

Final report: Review of factors linked to increased prevalence of special educational needs in Gibraltar

Una Geary, NHS Public Health Specialty Registrar

Table of Contents

Executive Summary.....	2
Background	5
Phase 1: Quantitative analysis of Department of Education data	6
Methods.....	6
Results.....	7
Current prevalence of SEN among children in Gibraltar, and trends in prevalence	7
International benchmarking of SEN prevalence rates	7
Most common or fastest growing types of SEN.....	9
Patterns of identification by school over time for the most common or fastest growing types of SEN	12
Phase 2: Literature review on risk factors for health conditions linked to increased SEN prevalence .	16
Autism spectrum disorder (ASD).....	16
Attention deficit hyperactivity disorder (ADHD)	20
Mental health conditions among children and young people.....	21
Phase 3: Qualitative data collection through interviews and focus groups.....	24
Methods.....	24
Interviews	24
Focus groups.....	25
Data analysis	26
Results.....	26
Health conditions	26
Better awareness and identification, and more social acceptance of developmental delays and conditions	27
Socio-demographic factors.....	28
Societal trends as contributory factors in relation to behavioural and mental health problems....	28
Impact of Covid-19 lockdowns on child development.....	29
Genetic risk factors	29
Environmental risk factors	30
Maternal care and maternal health risk factors	30
Conclusions and recommendations	32
Conclusions	32
Recommendations.....	34
Appendix 1: Interview topic guides	36

Executive Summary

Background

The Department of Education has observed that Gibraltar is experiencing an increase in the number of children with special educational needs (SEN). The special educational needs definition for Gibraltar includes children with learning difficulties and/or physical or intellectual disabilities. The Minister for Education commissioned a review to be carried out of factors linked to increased prevalence of special educational needs among children in Gibraltar, and likely root causes.

Methods

The project was carried out using mixed methods in three phases:

1. Descriptive analysis of quantitative data from the Department of Education on children with SEN to estimate current prevalence and trends in prevalence of SEN, and the most common and fastest growing types of SEN;
2. A literature review to investigate the evidence base on risk factors for the health conditions that likely underlie the most common or fastest growing types of educational need, namely autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and mental health conditions (among children and young people);
3. Qualitative data collection through 15 interviews and 3 focus groups, which were carried out in person between 6th-28th February 2024 with professionals from the education, health, social care and voluntary and community sectors, as well as with parents of children with special educational needs.

Results

Data from the Department of Education indicates that there has been a consistent upward trend in the prevalence of special educational needs (SEN) among children in government-run schools in Gibraltar, from about 20% in 2014/15 to about 30% in 2022/23. This compares to a prevalence rate of 17% in the UK in 2023. Prevalence of SEN is also rising in the UK however, and prevalence of ASD is rising worldwide.

Consistently over time, the three most common types of special educational needs among children in Gibraltar are general learning difficulties, behavioural, emotional and social development needs, and speech and language difficulties. The profile of needs has remained fairly consistent over time in Gibraltar, although in recent years, speech and language difficulties and autistic spectrum disorders respectively are making up a growing share of need.

It is more than likely that multiple factors are at play in relation to the increasing prevalence of SEN in Gibraltar – it is highly unlikely that there is a single reason or cause.

The quantitative and qualitative data indicated that ASD, ADHD, mental health and behavioural problems are largely driving the rise in prevalence of SEN. In general, both professionals and members of the public felt that the prevalence of SEN isn't particularly socially patterned in Gibraltar. Further, in terms of nationality, participants said that the increasing numbers of children with SEN are mainly Gibraltarian, and that this increase is not being driven by external or transient populations moving to Gibraltar for work.

Across the board, from the perspective of professionals across sectors and members of the public, three key themes emerged from the qualitative data as the main reasons behind the rise in prevalence of SEN:

- More awareness among the public and professionals (health and education) of ASD and ADHD in particular, and of developmental delays and conditions more broadly;
- Better and earlier identification by health and education professionals of developmental delays and conditions, as a result of improved awareness, training, and screening and diagnostic tools;
- Less stigma and more social acceptance of children with developmental delays, conditions and disabilities.

These findings from the qualitative data are supported by those of the literature review carried out as part of this project, in relation to ASD in particular. It is important to note, however, that although participants felt that much of the rise in prevalence of SEN can be attributed to better identification of children with conditions that would not have been diagnosed in the past, they also emphasized that there is an element of the growth in prevalence that they believe is due to a 'genuine' increase in cases of severe ASD in particular – cases that would not have been missed, or possible to 'hide away', in the past.

A very interesting perspective brought by healthcare professionals who had previously worked in the UK was that, in Gibraltar, people have better access to healthcare in general than in the UK, and as a result, children with any kind of developmental delay are picked up earlier than they would be in the UK, and earlier intervention is put in place. Earlier identification of developmental delays and conditions would give rise to higher prevalence of SEN overall, compared to the UK. However, the perspective of parents was in sharp contrast – parents voiced their view that there is a lack of early intervention for children with developmental delays and conditions in Gibraltar, and that access to services has disimproved over time. Healthcare professionals interviewed did also voice concerns about therapy services in particular being understaffed.

In relation to ASD and ADHD in particular, findings from the literature review and qualitative data gathered also indicated a strong role for genetic and maternal health risk factors. Maternal overweight and obesity, metabolic syndrome and diabetes, are particularly well-established risk factors for both ADHD and ASD that have grown significantly in prevalence in recent years.

In relation to behavioural and mental health problems, participants highlighted three key societal trends as having a major influence:

- A shift in attitudes to parenting towards treating the child as a 'friend' or 'equal', immediate gratification of the child's desires, and a lack of boundary-setting;
- A dramatic increase in time spent on screens and social media;
- A shift in dietary habits towards consumption of more ultra-processed foods.

The exponential rise in social media and screen time was highlighted by participants across the board as a trend that is detrimental to children's development and mental health for a number of reasons, including negative impacts on the development of social and communication skills, sleep, exposure to peer pressure, and on mental wellbeing and

resilience. This point of view was supported by findings from the literature review - social media and screen time are well-established risk factors for mental ill-health among children and young people.

Recommendations

Based on the findings across the three phases of the project, and focussing on factors that are amenable to intervention, four recommendations are put forward for consideration across Government in relation to addressing the issue of increasing prevalence of SEN among children. These are summarised below and set out in full on page 34.

- 1. Tackle maternal overweight and obesity:** It is recommended that women planning pregnancy, and pregnant women, be targeted in efforts to tackle maternal overweight and obesity through, for instance, pre-conception and antenatal services.
- 2. Provide support for parenting skills:** Health and education professionals interviewed felt that more support should be given to parents to improve their knowledge and skills in relation to parenting. Although the Care Agency provides a parenting course, the social workers interviewed were of the opinion that there would be better uptake and less stigma around such courses if they were offered by an alternative agency.
- 3. Limit children's screen time:** It is recommended that action be taken to increase parents' awareness of the risks of social media and screen time for their child's mental health, and by schools to limit the amount of time children are spending on screens.
- 4. Continue to pursue a philosophy of inclusion in education:** It is recommended that the Department of Education continues to pursue its philosophy of inclusion of children with SEN. Health professionals interviewed, including paediatricians and speech and language therapists, felt that including children in mainstream schools and classes, wherever possible, is more beneficial to their development, particularly in relation to social functioning, than placing them in separate settings. The trend of increasing prevalence of SEN is not unique to Gibraltar – it is also happening in the UK, and prevalence of ASD is rising worldwide. It is important to consider how to best use resources to support the needs of these increasing numbers of children in mainstream settings as far as possible.

Background

The Department of Education has observed that Gibraltar is experiencing an increase in the number of children with special educational needs. Under the Gibraltar Education and Training 1974 Regulations¹, a child is defined as having “special needs” if they have a learning difficulty which calls for special educational provision to be made for him. Under the regulations, a learning difficulty is defined as having:

(a) a significantly greater difficulty in learning than the majority of children of his age;
or

(b) a disability which either prevents or hinders him from making use of educational facilities of a kind generally provided for children of his age in government schools.

The special educational needs definition for Gibraltar therefore includes children with learning difficulties and/or physical or intellectual disabilities. The Gibraltar Disability Act 2017 defines disability as, “a physical or mental impairment which has a substantial and long-term adverse effect on a person’s ability to carry out day-to-day activities”².

In 2023, the Minister for Education commissioned a review to be carried out to investigate the factors linked to increased prevalence of special educational needs (SEN) among children in Gibraltar, and likely root causes.

The project was carried out by a UK-based NHS public health specialist using mixed methods in three phases:

1. Descriptive analysis of quantitative data from the Department of Education on children with SEN to estimate current prevalence and trends in prevalence of SEN, and the most common and fastest growing types of SEN;
2. A literature review to investigate the evidence base on risk factors for the health conditions that likely underlie the most common or fastest growing types of educational need, namely autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and mental health conditions (among children and young people);
3. Qualitative data collection through 15 interviews and 3 focus groups, which were carried out in person between 6th-28th February 2024 with professionals from the education, health, social care and voluntary and community sectors, as well as with parents of children with special educational needs.

The methods and findings of each of these three phases are outlined in the following sections.

¹ Government of Gibraltar. *Education and Training: Children with special educational needs (assessment panel) regulations 1974-11*. Available at: <https://www.gibraltarlaws.gov.gi/legislations/children-with-special-needs-assessment-panel-regulations-417/download#:~:text=%E2%80%9Cschool%E2%80%9D%20means%20the%20school%20deemed.to%20be%20made%20for%20him>

² Government of Gibraltar. *Disability Act 2017*. Available at: <https://www.gibraltarlaws.gov.gi/legislations/disability-act-2017-4312>

Phase 1: Quantitative analysis of Department of Education data

Methods

Descriptive analyses of Department of Education data were carried out using Microsoft Excel to investigate:

1. The current prevalence of SEN among children in Gibraltar, and trends in prevalence of SEN among children in Gibraltar over the past 9 years;
2. The most common or fastest growing types of SEN that are driving the overall increase in prevalence;
3. For the above types of need, patterns of identification by school over time.

The latter two analyses were carried out using publicly available Government Statistics data on the number of children with different types of special educational needs in Gibraltar, by school and over time.³ This dataset provides annual total numbers of children recorded as having each of 10 different types of need in Government-funded schools (including nurseries attached to lower primary schools). Children may be double counted across categories, as they may have more than one type of need. This dataset does not provide the total annual number of pupils with any type of SEN, as the totals across categories of need equate to total number of recorded needs, rather than total number of pupils. Hence, it could not be used to estimate overall prevalence of SEN. The classification system used in Gibraltar differs slightly from that used in the UK – Table 1 below lists the typologies of need used in Gibraltar versus in the UK⁴. Specific definitions of each type of need are not available for Gibraltar.

In order to estimate the prevalence of SEN overall, annual data was provided directly by the Department of Education on the total number of pupils enrolled in Government-funded lower primary, upper primary and secondary schools, which constituted the denominator for annual prevalence estimates (in line with the methodology used in the UK), and on the total number of pupils on school SEN registers with any type of SEN.

Table 1: Classifications of different types of SEN used in Gibraltar and the UK

Gibraltar classifications of types of SEN	UK classifications of types of SEN
Speech and language difficulties	Speech, language and communications needs
Autistic spectrum disorder	Autistic spectrum disorder
General learning difficulties	Moderate learning difficulty Severe learning difficulty Profound & multiple learning difficulty
Specific learning difficulties	Specific learning difficulty
Behaviour, emotional and social development	Social, emotional and mental health
Hearing impairment	Hearing impairment
Visual impairment	Visual impairment
Physical impairment	Physical disability
Down's syndrome	Multi-sensory impairment
ADHD	Other difficulty/disability

³ Government of Gibraltar. *2023 Statistics: Education*. Available at: <https://www.gibraltar.gov.gi/statistics/statistics-topic-area/2023/education>

⁴ UK Department for Education. *Special educational needs and disability: an analysis and summary of data sources*. 2023. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1164690/Special_educational_needs_and_disability_an_analysis_and_summary_of_data_sources.pdf

Results

Current prevalence of SEN among children in Gibraltar, and trends in prevalence

In 2022/23, the prevalence of special educational needs (SEN) in government-run nurseries and schools in Gibraltar was 30.3% (using the total number of enrolled pupils as the denominator). Figure 1 below shows a consistent upward trajectory in prevalence since 2014/15, when prevalence was 19.8%.

