General Practitioners' Knowledge on Childhood Developmental and Behavioural Disorders

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ABSTRACT

Introduction: Childhood developmental and behavioural disorders are increasingly being recognised, with high demands for earlier diagnosis and intervention. In Singapore, referrals to the Child Development Unit, KK Women's and Children's Hospital, originate mainly from primary health care practitioners, who therefore should have adequate baseline knowledge of normal development as well as common developmental and behavioural disorders.

Methodology: A pilot study, using a questionnaire survey, was conducted, with the aim of assessing existing knowledge in childhood developmental and behavioural paediatrics amongst a cohort of general practitioners (GPs) in Singapore. True/False questions on normal development as well as developmental disorders such as autistic spectrum disorder (ASD), attention deficit/hyperactivity disorder (ADHD) and learning disability, were structured. These disorders were selected because of their relatively higher prevalence.

Results: A total of 48 GPs were surveyed, representing 2% of non-specialists practising in the private sector. The median total score (T-score) was 9 (range 6 to 13) of a possible 14. Only just over a-third of the group achieved the pass rate (defined arbitrarily as 75%) for T-score, with two-thirds replying correctly to all questions on normal development. Scores for factual ASD/ADHD questions were also not ideal, with some myths being believed as truths.

Conclusion: The scores reflect knowledge and educational deficits in developmental paediatric medicine amongst the study cohort. Expected to provide holistic care and counselling, these GPs are currently insufficiently equipped with the necessary knowledge and skills to support families of special-needs children. Education and training programmes in this aspect of paediatric medicine are clearly needed, through the organisation of CME lectures and incorporation of various developmental topics into the training curriculum. This will enable early identification and diagnosis of childhood developmental and behavioural disorders, which will in turn allow greater optimisation of potential and functionality in these special-needs children.

Keywords: childhood, developmental, behavioural, knowledge, special-needs

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INTRODUCTION

Childhood developmental and behavioural disorders have been extensively studied throughout the world. It is estimated worldwide, that 15-20% of children have developmental disabilities. In Singapore, such disorders are increasingly being recognised. Demands for diagnostic and intervention services have risen dramatically in recent years, with about 1.5 to 2% of the annual birth cohort requiring the services of the Child Development Unit (CDU) in KK Women's and Children's Hospital, serviced by six developmental paediatricians. As these referrals originate from the primary health care practitioners, it is deemed important that general practitioners (GPs) have adequate baseline knowledge of normal development as well as common developmental and behavioural disorders.

A questionnaire survey was thus conducted on 14 July 2002 to confirm existing knowledge on childhood developmental and behavioural disorders amongst GPs. This was carried out in conjunction with the Paediatric Medicine Update for General Practitioners, at KK Women's and Children's Hospital, prior to the delivery of a lecture on "Highlights on Learning Disorders".

The primary aim of this study was to provide an indication of the current knowledge in the field of childhood developmental and behavioural paediatrics amongst GPs in Singapore. The secondary aim was to determine their interest in receiving Continuing Medical Education (CME) in this field.

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METHODS

Materials

This was a pilot cohort study, taken at a single setting. The questionnaire contained a total of 14 factual questions on childhood developmental and behavioural issues and one question on interest in CME in this area. Three questions referred to normal development while five questions pertained to autistic spectrum disorders (ASD), four to attention deficit/hyperactive disorders (ADHD) and two to Learning Disability (LD). Participants were requested to indicate true/false answers to the questions, shown on Fig. 1. One point was awarded for each correct answer, with no negative marking. The total score (T-score) was defined by the number of points awarded of 14 questions. A pass T-score was defined arbitrarily as achieving a 75% pass rate, which is the equivalent of a T-score of ≥11 out of 14. Responses to ASD and ADHD blocks were also examined separately. The significance of the responses was denoted by the negative scores for the ASD (NS-ASD) and ADHD (NS-ADHD) blocks, which are defined by the number of wrong answers achieved for each block. The higher the NS-ASD and the NS-ADHD, the greater the inferred deficit in knowledge. The maximum negative ASD-negative score (ASD-NS) was 5, while the maximum ADHD-negative score (ADHD-NS) was 4. Those who did not indicate an answer for a question were deemed not to know the answer to that question, hence contributing to the negative score.

