Investigating Level of Knowledge of Applied Behavior Analysis Strategies among Speech and Language Pathologists in State of Kuwait

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Abstract
This paper discussed the level of knowledge of Applied behavior analysis strategies among speech and language pathologists in special education schools in Kuwait. The study used the quantitative methodology in collecting the data through the use of A questionnaire that has been validated and reviewed by a panel of behavior analysts and individuals who possess master degree in behavior analysis. The sample of the study consisted of fifty-one Speech and language pathologists. Data was collected using online questionnaire. Results indicated that SLP possess a varied level of knowledge according to some variables such as getting a training in Applied behavior analysis and having a certification from Applied behavior analysis boards. Results also indicated there are areas that most of SLP need more training such as the use of measurement in speech sessions and the behavior reduction procedures. Future recommendations is to provide more training to SLP to ensure their ability to be more knowledgeable about evidence based practice used in Applied behavior analysis
Keywords: Applied Behavior Analysis, Knowledge, Speech and language Pathologists. Special Education schools. Kuwait

1. Introduction
Autism rates have been increased significantly in the past ten years, with the current prevalence indicating that 1 in 36 children are diagnosed with autism spectrum disorder (ASD, center for Disease and control, 2023) given this rapid increase, the need to provide effective interventions for this growing population is very essential. Applied Behavior Analysis is recommended by Center for Disease and Control) as an effective intervention for teaching and educating children and individuals with Autism spectrum disorder. There is a wealth of studies that referred to the effectiveness of using behavioral interventions with the children with ASD. The behavioral interventions that used Applied behavior analysis as a conceptual framework has been found to be effective in decreasing problem behavior.

individuals with ASD encounter a triad of deficit in social reciprocity, communication and repetitive behavior and interests American Psychiatric Association, 2013**;** Wetherby & Prizant, 2000). Furthermore, individuals with ASD have different ranges in symptoms severity in terms of intellectual disability, language deficits and different types of behavioral problems (Leventhal, & Cook, 2001).

The deficits in social communication is one of the core features of individuals with ASD, Speech and language pathologists are specialized individuals who work directly to improve language and communication with the individuals with ASD and other developmental disabilities. Besides, according to the American Speech- language Hearing Association (ASHA) practice portal, one of the responsibilities of SLP is to collaborate and consult with other professionals, family members, caregivers and other to facilitate program development and evaluation of interventions. According to Cardon 2017) SLP rely on some of the approaches that has been derived mainly from Applied behavior analysis specifically Picture exchange communication system, PECS is basically a behavioral intervention based on the Skinnerian analysis of language which focused on teaching children with limited or no language how to request items by using a picture. Use of behavioral intervention can help SLP to work better in their areas of language especially that knowledge of these strategies and applying it could enable them to address behavioral and language skills better.

1.1 Statement of the problem
Speech and language pathologist are one of the most important services that are accessed due to its priority for

individuals with ASD (**(**Denne, et al ., 2018) however, and due to the presence of challenging behaviors among children with ASD which is interfering with their ability to learn , there are very few studies that sought to investigate the use and knowledge of Applied Behavior Analysis strategies among Speech and language pathologist to determine the level of knowledge and to what extent they apply these strategies int their sessions. Previous researchers in these areas focused generally in understanding what type of practices and interventions are used by SLP in their sessions. For example, Sandham (2021) examined different types of challenges among speech and language pathologist in apply evidence Based Practice. Results refers to the lack of resources may lead to over-reliance on interventions that lacking empirical support and over reliance on subjective outcomes. According to (Wethers 2018) SLP in school systems are required to provide effective treatment however, lack of knowledge about behavioral interventions can hinder their ability to work in improving the emergent skills of the students they are working with. Although there are empirical effective interventions that are widely used and recommended by official authorities such as CDC however little is known about the knowledge and Application of these evidence based practice among SLP in middle east , furthermore due the increased rate of problem behavior among children with ASD which needs.

