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Teaching Students with Disabilities Using Evidence-based Practices in Saudi Arabia Schools

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Abstract

The study aimed to identify special education teachers' knowledge, use, and implementation of evidence-based practices (EBPs) when teaching students with severe disabilities in Saudi Arabia schools. The study used a descriptive-analytical approach to develop a questionnaire with three factors: teachers' knowledge of EBPs, use of EBPs and compliance with the steps or guidelines for implementing EBPs. Validity and reliability of the instrument were evaluated, and it was then administered to 91 special education teachers randomly selected from Saudi Arabia schools. The results showed that teachers demonstrated good understanding and use of EBPs, with reinforcing, peer tutoring, video modeling, computer assisted instruction, and generalizing strategies being the most known and frequently used practices. However, teachers experienced challenges in adhering to implementation guidelines, and several recommendations are made to address this issue. The provision of comprehensive and ongoing professional development opportunities that focus on EBPs may improve teachers' knowledge and skills. To support teachers in inclusive education, it's crucial to establish clear guidelines for implementation, backed by mentorship and coaching programs. Encouraging collaboration and peer learning can offer valuable opportunities for teachers to share knowledge. Providing access to suitable resources alongside continuous assessment and feedback would further support educators. Additionally, promoting research and innovation in special education, involving both parents and the community, can significantly enhance educational outcomes for students facing severe disabilities.

Keywords: *evidence-based practices, implementation guidelines, professional development, special education teachers, severe disabilities.*

Introduction

Inclusive education prioritizes equity by considering diverse learners' needs, including those with disabilities (Hehir et al., 2016). Evidence-based practices (EBPs) are pivotal in developing inclusive education for students with disabilities, as they encompass thoroughly researched instructional strategies and interventions proven effective through empirical evidence. These practices bridge the gap between theory and practice, guiding educators by presenting the latest research and adaptable technologies (Torres et al., 2012). However, limited research focuses on Saudi Arabia's special education context concerning teachers' knowledge, usage, and implementation of EBPs. This paper delves into teachers' understanding of EBPs, exploring commonly utilized practices, adherence to guidelines, and factors influencing their implementation.

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EBPs offer a framework for informed decisions in instructional methods, enhancing teaching effectiveness and student engagement. Educators using EBPs can bolster their professional competence and confidence, leading to improved student outcomes. These practices contribute to students' academic achievements across subjects, skill development, and more effective social interaction and communication (Atas et al., 2023). For students with disabilities or those facing social, academic, and communication challenges, EBPs provide targeted interventions facilitating social skill acquisition and overall socio-emotional development (Morin et al., 2021). By integrating evidence-based strategies, teachers create inclusive environments fostering positive peer relationships and improved interpersonal skills (Munoz & Mendelson, 2005). Learners with severe disabilities benefit significantly from EBP approaches, aligning with the need for equitable and sustainable learning environments (Browder & Cooper-Duffy, 2003).

The Council for Exceptional Children (CEC) (https://exceptionalchildren.org/search?query=Evidence-Based+Practices) and the What Works Clearinghouse (WWC) (https://ies.ed.gov/ncee/wwc/) have been instrumental in establishing guidelines distinguishing EBPs from best or research-based practices.

These guidelines ensure that educational practices are supported by rigorous research and have a demonstrated impact on student outcomes. The CEC standards for EBPs in special education outline the criteria for evaluating the effectiveness of interventions and instructional strategies. Within the education context, EBPs have been identified through systematic reviews and literature analysis. Examples of such practices include direct instruction, peer-mediated instruction and intervention, prompting, social skills training, video modeling, and visual supports, targeting a range of outcomes, including academic achievement, social competence, and communication skills. In addition, the American Association of Severe Disabilities emphasized that teachers have to consider many steps when implemented EBPs in the classroom to be effectives in the student's outcomes. Thus, Torres, C.et al., 2012 in their study, provided a list of a 10-step implementation framework following the guideline that is provided by the American Association of Severe Disabilities for planning successful integration of EBPs for teachers in the classroom.