Data collection

All registrants who signed up for CME points for the seminar concerned were included for the survey. The questionnaire was distributed at the point of registration for CME points. The participants were given approximately five minutes to answer the questions and collection of questionnaire was done immediately before the start of the relevant lecture, so as not to allow confounding bias. Those who did not return these forms at the time of collection were thus excluded from any analysis.

Statistical Analysis

Statistical analysis was performed using SPSS for Windows, Version 10.0.

RESULTS

There was a response rate of 68.6% (48 returned questionnaires of 70 surveyed). Excluding six who did not wish to specify their gender, there was an even distribution of males (45.8%) and females (41.7%). The median age was 35 (range 28 to 62) years, with nine not indicating their ages.

The median T-score was 9 (range 6 to 13). There were none with a full T-score of 14. Only 18 of 48

Fig. 1

Knowledge Survey Of GPS On Childhood Behavioural and Developmental Disorders (C-DABP).

1.	There is now evidence that ASD is linked to preservatives present in the old MMR vaccine.	❍ T ❍ F
2.	A child only develops make-believe play at 4 years old.	❍ T ❍ F
3.	A learning disability needs to be considered if a sociably appropriate child with a high IQ is not performing well in school.	❍ T ❍ F
4.	By 5 years of age, a child should be able to relate daily activities and experiences.	❍ T ❍ F
5.	Children should be able to converse reciprocally by the age of 4.	❍ T ❍ F
6.	The incidence of autistic spectrum disorders is approximately 1 - 2 per 1000 children.	❍ T ❍ F
7.	It has been shown that medication alone is the most effective mode of treatment in children with ADHD.	❍ T ❍ F
8.	Letter reversal is diagnostic of dyslexia.	❍ T ❍ F
9.	Dietary modification is helpful in altering the outcome of a child with ASD.	❍ T ❍ F
10.	A child with ADHD may show all the signs at home and yet none of the signs at school.	❍ T ❍ F
11.	Sugar has been clearly proven to be a causative factor for hyperactivity in children.	❍ T ❍ F
12.	A child with ASD often does better with visual input than with auditory input.	❍ T ❍ F
13.	Due to limited local resources, children with autism usually have to wait 1 year before they can enter a special school.	❍ T ❍ F
14.	Features of inattention and hyperactivity in most ADHD children improve towards adolescence, even without medication.	❍ T ❍ F
15.	There is a need for continuing medical education amongst the general practitioners in the area of childhood developmental disorders.	❍ T ❍ F

(37.5%) achieved a pass rate (≥75%) for the T-score. Thirty GPs (62.5%) achieved all correct answers to three questions on normal development. There was one with wrong answers to all three questions on normal development (Table I). There was no statistical difference in the mean scores between male (9 ± 2) and female (10 ± 2) GPs (p=0.31). In looking at age of the GPs, there was no statistical difference in mean scores between those less than 40 years (10 ± 1) and those aged 40 years or more (9 ± 2) (p=0.23). Logistic regression did not reveal significant contribution by age or sex towards achieving a pass rate for T-score.

In examining their responses to specific questions on more common specific developmental disorders, the breakdown for answers to ASD and ADHD blocks were studied. The median NS-ASD was 2 (range 0 to 3), with 29 (60%) achieving a score of ≥2. The majority were aware that ASD was not linked to preservatives in vaccines. There were 20 GPs (41.7%) who believed that dietary modification would aid in altering the outcome of children with ASD. Eleven (23%) were not aware that children with ASD are likely to respond better to visual input. Forty (83%) were of the opinion that children with severe ASD will have to wait usually a year to enter special schools. A similar number were aware that the incidence of ASD was in the range of 1-2 in 1,000 (Table II).

The median NS-ADHD was 1 (range 0 to 4), with 22 (46%) achieving a score of ≥2. The majority (85%) were aware that medication alone was not the most effective mode of treatment in ADHD. However, about a-third (31%) indicated that an ADHD child may show all the signs at home and none at school. A quarter (25%) believed sugar to be a causative factor for hyperactivity. Thirty-five (73%) indicated that inattention and hyperactivity improved towards adolescence even without medication. (Table III)

Sixteen (33.3%) of them provided correct answers to both questions on LD, while two had wrong answers for both questions. (Table IV) The majority of the GPs (92%) were aware that LD needed to be considered should a socially appropriate child with a high IQ have academic difficulties. About two-thirds of them indicated that letter reversal was diagnostic of LD.