1.2 Research questions

i) What is the current level of knowledge of Applied behavior analysis among SLP of students with ASD in special education schools in the state of Kuwait in the following domains(Basic principles of Applied behavior analysis ,Measuring behavior ,Skills acquisition ,Antecedent intervention ,Behavior reduction)

ii) What is the effect of getting certification in Applied Behavior Analysis on the level of knowledge among Speech and language pathologists in state of Kuwait?

2. Methodology

This research used the quantitative design by using a questionnaire that consists of 36 strategies and divided into five main domains (Basic principles, Measuring behavior, skill acquisition, antecedent intervention and behavior reduction).

2.1 Participants

The population of this study is speech and language pathologists in special education schools in Kuwait. Normally the number of Speech and language pathologist are very small in each school as some school might have between two to four SLP in each school. The number of SLP who participated in this study was fifty-one SLP from different types of schools in special education schools in state of Kuwait.

2.2 Research instrument

The researcher adopted the questionnaire from previous research tools such as the questionnaire used in**(**Randozzo 2011). However, the present researcher modified the questionnaire and divided it into sections by categorizing the strategies into different domains. the present questionnaire was reviewed and validated by a group of Processionals in Applied behavior analysis such as Board-certified Behavior analyst and professional therapists who possess a master degree in behavior analysis. The instrument consists of thirty-six strategies divided into five major domains. Participants were asked to answer questions related to their level of knowledge of each strategies as it organized in the different domains.

2.3 Tool validation

To validate the present questionnaire the researcher contacted five board certified behavior analysts and two college professors who are specialized in special education and behavior analysis. One of the board-certified behavior analysts was mainly a SLP. the suggestions were mainly on correcting some of the definitions and suggesting divide the strategies into different domains to better measure the differences between the participants. After the corrections made the questionnaire has been sent to two individuals who possess a master degree in behavior analysis to review it before the implementation of the study and they assured on the appropriateness of the study tools to collect the data from the sample.

2.4 Tool stability

To confirm the stability of the research tool, the coefficient of the internal consistency were calculated using the Cronbach alpha formula to determine the stability of the research tool in related to the strategies of Applied behavior analysis in the questionnaire.

Table 1. Degree of reliability using Cronbach alpha

	Degree of stability coefficient
Overall Cronbach alpha	.958

3. Results

3.1 Population description

All participants have more than 5 years of experience and nearly half of the participants are females 28(54.9%) and the other are males 23(45.1%). Moreover, there were three types of school Arabic school 18(35.3%), Bilingual or international school 19(37.3%), and Governmental school 14(27.5%). Concerning academic degree, most of participants have Bachelor's speech and language pathology 46(90.2%) and less than 10% have Bachelor's degree in special education 5(9.8%). Furthermore, the majority of participants have students less than 5 students 49(96.1%) whereas only few participants have more than 5 students 2(3.9%). The majority of participants deals with children with mild to moderate ASD 49(96.1%) and few of them deal with sever ASD 2(3.9%). Nearly three quarters of participants didn't hold certificate in ABA 39(76.5%) about quarter of them hold it 12(23.5%). However, less than 4% hold certificate in ABAT 2(3.9%) and less than 20% of them holding RBT 10(19.6%).

Table 2. Description of population under study

Demographic parameter	categories	Frequency (%)
Years of Experience	More than 5 years	51(100%)
Types of school	Arabic school	18(35.3%)
	Bilingual or international school	19(37.3%)
	Governmental school	14(27.5%)
Gender	Female	28(54.9%)
	Male	23(45.1%)
Academic Degree	Bachelor's degree speech and language	46(90.2%)
	Bachelor's degree in special education	5(9.8%)
Number of students in your class	Less than 5	49(96.1%)
	More than 5	2(3.9%)
Types of children with ASD you teach.	Mild to moderate	49(96.1%)
	Severe	2(3.9%)
Holding a certificate in ABA	No	39(76.5%)
	Yes	12(23.5%)
what type of certification do you possess	ABAT	2(3.9%)
	NO APPLICABLE	39(76.5%)
	RBT	10(19.6%)

3.2 Results related to research question one

Levels of Knowledge in the survey were categorized into five categories, each category was given a score start from 0 : no knowledge till 4: very knowledge. Then the scores of subdomains were summed to be the score of domains then it transformed into percentage the 100% is the individual who gain 4 in all subfields.