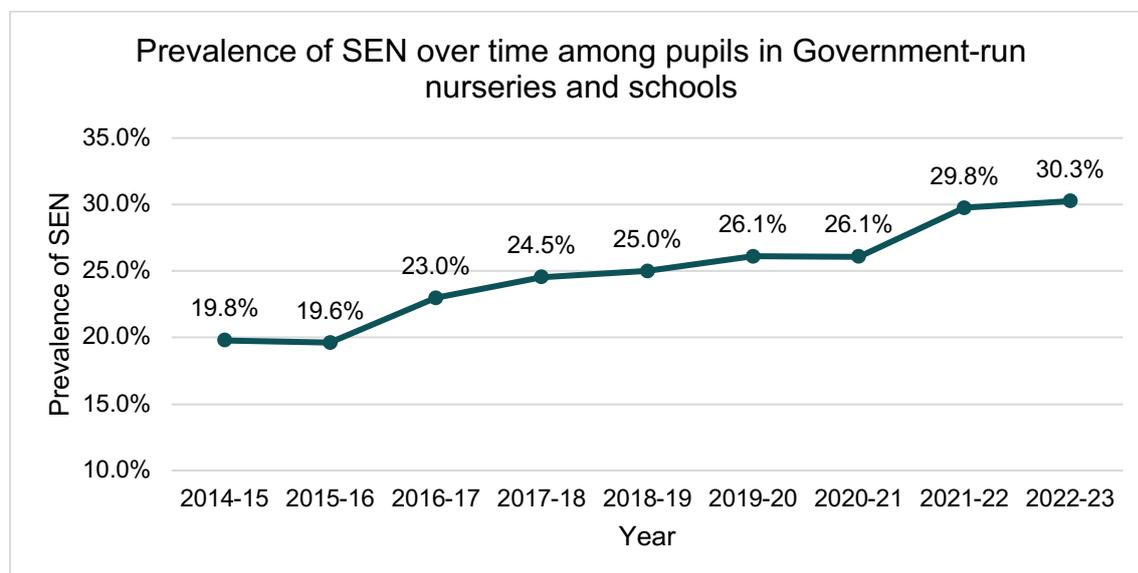


Figure 1: Prevalence of SEN over time among pupils in Government-run nurseries and schools

International benchmarking of SEN prevalence rates

It is notoriously difficult to compare prevalence rates for SEN across countries, due to differences at the national level in approaches to assessing and categorising needs.⁵ In 1978, the landmark Warnock report first introduced the term 'special educational needs' into UK education policy, and concluded that, as a general rule of thumb, up to 20% of children are likely to have some form of special educational needs over the course of their schooling.⁶ In England, the prevalence of SEN has fluctuated over the past 17 years, as shown in Figure 2 below, from a peak of 21.1% in 2010 to a low of 14.4% in 2016. These overall prevalence figures capture pupils with both types of SEN plans in England; non-statutory SEN Support plans, and statutory Education, Health and Care (EHC) plans for pupils with higher support needs. 'SEN Support' means support provided for pupils who are identified as having a learning difficulty or a disability that requires extra or different help to that normally provided as part of the school's usual curriculum offer. A pupil on SEN Support will not have an EHC plan. EHC plans are issued by local authorities for pupils who need more support than is available through SEN Support. They are issued through a statutory assessment process whereby the local authority considers the pupil's special educational needs and any relevant health and social care needs; sets out long term outcomes; and specifies the provision which will deliver additional support to meet those needs.⁷

⁵ UNESCO. *Global Education Monitoring Report 2020: Inclusion and Education: All Means All*. Paris: UNESCO; 2020. doi:10.4135/9788132108320.n14.

⁶ Department for Education Science. *Special Educational Needs: Enquiry into the Education of Report of the Committee of Handicapped Children and Young People (The Warnock Report)*. London: Her Majesty's Stationery Office; 1978.

⁷ Department for Education. *Special educational needs and disability: an analysis and summary of data sources*. London: Department for Education; 2023.

The fluctuations in SEN prevalence rates shown in Figure 2 below are likely linked to changes in SEN policy in England.⁸ The Department for Education has attributed the dramatic decline in overall prevalence of SEN between 2010 and 2016 to better identification of SEN following a SEND review by Ofsted in 2010 and the implementation of SEND reforms in 2014.⁸ The current system with SEN Support and EHC plans was established in 2014 through a SEND Code of Practice. Previously, 'Statements of SEN' had been issued under a different legal framework to EHC plans and were phased out over the period 2014-18.

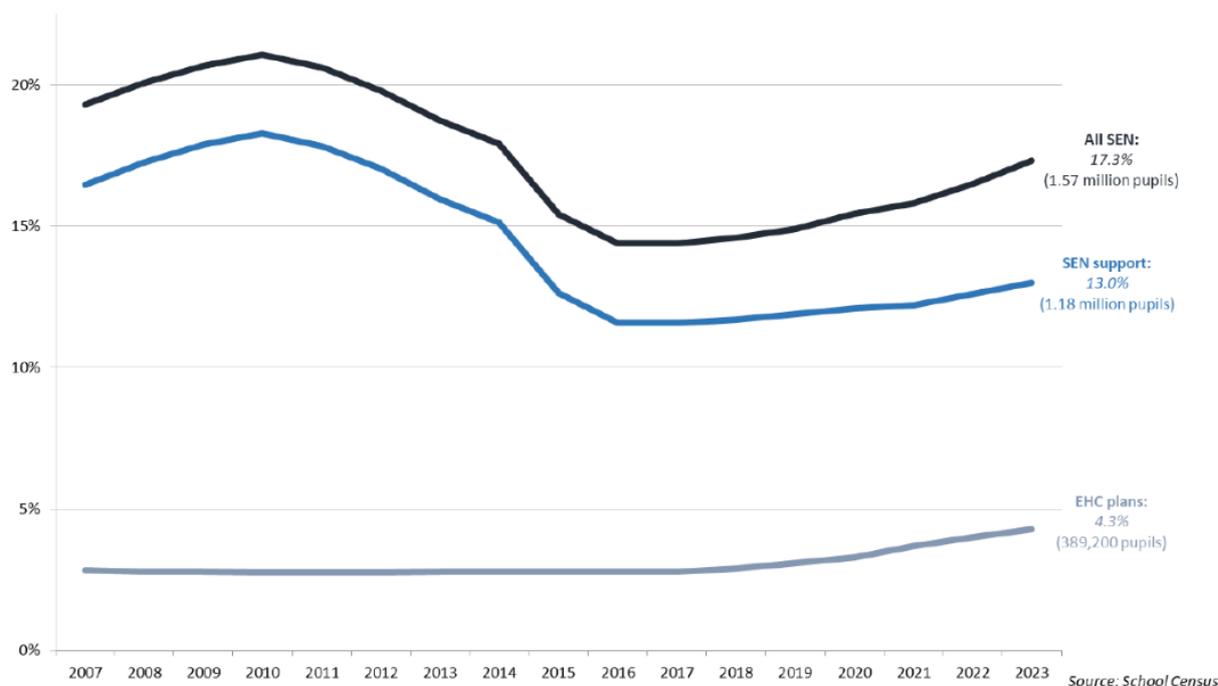


Figure 2: Annual percentage of pupils with SEN in England (Source: Department for Education, 2023)

In Europe, the European Agency for Special Needs and Inclusive Education produces annual statistics comparing the percentage of pupils with an 'official decision of SEN' across countries. However, these statistics only reflect children at the more severe end of the scale with higher support needs, rather than all children with SEN – for instance, in England, this would reflect only children with a statutory EHC Plan, rather than all children with SEN.

The most recent statistics published by EASIE in 2023, for the school year 2019/20, provide data on the proportion of pupils enrolled in any recognised form of education with an official decision of SEN, broken down by pre-primary, primary, lower secondary and upper secondary levels.⁹ (These statistics do not include data for England, Northern Ireland or Scotland – however, Wales is included.)

Data on pre-primary level was available from 16 countries, across which the average prevalence of children with an official decision of SEN was 2.1%, ranging from 0.5% in Sweden to 19.6% in Lithuania. Data on primary level was available from 20 countries, across which the average prevalence of children with an official decision of SEN was 4.6%, ranging

⁸ O'Connor U., Courtney C., Mulhall P., & Taggart L. The prevalence of special educational needs in Northern Ireland: A comparative analysis. *European Journal of Special Needs Education*. 2022: 38(4); 1-15. Advance online publication. <https://doi.org/10.1080/08856257.2022.2127082>

⁹ European Agency for Special Needs and Inclusive Education. *European Agency Statistics on Inclusive Education: 2019/2020 School Year Dataset Cross-Country Report*. (P. Drál', A. Lénárt and A. Lecheval, eds.). Denmark; 2023.

from 2.4% in Luxembourg to 18.7% in Lithuania. Data on lower-secondary level was available from 20 countries, across which the average prevalence of children with an official decision of SEN was 5.4%, ranging from 2.1% in Luxembourg to 18.3% in Iceland. Data on upper-secondary level was available from 15 countries, across which the average prevalence of children with an official decision of SEN was 3.1%, ranging from 1% in Luxembourg to 18.3% in Finland.

Most common or fastest growing types of SEN

It is clear from Figure 3 below that, consistently over time, the three most common types of special educational needs among children in Gibraltar are general learning difficulties, behavioural, emotional and social development needs, and speech and language difficulties.

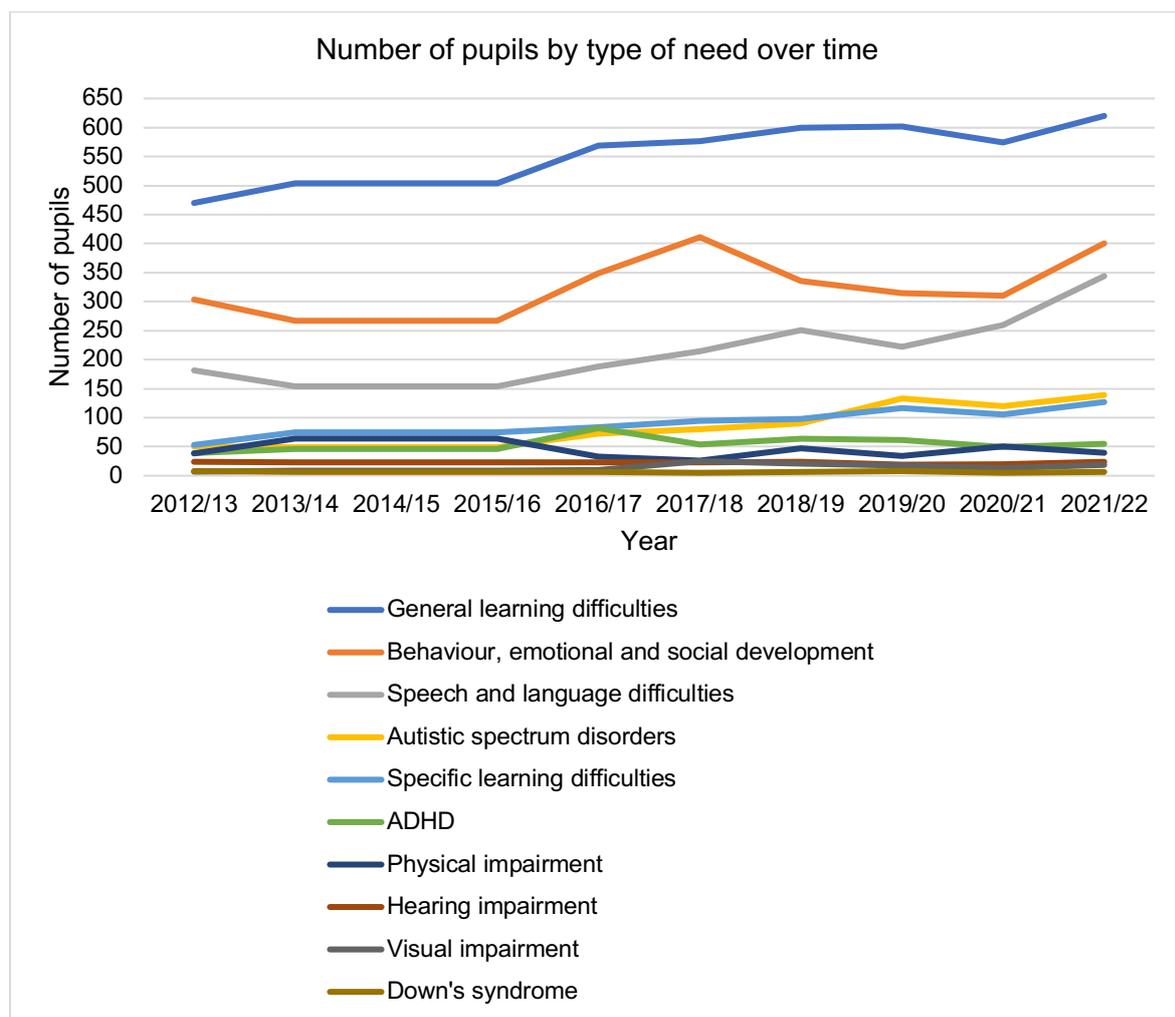


Figure 3: Number of pupils by type of need over time

In 2021/22, as shown in Figure 4 below, general learning difficulties made up about 35% of all recorded special educational needs, behaviour, emotional and social development needs made up about 23%, and speech and language difficulties about 19%.