Interestingly, 2 (both with T-scores of 64.3%) of the 48 indicated that there was no need for CME lectures in the area of developmental and behavioural disorders.

Table I: Normal development.

Correct responses to questions on normal development	%
A child only develops make-believe play at four years old. (F)	70.8
By five years of age, a child should be able to relate daily activities and experiences. (T)	93.8
Children should be able to converse reciprocally by the age of four. (T)	89.6

Table II: Autistic Spectrum Disorder (ASD) Block.

Correct responses to questions on ASD	%
There is now evidence that ASD is linked to preservatives present in the old MMR vaccine. (F)	95.8
The incidence of autistic spectrum disorders is approximately 1 - 2 per 1000 children. (T)	83.3
Dietary modification is helpful in altering the outcome of a child with ASD. (F)	58.3
A child with ASD often does better with visual input than with auditory input. (T)	77.1
Due to limited local resources, children with autism usually have to wait 1 year before they can enter a special school. (F)	14.6

Table III: Attention Deficit/Hyperactivity (ADHD) Block.

Correct responses to questions on ADHD	%
It has been shown that medication alone is the most effective mode of treatment in children with ADHD. (F)	85.4
A child with ADHD may show all the signs at home and yet none of the signs at school. (F)	68.8
Sugar has been clearly proven to be a causative factor for hyperactivity in children. (F)	72.9
Features of inattention and hyperactivity in most ADHD children improve towards adolescence, even without medication. (F)	27.1

Table IV: Learning Disability (LD) Block.

Correct responses to questions on ASD	%
A learning disability needs to be considered if a sociably appropriate child with a high IQ is not performing well in school. (T)	91.7
Letter reversal is diagnostic of dyslexia. (F)	37.5

DISCUSSION

Childhood developmental and behavioural disorders are increasingly being recognised nowadays, with the number of cases receiving diagnosis and intervention being likely only the tip of the iceberg. Data from North America and Europe suggest a prevalence of 5 to 20%. Based on data obtained from the National Health Interview Survey, it has been estimated that 16.8% of children below age 18 in the United States of America have at least one developmental disability, with 4.9% having two or more.

Developmental and behavioural disorders include delays in motor development, speech and language development and attainment of social skills, sensory deficits such as visual or hearing impairment, multi-system developmental disorders, cerebral palsy (CP), and cognitive deficits or mental retardation (MR). Learning disabilities (LD), emotional and behavioural

problems, social communication disorders (such as ASD), as well as attention deficit/hyperactivity disorder (ADHD) are increasingly recognised in our local paediatric population.

In Singapore, referrals for developmental concerns to the developmental specialists have been increasing over the years. While there are existing efforts to collate information on the incidence and prevalence of these disorders amongst the preschool children, we do not, at present, have any data for Singaporean children.

As the educational level of parents improve, developmental concerns are brought to the attention of the general practitioner earlier and in greater detail. There are also concerns that the general practitioners are not adequately equipped to screen the children for specific developmental disorders. This is particularly because developmental paediatrics is not an area of focus in medical school education. The GPs do not receive any rotation at developmental clinics during their formal training in family medicine. In addition, there are currently few CME sessions on developmental paediatrics.

This descriptive study was carried out with the aim of providing some insight into existing knowledge on developmental and behavioural disorders amongst GPs in Singapore. There is, at present, a record of 2,243 non-specialists practising in the private sector[1]. There are no actual estimates of the number of general practitioners in Singapore. It is noted that this was essentially a pilot survey as the number of questions that were provided was limited due to time constraints, and the number surveyed represented a small proportion of the entire group of GPs in Singapore. Furthermore, the group surveyed may be a biased group, as they were a group that were interested in upgrading themselves as can be established by their registration for the Update Seminar. Nevertheless, the survey yielded useful information and will aid the Department in the preparation of subsequent CME lectures and workshops on developmental and behavioural disorders.

The pass-rate for T-score was arbitrarily selected as 75%, rather than the traditional 50%. This was because it was generally felt that GPs should have a level of knowledge that permits them to identify patients at risk at the primary care level, so that such patients could be referred early for prompt identification and intervention. Only just over a-third of the group achieved the pass rate. This is reflective of the lack of knowledge in developmental paediatric medicine and educational deficits in this particular area. Whether this translates into under-referral of patients with developmental concerns is debatable, but it is certainly disturbing. Age and sex were not contributory factors towards a better score. Data for the experience of the GPs were not available, although it would, perhaps, be reasonable to extrapolate the age of the practising doctor to the number of years of experience.

