**Introduction**

Attention deficit hyperactivity disorder (ADHD) affects approximately 3 to 7% of all school-aged children worldwide, with a prevalence rate of at least one child in a classroom of 25 children (Carlson et al 2006). In Singapore, 4.9% of 2400 six to twelve year-old children shows disruptive behaviour based on parent surveys (Woo et al 2004). It was also identified to be the country’s third highest contributor of Disability Adjusted Life Years (Phua, 2009).

According to Lerner and Lerner (1991) hyperactivity has been described as early as the 18th century using terms such as “brain damaged” and “brain injured”. After years of professional studies, the diagnostic criteria have been created and standard terms were used. From the Diagnostics and Statistics Manual (DSM) IV-TR (American Psychiatric Association, 2000), ADHD is characterized by hyperactivity, impulsivity, and inattentive behaviour. These behaviours include fidgeting in seat, talking excessively, engaging in physically dangerous activities without considering the possible consequences, difficulty following through instructions and difficulty sustaining attention in tasks or play activities. These behaviours were often mistaken as simply disruptive or ‘naughty’ behaviour in schools. A lack of knowledge of the symptoms and the strategies to manage these behaviours could result in frustration for the teacher and academic failure for the student. This case study discusses the effects and impact of a structured behavior management system on a child diagnosed with ADHD.

**Literature Review: Management of ADHD**

ADHD is a behaviour that has been extensively researched. Through these research studies, we are able to identify the characteristics of ADHD and the management techniques that can be utilised by teachers who are teaching these students.

Templeton (1995) advised teachers to gain sufficient knowledge about the symptoms of ADHD before they changed the attitudes and stigmatism associated with ADHD. To achieve success, teachers would need to adopt a patient, caring, understanding and empathic approach to address challenging student behaviours. Templeton suggested the implementation of a few systems within the classroom setting. These are: (1) providing set routines in the daily schedule; (2) seating the child near the teacher; (3) shortening the required assignments; (4) displaying class rules and procedures and (5) giving short breaks during lessons.
The use of medical drugs is one of the recommended approaches to manage behaviour in ADHD but also a controversial one (Templeton, 1995 and Ozdemir, 2010) due to the effects in later life. These include drug addiction and alcohol abuse (Templeton, 1995). According to Whalen and Henker (1991) a psychosocial approach to ADHD may have a better outcome in the management of children compared to a purely pharmacological approach.

A systematic approach to intervention was suggested by Faison and Barniskis (1993). The basis of this model is to improve and enhance task completion. The four levels of intervention are instructional, behavioural, psychotherapeutic and medical interventions. They also explored a distractibility developmental model, which consisted of five points to indicate the level of attention, or intervention required for a child. These five points are: (1) independent; (2) monitoring; (3) supervision; (4) prompting and (5) non-responsive to treatment. Their theory suggests that the higher the child is on the distractibility scale, the greater the need for intervention for the child.

The United States Department of Education (2006) has extensive strategies on the management of children with ADHD. This guidance covers the areas of academic instruction, behavioural interventions and classroom accommodation. Ozdemir (2010), Templeton (1995) and Villegas et al (1995) have further reinforced these strategies that include developing the classroom environment, modifying the curriculum, enforcing rules, providing consistent and clear instructions, establishing set routines, and providing positive reinforcements.

Case Study

The student in this case study, Charlie (a pseudonym), was diagnosed with ADHD at the age of 8. As a preschooler, he was observed to encounter difficulties in reading and writing due to his hyperactive nature. Subsequently, he was admitted to Katong School on conditional placement and attended the school's second grade class. During his first year in the school, Charlie was observed to exhibit the following behaviours:

Hyperactivity
Charlie often roamed around the classroom and school. When sat on a chair, he fidgeted with his hands, moved his legs up and down, rocked his chair or stood up without asking permission. In situations that needed quiet, focused and controlled behaviour such as the flag-raising ceremony or assembly talks, Charlie would be seen jumping, squirming or running around the school hall.

Inattention
During art activities and participation in manipulative games such as playing with Lego blocks, Charlie showed sustained attention for a period of time. However, during other tasks that required full attention such as listening to a lesson, he was observed to be looking away and blurting out unrelated topics. During writing activities, Charlie tended to be distracted and would miss out items on the paper and fail to complete all the instructions.