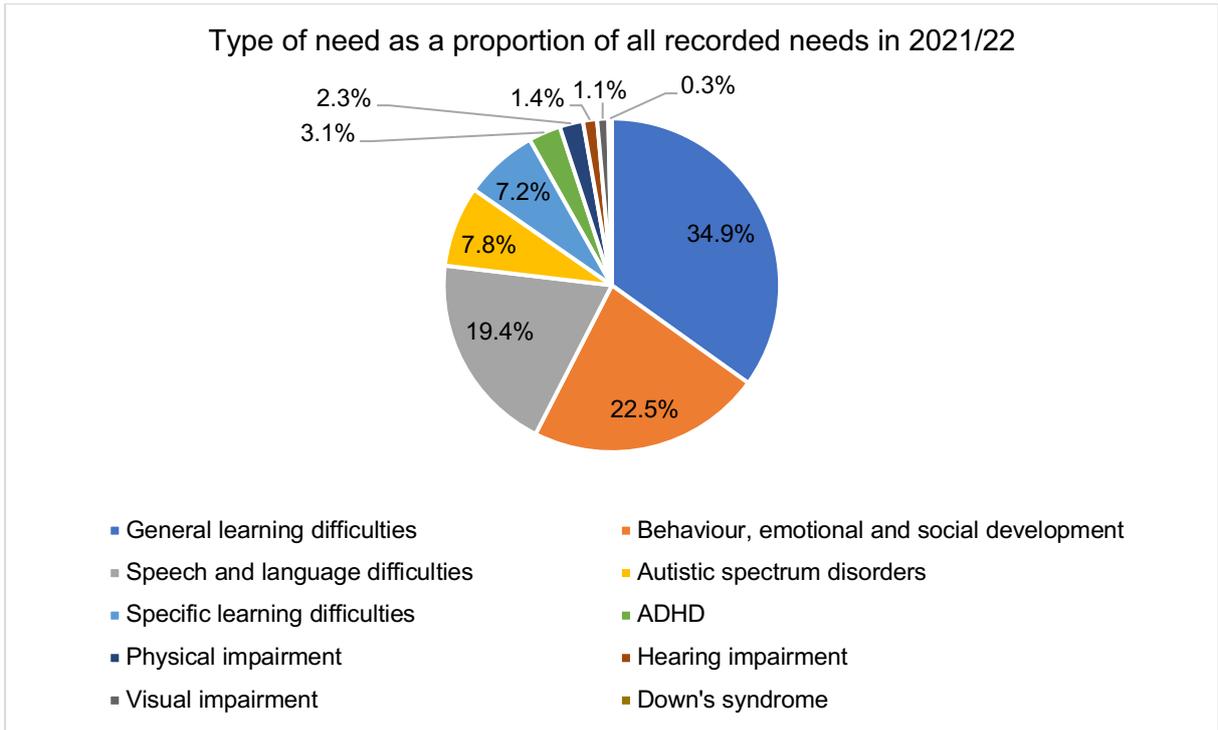


Figure 4: Type of need as a proportion of all recorded needs in 2021/22

Figure 5 below indicates that the profile of needs has remained fairly consistent over time in Gibraltar, although in recent years, speech and language difficulties and autistic spectrum disorders respectively are making up a growing share of need.

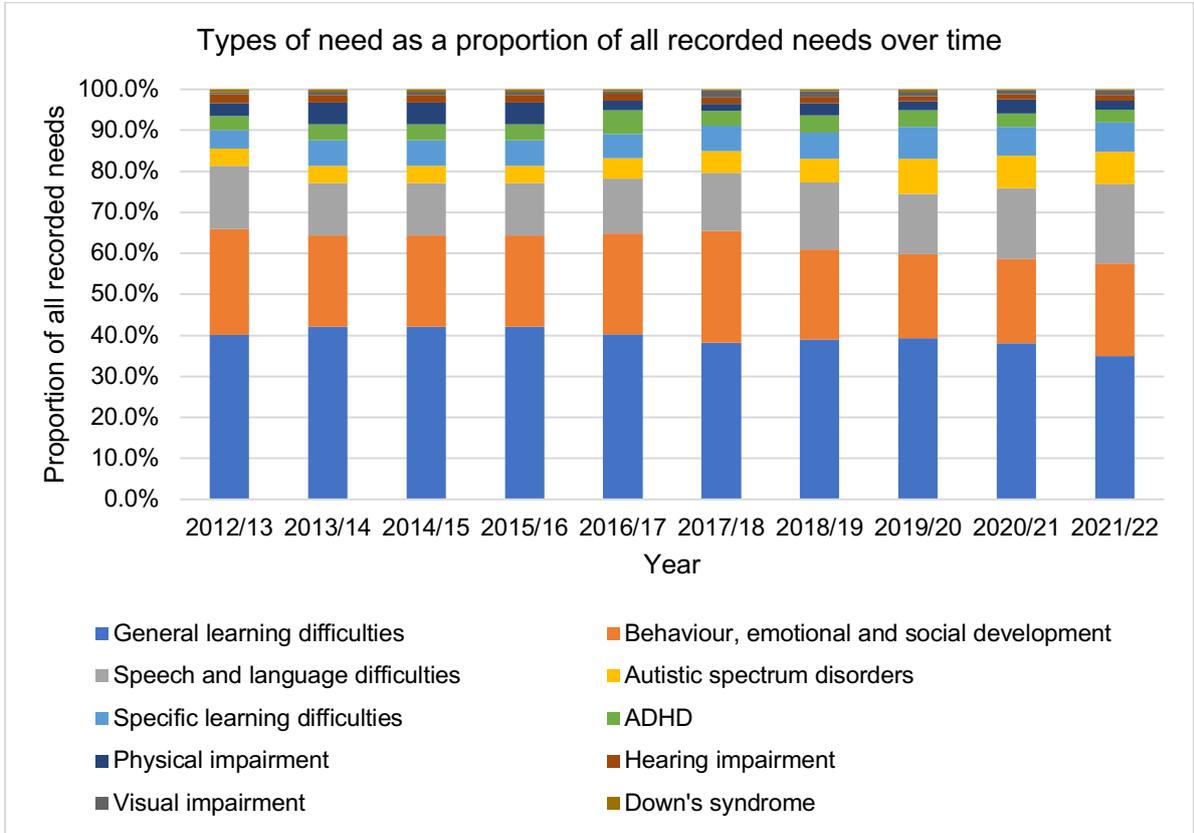


Figure 5: Types of need as a proportion of all recorded needs by year from 2012/13 to 2021/22

Figure 6 below shows that the fastest growing types of need (in terms of percentage growth in the number of pupils recorded as having that need) between 2012/13 and 2021/22 were autistic spectrum disorders, visual impairment, specific learning difficulties and speech and language difficulties.

In relation to visual impairment, Gibraltar Health Authority (GHA) orthoptists were consulted in relation to the increase in numbers in the Government Statistics education data – however, they have not noticed any increase in the number of children diagnosed with visual impairment, and concluded that it is likely that teachers are including children in this category who do not meet the medical definition of visual impairment (i.e. an impairment that is not correctible with glasses or other aids), and that the criteria being used to define children as having a visual impairment are likely to vary across teachers and schools, given variation in the numbers from year to year.

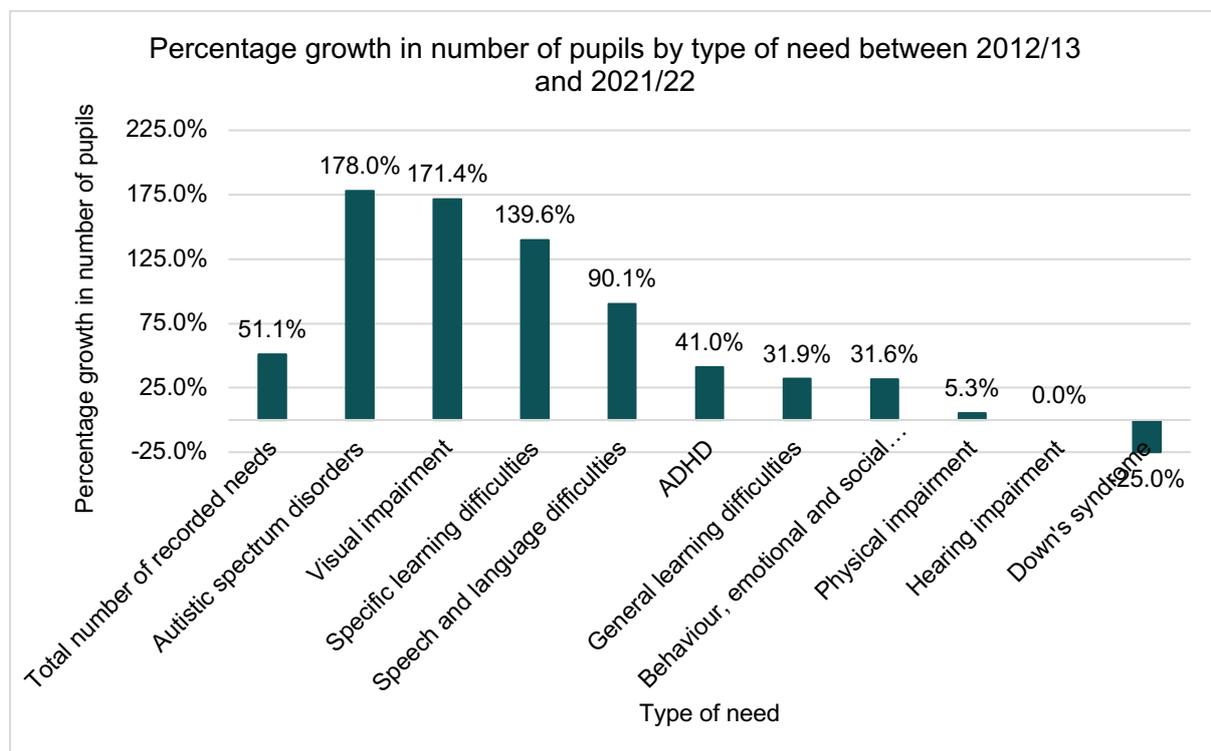


Figure 6: Percentage growth in number of pupils by type of need between 2012/13 and 2021/22

Patterns of identification by school over time for the most common or fastest growing types of SEN

Based on the analyses set out in the previous section, the most common or fastest growing types of SEN in Gibraltar are the following:

- General learning difficulties
- Behaviour, emotional and social development needs
- Speech and language difficulties
- Autistic spectrum disorders
- Visual impairment
- Specific learning difficulties

For each of these six types of need, analyses by school are set out below using graphs showing the proportion of pupils within each school recorded as having that particular type of need over a 9-year period (from 2013/14 to 2021/22). Proportions rather than numbers were used, to ensure comparability across schools of different sizes.

For most types of need, St. Martin's school has the highest proportion of its pupils identified with that need, which is as expected for a special educational setting. Identification practices at St. Martin's appear to have changed over time, with a sharp drop in 2019/20 in the proportion of pupils recorded as having general learning difficulties, behaviour, emotional and social development needs, speech and language difficulties, and visual impairment. On the other hand, the proportion of pupils recorded as having autistic spectrum disorders at St. Martin's has increased steadily over time.

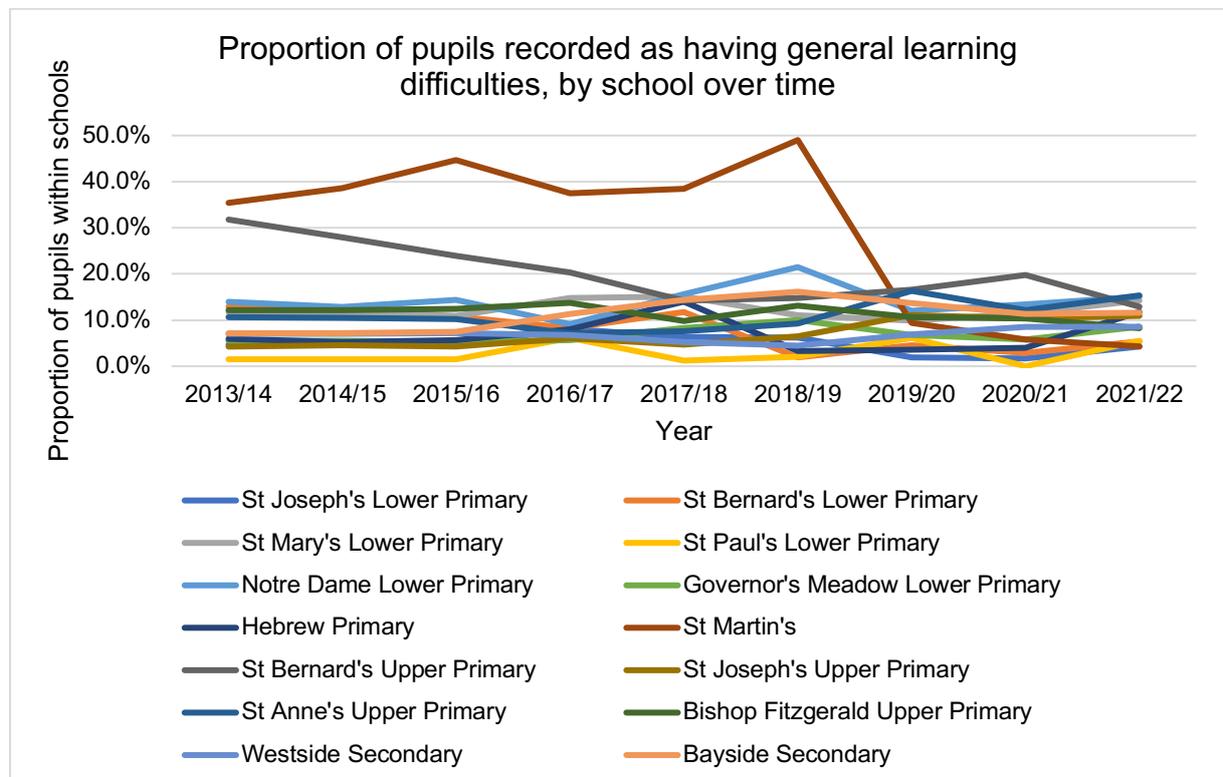


Figure 7: Proportion of pupils recorded as having general learning difficulties, by school over time

