this drug intake. The symptoms of this aggravation are agitation (75%), stereotypy (33%), worsening of all symptoms (17%) and other symptoms (20%) (*p-value* = 0.159).

Discussion

Socio-demographic data

A study in Romanian children abandoned and then adopted reveals that between 6 to 10% of these children show signs of autism [13]. These children had a level of cognitive deficit correlated with the duration of deprivation of parental contact [13]. But these data were difficult to interpret since it is not known whether it is the autistic behaviors of these children that led their parents to abandon them or if the symptoms are consecutive to the abandonment. A remote study shows that after treatment, many of these children have progressed either towards recovery or have developed other neuro-developmental disorders not typically autistic [14]. In our study 40% of parents of autistic children are active, which opens the parenthesis for this theory. However, there is no evidence to

date to support the hypothesis that autism is caused by poor or inadequate parental education due to the deprivation of parental contact [15]. Among the parents in our study, 58% do not have a profession, of which 38% have given up their work because of their children's illness. Studies show that parents of children with ASD have a particularly high risk of social isolation, marital discord and separation. Their professional advancement is more difficult, they experience more anxiety and have a more negative perception of their parenting skills [16]. Childhood ASDs significantly affect the psychological health of parents and have an impact on the whole family.

According to the results of our study, 30% of mothers had their child when aged between 30 and 35 years and 22% between 35 and 40 years. Indeed, an advanced age of the parents at birth (paternal age> 39 years and maternal age> 35 years) would be associated with the onset of autism spectrum disorder and constitutes a significant risk factor. The risk would be multiplied by 1.3 for mothers over 35 and by 1.4 for fathers over 40 [16]. Our study found that 23% of parents of children with ASD were consanguineous. Inbreeding is a relationship between two people who share a common ancestor. Recent techniques for examining the whole genome are making it possible to identify more and more genes involved in major mental disorders such as schizophrenia, autism and bipolar disorder [17]. According to epidemiological studies, autism occurs in all social classes [4]. However, our study found that the majority of autistic children (87%) are of urban origin. A predominance of the male sex is reported, 61% of children, with a sex ratio of 2.6. In fact, autism preferentially affects the male sex with an average sex ratio of 4 boys to a girl [6,7]. It is most often between 2.5 and 4 but the values vary from 1.5 to 8.9 boys for a girl [6,18,19].

Among the children, 34% were the oldest of the siblings and 44% the last born of the siblings. Our results are consistent with those of a study carried out in America. Indeed, according to this study, children with ASD tend to be born at the two chronological ends of a sibling: in families of two children, they are most often the oldest and in families of 3 or more, they are the oldest. last born of the siblings [20]. According to the results obtained, 7% of autistic children had siblings also suffering from autism. A similar study found that with a history of autism in siblings, the risk of recurrence is 4% if the child with ASD is a girl and 7% if it is a boy [21]. The first signs of autism were detected between 18 and 36 months (22% and 20% respectively). Indeed, according to the literature, a large number of children are identified at an early age before the age of 3, but the majority do not receive their diagnosis until the age of 4 [22]. In general, children with more pronounced symptoms are diagnosed earlier than those with subtler features [22]. It is important to establish, as early as possible, the diagnosis of ASD in children in order to offer appropriate management and improve the prognosis of the disease. Numerous studies have found that early and specialized diagnosis can produce significant gains in many children with ASD [23]. Also, early diagnosis allows an etiological investigation and genetic advice to parents regarding the risk of recurrence [24].

