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Laporan Kes / Case Report

Pivotal Response Treatment as an Intervention Procedure for Autism Spectrum Disorder: A Case Study

Intervensi Tindak Balas Pivotal sebagai Prosedur Intervensi untuk Gangguan Autism: Satu Kajian Kes

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ABSTRACT

Pivotal Response Treatment (PRT) is a naturalistic intervention based on the principles of Applied Behaviour Analysis, targeting pivotal areas of development such as self-initiation and motivation. This case report presents a case that aims to evaluate the effectiveness of PRT in enhancing communication, play skills, affect, and reducing maladaptive behaviours in child disorder (ASD). This case reports a patient AKM, a 3-year 11-month old Malay boy referred for psychological evaluation and management of autistic traits. Assessment tools used were the Childhood Autism Rating Scale (CARS), Gilliam Autism Rating Scale-3 (GARS-3), and Parenting Stress Index (PSI). Assessment results indicated mild to moderate autism spectrum disorder, with pronounced deficits in verbal communication, social initiation, and emotional regulation. Parental stress levels were also elevated, particularly in the mother. PRT was chosen as the primary intervention strategy, focusing on enhancing self-initiated communication, increasing motivation, and reducing dysfunctional behaviours. The intervention involved six planned sessions combining child-directed strategies and parent training. The PRT techniques include providing choice of materials, modelling appropriate verbalizations, varying tasks, using natural reinforcers, and rewarding attempts at communication. Initial clinic-based sessions revealed low response rates; however, progress was noted with the emergence of new verbalisations ("four" and "tak nak") and improved functional communication attempts. Parental reports indicated improved confidence and more effective application of reinforcement strategies at home. Tantrum behaviours showed a reduction in frequency and duration with consistent behaviour management.

Keywords: Autism Spectrum Disorder, Intervention, Pivotal Response Treatment, Behaviour Management

ABSTRAK

Intervensi Tindakbalas Pivotal (PRT) ialah intervensi naturalistik berdasarkan prinsip Analisis Tingkah Laku Gunaan, menyasarkan bidang pembangunan penting seperti permulaan kendiri dan motivasi. Laporan kes ini membentangkan kes yang bertujuan untuk menilai keberkesanan Latihan Tindak Balas Pivotal (PRT), dalam meningkatkan komunikasi, kemahiran bermain, dan mengurangkan tingkah laku maladaptif untuk seorang kanak-kanak yang mengalami gangguan spektrum autisme (ASD). Kes ini melaporkan seorang pesakit AKM, seorang kanak-kanak Melayu berumur 3 tahun 11 bulan yang dirujuk untuk penilaian dan intervensi psikologi. Alat penilaian yang digunakan termasuk Childhood Autism Rating Scale (CARS), Gilliam Autism Rating Scale-3 (GARS-3), dan Parenting Stress Indeks (PSI). Hasil penilaian AKM menunjukkan gangguan spektrum autisme ringan hingga sederhana, dengan defisit yang ketara dalam komunikasi lisan, kemahiran bersosial dan pengawalan emosi. Tahap tekanan ibu bapa juga tinggi, terutamanya pada ibu. PRT dipilih sebagai strategi intervensi utama, memfokuskan pada meningkatkan komunikasi dan mengurangkan tingkah laku tidak berfungsi. Intervensi melibatkan enam sesi yang dijadualkan dengan menggabungkan strategi terarah kanak-kanak dan latihan intervensi untuk ibu bapa. Teknik termasuk menyediakan pilihan bahan, memodelkan verbalisasi yang sesuai, variasi tugas, menggunakan motivasi semula jadi, dan percubaan yang memberi ganjaran dalam komunikasi. Sesi awal berasaskan klinik mendedahkan kadar tindak balas yang rendah, walau bagaimanapun, kemajuan telah

dicatatkan dengan adanya verbalisasi baharu ("empat" dan "tak nak") dan percubaan komunikasi berfungsi yang lebih baik. Laporan ibu bapa menunjukkan keyakinan yang lebih baik dan penggunaan strategi peneguhan yang lebih berkesan di rumah. Tingkah laku tantrum menunjukkan pengurangan kekerapan dan tempoh dengan pengurusan tingkah laku yang konsisten.