3.2.1 Comparing levels of Knowledge among Main domains among SLP

There is a significant difference in the percentage of knowledge between different domains. The lowest average percentage of knowledge is in Antecedent intervention 19.8±31.5 then Measuring behavior 27.2±28 and there is no significant difference among them. Moreover, the highest percentage of knowledge is in Skill acquisition 45.1±19.8 then the Applied behavior 38.9±27.6 and there is no significant difference among the two highest groups. It deserves noting that there is significant difference between the two highest domains and the two lowest domains. It worth noting that Behavior reduction 35.7±26.4 has an intermediate percentage of knowledge and not significant with all domains except with the lowest domain: Antecedent intervention.

Table 3. Description of percentage of knowledge in each domain

Domains	Mean±Std	Median[Min-Max]
Antecedent intervention	19.8±31.5	8[0-100]
Measuring behavior	27.2±28	14[0-100]
Behavior reduction	35.7±26.4	19[12.5-100]
Basic principles	38.9±27.6	25[18.8-100]
Skill acquisition	45.1±19.8	41[18.1-100]
p-Value	<0.001	

Table 4. Multiple comparisons between different domains

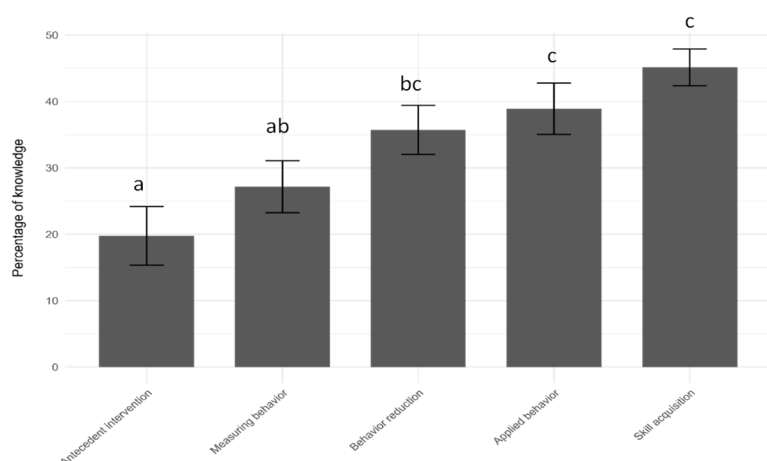|	Antecedent intervention	Measuring behavior	Behavior reduction	Applied behavior
Antecedent Intervention				
Measuring Behavior	0.08			
Behavior Reduction	<0.001	0.273		
Basic principles	<0.001	0.014	>0.999	
Skill acquisition	<0.001	<0.001	0.059	0.733

Figure 1. Results related to research questions two: Effect of certification on level of knowledge

3.2.2 Comparing degree of knowledge among main domains with respect to holding certificates

Table 5. Comparing knowledge percentage of each domain between certified and non-certified participants

Holding Certificate(s)	No	Yes	No	Yes	p-Value
Major Domains	Mean±Std		Median[Min-Max]		
Antecedent intervention	5.6±12.1	66±30.9	0[0-75]	54[0-100]	<0.001
Measuring behavior	13.2±10.3	72.6±16.1	14[0-50]	73[53.6-100]	<0.001
Behavior reduction	24.1±14.8	73.4±19.4	19[12.5-90.6]	75[43.8-100]	<0.001
Basic principles	24.6±7	85.4±14.4	25[18.8-53.1]	88[59.4-100]	<0.001
Skill acquisition	36.8±11.8	72.3±15.6	41[18.2-52.3]	72[52.3-100]	<0.001

There is a significant difference in all domains between participants that are certified and non-certified participants as in all domains the certified participants have average percentage of knowledge which is significantly higher than non-certified participants.