Special education was introduced in Saudi Arabia to modernize the education system and introduce the principle of equity (Aldabas, 2015), and there is a general acknowledgment that inclusive educational practices need to be enshrined at the heart of the educational process to create a more just society (Almalky & Alwahbi, 2023). EBPs help achieve these goals. However, EBPs need to be supported by a system of training, the provision of resources and collaborative learning (Ashour & Bagadood, 2022). A comprehensive approach is needed to augment the quality of education for individuals with disabilities through concentration on special education teachers' levels of knowledge and use of EBPs in Saudi Arabia schools (Aldabas, 2020). Khodari (2019) considers that effective intervention strategies can only be introduced if context is understood. Conceptions of special education must take into account the stakeholders and context involved in the decision-making process. In cases where context isn't considered, discrepancies arise between policies and theoretical frameworks versus practical implementation. There's an observed disparity between teachers' perceived understanding of Evidence-Based Practices (EBPs) and their actual implementation. The reason for this has been identified by Alnahdi et al. (2019) as the inadequacy of teacher training programs. Alsarawi (2023), however, pinpoints the problem as lying in the implementation handicap of EBPs rather than teachers' comprehension of them. This, in turn, leads to a chasm between theory and practice. These limitations stem from approaches often mismatched with the realities of countries like Saudi Arabia (Al-Hendawi et al., 2023). Gibbs and Bozaid (2022) stress the importance of collaborative learning to bridge this gap.

Alothman (2014) highlights the need for collaborative efforts between the two important agencies at work for the deaf students in Saudi schools, viz., the school and parents.

Aalatawi (2023) identifies the different challenges that cause obstacles in the implementation of EBPs in Saudi schools. Typically, these are poor resources, inadequate training, and societal norms. In other words, if people with disabilities are to be given the best learning environments, then the efforts have to be at the community level.

In addition to awareness, adequate and continuous teacher training and development are imperative in the successful application of EBPs. Hart Barnett's (2018) interviews with general education teachers in preschool inclusion settings underscore the need for professional development to effectively implement EBPs. Taking this thought forward, Alatifi et al. (2023) investigated how early intervention with autistic children impacted learning, thus emphasizing the significance of comprehensive training attuned with CEC standards for successful EBP implementation. Similarly, Atas et al. (2023) discovered that special education teachers require professional development opportunities addressing misconceptions about EBPs and providing practical implementation guidance.

In Saudi Arabia, special education teachers utilize various strategies, including Applied Behavioral Analysis (ABA), to assist students with disabilities (Almutlaq, 2021).

Aldosiry et al. (2021) showed a focus on facilitation and a need to adjust the learning environment to meet the needs of students with disabilities. Zaien (2021) described the use of self-regulated strategy development, emphasizing story writing as a means of educating learners with disabilities because it helps develop learners' contextual awareness. Differentiated instruction is a key strategy involving visual materials, structured teaching processes and a collaborative learning context (Alshuwaysh et al., 2021). Al-Kahtani (2015) describes the importance of individualized educational plans (IEPs) in meeting the needs of the learners with disabilities faced with different types of challenges. Peer learning and multisensory approaches have also been described as effective for students with disabilities (Alrobian, 2014). In general, teachers of learners with disabilities are described as having higher levels of EBP awareness (Haimour & Obaidat, 2013).

In Saudi Arabia, barriers to the implementation of EBPs relate to inadequate professional development and the absence of administrative support provided to teachers, suggesting a need to address the structural and systemic obstacles standing in the way of successful EBP implementation. Almalky and Alrasheed (2023) focused on the limited resources and lack of training facilities available to learners with disabilities. There is also a need to concentrate on technology and a proper system of peer support. High-tech assistive technology was the focus of the study carried out by Almulla (2019), while Alsamiri et al. (2023) further showed a need to consider the nature of mixed abilities classrooms and the unique needs of learners with disabilities within such a context.

Most of the studies that have been carried out in Saudi Arabia have focused on either the knowledge or the use of the EBPs, and teachers' implementations have often been ignored. Teachers' preferences and motivations need to be examined. Alsalamah (2023) suggested a need to focus on the experiences of teachers, and whether or not they have the necessary knowledge and attitude to deal with such a complex environment. Attention must also be given to the beliefs and preferences of teachers and the basic human values that guide their interactions with learners with disabilities.