Kata kunci: Autisme, Intervensi, Intervensi Tindak Balas Pivotal, Pengurusan Tingkah Laku

INTRODUCTION

Pivotal Response Treatment (PRT) is described as a method of intervention based on the principles of Applied Behaviour Analysis, which emphasizes teaching skills in a natural setting or an environment that is built on a natural setting (Koegel et al. 1999). Pivotal areas are defined as "those that, when changed, generally produce large collateral improvements in other areas." (Koegel et al. 1999).

Koegel et al. (1999) developed PRT in response to the increasing prevalence of autism spectrum disorder (ASD). ASD is characterised by social communication difficulties and restricted, repetitive patterns of behaviours, interests, or activities (American Psychiatric Association 2022). Children with ASD have been found to exhibit higher levels of challenging behaviours compared to typically developing children (Matson, Wilkins, & Macken, 2008; Hastings et al. 2021). Predictors of increased problem behaviours include greater symptom severity (Matson et al. 2008) and lower levels of language development (Maskey et al. 2013).

Koegel et al. (1999) described self-initiation as one of the pivotal responses, which, when being intervened, is going to increase several desirable behaviours in the following areas, namely, speech, communication, learning, and motivation. Additionally, PRT involves learning in a natural setting (Koegel et al. 1999), making it suitable to be generalised to the patient's real-life setting. Some of the goals in PRT, as described in Koegel et al. (1999), include having an inclusive intervention, having a limited contact hours with a skilled specialist, diversifying the interventionists (to include not only therapists, but also parents), and having target behaviours that are tailored and manageable in the child's settings.

While the concept of PRT is derived from the principles of Applied Behaviour Analysis (ABA) and developmental psychology (Koegel et al. 1999), it was then realised that ABA shows limitations in motivation to learn (Koegel & Koegel 2006). A study found that higher gains in motivation were noted in a randomized control trial of PRT versus ABA by Mohammadzaheri et al. (2015), at the same time showing a reduction of disruptive behaviours. The use of preferred stimulus, variability of task, and interspersing maintenance tasks were believed to be the reasons for the improvements that were seen in children assigned to the PRT group in the study. Additionally, another research found the clinical effectiveness of PRT on improving self-initiations, play skills, language skills, affect, and reduction in dysfunctional behaviour among children (Cadogan & McCrimmon 2015).

PRT intervention is its emphasis on motivation as a central component of intervention (Koegel & Koegel 2006). Incorporating preferred stimuli could enhance learning and motivation in autistic children (Williams et al. 1981), which subsequently informed the development of the PRT intervention. Earlier, the effects on communication and language were also seen when motivation is the key component in the intervention (Koegel et al. 1987). More recent randomized controlled trials (RCTs) further support the effectiveness of PRT in language functioning, including untargeted cognitive and social domains (Wang et al. 2024), and communication skills (Gengoux et al. 2019; Mohammadzaheri et al. 2022).

Pivotal Response Treatment (PRT) emphasizes intervention in naturalistic settings and is therefore feasible for home implementation. In one randomized controlled trial, parents were able to learn and implement PRT within three months, with observed improvements in their children's adaptive communication skills (Hardan et al. 2015). A similar study conducted over a longer intervention period, combined with clinician-led sessions, reported comparable outcomes, specifically improvements in functional utterances, vocabulary, and social communication skills (Gengoux et al. 2019).

Therefore, in this case study report, PRT was the choice of intervention used for the case of AKM, a 3-year-11-month-old Malay boy. The intervention focuses on generalizing the intervention to be applied at home. The report will describe the reason for referral, a brief summary of assessments and findings, clinical impression, case conceptualisation, and a summary of the PRT intervention used. The main objectives of the intervention include (1) increasing self-initiation and functional communication skills, and (2) reducing dysfunctional behaviour.

CASE PRESENTATION

AKM was referred to the Klinik Psikologi Klinikal dan Kaunseling, Fakulti Sains Kesihatan (FSK), Universiti Kebangsaan Malaysia (UKM) by a speech therapist due to several autistic features that warranted diagnostic evaluation. AKM completed 10 speech therapy sessions at Klinik Audiologi dan Sains Pertuturan (KASP), FSK, UKM, and, upon speech and language assessment, AKM was found

to have delayed receptive and expressive language ability (Age Level of 1:0-1:5 years old).

AKM's parents described concerns with poor speech, limited eye contact, and motor difficulties. Another notable issue was his behavioural difficulty, including tantrums, especially when his needs were unmet, or when he sought parental attention, especially during moments when his parents spoke to each other in his presence. To further elaborate, he would often cry whenever they spoke to each other, especially in the car. At home, AKM mainly used physical gesturing to request his needs and has a good understanding of non-verbal gestures. No issues were reported with feeding or sleeping, but tantrums often increase with inadequate sleep (sleeps 9 PM–4 AM).