In antecedent intervention the average percentage of knowledge for certified participants 66±30.9 in more than ten times of non-certified participants 5.6±12.1. Moreover, the median of knowledge of non-certified participants is zero which means that 50% of noncertified participants has zero knowledge and the maximum is 75% which means that the other half is between 0 and 75% whereas the median of certified participants is 54% and the maximum is 100%.

In measuring behavior, the average knowledge of certified participants 72.6±16.1 is more than five times that in none certified participants 13.2±10.3. Moreover, in non-certified participants half of the participants that have the highest average knowledge between 14% and 50% maximum but in certified participants, the highest average knowledge between 73% and 100% maximum and its minimum average percentage in certified participants is 53%.

In behavior reduction, the average percentage of knowledge for certified participants 73.4±19.4 is about three times that of non-certified participants 24.1±14.8. Furthermore, the lowest half on non-certified participants is between 12% and 19% (19[12.5-90.6]) and the maximum value is about 90% whereas, the lowest half of certified participants is between 43% and 75% (75[43.8-100]) and half of them is over 75%.

Concerning applied behavior, the average percentage of knowledge for certified participants 85.4±14.4 is about three times that of non-certified participants 24.6±7. Moreover, the lowest half of non-certified participants is between 18% and 25% (25[18.8-53.1]) and the maximum percentage of knowledge is 53% whereas the lowest of certified participants is between 59% and 88% (88[59.4-100]) and half of them over 88%.

When considering skill acquisition, the average percentage of knowledge for certified participants 72.3±15.6 is about two times that of non-certified participants 36.8±11.8. Moreover, the lowest half of non-certified participants is between 18% and 41% (41[18.2-52.3]) and the maximum percentage of knowledge is 52% whereas

the lowest of certified participants is between 52% and 72% (72[52.3-100]) and half of them over 72%
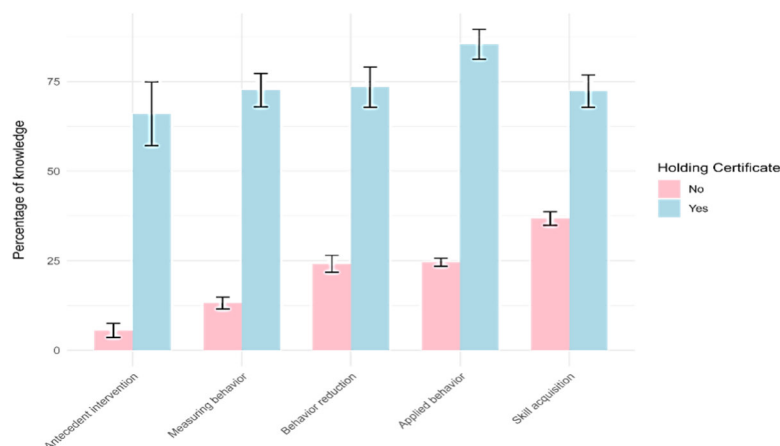

Figure 2. Stacked bar chart showing percentage of knowledge among holding certificates and different behavioral domains

4. Findings

Results for the present research indicated that Speech and language pathologists possess different level of knowledge in the different types of Applied behavior analysis strategies. The findings also revealed that there are some domains within Applied behavior analysis that SLP possess a different level of knowledge across the main domains for example SLP have good knowledge mainly in two domains respectively in skills acquisition and basic principles. Skill acquisition strategies are mainly the strategies that SLP use to teach students concepts and helping them to acquire knowledge while basic principles are mainly the main concepts of Applied behavior analysis such as reinforcement and punishment however there are areas where SLP have low level of knowledge mainly in measuring behavior and antecedent interventions. lack of knowledge in measuring behavior reflects on the ability of the therapist to take data related to his interventions which risk the ability to measure the effectiveness of their interventions and teaching methods. Moreover, lack of knowledge in Antecedent interventions also decreases the ability of the therapist to intervene proactively to deal with problem behavior.