Problem Statement

Inclusive education in Saudi Arabia has progressed in recent years, but little is known about special education teachers' knowledge, use, and implementation of EBPs in their classrooms. This information is important because use of EBPs has been shown to have positive outcomes for children with disabilities. While published guidelines are available to assist teachers in their implementation of EBPs, the guidelines are not specific to the Saudi Arabia educational context and further investigation into the EBP theory/practice gap is needed to understand the challenges faced by educators in that context. There is a

need for research in Saudi Arabia that takes into account the current application of EBPs and the challenges of implementing such practices.

Research Questions

The main research question is: What do teachers know about EBPs for students with severe disabilities and their use and adherence to guidelines when applying them in their classes? Four sub-questions were asked:

1- What is the level of knowledge and use of EBPs reported by special education teachers teaching learners with severe disabilities?

2- What EBPs are frequently used by special education teachers in Saudi Arabia schools?

3- What is the level of implementation of the ten steps identified by the American Association of Severe Disabilities and designed by Torres, C.et al., 2012 when using evidence-based practices?

4- Are there statistically significant differences in teachers' knowledge and use of EBPs attributed to variables such as gender, school stage, and school type?

Study importance

The study aims to contribute information for policy makers, educational institutions and stakeholders that may lead to the augmentation of educational experiences of students with disabilities in Saudi Arabia and targeted interventions to meet the needs of all learners.

Methodology

Research design

A descriptive-analytical approach was used to describe special education teachers' use of EBPs in Saudi Arabia classrooms when teaching students with severe disabilities. The descriptive-analytical approach involves collecting data from the study sample to understand several aspects of a problem. A survey design was used to collect data from special education teachers in Saudi Arabia schools. The study consisted of two parts: the first dealing with teachers' knowledge and use of EBPs, and the second focusing on implementation of EBPs, in particular in relation to published guidelines.

Participants

The participants were teachers working in Saudi Arabia schools selected using purposive sampling, i.e., teachers who have experience in teaching students with disabilities were targeted. Participants were from different schools and educational settings to ensure diversity in the sample. 117 teachers constitute the population of special education teachers for students with severe disabilities in Saudi Arabian schools for the year 2019/2020 in Riyadh region (Ministry of Education, 2019). The study sample consisted of 91 of these teachers, selected by simple random sampling from the population. Table 1 provides an overview of the study participants.

Table 1: Demographic Characteristics of Participants

Variables	Groups	N	%
Educational level	Bachelor's degree	57	63
	Special education diploma	10	11
	Graduate studies (Master's/PhD)	24	26
School type	Inclusive schools	66	73

	Special education institute	25	27
School phase taught	Primary	43	47
	Intermediate	20	22
	Secondary	28	31
Gender	Males	73	80
	Females	18	20
Experience	Less than 5 years	19	21
	5–10 years	20	22
	More than 10 years	52	57

Table 1 shows that most of the participants had a bachelor's degree, worked in inclusive schools, and had more than 10 years of experience. There was a diversity in the majors and phases they teach, and most of them are male.

Materials

The study instrument was a survey questionnaire developed by the researcher after a thorough review of the relevant literature, paying particular attention to research related to EBPs (Torres, C.et al., 2012, Carlon et al., 2015, Paynter et al., 2017, 2018), to assess the participants' knowledge, use, and implementation of EBPs. Based on the theoretical framework and previous studies, the questionnaire consisted of three factors: the first factor was teachers' knowledge of EBPs and consisted of 13 items; the second was teachers' use of EBPs and contained 13 items; and the third factor was teachers' compliance with the steps or guidelines for implementing EBPs and contained 10 items. The questionnaire used a Likert scale to measure teachers' responses, ranging from 1 (strongly disagree) to 5 (strongly agree). Teachers were also given the opportunity, through open-ended questions, to add examples of EBPs not mentioned in the survey, if they needed.