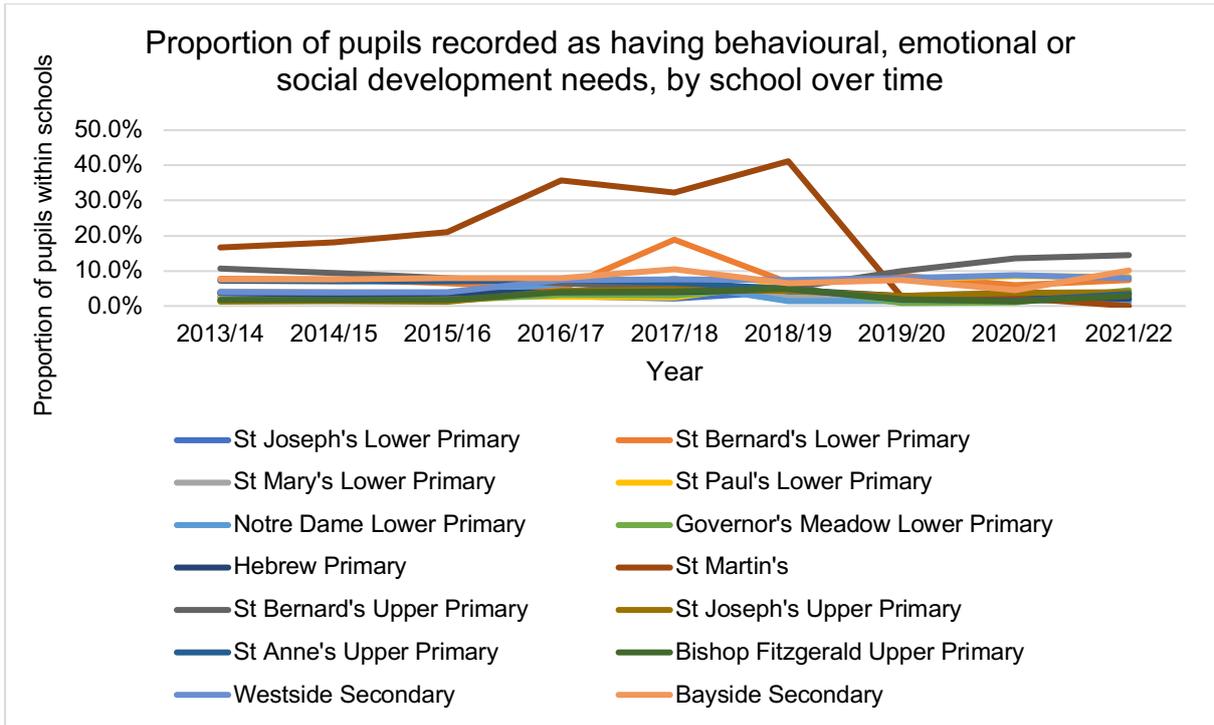


Figure 8: Proportion of pupils recorded as having behavioural, emotional or social development needs, by school over time

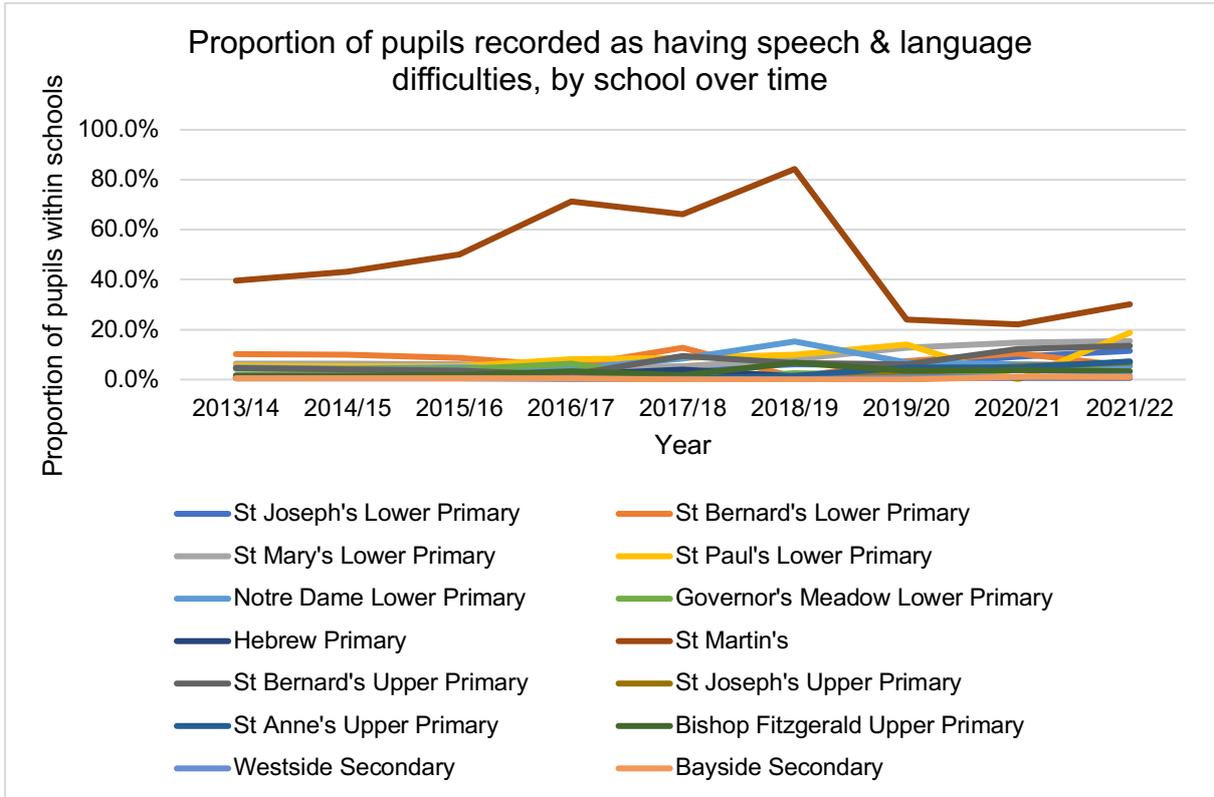


Figure 9: Proportion of pupils recorded as having speech & language difficulties, by school over time

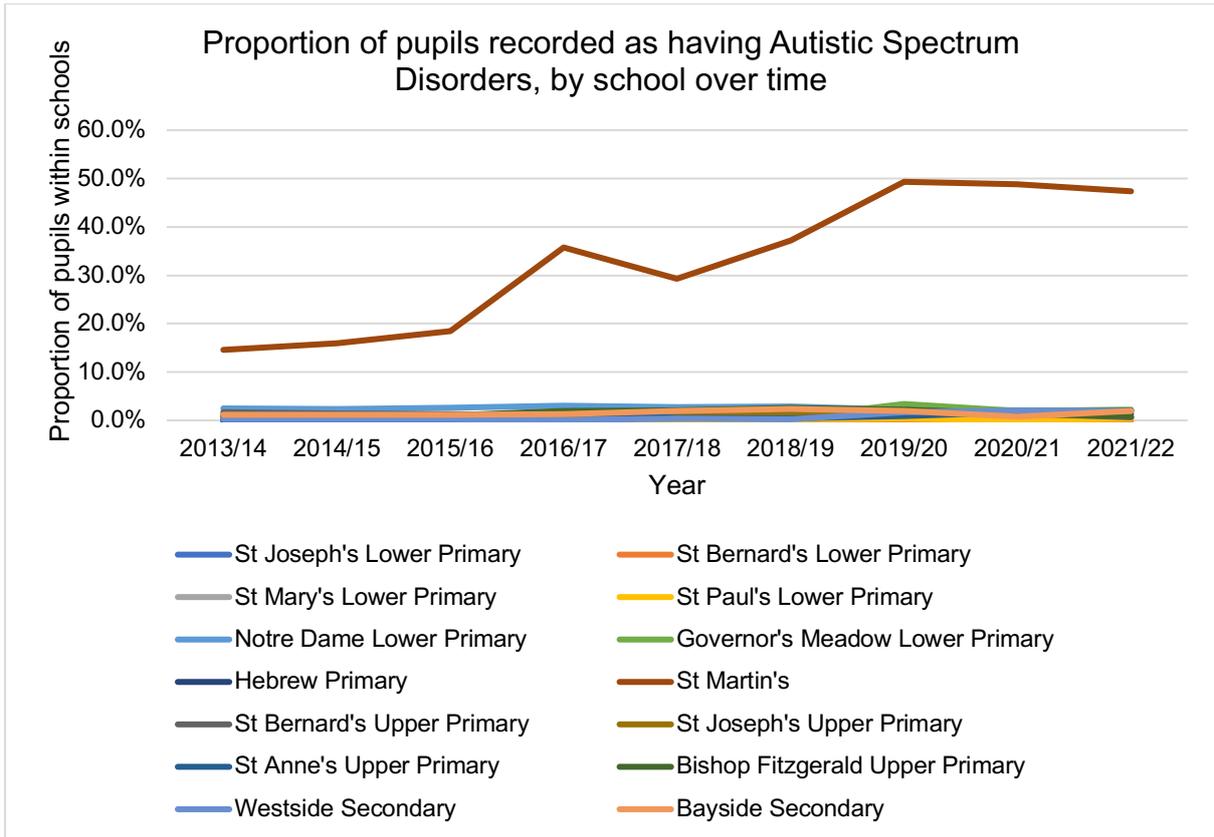


Figure 10: Proportion of pupils recorded as having autistic spectrum disorders, by school over time

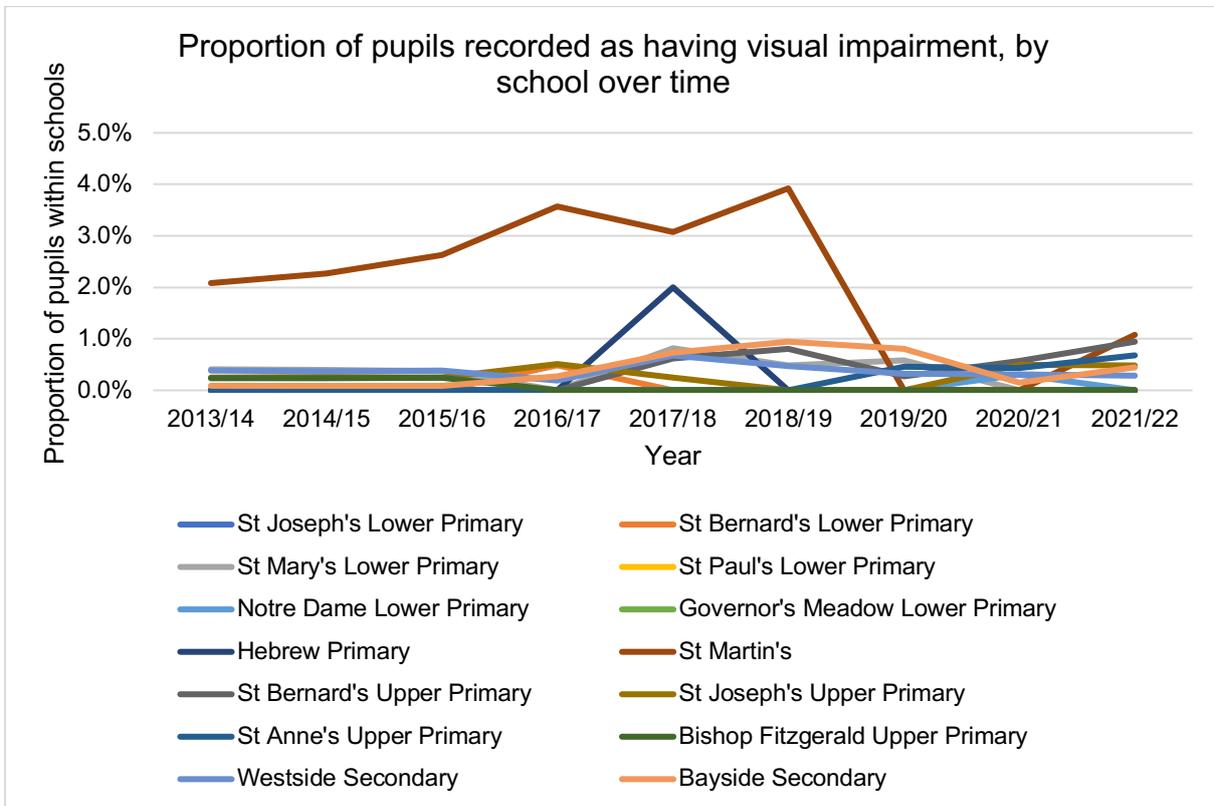


Figure 11: Proportion of pupils recorded as having visual impairment, by school over time