Impulsivity
Based on school incident reports and his teachers’ observations, Charlie has exhibited the following actions in school: climbing up and down school furniture, manipulating electric sockets and light switches, spitting on the floor, teachers and other students, breaking rules in games and hitting classmates. These behaviours resulted in his peers disliking and avoiding him.

From the interview with Charlie's parents, he was also reported to be very active at home. He seldom sat quietly
except when watching television. He would also jump up and down in the room and he enjoyed playing with toys that he could build and dismantle such as screws and Lego blocks. His brothers occasionally complained of Charlie taking their belongings without permission.

Apart from his observed behaviours, Charlie also showed learning difficulties in English and Mathematics. As a predominantly Malay-speaking child, he was not able to converse well in English. Charlie only knew short phrases and was still unable to completely communicate his ideas and feelings to his teachers and classmates. He showed good mastery of all the letters of the alphabet but he was still unable to read and spell simple words. In Mathematics, he often committed reversal errors of numbers 2, 5, 6, 7 and 9 when writing these on paper. He also committed errors in counting and performing single digit sums.

Based on his teachers’ feedback, a formal assessment was conducted on Charlie for ADHD. His conditional placement in school was extended for 6 more months to further observe whether Charlie would benefit from the school’s structure and curriculum.

When Charlie’s diagnosis of ADHD was confirmed, a behaviour management program was planned to establish structure in his daily classroom activities and to manage his hyperactivity, inattention and impulsivity in school. This was implemented from the beginning of the 2009 academic year and has been used continuously.

**Approach**

A combination of strategies was implemented in the behavioural management plan for Charlie. The strategies included the provision of a structured classroom environment, the use of positive reinforcements, implementation of consequence charts and followed up with behavioural processing.

**Structured Classroom Environment**

Correcting children with ADHD through punishment alone does not give long-term positive results. Rules, directions, and a structured environment facilitate compliant behaviour in ADHD (Villegas et al, 1995). It helps students to organise tasks and complete their work when the classroom has set routines. For this particular student a few methods were used to provide a structure to his daily activities in school. These included providing accommodations to the physical environment of the classroom.

To be able to constantly monitor his on-task behaviour, Charlie was arranged to sit near the teacher. With this, his off-task behaviour was also easily noticed and redirected. The class’ seating arrangement was arranged to reduce his focus on some classroom distractions such as pictures, windows, and the Mass Rapid Transit (MRT) rail tracks that can be seen from the room. The classroom was also organised and labelled into different learning areas for the students to identify where certain activities in class took place. A daily schedule was written on the board to establish routines and for the students to be able to prepare their mindsets for the next activities. Within the schedule, lessons and tasks were done within 10 to 15-minute timeframes to keep Charlie’s attention throughout the activities and a short break was inserted after tasks were completed. Duty rosters were set to reinforce sense of ownership and facilitate responsibility in the classroom. Since Charlie liked to play with light switches, he often initiated to be the lights and fan switches monitor. Class rules were also presented and discussed in class. Visual representations of these rules were also posted on the...
notice board for the students’ easy reference. It was also ensured that the rules were consistent, clear, and stated in a positive manner. During discussions, each rule was rationalised to have the students recognise why it was necessary to enforce each rule in class. The following are some of the rules that were implemented to specifically address Charlie’s observed behaviour in the classroom: (1) Listen to the speaker; (2) Raise your hand to say your answer; (3) Ask permission before taking things or going to the toilet; (4) Work and play safely; (5) Use a tissue when needing to spit and (6) Keep your hands to yourself.

**Positive Reinforcements**

Positive reinforcement has been noted to reduce students’ disruptive behaviour (Dupaul and Eckert, 1997). The most common form of positive reinforcement is giving praises. The U.S. Department of Education (2006) noted that effective teachers praise children with ADHD frequently. Praises for Charlie were given immediately and it was behaviour-specific. For instance, instead of saying “Good job!” words such as “I like that you completed your worksheet without needing any help!” were used. Through the Promoting Alternative Thinking Strategies (PATHS) programme¹, his classmates also provided encouragements and compliments. In these lessons, each child was called to describe a positive trait that they like about another classmate. Charlie responded well to these verbal reinforcements that were given to him by his teachers and peers.