AKM's mother was unaware of her pregnancy until she was five months pregnant, which resulted in additional stress as she had not been able to prepare herself mentally and financially for the pregnancy, including taking in supplements she believed were important. Other than the gestational diabetes experienced during pregnancy, there were no complications experienced during birth. AKM showed signs of socioemotional delay (poor eye contact) by 10 months, with motor and speech delay by the age of 2. During a routine check-up with a pediatrician, AKM was suspected to have autism spectrum disorder, and intervention of Speech Therapy (ST) and Occupational Therapy (OT) were suggested. There were history of speech and motor delay experienced by AKM's father, which subsequently resolved, and this led the father to believe AKM would later overcome this issue.

AKM is an only child. His mother worked as a teacher and was the breadwinner at that time. His father had been retrenched from a corporate job and worked as a Grab driver while seeking another job The family follows a permissive parenting style. AKM stays with his maternal grandmother during work hours, who also uses a permissive parenting style. At present, AKM goes to a playgroup with his parents, and there was noticeable difficulty with social communication, where AKM prefers to be with his parents instead of following his friends in the group. He exhibited poor speech ability and mostly used gestures to express his needs.

DIAGNOSTIC PROCEDURE

A clinical interview was conducted over one session with AKM's parents, along with behavioural observation with AKM. Gilliam Autism Rating Scale, Third Edition (GARS-3), Childhood Autism Rating Scale (CARS), and Parenting Stress Index (PSI) were the formal psychological assessments used in the evaluation of the autism spectrum disorder and the measurement of parental stress.

AKM showed an active demeanour and was generally curious with the surroundings. He showed neutral affect, and he responded well to overly interactive praise. He clung more to his parents compared to the therapist. He was slow to warm up during the sessions and often cried continuously when the mother left the room. He did not respond well to verbal instructions, but he was able to direct his attention to sounds made through objects. He showed delayed latency in responding to his name being called, despite several verbal and physical prompts. Attention was observed to be brief, and he preferred engaging in solitary play without disruption. During the initial sessions where rapport was not fully established, AKM showed signs of distress when therapists tried to engage with him during play sessions. However, as the therapeutic relationship continued to develop, AKM became more receptive to therapist-led interactions.

AKM's autistic traits were assessed through clinical interview and behavioural observation. Childhood Autism Rating Scale (CARS) and Gilliam Autism Rating Scale, Third Edition (GARS-3) were used as objective measures in determining the presence and the severity of AKM's autistic traits. The Parental Stress Index (PSI) was given to both parents to evaluate their parental stress.

On the CARS, AKM obtained a score of 35.5, classifying him under the Mildly-Moderately Autistic range. AKM obtained a high raw score in the following domains: Verbal Communication (4), Level and Consistency of Intellectual Responses (3), and Imitation (3.5). He showed moderate severity in the following domains, namely, Relating to People (2.5), Emotional Response (2), Body Use (2), Object Use (2), Listening Response (2), Adaptation to Change (2), Taste, Smell and Touch Response and Use (1), Visual Response (2.5), Fear of Nervousness (1), and Activity Level (2.5).

On the GARS-3, AKM obtained an Autism Index Score of 90 (Percentile Rank=25), consistent with DSM-5 Level 2 Severity (requiring substantial support). He often displays repetitive behaviors and strong object interests, difficulties initiating social interactions, and limited nonverbal communication, especially in unfamiliar settings. He also shows heightened emotional distress during routine changes, often needing significant reassurance.

The PSI measures four main areas: the Child Domain, Parent Domain, Total Stress, and Life Stress, with higher scores indicating higher levels of stress. Based on the mother's responses, elevations were observed across all domains. In particular, the Child Domain showed elevated scores in the areas of adaptability, reinforces parent, mood, and acceptability. In the Parent Domain, elevations were noted in isolation, attachment, health, and depression. AKM's father also demonstrated elevated stress levels, specifically in the isolation and health subdomains of the Parent Domain.