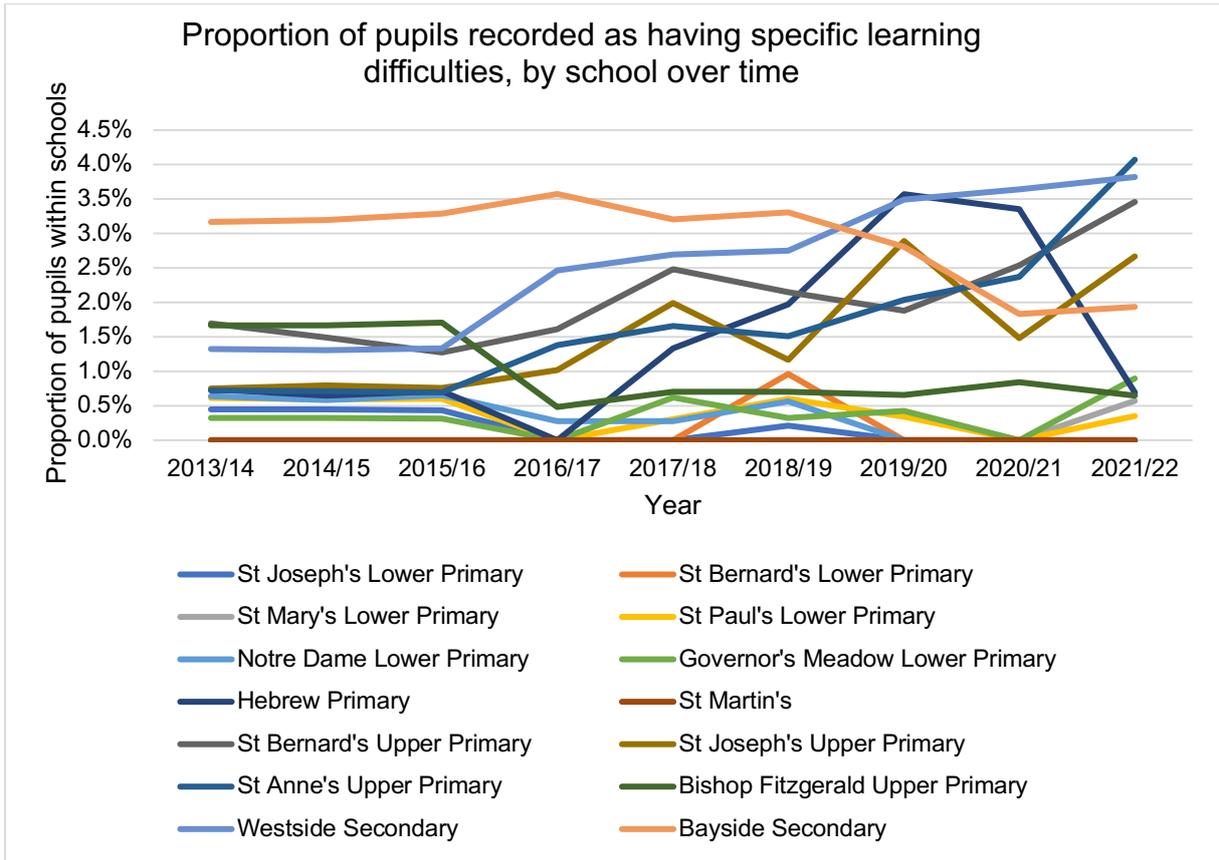


Figure 12: Proportion of pupils recorded as having specific learning difficulties, by school over time

Phase 2: Literature review on risk factors for health conditions linked to increased SEN prevalence

The analyses set out previously identified the following categories of need as the most common or fastest growing types of SEN in Gibraltar:

- General learning difficulties
- Behaviour, emotional and social development needs
- Speech and language difficulties
- Autistic spectrum disorder
- Specific learning difficulties

A literature review was carried out with the aim of investigating the evidence base on causes or risk factors for the health conditions that likely underlie these types of educational need. The health conditions included in scope were:

- Autism spectrum disorder (ASD)
- Attention deficit hyperactivity disorder (ADHD)
- Mental health conditions (among children and young people)

The latter two are linked to the SEN category, “Behaviour, emotional and social development needs”. This category maps onto the category used in the UK entitled, “Social, emotional and mental health difficulties”, for which the UK SEND Code of Practice identifies mental health conditions and ADHD as the conditions which may underlie such difficulties.¹⁰ In relation to the category of speech and language difficulties, the only condition specifically linked to such difficulties in the UK SEND Code of Practice is ASD. General learning difficulties may reflect a wide range of underlying health conditions and/or other factors, and specific learning difficulties are not directly linked to health conditions, hence these two categories of need were excluded from the scope of the literature review.

Autism spectrum disorder (ASD)

In the latest International Classification of Diseases (ICD-11), ASD is defined as a neurodevelopmental condition characterised by impairments in social and communication skills, rigid or repetitive behaviours, atypical interests and differences in the perception of sensory stimuli.¹¹ ASD can be diagnosed as early as 18-24 months of age, when characteristic symptoms begin to distinguish those affected from typically developing children.¹²

There is no single cause of ASD; rather research has identified numerous genetic and nongenetic risk factors, many of which also increase risk for a range of other neurodevelopmental disorders, including ADHD. Risk factors can be defined as measurable attributes that increase the susceptibility of an individual to developing a condition. Risk

¹⁰ Department for Education and Department of Health. *Special educational needs and disability code of practice: 0 to 25 years*. London: Department for Education; 2015.

¹¹ World Health Organization. *ICD-11: International Classification of Diseases (11th Revision)*. 2019. Available online: <https://icd.who.int/>

¹² Elsabbagh M. Linking risk factors and outcomes in autism spectrum disorder: is there evidence for resilience? *BMJ*. 2020;368:l6880. DOI: <http://dx.doi.org/10.1136/bmj.l6880>

factors interact over time in complex ways to modify brain development from very early on in life, resulting in the reorganization of neural networks underlying cognition and behaviour.¹²

Some cases of autism share causes with monogenetic conditions, while non-genetic risk factors include prenatal and perinatal environmental risk factors, which result in neurological vulnerability. In the latter, autism can arise as a result of genetic mutations and/or epigenetic modifications interfering with brain development and functioning; autoimmune activation modifying brain growth prenatally; or neuronal death or damage around birth.¹² (Epigenetic changes do not change DNA sequences, as happens with genetic changes, but rather affect gene expression by turning certain genes 'on' or 'off'.) As a condition with complex causes, a direct causal relationship between risk, protective factors, and outcomes is difficult to establish. Each individual's biological, environmental, and social characteristics shape development over time, and outcomes therefore vary across individuals.¹²

A recent 'State of the art' review¹² in the *British Medical Journal* of risk factors for ASD summarised the current known risk factors for the condition in the below diagram, grouping them into three main categories; familial/genetic, maternal health and neurological. Each factor has been independently associated with the risk of autism with some degree of consistency across studies. Each group of factors maps on to a plausible causal mechanism shared with other developmental conditions and/or is well grounded in animal models. Such mechanisms are challenging to investigate directly in autism because of the time lag between their influence on foetal development and a confirmed diagnosis starting at age 3.¹²

Much less is known about protective factors for ASD, apart from the well-established 'female protective effect', whereby females would require more causal factors to manifest the same degree of impairment as males. The mechanisms responsible for the female protective effect are still largely unknown.¹²

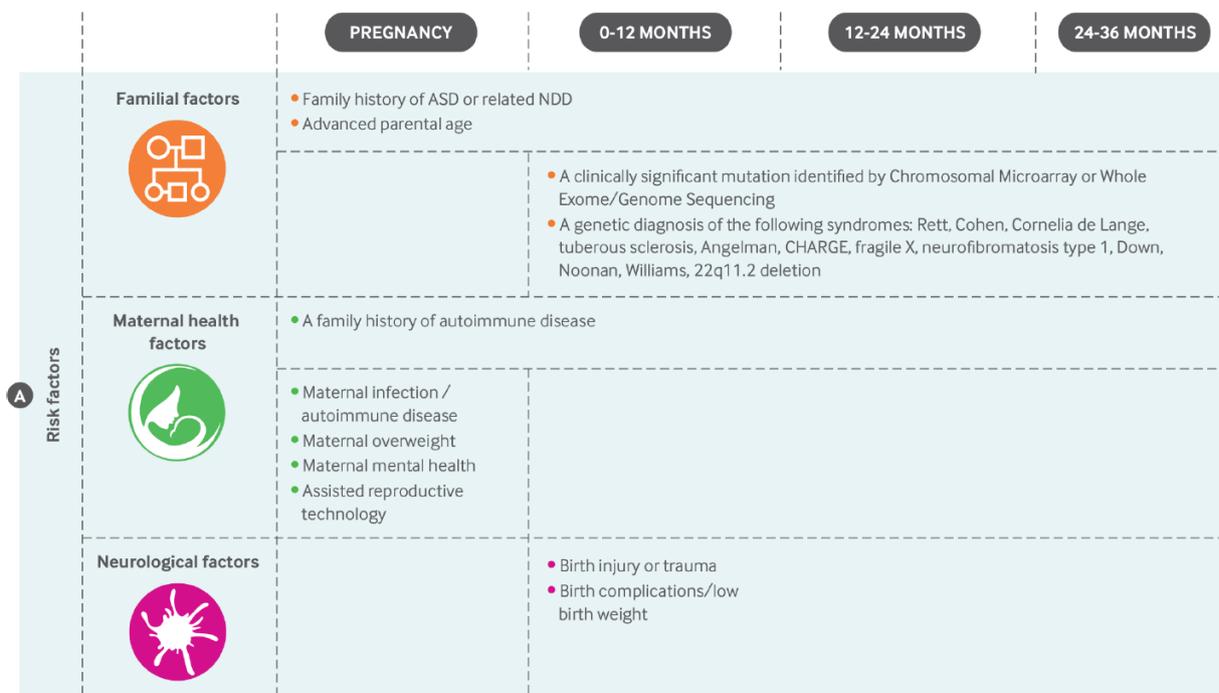


Figure 13: Known risk factors that increase susceptibility for ASD (Source: Elsabbagh M. Linking risk factors and outcomes in autism spectrum disorder: is there evidence for resilience? *BMJ*. 2020.)

Familial/genetic risk factors:

Genetic risk factors for ASD illustrated in Figure 13 include:¹²

- Family history of ASD or a related neurodevelopmental disorder
- Advanced parental age
- A clinically significant genetic mutation (identified by Chromosomal Microarray or Whole Exome/Genome Sequencing)
- A genetic diagnosis of the following syndromes: Rett, Cohen, Cornelia de Lange, tuberous sclerosis, Angelman, CHARGE, fragile X, neurofibromatosis type 1, Down, Noonan, Williams, 22q11.2 deletion

In relation to family history, there is general agreement in the literature that heritability is greater than 50%, with first degree relatives having a higher risk for developing autism relative to the general population.

It is thought that advanced paternal age increases the risk of autism by increasing rates of de novo (not inherited) mutations and epigenetic alterations.¹²

Research has identified certain genetic mutations, which are very rare (<1%) in the general population but have a much higher frequency among individuals diagnosed with autism and other neurodevelopmental disorders. Such variants include CHD8, 16p11.2 and 15q11.2 deletions or duplications. Genetic testing can identify such variants in about 10-20% of ASD cases – a proportion that is expected to increase with next-generation sequencing.¹²

Several genetic syndromes overlap with autism in their phenotypic presentation, with a high proportion of cases having a co-morbid diagnosis of autism. Syndromes with the highest overlap with autism are Rett syndrome and Cohen syndrome, where more than half of patients also have autism. Others are Cornelia de Lange syndrome, tuberous sclerosis complex, Angelman syndrome, CHARGE syndrome, and fragile X syndrome, where more than 30% of patients also have autism. For neurofibromatosis type 1, Down's syndrome, Noonan syndrome, Williams syndrome, and 22q11.2 deletion syndrome, more than 10% of patients have autism.¹²

Maternal health risk factors:

Maternal health risk factors that increase susceptibility for ASD, illustrated in Figure 13 include:¹²

- A family history of autoimmune disease
- Maternal infection or autoimmune disease
- Maternal overweight
- Maternal mental health
- Assisted reproductive technology

As is clear from the above list, several factors associated with immune system vulnerability in pregnant women are implicated in autism, including a family history of autoimmune disease, maternal infection during pregnancy and maternal autoimmune disease, and are thought to interact with genetic factors to increase susceptibility for ASD.¹²

The risk of autism is increased in children of overweight mothers compared with normal weight mothers, and of mothers with diabetes compared with those without diabetes. Maternal overweight can compromise the integrity of the maternal microbiome, thus altering immune responses in some regions of the brain. The interaction between immune system

factors and nutrition affects prenatal brain development by increasing oxidative stress and cytokine response.¹²

Factors related to maternal mental health also show consistent association with the risk of autism, albeit indirectly. These include maternal depression, a known risk factor for a range of health conditions in children. Further, use of selective serotonin reuptake inhibitors (SSRIs) during pregnancy as a result of diagnosed depression increases risk for autism.

Use of assisted reproductive technology is linked to increased risk of ASD, via epigenetic modifications of DNA. These changes in the mother are stable and heritable and affect mechanisms that induce or suppress genetic expression during development.¹²

Neurological risk factors:

Neurological risk factors that increase susceptibility for ASD, illustrated in Figure 13 include:¹²

- Birth injury or trauma
- Birth complications/low birth weight

Perinatal risk factors lead to neurological vulnerability, increasing the risk for autism and other neurodevelopmental conditions. Some of the perinatal factors that increase the risk of autism are birth injury or trauma, low birth weight, caesarean section, and umbilical cord complications. The higher frequency of such pregnancy and birth complications in older mothers is thought to account for the association between advanced maternal age and the risk of autism.¹²

One causal mechanism resulting from this group of risk factors is hypoxic-ischemic damage that induces inflammation, dysregulation of signalling pathways, and in turn neuronal damage and death.