In addition to praises, a reward system was also used in class. The class called it a smiley face chart where each student received a smiley face when they did either a good deed or showed positive behaviour in class. Once each child had accumulated 5 smileys, he or she would exchange for rewards such as stickers, pencils, erasers, or even playtime breaks. Charlie often got Tom and Jerry stickers or pictures of light bulbs and flashlights, which were his most preferred rewards.

**Consequence Chart**

This strategy was used for Charlie when the positive reinforcements did not work to correct his actions. These included inappropriate behaviours that violated the school and class rules such as taking things without permission or showing disrespect to the teacher. When Charlie showed an inappropriate behaviour in class or in school, his name was written on the board and a tally mark would be drawn beside his name that was called ‘stick warnings’ in class. This stick warning gave Charlie a visual cue that he had done something inappropriate and he needed to correct himself. Whenever Charlie got three stick warnings, he was given a timeout of 15 minutes in a designated area in the classroom as a consequence. The goals of charting Charlie’s inappropriate behaviours were to allow self-correction before punishment and to highlight that negative actions would result in negative consequences.

**Post Incident Processing**

Post incident processing is the most important part of the behaviour management process, especially for Charlie. The processing was implemented after the timeout consequence had been given and after every significant incident that happened due to his misbehaviour. Post incident processing is a sequential process that involves:

¹ The PATHS Programme is a subject in Katong School that focuses on building socio-emotional skills such as managing emotions, showing empathy, being self-conscious and relating with others.
a. Asking the student to describe what happened in the incident or to explain why he was given a timeout.
b. Encouraging the student to explain his feelings and to describe what he was thinking about during the timeout period.
c. Eliciting the positive and negative consequences of the behaviour displayed by the student.
d. Asking the student how he would prevent such incidents and situations from occurring again.

The concept of processing is to give the student a chance to describe his emotions and understanding of how and why the incident occurred (Wiki Books, 2010). Most of the time, Charlie was unable to describe and explain the situations on his own. For this, the teacher assisted him in constructing his sentences and verifying his feelings towards the incidents.

**Occupational Therapy and Social Skills Training**

In addition to the behaviour management plan that was implemented by the teacher, Charlie was receiving services from the school's occupational therapist and the psychologist. The aims were to improve his work behaviour skills, motor planning skills and handwriting.

The child was also attending a social skills group led by the psychologist. Social skills were taught through play activities with other students. The purpose of these sessions was to teach Charlie about sharing, saying ‘please’ and ‘thank you’ and playing safely.

Charlie's parents had also decided to start prescription medications for ADHD on recommendation of his paediatrician. The performance of the child throughout the implementation of the behaviour management intervention was assessed using his grades and performance in English, Mathematics, ratings in the schools standards of performance and summary reports done by the occupational therapist. Feedback was also sought from teachers and the occupational therapist.

**Results and Discussion**

Being in a special school setting, Charlie’s major subjects were limited to English and Mathematics. For parent reporting purposes, the school provided progress reports for the subjects including a report on the child’s Standards of School Performance. In general, Charlie showed improvement after applying the behaviour intervention strategies. The following charts describe his performance² in Mathematics and Standards of School Performance in the mid and end-of-year assessments:

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² The Standards of School Performance (SSP) refers to the list of the students' expected behaviour outcomes in school. This is measured by the teachers' behavioural checklists and rating scales.
Charlie’s Mathematics curriculum covered basic counting and computation skills, measurement, data analysis and problem solving. In December 2008, Charlie received an overall 66% score from his quizzes and exams. The behavioural intervention was started in the 2009 academic year. Charlie continued his study at 2nd grade level and learned the same curriculum level in Mathematics. In a period of 6 months, his scores increased to 82%. Towards the end of 2009, as more difficult concepts were introduced in the semester, his score decreased to 79%. In 2010, Charlie’s Mathematics module was progressed to include more complex topics such as multiplication and number bonds. He received a grade of 57% in the mid-year reporting but was able to achieve 97% at the end of the school year.

Based on the chart, there was an overall improvement in Charlie’s Mathematics scores. His better attention skills during lessons contributed to his increase in participation and concentration during tasks.