The results also indicated that SLP have moderate level of knowledge in behavior reduction strategies which means that SLP need more knowledge in how to deal with behavioral issues within their sessions. The lack of knowledge in behavior reduction strategies decrease the ability of the speech therapist in how decrease problem behavior and in how to use effective interventions such as DRO and DRA in decreasing some of the problem behavior.

Another significant result in the current research is the positive effect of having a certification in Applied behavior analysis and its relation with increased level of knowledge. Results showed that speech and language pathologists who possess a certificate in ABA such as RBT or ABAT have better knowledge in the main domains of Applied behavior analysis. Across all the domains and strategies of Applied behavior analysis the SLP who owns a certification and gets training in ABA were more knowledgeable than those SLP who do not have certification and did not attend training in ABA, consequently, attending ABA training and possessing a certification in ABA helps SLP to be more knowledgeable about these strategies which led them to better understand to work with their clients in speech sessions.

The present research helped to identify the training needs in the field of knowledge of ABA strategies. The results referred that most of SLP needs more training to understand the types of measurements systems in ABA and how to use it in their sessions moreover, SLP needs more training in antecedent interventions strategies such as non-contingent reinforcement , Premack principles and task modifications, these type of strategies enable SLP to deal with problem behavior before it occurs so they can prevent the occurrence of these problem behaviors rather than having challenges to manage it after it already occurred. The results also reveal that SLP needs more training in gaining knowledge related to behavior reduction strategies such as strategies related to the use of differential reinforcement and use of other reductive strategies such as escape extinction and blocking. Using behavior reduction strategies by SLP will enable them to run their sessions smoothly while shaping appropriate behavior.

Conflicts of Interest: Amr Moustafa is board certified behavior analysts; I declare that there is no interest relevant

to his authorship of this paper

References

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of applied behavior analysis, 1*(1), 91.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1987). Some still-current dimensions of applied behavior analysis. *Journal of applied behavior analysis, 20*(4), 313-327.

Cardon, T., Wynkoop, K., Hawkins, P. M., & Pray, C. (2020, November). Speech-Language Pathologists and Behavior Analysts: A Survey of Video Modeling Use and Perspectives. In *Seminars in Speech and Language* (Vol. 41, No. 05, pp. 383-399). Thieme Medical Publishers.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Definition and characteristics of applied behavior analysis. Applied Behavior Analysis* (2nd ed.)*.* Upper Saddle River, NJ: Pearson, 2-23.

Denne L. D., Hastings R. P., Hughes C. J. (2018). Common approaches to intervention for the support and education of children with autism in the UK: An internet-based parent survey. *International Journal of Developmental Disabilities, 64*(2), 105–112. https://doi.org/10.1080/20473869.2016.1275439

Fenske, E. C., Zalenski, S., Krantz, P. J., & McClannahan, L. E. (1985). Age at intervention and treatment outcome for autistic children in a comprehensive intervention program. *Analysis and intervention in Developmental Disabilities, 5*(1-2), 49-58.

Lord, C., Leventhal, B. L., & Cook, E. H., Jr. (2001). Quantifying the phenotype in autism spectrum disorders. *American Journal of Medical Genetics, 105,* 36-38.

Randazzo, M. E. (2011). *Elementary teachers' knowledge a implementation of applied behaviour analysis techniques.* (Doctor of Philosophy, Rutgers The State University of New Jersey).

Sandham, V., Hill, A. E., & Hinchliffe, F. (2022). The perspectives of Australian speech pathologists in providing evidence-based practices to children with autism. *International Journal of Language & Communication Disorders*, *57*(6), 1229-1243.

Shook, G. L. (2005). An examination of the integrity and future of the Behavior Analyst Certification Board® credentials. *Behavior Modification, 29*(3), 562-574.

Wetherby, A. M., & Prizant, B. M. (2000). *Autism spectrum disorders: A transactional developmental perspective* (9th ed.). Baltimore, MD: Paul H. Brookes

Withers, G. (2018). *Use of behavior strategies in speech-language therapy: A survey of Virginia school based speech-language pathologists.* https://commons.lib.jmu.edu/honors201019/621