Prevalence of ASD

A systematic review of the global prevalence of ASD published in 2022 found that the median prevalence worldwide was approximately 1%, and that estimated global prevalence had increased since the previous such systematic review in 2012.¹³ The authors further found that, in line with previous evidence, recent studies continue to report an increase in prevalence over time either at a country level and/or for specific subgroups.

Factors known to account for the rise in prevalence of ASD worldwide include the increase in community awareness and public health response globally, changes in case definition that have broadened diagnostic boundaries over time, increased diagnosis of milder forms, and increase in the identification of autism in previously under-diagnosed populations defined by sex, geography, race/ethnicity, or socio-economic status (SES).¹³

The authors found significant variation in estimates of prevalence within and across regions, but concluded that, to date, there is weak or conflicting evidence for the hypothesis that geographic variation or time trends in prevalence may reflect differences in exposure to environmental risk factors.¹³

The authors further concluded that evidence for the hypothesis that social determinants of health, such as race or SES, may lead to variations in prevalence of ASD is not compelling. For instance, racial disparities in autism prevalence have been monitored in the United

¹³ Zeidan J, Fombonne E, Scora J et al. Global prevalence of autism: A systematic review update. *Autism Research*. 2022;15:778–790.

States over time and the pattern of change suggests a “catch up” in diagnosis in minorities who were initially underdiagnosed. Recent findings suggest that differences in SES may underlie such racial disparities in the US. Some research has found a positive association between SES and autism prevalence, with higher prevalence among higher income groups, but other studies have demonstrated conflicting findings.

The authors concluded that geographic variation in prevalence estimates, and the inconsistency in the association between SES and autism prevalence may reflect differences in availability, accessibility and affordability of health services in countries, and further, that hypotheses linking risk factors for autism with variations in prevalence will require research with large, representative samples and comparable autism diagnostic criteria and case-finding methods in diverse world regions over time.¹³

Attention deficit hyperactivity disorder (ADHD)

ADHD is one of the most common childhood neurodevelopmental disorders, characterised by inattention, hyperactivity, and impulsive behaviour.¹⁴ The worldwide prevalence of ADHD, which was estimated to be 5–7% in 2015, is expected to increase due to the change in classification of ADHD as a lifespan neurodevelopmental condition with specific criteria for children and adults, from the 4th version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) to the current version, DSM-5.^{14,15} Research suggests that the prevalence of ADHD is similar across different regions of the world, and stable over time, when study methods are consistent.¹⁵

Like ASD, ADHD is a multifactorial disease, and its aetiology is still not clearly understood. However, it is considered a hereditary disorder - the heritability for ADHD is high; twin studies have produced estimates ranging between 70% and 80%, with some up to 90%.^{15,16} Nonetheless, the genetic risk factors for ADHD are not clearly understood. Genome-wide association studies have successfully identified 12 genome-wide significant risk loci, yet these associations only account for approximately 22% of the disorder’s heritability, leaving researchers unable to account for the over 50% gap in heritability compared to estimates from twin studies.¹⁵

Some have hypothesized that this unexplained gap in heritability may related to gene-environment interactions, given that estimates of heritability from twin studies reflect a combination of genetic main effects and gene-environment interactions.¹⁵ However, the findings of studies attempting to identify interactions between specific genes and environmental exposures implicated in ADHD, to date, are inconsistent.¹⁵

Research has, however, identified numerous environmental exposures associated with ADHD. Nonetheless, findings on environmental risk factors have also been inconsistent, with the magnitude of association with ADHD often unclear, and causal associations yet to be established.^{14,15}

A recent review of environmental risk factors for ADHD¹⁴ published in the *Lancet Psychiatry* concluded that there is strong evidence for the association between eight environmental risk factors and ADHD:

¹⁴ Han Kim J, Yeob Kim J, Lee J et al. Environmental risk factors, protective factors, and peripheral biomarkers for ADHD: an umbrella review. *Lancet Psychiatry*. 2020; 7: 955–70.

¹⁵ Posner J, Polanczyk GV, Sonuga-Barke E. Attention-deficit hyperactivity disorder. *Lancet*. 2020; 8; 395(10222): 450–462.

¹⁶ Kian N, Samieefar N, Rezaei N. Prenatal risk factors and genetic causes of ADHD in children. *World Journal of Pediatrics*. 2022; 18:308–319.

- Maternal pre-pregnancy overweight
- Maternal pre-pregnancy obesity
- Maternal smoking during pregnancy
- Hypertensive disorders during pregnancy
- Preeclampsia
- Maternal acetaminophen (paracetamol) exposure during pregnancy
- Childhood eczema
- Childhood asthma

Some of these risk factors overlap with those for ASD – the authors found in particular that maternal metabolic syndrome and acetaminophen use during pregnancy were robust environmental risk factors for both ADHD and ASD.

The authors concluded that the association of maternal metabolic syndrome, acetaminophen exposure during pregnancy, and childhood atopic diseases with ADHD suggests that immunological pathways could play an important role in ADHD, but that high-quality studies are needed to confirm causality and investigate gene-environment interactions in relation to these factors.

Mental health conditions among children and young people

In January 2024, the UK Department of Health and Social Care published a conceptual framework of modifiable risk and protective factors for babies, children and young people's (BCYP) mental health, which were identified through a systematic literature search and consultation with experts and other stakeholders.¹⁷ The framework is shown below in Figure 14. The focus of the framework is on modifiable factors, for which there is scope to intervene to improve BCYP mental health. It uses the socio-ecological model of health determinants to group the identified factors influencing mental health at the:

- individual level;
- interpersonal relationship level;
- local community level;
- wider environment and society level.

The allocation of factors to each of these levels in the model was informed by a judgement about the level at which the action to modify the factors is most likely to be taken. The socio-ecological model recognises the complex interplay of risk and protective factors across these different levels, and that action is needed across multiple levels for effective prevention of mental ill-health. For instance, factors such as socio-economic status, family relationships, school experience and neighbourhood environments are often interconnected. The overlapping rectangles in the model illustrate how factors at one level influence factors at another level.

Exposure to risk factors during developmentally sensitive periods, especially during early childhood, and the accumulation of risk factors, are particularly detrimental to mental health and can predispose towards mental health conditions later on in life.¹⁷

¹⁷ Department of Health and Social Care. *Improving the mental health of babies, children and young people: a framework of modifiable factors*. Available at: <https://www.gov.uk/government/publications/improving-the-mental-health-of-babies-children-and-young-people/improving-the-mental-health-of-babies-children-and-young-people-a-framework-of-modifiable-factors>

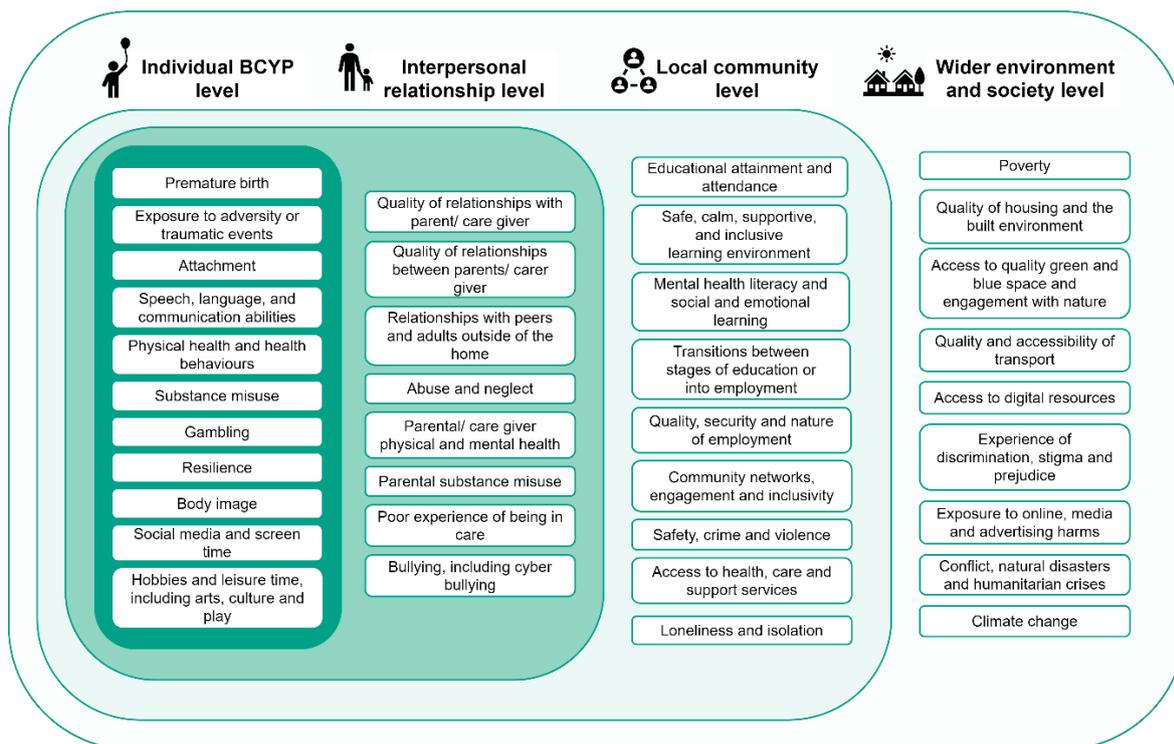


Figure 14: Babies, children and young people’s mental health: a framework of modifiable factors to guide promotion and prevention (Source: Department of Health and Social Care)

Each of the factors included in the model, and the evidence behind it, is outlined in further detail in the DHSC’s accompanying document on the findings of the literature search and stakeholder engagement.¹⁸

In addition to the factors included in the model, the findings of DHSC’s exercise also highlighted particular population groups among BCYP that are at greater risk of poor mental health, or have a higher prevalence of mental health conditions, including:

- being of adolescent age
- being lesbian, gay, bisexual or transgender
- being in contact with social care
- having a parent with psychosis
- experiencing brain damage
- having a special educational need or disability
- having diverse cognitive functioning
- experience of poverty or deprivation
- experience of youth and criminal justice system
- experience of displacement (being an immigrant, asylum seeker or refugee)
- not being in education, employment or training
- being a carer
- living in a rural area
- experience of homelessness

¹⁸ Department of Health and Social Care. *Improving the mental health of babies, children and young people: methodology, literature review and stakeholder feedback that informed the framework*. Available at: <https://www.gov.uk/government/publications/improving-the-mental-health-of-babies-children-and-young-people/improving-the-mental-health-of-babies-children-and-young-people-methodology-literature-review-and-stakeholder-feedback-that-informed-the-framework>

Data also shows that there are disparities in mental health outcomes between BCYP according to ethnicity and gender. However, these are variable according to other characteristics, such as age.¹⁷

Phase 3: Qualitative data collection through interviews and focus groups

Methods

The third phase of the project consisted of qualitative data collection through a series of semi-structured interviews and focus groups with key informants across sectors, as well as parents, to explore their views on the likely root causes of increased prevalence of special educational needs among children in government-run schools in Gibraltar. In all, 15 interviews and 3 focus groups were carried out in person between 6th-28th February 2024, with professionals from the education, health, social care and voluntary and community sectors, as well as with parents of children with special educational needs.

Interviews

For the interviews, a purposive sampling approach was taken to recruit 'information-rich cases', i.e. interviewees who were most likely to provide meaningful information by virtue of their professional experience, and length of service, in the education, health and social care sectors. Interviewees were nominated by the Department for Education primarily. Psychiatrists and paediatricians from Gibraltar Health Authority (GHA) were also consulted and nominated further interviewees from a health perspective. The range (and number) of professionals interviewed are set out in Table 2 below.

Interviews were semi-structured. Two topic guides were developed – one for interviewees from the education sector, and one for interviewees from health or social care sectors (as set out in Appendix 1). Across both guides, the central focus of the interviews was on exploring interviewees' views on the root causes of the increasing prevalence of SEN, and their observations in relation to patterns or changes over time regarding the health conditions and socio-demographic profile respectively of children with SEN. The interview topic guide for professionals from the education sector included some further questions aimed at clarifying SEN assessment and data collection practices in schools.

Four joint interviews were carried out and 11 individual interviews. Joint interviews were carried out at the request of interviewees, with the education psychologists, speech and language therapists (currently in post), midwives and social workers respectively. These joint interviews allowed for discussion, and areas of agreement and disagreement to be captured, between professionals. Interviewees were invited by email to participate and provided written consent to do so. Interviews were carried out in person and lasted approximately 60 minutes.