3 The Standards of School Performance included the following expected behavioural outcomes: (1) attends school/work; (2) returns punctually from breaks; (3) dresses in appropriate attire; (4) appears well-groomed; (5) behaves politely and appropriately; (6) works well with others; (7) interrupts appropriately; (8) stays on task; (9) perform routine activities; (10) completes assigned work; (11) accepts instruction and correction and (12) manages emotion.
Charlie has achieved only 42% of the behavioural outcomes in 2008. During the behavioural intervention in 2009, he has achieved 50% and 67%. In 2010, his performance increased to 92% in May 2010 and dropped to 83% at the end of the year. The drop in the SSP score was affected by his lower performance in following grooming routines such as brushing teeth and keeping his uniform neat and tidy.

The accommodations in the class structure addressed some of the areas in Charlie's performance outcomes. For instance, the activity schedules and set routines were designed to aid him in performing routine activities, and completing assigned work. Providing activity breaks also contributed to his better attention in schoolwork. The post-incident processing strategy and social skills lessons also helped him accept instruction and correction and manage his emotions in certain social situation.

Charlie's English grades were not generated because of the introduction of the Reading Mastery 4 curriculum that was implemented in March 2009. Instead of numerical scores, progress reports in English were presented in the form of a checklist. Based on Charlie's reading skills checklists, he showed significant improvement in reading and speaking. Initially Charlie was only able to identify and write the English alphabet. By the end of 2009, he was already reading sentences with 2 to 3-letter words. Charlie has also started to speak in simple sentences and showed more confidence when talking with his teachers and classmates.

Charlie's improvement in behaviour was also evident from the teacher's remarks from his progress reports. In November 2008, one of his teachers commented that Charlie “needs to work on regulating his behaviour, and managing his emotions especially when corrected or reprimanded”. In May 2009, another teacher mentioned that “Charlie was consistently reminded to show tolerance to his peers and use gentle touch and soft voice during social interaction”. The same teacher also noted in November of the same year, “Charlie's social behaviour improved significantly this semester. He showed better awareness of rules and more control over his actions. He also started to do good deeds in school such as sharing his things, distributing pencils, and helping his friends look after their bags. He also benefitted from providing praises and encouragements to remind him to show appropriate behaviour.” These statements from the teacher provide an overview of his improvement in the way he worked with his peers.

In December 2009, the school's occupational therapist also gave the following progress remarks after engaging Charlie in occupational therapy sessions:

“He is more talkative and expressive during sessions.
He is more able to redirect his own attention to focus on his work and more compliant compared to before.
His touching behaviour has lessened and now able to spit into the trash bin.
He is now able to follow simple rules and instructions.”

Based on his academic and behavioural improvements, Charlie received the school's Best Progress Award at the end of the school year in 2009. Subsequently, his conditional placement status in school was changed to full placement. At present, Charlie has been consistently showing improvement in complying with instructions and showing appropriate behaviour. His parents have also stopped giving him medicines since February 2011 and his occupational therapy sessions have also been terminated after seeing his notable progress.

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4 Reading Mastery (RM) is a beginning reading programme that develops the skills that the students will need to master the basics of reading.
The comprehensive intervention plan along with occupational therapy, social skills training and medication provided a positive contribution to Charlie's improvement in school. However, some limitations were noted during the course of the study. First, the intervention plan was only applied to one student. Thus, it cannot be assumed that this model of behavioural strategies will work for all students with ADHD in the Mild Intellectual Disability setting. Another limitation is the retrospective gathering of results and information. Backtracking of files and information may result to omission of important details relevant to the study. Lastly, the strategies for the behaviour intervention could be improved further by adding a self-management system. This technique trains students to monitor and evaluate their own behaviour without constant feedback from the teacher (US Department of Education, 2006). For Charlie, the next step is to implement this self-management system to prepare him for independent learning.

More research is needed to determine the effectiveness of the behavioural strategies to a larger number of students in varying classroom settings. It would also be useful to study the need for teacher training or if the behavioural strategies can be applied to students other than those with ADHD. Furthermore, given that ADHD symptoms emerge before the age of 7, a study may also help determine if the behaviour management strategies may be applied for early intervention.

Conclusion

ADHD is characterised by hyperactive, inattentive and impulsive behaviour, which may cause disruption, fights, and frustration for students and teachers in school. Students with ADHD do not improve from punishment or medication alone. This case study shows that a child diagnosed with ADHD could benefit from adding structure to their learning environment, modifying instructions, providing positive reinforcements, applying consequence schemes and post-incident processing. Handling students with ADHD and implementing all the needed educational interventions are challenging for teachers. However, these efforts can result to the child's positive behavioural and learning outcomes.

References