The questions on normal development were selected for their less emphasised roles in development. Often times, in medical school, our focus is very much on the developmental milestones involving motor and speech and language arenas. While most of us know when a child should walk and talk, few of us know when and how a child should learn to play. Also, while we know when a child should speak in the initial years, we are not always so familiar with how much a child should talk in preschool years. It was therefore not surprising to discover that almost a-third of those surveyed had the impression that a child only develops pretend-play at the age of four, although early pretend play actually develops from the age of 18 months. However, the majority knew that a child develops conversational skills at four to five years of age. It was also encouraging that two-thirds of them had all three questions on normal development correct.

The Autistic Spectrum Disorders (ASD) have been reported to have an incidence of about one to two in 1000. First described as Autism by Leo Kanner[2] in 1943, Lorna and Gould[3] in 1979, subsequently described a spectrum of disorders sharing the classic triad of impaired communication, impaired social interaction and limited imaginative play. This lifelong developmental disorder is also known as Pervasive Developmental Disorder, a more commonly-used terminology in the United States. With an incidence that far surpasses that of congenital hypothyroidism (one of the disorders that is routinely screened for in Singapore at birth) and with rising prevalence in many countries, it was felt that this was one disorder that GPs needed to know about in some detail. It was encouraging to note that there were none with a NS-ASD of five, indicating that all surveyed have some knowledge of ASD. However, it is alarming to note that 60% have a NS-ASD score of $\geq$2, indicating significant deficits in knowledge on the causes of ASD and the support services available for these children.

Vaccination and its safety are of continuous concern to both medical professionals and the public. There has been much literature on the likelihood of vaccines being related to a diagnosis of ASD[4,5]. One needs to keep in mind that the onset of symptoms related to ASD often surface at around the time when the child is due for Mumps, Measles and Rubella (MMR) vaccination. This is also the reason that led researchers to focus on the possible relation. The work by Peltola

et al[6] as well as Brent and co-authors[7] showed that ASD was not causally related to the MMR vaccine. This work was further supported by James Kaye and co-authors[8], who reported their findings in the British Medical Journal in February 2001. In a more recent population-based study of 537,303 children, published in the New England Journal, November 2002[9], the authors concluded that there was strong evidence against the hypothesis that MMR vaccination causes autism. Hence, it was good to note the majority were aware that there was no such causal relationship. This is of particular concern as parents have been advised on missing the MMR vaccine because of previous unproven concerns that it was causally related to ASD.

On the other hand, 41% were of the mistaken notion that dietary modification made a difference in the outcome of children with ASD. It is emphasised that there has been no conclusive research on any of the varied diets that parents have subjected their children with ASD to. Some early reports have been anecdotal and cannot be generalised. Those studies that showed positive results after implementation of special diets were either not reproducible in other studies or had shortcomings in the methodology. Other subsequent randomised, placebo-controlled studies often showed negative results. These include diets involving secretin[10-15], Dimethylglycine (DMG)[16], mega doses of vitamins (megavitamins)[17-20], and gluten/casein-free diets[21,22].

In terms of resources, 83% agreed that children with severe ASD usually wait a year before entering special school education. At present, the waiting time is closer to three years from the child's first consult with the developmental paediatrician. A child referred to the CDU by the GP (private or polyclinic-based) for developmental concerns will be evaluated by the developmental paediatrician two to four months later. Should the provisional diagnosis be that of ASD, a psychological assessment is arranged, and this is conducted about four months later. When both developmental paediatrician and psychologist are of similar opinions and a diagnosis of ASD is established, a referral to the special schools system is then made. An interview by the relevant school will be conducted a few months later, after which the child will be placed on the waiting list. This child will subsequently enter the school about two years later from the time of the interview. This, however, certainly does not mean that the child will not be receiving any intervention in the meanwhile. He will be referred for a combination of therapies that are needed to optimise potential for a better outcome. It is noted that the use of visual cues and aids form an integral part of the teaching strategies in children with ASD, as they respond better to visual input, a fact which almost a quarter of the study cohort was not aware of.