The CARS and GARS-3 assessment tools suggested the presence and severity of ASD in

AKM, which correlates with behaviour observation and clinical interview. AKM's adaptive behaviour also correlates with his poor adaptive functioning. AKM's main deficits were in the communication and socialization area, which were also reported in the presenting problem. AKM's poor ability to express his wants and needs led to behavioural issues, which caused extra stress for his parents. His poor independence also requires the parents to provide extra assistance, therefore causing greater stress. The stressors were objectively measured, and elevated stress was seen especially in AKM's mother. The mother reported being the breadwinner, high work demand, and poor relationship with her own mother adds to the current stress that she is experiencing.

According to the Diagnostic and Statistical Manual of Mental Disorders, Text Revision (5th ed.; DSM-5-TR, Psychiatric Association 2022), AKM met all the diagnostic criteria for autism spectrum disorder (ASD).

INTERVENTION PROCEDURE

Koegel (1999) outlined five steps that were used in AKM's intervention, as explained below. The following steps (not in order) were the main methods used to guide the intervention.

1. Provide a choice of instructional materials

AKM's intervention session began in the clinic to assess the suitability before it was then generalized at a naturalistic setting. Therefore, the session set up mimicked naturalistic settings with instructional materials placed on the floor. AKM was encouraged to approach and engage with his preferred task and object, and the motivational level of each task or object was observed.

2. Model the label of the item

Once rapport was built, AKM was approached while playing. Then, the therapist modelled the label of the item that he was playing. He was encouraged to label the item clearly to encourage the production of speech. AKM was given 5-10 seconds to respond, and prompts were given when he did not succeed. It was advisable not to repeatedly request AKM to attempt labelling objects during the initial sessions.

3. Vary task

Task variation was done after each opportunity. It was encouraged for AKM to be exposed to several objects and items, in a minimal amount, and to teach AKM that each item has its own label. The therapist provided enough trials for AKM's favourite item to elicit a word. Varying tasks reduces repetitiveness and increases AKM's motivation.

4. Use natural and direct rewards

AKM was rewarded directly using his choice of preferred item. Hammer toy was identified as AKM's preferred item. This helped AKM to associate getting immediate reward after producing attempting to label items to increase his motivation to produce speech.

5. Reward attempts

AKM was rewarded for any verbal attempt he produced, especially in the beginning. Although AKM's pronunciation may not be clear, it was advisable to reward the initial attempt before providing a clear speech.

A naturalistic environment was created by placing cause-and-effect toys (toys that encourage joint attention), combined with several other toys, to discover AKM's interest. When he had a particular toy that he was interested in (e.g., hammer toy), the hammer was kept as a motivator for him to initiate manding for the toy (E.g., points to the hammer, tries saying hammer). The reinforcer (hammer toy) was delayed until he produced a desirable response. Once he produced the desirable response, he was then reinforced using the specific toy that he manded (hammer).

BASELINE MEASURE

Prior to starting the intervention procedure, AKM's progress was measured according to the objectives. Table 1 provides the explanation of baseline measures taken before starting the intervention. Prior to the intervention, AKM only uttered five words at home: mama, papa, susu, air, and ucu. The primary intervention goal was to increase AKM's motivation for functional speech, specifically through labelling items during intervention sessions, using immediate reward to increase motivation. The frequency of AKM's attempts to label items was recorded as a percentage of opportunities during each session. The pivotal areas targeted in the intervention included expanding expressive vocabulary (number of words uttered) and reducing challenging behaviours. Meanwhile, dysfunctional behaviour was provides the outline of planned sessions.

RESULTS

Six planned weekly sessions, including the assessments conducted for AKM and the implementation of PRT were carried out The first three sessions were focused on the psychological assessments and baseline measures, at the same time building rapport with AKM. The therapist aligned goals with AKM's parents, including getting their consent, cooperation, and engagement in the therapeutic process. Another three sessions in the clinic were focused on the implementation of PRT.

During the first two PRT sessions (sessions 4 and 5) in the clinic, AKM had difficulty reaching his targeted skill, which was to label an item or activity upon request. In session 6, AKM produced the

TABLE 1 Objective and intervention baseline measure

Objective	Measurement	Description
Increase self-initiations and functional communication skills	Response rate	Response rate refers to the percentage of items being labelled when opportunities were presented (number of attempts/opportunities provided X 100%)
	Number of words uttered	Prior to the intervention, AKM only uttered five words (mama, papa, susu, air, ucu). The increase in the number of new words was recorded during the session
Reduce dysfunctional behaviour	Frequency of behaviour and antecedent, behaviour, and consequence (ABC) chart	The information on the frequency of behaviour was gathered through an interview, and the ABC chart was filled. The frequency of behaviour was rated weekly using the ABC chart.