Particularities of the psychomotor and psycho-emotional development of the child

Course of pregnancy

Almost one third (33%) of mothers of autistic children had complications during their pregnancy. The main complications were the occurrence of an infectious and febrile episode, the occurrence of anemia or diabetes or physical and mental stress. There was also a case of bleeding in the third trimester with an increased risk of miscarriage, a case of cholecystectomy operation and a case of discovery of cervical cancer. Indeed, many studies have been carried out on the effects of an infection on the development of autistic traits. Thus, a first study, after an epidemic, estimated that 10% of children with congenital rubella suffer from autism [4]. Exposure to the rubella virus during pregnancy and particularly before the maturation of the fetal immune function would therefore appear to be responsible for the onset of autism [25]. Another infection in utero has been implicated in the onset of autistic symptoms: cytomegalovirus inclusion disease [26].

More than half of mothers of autistic children (56%) took medication during their pregnancy. This large percentage suggests the presence of a link between the taking of certain drugs by the mother and the occurrence of ASD in the child. Among the drug treatments, we note taking infertility treatment. It should be noted that among the mothers in our sample two women had recourse to medically assisted procreation, one according to the IVF method and one according to ICSI. In fact, it has been proven in the literature that infertility treatment followed by one of the parents exposes the embryo to a high level of sex hormones which can be an aggravating factor and promote the appearance of pathologies [27].

Almost two-thirds (64%) of mothers took dietary supplements during the pregnancy period. Folic acid supplementation is the most common (64%) followed by vitamin D (33%), vitamin C (16%) and another supplementation (30%). In fact, the mother should take folic acid supplementation during the month before conception and during the 2 months of early pregnancy [30]. The authors have shown that taking vitamin B9 prenatal and early in pregnancy reduces the risk of autism by 40% [28]. Also, vitamin C is extremely safe and beneficial in many ways for both the brain and the body. Its potential contribution in the prevention and treatment of autism remains very little studied. It is present in very high concentrations in the brain, but its exact role is still difficult to define [29]. In addition, eighteen studies conducted between 1965 and 1996 demonstrated the effectiveness of

vitamin B6 (associated with magnesium) for almost half of the children and adults with autism observed [30]. Children with autism have lower magnesium levels than healthy children [31]. According to Doctor Marianne Mousain-Bosc, author of the book "The magnesium solution", "this deficiency is associated with a decrease in the function and integrity of nerve cells which leads to disturbances in the transmission of the nervous message. Magnesium is therefore responsible for learning difficulties, behavioral disorders or even language disorders", disorders found in autistic children [32]. The observation of these deficiencies and their consequences led researchers to hypothesize the effectiveness of magnesium and vitamin B6 supplementation in the context of autism. In 1985, a study carried out on 60 autistic children demonstrated an improvement in children's behavior thanks to supplementation combining vitamin B6 and magnesium [33].

Delivery process

The pre- and perinatal history is more frequent in ASD than in the general population [21]. A non-quantitative systematic review from 7 studies (3 cohort studies, 4 case-control studies) performed in 5 countries (Australia, Denmark, United States, Israel, Sweden) suggested that two perinatal features were associated with an increased risk of autism: low birth weight for gestational age and neonatal distress (with Apgar score <7) [16,27]. In another cohort study, in the United States, the prevalence of multiple pregnancy, prematurity (<37 weeks), vaginal bleeding was significantly higher in autism than their prevalence in the general population. [27]. Among mothers of children with ASD, 24% had pre- and perinatal complications. All events which occur from conception to birth, such as infectious episodes, trauma, bleeding, maternal depression, maternal physical or mental stress, maternal anemia, excessive drug intake, etc., are considered as prenatal factors [34,35]. Among autistic children, 20% had abnormal birth weight. Indeed, a weight lower than normal is a factor associated with the onset of autism [27].