Table 2: Number and type of professionals interviewed

Type of professional	Number interviewed
Education psychologist	Two – both current post-holders
Education Advisor for SEND	Two – one current and one retired post-holder
Headteacher of St. Martin's School	Two - one current and one retired post-holder
SEN Coordinator	One current post-holder
Consultant paediatrician (GHA)	Three – two current post-holders and the retired Head of Neurodevelopmental Service (this service is no longer in existence)
Speech and language therapist (GHA)	Three – two current post-holders and the retired previous Head of Service
Midwife (GHA)	Three – all current post-holders
Consultant psychiatrist (GHA Children's Mental Health Service)	One current post-holder and Head of Service

Psychologist (GHA Children's Mental Health Service)	One current post-holder
Social worker (Care Agency)	Two – both current post-holders

Focus groups

Three focus groups were carried out with the following groups:

- School counsellors - this is a team of different kinds of therapists that support children with a range of special educational needs, based in Westside School;
- Special Council – this is a council of voluntary and community sector (VCS) professionals, established by the Government's Supported Needs and Disability Office;
- Parents, people with lived experience of disability, teachers and representatives of VCS organisations – who attended an open hall session organised by the Supported Needs and Disability Office as part of this project.

The focus groups lasted approximately 60 minutes, and consisted of discussion of the following questions:

- In your view, what are the likely root causes of the increasing prevalence of special educational needs (SEN) among children in Gibraltar?
- Have you noticed any patterns or changes over time in terms of the health conditions of children with SEN, and if so, what do you think may be underlying such patterns or changes?
- Have you noticed any patterns or changes over time in terms of the socio-demographic profile of children with SEN, and if so, what do you think may be underlying such patterns or changes?

The focus group with the school counsellors took place on February 9th. The focus group with the Special Council took place on the 27th of February and consisted of seven participants from the following organisations:

- Gibraltar Disability Society
- Mobility Centre
- Senti Music Therapy
- Gibraltar Alzheimer's and Dementia Society
- Clubhouse Gibraltar
- Gibsams
- Cerebral Palsy Gibraltar

An open invite to the public was issued by the Supported Needs and Disability Office to the open hall session, which took place on the evening of 26th of February. The session was promoted through the media, on social media, and through schools, and was attended by 50 people in total, representing the following groups:

- Parents
- Grandparents
- People with disabilities
- Gibraltar Disability Society
- Mobility Centre

- PossAbilities
- Cerebral Palsy Gibraltar
- Special Olympics
- St. Martin's School
- Notre Dame School
- Gibraltar College of Further Education
- Lions Charity
- CYE-CLE Charity
- Speech and Language therapy service
- Paediatrician
- Breast Cancer Support Group
- Prostate Cancer Gibraltar
- Mental Welfare Society
- Mind Body and Soul
- Together Gibraltar
- Dyslexia Gibraltar
- Supported Employment
- GHITA

Data analysis

Notes were taken of the key points raised during the interviews and focus group discussions. Thematic analysis was carried out to analyse the qualitative data gathered through these notes. An inductive and semantic approach to thematic analysis was taken, whereby the identification of themes was directed by the explicit content of the data itself. The former is an approach in which the identification of themes is directed by the content of the data itself, rather than being driven by pre-set concepts or research questions as would happen in a deductive or theoretical approach. A semantic approach focusses on identifying themes within the explicit content of the data (i.e. the surface meanings of what participants said), and contrasts with latent analysis which explores underlying ideas, concepts and assumptions that underpin the content of what participants have said.¹⁹

Results

It is more than likely that multiple factors are at play in relation to the increasing prevalence of SEN in Gibraltar – it is highly unlikely that there is a single reason or cause. The multifactorial nature of this issue is reflected in the broad range of themes that emerged from the qualitative data gathered through the interviews and focus groups. The key themes that were identified are grouped and outlined below.

Health conditions

The two health conditions perceived to be largely driving the rise in prevalence of SEN are autistic spectrum disorder (ASD) and ADHD. In relation to ASD, participants, both professionals and members of the public, said there has been a rise in severe cases in recent years. Speech and language therapists interviewed specified that the sharp increase in severe cases of ASD that they have seen in their service has occurred over the last 2-3 years. At St. Martin's School, the majority of children now have ASD or 'suspected ASD' if they don't have a diagnosis (which is often co-morbid with other conditions). A paediatrician interviewed said that the majority of ASD cases (up to 60-70%) they saw were co-morbid

¹⁹ Maguire M and Delahunt B. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Teaching and Learning in Higher Education*. 2017.

with a genetic syndrome, rather than being 'isolated' ASD. Recent advances in genetic testing have allowed such syndromes to be diagnosed.

Participants also highlighted that behavioural and mental health problems among children have been increasing significantly in recent years. Such problems would fall under the category of SEN entitled, 'Behavioural, emotional and social development needs'. Possible reasons for this are explored in the sub-section below on societal factors.

Better awareness and identification, and more social acceptance of developmental delays and conditions

Across the board, from the perspective of professionals across sectors and members of the public, three key themes emerged as the main reasons behind the rise in prevalence of SEN:

- More awareness among the public and professionals (health and education) of ASD and ADHD in particular, and of developmental delays and conditions more broadly;
- Better and earlier identification by health and education professionals of developmental delays and conditions, as a result of improved awareness, training, and screening and diagnostic tools;
- Less stigma and more social acceptance of children with developmental delays, conditions and disabilities.

In relation to the latter point, participants highlighted that, in the past, many such children were 'hidden away' out of sight, and parents were often resistant to their child being classified as having SEN. Nowadays, the opposite is true in many cases – parents come forward looking for and wanting a diagnosis.

Some of the professionals interviewed noted that there are also financial incentives for parents to get a diagnosis or a classification of 'SEN' for their child – the eligibility criteria for the Special Needs Allowance was broadened over the last two years to include children in Learning Support Facilities (LSFs) in mainstream schools, as well as children in St. Martin's.

A very interesting perspective brought by healthcare professionals who had previously worked in the UK was that, in Gibraltar, people have better access to healthcare in general than in the UK, and as a result, children with any kind of developmental delay are picked up earlier than they would be in the UK, and earlier intervention is put in place. Earlier identification of developmental delays and conditions would give rise to higher prevalence of SEN overall, compared to the UK.

However, the perspective of parents was in sharp contrast – at the open hall session, parents voiced their view that there is a lack of early intervention for children with developmental delays and conditions in Gibraltar, and that access to services has disimproved over time. Parents said that they feel they have to go to Spain to see private therapists (for speech and language, occupational or physiotherapy) due to a lack of provision in Gibraltar.

Healthcare professionals interviewed did also voice concerns about therapy services in particular being understaffed.

It is important to note, however, that although participants felt that much of the rise in prevalence of SEN can be attributed to better identification of children with conditions that

would not have been diagnosed in the past, they also emphasized that there is an element of the growth in prevalence that they believe is due to a 'genuine' increase in cases of severe ASD in particular – cases that would not have been missed, or possible to 'hide away', in the past.

Socio-demographic factors

In general, both professionals and members of the public felt that the prevalence of SEN isn't particularly socially patterned in Gibraltar. Participants hadn't observed that any particular groups in the population (in terms of ethnicity or deprivation for instance) were more affected by the increasing prevalence of SEN. Further, in terms of nationality, participants said that the increasing numbers of children with SEN are mainly Gibraltarian, and that this increase is not being driven by external or transient populations moving to Gibraltar for work.

Participants did observe, however, that more boys are affected by ASD, as is well documented in the literature, and that boys tend to present with greater severity.

Participants did also notice a link between deprivation and behavioural and mental health problems. Professionals, from both health and education sectors, said that behavioural and mental health problems tend to be more prevalent among children from families with lower socio-economic status, and among looked-after children - this may be due to a number of correlated factors, such as stress, trauma and troubled family backgrounds.

Societal trends as contributory factors in relation to behavioural and mental health problems

Participants highlighted three key societal trends as having a major influence on behavioural and mental health problems among children and young people:

- A shift in attitudes to parenting towards treating the child as a 'friend' or 'equal', immediate gratification of the child's desires, and a lack of boundary-setting;
- A dramatic increase in time spent on screens and social media;
- A shift in dietary habits towards consumption of more ultra-processed foods.

In relation to parenting styles, health and education professionals felt strongly that this change in attitudes to parenting has consequences in terms of children's behaviour. They felt that more support should be given to parents to improve their knowledge and skills in relation to parenting. Although the Care Agency provides a parenting course, the social workers interviewed were of the opinion that there would be better uptake and less stigma around such courses if they were offered by an alternative agency.

The exponential rise in social media and screen time was highlighted by participants across the board as a trend that is detrimental to children's development and mental health for a number of reasons, including negative impacts on the development of social and communication skills, sleep, exposure to peer pressure, and on mental wellbeing and resilience. This point of view was supported by findings from the literature review - social media and screen time are well-established risk factors for mental ill-health among children and young people, and are included in the conceptual framework recently published by the UK Department of Health and Social Care of modifiable risk and protective factors for babies, children and young people's mental health, which were identified through a systematic literature search and consultation with experts and other stakeholders.¹⁷

Health and education professionals further highlighted that use of screens by parents is also negatively impacting children – it reduces the level of social interaction, and potentially bonding, between parents and children, and some parents give devices to their children, even from when they are babies, as an ‘easy option’ to keep them occupied.

Screen time is not a causal factor in relation to ASD or ADHD, but professionals said that it can contribute to behavioural problems in children with these conditions.

The relatively recent change in dietary habits towards consuming more ultra-processed foods, high in fat, sugar and salt, was raised as an issue impacting children’s physical and mental health, as well as their behaviour, by both professionals and members of the public. The link between this change in dietary habits and a shift in parenting styles towards more immediate gratification of children’s desires was highlighted by some professionals.

At the open hall session, attendees raised a couple of other issues affecting children’s mental health – namely, bullying and academic pressures on children. A number of attendees made the point that bullying is a big problem for children and young people with SEN and disabilities, and that, in their view, the perpetrators tend not to be held accountable for their actions by schools. Attendees also emphasized that the academic pressure placed on all children and young people by the education system has increased over recent years and increases anxiety. Whilst noting that this was out of scope of the report it was felt to be important to include this feedback in the report and propose further investigation of this issue by the Department of Education.

Impact of Covid-19 lockdowns on child development

A key theme to emerge from the perspective of both professionals and members of the public was the disproportionate impact of the Covid-19 lockdowns on children in early years – their development was negatively impacted in a range of ways, including in relation to social interaction, and speech and language skills. Participants said that the lockdowns accelerated the trend of spending increasing amounts of time on devices. Children in early years were particularly impacted due to lockdowns occurring during critical periods of their development. Further, children in Gibraltar may have been more confined and affected by lockdowns than children elsewhere due to the lack of green spaces.

Genetic risk factors

A common observation made by healthcare professionals interviewed was that there is very often a family history of neurodevelopmental disorders – more often than not, siblings or parents of children with ASD or ADHD will also display traits of those conditions, although they may not have a diagnosis, or another neurodevelopmental disorder. This observation is supported by the findings of the literature review carried out as part of this project on risk factors for ASD and ADHD, which showed that there is general agreement in the literature that heritability for ASD is greater than 50%, with estimates of heritability for ADHD as high as 70-90%.^{12,15,16}

A hypothesis that was raised consistently, by both professionals and members of the public, was that Gibraltar may have a ‘small gene pool’ and consanguinity (i.e. reproductive relationships between blood relatives) may be leading to higher numbers of children with genetic disorders. Consanguinity is well known to increase the risks of autosomal recessive

disorders among offspring.²⁰ Several genetic syndromes overlap with autism in their phenotypic presentation, as outlined in more detail in the previous section on the literature review findings.

An argument against this hypothesis, however, is that Gibraltar has always been a small place and community – hence this wouldn't explain the recent rise in numbers of children with SEN. Nonetheless, some people opined that the period of the border closure under Franco may have exacerbated the issue of consanguinity.

A contrasting perspective came from a medic who said that having seen the results of genetic testing of a large proportion of the population to find a bone marrow donor match (over 10 years ago), that in fact, the gene pool is very diverse in Gibraltar. They also said, however, that the incidence of rare genetic disorders does appear to be higher than expected for such a small population – but in their opinion, this may be due to the diversity of the gene pool, rather than consanguinity.

Environmental risk factors

In relation to environmental risk factors for ASD and other health conditions, participants voiced their concerns in relation to pollution due to heavy industry in the area including shipping and the Gibraltar-San Roque refinery, as well as pollution due to the construction industry. However, such environmental risk factors are not supported by the findings of the literature review carried out on risk factors for ASD and ADHD. It is likely that such environmental risk factors negatively impact health in other ways, but pollution is not an established risk factor for ASD or ADHD. A systematic review of the global prevalence of ASD published in 2022 found significant variation in estimates of prevalence within and across regions, but concluded that, to date, there is weak or conflicting evidence for the hypothesis that geographic variation or time trends in prevalence may reflect differences in exposure to environmental risk factors.¹³

Maternal care and maternal health risk factors

A key theme that emerged from the qualitative data was that improvements in the quality of maternal care over time have led to increased chances of survival for babies, including premature babies, with complex medical needs and conditions. Thus, these improvements in medical care are leading to increased numbers of children with a range of conditions and disabilities, who would not have survived birth in the past.

In relation to maternal health risk factors for ASD and other health conditions, two key themes that emerged from the interviews and focus groups with participants other than the midwives interviewed included older age of women in pregnancy, and linked to this, increased use of assisted reproductive technology.

Findings from the literature review carried out as part of this project showed that assisted reproductive technology has been established as a risk factor for ASD, via epigenetic modifications of DNA.¹² In Gibraltar, the Government introduced a policy to cover the costs of IVF in 2012, and it is likely that use of IVF has increased since then.