With regards to ADHD, the median NS-ADHD was also deemed unsatisfactory. ADHD is the most commonly diagnosed behavioural disorder afflicting children, with recent estimates in the United States ranging from 4 to 10%[23,24]. The criteria for diagnosis follow that of Diagnostic Statistical Manual-IV closely[25], with symptoms of inattention, hyperactivity and impulsivity, occurring for more than six months, across at least two different environmental settings, and presenting prior to the age of seven years. A-third of the surveyed GPs were unaware that a child must manifest symptoms across different environmental settings, usually denoted as both at home and in school, for a diagnosis of ADHD to be made.

Seven believed that medication alone was the most beneficial mode of treatment and was sufficient for management in ADHD, a fact that was shown to be false in the large multicentre trial conducted in the United States in 1992 and reported last year[26]. In this large study of 579 children, combination therapy (with medication and behavioural management) was conclusively shown to be superior to behavioural management alone, with medication alone having a significant incremental effect over behavioural management alone.

Of the 40 who were aware that medication alone was insufficient, nine thought that sugar was a causative factor for hyperactivity. Since Dr Feingold first introduced his elimination diet in the management of ADHD in 1975[27,28], there has been much interest in this area. Systematic research has, however, consistently failed to prove that artificial colourings, flavourings, natural salicylates or sugars are culprits for hyperactivity in children[29-36]. While some children may be food allergen-sensitive, individual claims should be explored on a case-by-case basis. It must be noted that although allergies may aggravate ADHD symptoms, it is not the primary causative factor for ADHD.

With regard to resolution of symptoms with age, most studies suggest persistence of symptoms to adolescence at approximately 70%. Hence, many of these children do not grow out of their symptoms and will still meet criteria for ADHD in adolescence. While the symptoms of hyperactivity and impulsivity mellow with age, inattention and disorganisation may not, a fact that 73% of the surveyed GPs were not aware of.

Conclusions cannot be made about their knowledge on Learning Disabilities, as there were only two questions, meant to be used as screening questions

to establish awareness of the existence of LD. Nevertheless, it was heartening to note that most would suspect LD in the presence of poor academic performance in a socially appropriate child with normal intelligence. However, 60% indicated that letter reversal was diagnostic of dyslexia, although letter reversal is acceptable as part of normal development prior to the age of five to six years. More education is also clearly necessary in this area.

This study, although simply conducted, has served to highlight major deficits in knowledge amongst the GPs surveyed. Some might perhaps feel that the study cohort, comprising approximately 2% of the group of non-specialists practising in the private sector, may not be representative of the entire group. While the cohort may comprise people who acknowledge their deficits in training and hence, awareness in these areas of knowledge, it is also possible that they represent those who are keen to be updated in the most recent advances as evidenced by their attendance during the Paediatric Medicine Update for General Practitioners. Certainly, more accurate data could be obtained should this study be extended to a random sample of GPs. It is, however, recognised that this can be difficult to achieve, in terms of logistics and obtaining data on true baseline knowledge.

In order to improve the education in developmental paediatrics amongst these first-line doctors, there needs to be a concerted effort to bring this knowledge to their midst. Lectures and seminars on child development as well as developmental and behavioural disorders should form part of regular core CME sessions, and are important in the transmission and update of knowledge. At present, organisation of CME lectures on relevant topics such as childhood development, ASD, ADHD and LD is on-going. The feasibility of including such topics in the curriculum for core lectures among training doctors is also being examined. However, it must be further emphasised that it would likely be more beneficial to gain additional hands-on experience, which can be achieved through an attachment at the CDU or other similar developmental centres. Child development is a crucial part of paediatrics and training in this area should therefore form an integral part of any training in general practice or family medicine.

CONCLUSION

In general, childhood developmental and behavioural disorders is an area of medicine where all medical professionals need to be educated on. More CME lectures and relevant training in this important aspect of paediatrics should be urgently planned for. This will enable better and earlier identification of children who are at risk for these disorders. This will, in turn, lead to early diagnosis and intervention for them. With the subsequent development of a database on these disorders, it is hoped that more services will be made available and facilities can be improved on in the long run. The aim is to achieve greater optimisation of potential in these children with special needs, with the end point of better adult-functionality, as many of these children, with specialised support and adequate services, can have a rightful place, for some, in main-stream education and for most, in society.

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