Characteristics of ASD in these children

According to the results of our survey, 70% of children developed the first symptoms of autism after vaccination. The Measles-Mumps-Rubella (MMR) vaccine is the only one incriminated by all parents. A study by Fombonne, carried out in Montreal, showed that no link could be established between the evolution of the prevalence of pervasive developmental disorders (PDD) and vaccination coverage [36]. Another study concluded that there was an improbable association between autism and combined vaccination [37]. The controversy over a possible link between autism and vaccines with far-reaching impact began in 1998 with an article published in The Lancet by the British Andrew Wakefield and his colleagues who reported a possible link between MMR vaccination and autism [38]. The results of the study carried out in 12 children indicated, for all of them, gastrointestinal abnormalities the days following the vaccination and, for two thirds, signs of autism. This highly publicized publication had international resonance and led to a decrease in childhood vaccination in many countries, and in particular in the United Kingdom. The MMR vaccination rate, which was 92% in 1997, fell to less than 80% in 2003 [39]. Despite several attempts at replication, no other team has yet been able to confirm its results and the epidemiological studies implemented have not revealed an association between autism and vaccination [40,41]. However, the responsibility of the vaccine in the appearance of cases of autism was anchored in the minds and those who were convinced of it accused the authors of these studies of having links with the vaccine producers. From 2003, an investigative investigation led by Brian Deer (supported by The Sunday Times and the British Medical Journal) revealed that the medical records of the 12 children who took part in the Wakefield study had been falsified. It also indicated that not only did Andrew Wakefield commit serious professional misconduct, but he did it knowingly and for profit (he was the consultant in a class action lawsuit by an anti-vaccine group and he created a company to develop a measles vaccine). It wasn't until 2010, that The Lancet retracted the article and Wakefield was barred for life by the General Medical Council. In January 2011, the British Medical Journal (BMJ) published an article signed by Brian Deer and two editorials accusing Andrew Wakefield of fraud and questioning the disproportionate impact of his publication [42]. After proof of the safety of the MMR vaccine and its non-implication in the occurrence of autism in young British children, that of the DT-Coq vaccine (tetanus-pertussis diphtheria) has just been also recalled in a study also published by the Lancet. MMR vaccination was first incriminated, without clear evidence, then this accusation was unanimously rejected. Hypothesis has been raised of the responsibility of the mercury contained in vaccine preparations, and in particular thimerosal, on the possible development of autism. Another study was therefore conducted recently to assess the effect of the DT-Coq vaccine, the only vaccine commonly used in the United Kingdom which contains thimerosal. Since 1990, this vaccine has been recommended for newborns aged 2, 3 and 4 months: 126 cases of autism have been studied in children aged 2 to 4, and at the same time, 624 patients against the paired according to of age and sex. This hypothesis was not confirmed in two systematic reviews of the literature [36,43]. To date, it is impossible to know whether exposure to heavy metals has repercussions in terms of autism on individuals [44]. Indeed, the only possible explanation for the association between vaccination and onset of ASD is that the age of onset of symptoms is similar to age of vaccination.

Moreover, our study found that all of the children were taking medication during a community illness. Among them, 67% presented a worsening of autistic

behavior following this drug intake. This prescription rate is higher than the value found in a French study where 52% of patients had taken a treatment during their lifetime but including dietary exclusion and vitamin supplementation regimes [45]. This prevalence rate is higher than those found in England (24% on psychotropic drugs) [46] and in Germany (33%) [47].

The limits of our study are the duration of the study limited to 10 months, the reduced number of children (90 children) and the absence of a patient follow-up notebook.

Conclusion

Our data highlight that autism spectrum disorders remain a real public health problem due to their cost and prevalence. Having a reliable diagnosis at an early age is important to improve the prognosis in children in the long term. This diagnosis must be made by following an approach based on international recommendations. Remember that no specific drug therapy can treat ASD. However, some drugs are used to treat co-morbidities or associated problems in children and adolescents with these disorders. The data collected will provide practitioners with an overview of the situation and allow them to situate their practice in relation to these results. This study highlighted the complexity of the management of autistic patients and the need to conduct more controlled studies on this population. In Morocco autism is a frequent disorder, but which remains little known. Helping people living with this disorder is a real struggle in the country because of the lack of screening and diagnostic centers, vocational training centers and specialized care structures, as well as the lack of knowledge and absence information and training for parents of autistic children.

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