²⁰ Science Direct. *Consanguinity*. Available at: <https://www.sciencedirect.com/topics/medicine-and-dentistry/consanguinity>

In contrast to participants' views, the literature review highlighted paternal age, rather than maternal age, as a risk factor for ASD (as this increases the risk of autism by increasing rates of de novo (not inherited) mutations and epigenetic alterations).¹²

The midwives interviewed emphasized that the proportion of pregnant women they see now, compared to 20 years ago, who are classified as high risk has increased significantly. In their view, the main reasons for this increased risk in pregnancy include older age, overweight and obesity in pregnancy, and linked to this, maternal metabolic syndrome and diabetes, and greater prevalence of both physical and mental health conditions.

They highlighted that people are in general less healthy now than they used to be, and this is due in large part to changes in dietary habits and more consumption of ultra-processed foods.

In relation to maternal age, they said that 20 years ago, the majority of pregnant women they saw fell into the 20-29 years age bracket, whereas now, the majority are aged 30-39 years. Further, the proportion of pregnant women in the 40+ age group has over doubled to 8% of all the women they see currently, compared to 20 years ago.

The midwives observed that pregnant women now have more physical and mental health conditions than they used to see in the past. In terms of physical health conditions, they highlighted in particular diabetes, cardiac conditions, autoimmune and gastrointestinal disorders. In relation to mental health conditions, they said that anxiety and depression are the key ones they see.

Findings from the literature review carried out as part of this project supported the midwives' observations. The literature review highlighted that maternal overweight and obesity, metabolic syndrome and diabetes, are particularly robustly established environmental risk factors for both ADHD and ASD.¹⁴

It further showed that maternal autoimmune disease and maternal depression are associated with the risk of autism. In addition, use of selective serotonin reuptake inhibitors (SSRIs) during pregnancy as a result of diagnosed depression increases risk for autism.¹²

Conclusions and recommendations

Conclusions

Quantitative and qualitative data analysis was carried out to investigate the factors linked to increasing prevalence of SEN among children in government-run schools in Gibraltar. Quantitative analysis was carried out on Department of Education data on children with SEN to estimate prevalence of SEN, and the most common and fastest growing types of SEN. Qualitative data was gathered through 15 interviews and 3 focus groups, which were carried out in person between 6th-28th February 2024 with professionals from the education, health, social care and voluntary and community sectors, as well as with parents of children with special educational needs.

Data from the Department of Education indicates that there has been a consistent upward trend in the prevalence of special educational needs (SEN) among children in government-run schools in Gibraltar, from about 20% in 2014/15 to about 30% in 2022/23. This compares to a prevalence rate of 17% in the UK in 2023. Prevalence of SEN is also rising in the UK however, and prevalence of ASD is rising worldwide.

Consistently over time, the three most common types of special educational needs among children in Gibraltar are general learning difficulties, behavioural, emotional and social development needs, and speech and language difficulties. The profile of needs has remained fairly consistent over time in Gibraltar, although in recent years, speech and language difficulties and autistic spectrum disorders respectively are making up a growing share of need.

Firstly, it is important to note that it is more than likely that multiple factors are at play in relation to the increasing prevalence of SEN in Gibraltar – it is highly unlikely that there is a single reason or cause.

The quantitative and qualitative data indicated that ASD, ADHD, mental health and behavioural problems are largely driving the rise in prevalence of SEN.

Across the board, from the perspective of professionals across sectors and members of the public, three key themes emerged from the qualitative data as the main reasons behind the rise in prevalence of SEN:

- More awareness among the public and professionals (health and education) of ASD and ADHD in particular, and of developmental delays and conditions more broadly;
- Better and earlier identification by health and education professionals of developmental delays and conditions, as a result of improved awareness, training, and screening and diagnostic tools;
- Less stigma and more social acceptance of children with developmental delays, conditions and disabilities.

These findings from the qualitative data are supported by those of the literature review carried out as part of this project, in relation to ASD in particular. The literature reviewed showed that factors known to account for the rise in prevalence worldwide of ASD include the increase in community awareness and public health response globally, changes in case definition that have broadened diagnostic boundaries over time, increased diagnosis of milder forms, and increase in the identification of autism in previously under-diagnosed populations defined by sex, geography, race/ethnicity, or socio-economic status (SES).¹³

A very interesting perspective brought by healthcare professionals who had previously worked in the UK was that, in Gibraltar, people have better access to healthcare in general than in the UK, and as a result, children with any kind of developmental delay are picked up earlier than they would be in the UK, and earlier intervention is put in place. Earlier identification of developmental delays and conditions would give rise to higher prevalence of SEN overall, compared to the UK.

However, the perspective of parents was in sharp contrast – at an open hall session, parents voiced their view that there is a lack of early intervention for children with developmental delays and conditions in Gibraltar, and that access to services has disimproved over time. Healthcare professionals interviewed did also voice concerns about therapy services (speech and language, occupational and physiotherapy) in particular being understaffed.

The key reasons for increasing prevalence of SEN outlined above would account for a ‘catching up’ on underdiagnosis in the past – however, participants, both professionals and members of the public, said there has been a genuine rise in severe cases of ASD in recent years. A paediatrician interviewed said that the majority of ASD cases (up to 60-70%) they saw were co-morbid with a genetic syndrome, rather than being ‘isolated’ ASD. Recent advances in genetic testing have allowed such syndromes to be diagnosed.

In general, both professionals and members of the public felt that the prevalence of SEN isn’t particularly socially patterned in Gibraltar. Further, in terms of nationality, participants said that the increasing numbers of children with SEN are mainly Gibraltarian, and that this increase is not being driven by external or transient populations moving to Gibraltar for work.

Participants did observe, however, that more boys are affected by ASD, as is well documented in the literature, and that boys tend to present with greater severity.

Participants highlighted three key societal trends as having a major influence on behavioural and mental health problems among children and young people:

- A shift in attitudes to parenting towards treating the child as a ‘friend’ or ‘equal’, immediate gratification of the child’s desires, and a lack of boundary-setting;
- A dramatic increase in time spent on screens and social media;
- A shift in dietary habits towards consumption of more ultra-processed foods.

At the open hall session, attendees raised a couple of other issues affecting children’s mental health – namely, bullying and academic pressures on children. A number of attendees stated that, from their perspective, that bullying is a big problem for children and young people with SEN and disabilities, and that, in their view, the perpetrators tend not to be held accountable for their actions by schools. This is out of the scope of the project but included in the report for further investigation by the Department of Education.

A key theme to emerge from the perspective of both professionals and members of the public was the disproportionate impact of the Covid-19 lockdowns on children in early years – their development was negatively impacted in a range of ways, including in relation to social interaction, and speech and language skills.

In relation to genetic risk factors, a common observation made by healthcare professionals interviewed was that there is very often a family history of neurodevelopmental disorders – more often than not, siblings or parents of children with ASD or ADHD will also display traits

of those conditions, although they may not have a diagnosis, or another neurodevelopmental disorder. This observation is supported by the findings of the literature review carried out as part of this project on risk factors for ASD and ADHD, which showed that there is general agreement in the literature that heritability for ASD is greater than 50%, with estimates of heritability for ADHD as high as 70-90%.^{12,15,16}

In relation to environmental risk factors for ASD and other health conditions, participants voiced their concerns in relation to pollution due to heavy industry in the area including shipping and the Gibraltar-San Roque refinery, as well as pollution due to the construction industry. However, such environmental risk factors are not supported by the findings of the literature review carried out on risk factors for ASD and ADHD. A systematic review of the global prevalence of ASD published in 2022 found significant variation in estimates of prevalence within and across regions, but concluded that, to date, there is weak or conflicting evidence for the hypothesis that geographic variation or time trends in prevalence may reflect differences in exposure to environmental risk factors.¹³

In relation to maternal health risk factors, findings from the literature review and the interview conducted with GHA midwives highlighted that maternal overweight and obesity, metabolic syndrome and diabetes, are particularly well-established risk factors for both ADHD and ASD that have grown significantly in prevalence in recent years. Other key maternal health risk factors identified through the literature review and observations from the midwives include older age of both mothers and fathers, maternal autoimmune disease, maternal mental health conditions and use of assisted reproductive technology. In Gibraltar, the Government introduced a policy to cover the costs of IVF in 2012, and it is likely that use of IVF has increased since then.

Recommendations

Based on the findings from the three phases of the project, and focussing on factors that are amenable to intervention, the following four recommendations are put forward for consideration across Government in relation to addressing the issue of increasing prevalence of SEN among children.

- 1. Tackle maternal overweight and obesity:** Findings from the literature review and the interview conducted with GHA midwives highlighted that maternal overweight and obesity, metabolic syndrome and diabetes, are particularly well-established risk factors for both ADHD and ASD that have grown significantly in prevalence in recent years. It is recommended that women planning pregnancy, and pregnant women, be targeted in efforts to tackle maternal overweight and obesity through, for instance, pre-conception and antenatal services.
- 2. Provide support for parenting skills:** Health and education professionals interviewed felt strongly that the recent shift in attitudes to and styles of parenting towards treating the child as a 'friend' or 'equal', immediate gratification of the child's desires, and a lack of boundary-setting are having a major influence on behavioural problems. They felt that more support should be given to parents to improve their knowledge and skills in relation to parenting. Although the Care Agency provides a parenting course, the social workers interviewed were of the opinion that there would be better uptake and less stigma around such courses if they were offered by an alternative agency.
- 3. Limit children's screen time:** The exponential rise in social media and screen time was highlighted by participants across the board as a trend that is detrimental to

children's development and mental health for a number of reasons, including negative impacts on the development of social and communication skills, sleep, exposure to peer pressure, and on mental wellbeing and resilience. This point of view was supported by findings from the literature review - social media and screen time are well-established risk factors for mental ill-health among children and young people. It is recommended that action be taken to increase parents' awareness of the risks of social media and screen time for their child's mental health, and by schools to limit the amount of time children are spending on screens.

- 4. Continue to pursue a philosophy of inclusion in education:** It is recommended that the Department of Education continues to pursue its philosophy of inclusion of children with SEN. Health professionals interviewed, including paediatricians and speech and language therapists, felt that including children in mainstream schools and classes, wherever possible, is more beneficial to their development, particularly in relation to social functioning, than placing them in separate settings. The trend of increasing prevalence of SEN is not unique to Gibraltar – it is also happening in the UK, and prevalence of ASD is rising worldwide. It is important to consider how to best use resources to support the needs of these increasing numbers of children in mainstream settings as far as possible.

Thinking differently about use of resources could include, for instance, having better trained, learning support assistants (LSAs), and distributing LSAs throughout mainstream schools and classes, as opposed to concentrating resources for supporting SEN in separate settings, such as St. Martin's and the learning support facilities (LSFs). In relation to the Early Birds Nursery in particular, one suggestion of note made by a healthcare professional was to shift from a model of educational provision for these children's needs to a multi-disciplinary 'child development centre' model, through which health professionals, including health visitors and therapists, could work in partnership with parents, empowering them to support their child's development.

Appendix 1: Interview topic guides

Interview topic guide for education professionals

1. In your view, what are the likely root causes of the increasing prevalence of SEN among children in Gibraltar?
2. Have you noticed any patterns in the socio-demographic profile of children with SEN, and if so, could you tell me more about these and whether they have changed over the past 10 years?
3. Have you noticed any patterns in terms of health conditions of children with SEN, and if so, could you tell me more about these and whether they have changed over the past 10 years?
4. Have there been any changes in practice to identifying and assessing SEN in your school over recent years, or in Gibraltar more widely? If so, could you tell me more about these changes please?
5. For the SEN category, “general learning difficulties”, what are the main reasons children are identified as having this type of need in your experience?
6. For the SEN category, “specific learning difficulties”, what are the main reasons children are identified as having this type of need in your experience?
7. For the SEN category, “behavioural, emotional and social development needs”, what are the main reasons children are identified as having this type of need in your experience?
8. For the SEN category, “speech and language difficulties”, what are the main reasons children are identified as having this type of need in your experience?

Interview topic guide for health and social care professionals

1. In your view, what are the likely root causes of the increasing prevalence of SEN among children in Gibraltar?
2. Have you noticed any patterns in terms of health conditions of children with SEN, and if so, could you tell me more about these?
3. Have you noticed any changes in relation to the health conditions of children with SEN over the past 10 years, and if so, what do you think may be underlying such changes?
4. Have you noticed any patterns in the socio-demographic profile of children with SEN, and if so, could you tell me more about these?
5. Have you noticed any changes in relation to the socio-demographic profile of children with SEN over the past 10 years, and if so, what do you think may be underlying such changes?
6. In relation to autism spectrum disorder, factors known to account for the rise in prevalence worldwide include the increase in community awareness and public health response globally, changes in case definition that have broadened diagnostic boundaries over time, increased diagnosis of milder forms, and increase in the identification of autism in previously under-diagnosed populations defined by sex, geography, race/ethnicity, or socio-economic status (SES)²¹. In your view, are these factors applicable to the Gibraltar context?

²¹ Zeidan J, Fombonne E, Scolah J et al. Global prevalence of autism: A systematic review update. *Autism Research*. 2022;15:778–790.