ABC = Antecedent, behaviour and consequences chart

TABLE 2 Objective and intervention baseline measure

Sessions	With AKM	With parents
1-2	Behaviour observation and rating Rapport building	Clinical interview Goal setting
3	Baseline data Identify readiness for intervention	Psychological assessment
4-5	Implementation of PRT	Psychoeducation (Reward and punishment strategies)
6	Implementation of PRT	Demonstration of PRT with parents
7	Implementation of PRT at home	Updates on the implementation of PRT at home

PRT = Pivotal Response Treatment

sound to imitate labelling four in request for a block puzzle of number four. Therefore, his response rate increases from 0% in sessions 4 and 5 to 12.5% in session 6

After the sixth session, the intervention was then continued to be generalized at home. Progress review was done with the parents during the seventh session, which was approximately two weeks after the sixth session, with sufficient time given for parents to implement similar techniques at home. AKM's parents reported a new word that was uttered by AKM at his grandmother's house, twice in the past week, which was 'tak nak'. However, AKM's mother was unsure what led to AKM mentioning the word 'tak nak'. This can be concluded that there was a strong motivational factor that led him to mention the word that has a resisting meaning to it.

An antecedent, behaviour, consequence (ABC) chart was used to collect data on AKM's dysfunctional behaviour. AKM's mother reported an improvement in her reward and punishment usage, in which she observed a positive consequence displayed by AKM. There was once when AKM was playing at a playground and refused to go home despite being told to, resulting in a tantrum that lasted around 15 minutes. The crying prolonged and intensified when AKM's attempts to gain his mother's attention for reassurance were unsuccessful. His mother implemented the behaviour management strategy learned by ignoring the prolonged crying and screaming, rather than attending to the behaviour. She began walking further away, but within the close vicinity, after which AKM gradually calmed down and followed his mother's lead. AKM's mother reported slightly better confidence in strengthening the reward and punishment system at home. She also understood the function of his behaviour better and was more skilled at applying necessary reward and punishment.

Looking at AKM's slight progress implied a good prognosis in the future. AKM's parents played a tremendous role in this intervention. Corrective feedback was provided to ensure the intervention method was being implemented in a correct manner. AKM's parents showed openness towards the intervention process, which eased the process of this intervention. AKM was also responsive to his parents and showed improved social awareness, therefore, contributed to the positive prognosis.

LIMITATIONS AND FUTURE RECOMMENDATIONS

PRT is typically conducted through naturalistic settings, therefore, one limitation of the intervention was the accuracy of data collection regarding AKM's intervention outcome. However, given his

age, learning through naturalistic settings was considered the most appropriate intervention approach in order to reduce the developmental gap. It is believed that once AKM is able to grasp the basic attending skills, receptive and expressive language skills, further intensive intervention that applies Applied Behaviour Analysis (ABA) treatment may be useful.

Time constraints and difficulty in attending regular sessions were also limitations in this intervention. Therefore, a collaborative agreement on designing a feasible intervention was done. This intervention was planned as such that parents can continue to generalise the intervention at home, without the need to attend sessions with the therapist. At the same time, parents was also helped to equip themselves with necessary skillset, but due to time constraints, this component was not implemented as thoroughly as intended.

Therefore, future intervention plans include having parents participate in session to observe both their interactions with AKM and the therapist's implementation of intervention strategies. A longitudinal monitoring would also be beneficial to ensure that parents remain on track with the intervention.

CONCLUSION

This case study reports the use of Pivotal Response Treatment (PRT) on a 3-year-11-month-old Malay boy with ASD. PRT is an intervention that targets pivotal areas of development, leading to improvements in several other domains. It is also a naturalistic intervention, which made it appropriate for AKM's parents to generalize the same techniques at home. The intervention focused on enhancing self-initiated communication and reducing dysfunctional behaviours. Due to the limitation of time, only three PRT sessions were conducted in the clinic setting, and parents were coached to apply the techniques consistently at home. While minimal progress was observed in speech output during the clinic sessions, more notable improvements were reported at home, including increased spontaneous word use and reduced behavioral issues. Considering that this is an intervention that emphasizes motivation, child choice, and natural reinforcement, PRT appears to be a feasible and parent-friendly approach for early intervention in young children with ASD, particularly within the Malaysian cultural context, where family involvement plays a central role in child development.

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