To establish the content validity of the instrument, the survey items were reviewed by a panel of 10 experts in the field of special education and EBPs. Their feedback and suggestions were incorporated to ensure that the items adequately measure the intended constructs. The researcher also made modifications to the wording based on the referees' opinions and deleted unsuitable items that did not achieve an agreement rate of 80% among the experts. The reliability of the survey instrument was assessed using internal consistency measures. A pilot test was conducted with a small group (N=30) of participants to calculate the reliability coefficient. The survey items were refined based on the results of the pilot to improve the internal consistency of the instrument. The internal consistency of the tool was determined using Pearson's correlation coefficient, as shown in Table 2 and Table 3. For reliability, the researcher calculated the split-half reliability and Cronbach's alpha coefficient, as shown in Table 4.

Table 2: Pearson correlation coefficients between individual questionnaire items and total questionnaire score (N=30)

Factor 1	Pearson Correlation	Factor 2	Pearson Correlation	Factor 3	Pearson Correlation
1	.601**	14	.705**	27	.606**
2	.380*	15	.585**	28	.839**

3	.759**	16	.576**	29	.740**
4	.596**	17	.586**	30	.790**
5	.715**	18	.621**	31	.868**
6	.453*	19	.533**	32	.807**
7	.511**	20	.654**	33	.789**
8	0.338	21	.665**	34	.704**
9	.377*	22	.597**	35	.870**
10	.418*	23	.606**	36	.793**
11	0.329	24	.530**		
12	.517**	25	.730**		
13	0.357	26	.598**		

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

Factor 1: Teachers' knowledge of evidence-based practices; Factor 2: Teachers' use of evidence-based practices

Factor 3: Teachers' adherence to guidelines for implementing evidence-based practices

Table 2 shows high correlation coefficient values significant at a level of 0.01, indicating the validity of the questionnaire items for examining teachers' knowledge and use of EBPs in teaching students with disabilities and the degree to which they follow the guidelines for implementing them in their classes.

Table 3: Pearson correlation coefficients between scores for each axis and the total score of the questionnaire

Factors	Pearson Correlation
Teachers' knowledge of evidence-based practices	.876**
Teachers' use of evidence-based practices	.944**
Teachers' adherence to guidelines for implementing evidence-based practices	.896**

***Correlation is significant at the 0.01 level (2-tailed)

Table 3 shows significant correlation coefficients ($p<0.01$), indicating that the dimensions measure what they are intended to measure, and thus, there is internal consistency.

Table 4: Reliability coefficient values using Cronbach's alpha and split-half method (N=30)

Factors	Cronbach's Alpha	Split-Half Method
Teachers' knowledge of evidence-based practices	0.917	0.820
Teachers' use of evidence-based practices	0.859	0.693

Teachers' adherence to guidelines for implementing evidence-based practices	0.929	0.905
Total score	0.958	0.823

Table 4 shows that all values of reliability coefficients exceeded 0.7, leading to confidence in the reliability of the questionnaire regarding teachers' knowledge and use of EBPs in teaching students with disabilities, and the degree to which they follow the guidelines for implementing them in their classes.

Procedure

Data were collected through self-administered surveys distributed to the selected participants. The surveys were distributed electronically via email or through an online survey platform. Participants were given clear instructions on how to complete the survey and a specific time frame to submit their responses. The anonymity and confidentiality of the participants' responses was ensured.

Analysis

The collected data were analyzed using descriptive statistics. Participants' responses to the Likert scale items were summarized using measures such as mean, standard deviation, and frequency distributions to provide an overview of the participants' level of familiarity, understanding, and adherence to EBPs in teaching students with disabilities. Judgment criteria used to interpret the survey results are shown in Table 5. Scores on the Likert scale (ranging from 1 (lowest) to 5 (highest)) were described in terms of level descriptors, and by % as shown in the table.

Table 5: Judgment criteria for interpreting the results of the Likert scale survey items. The Likert scale ranged from 1 (lowest) to 5 (highest).

Mean Likert Scale Score (Range 0–5)	Descriptor of level	%
< 1.8	Very Low	0–36%
1.8 – 2.60	Low	36–52%
2.60 – 3.4	Medium	52–68%
3.4 – 4.2	High	68–84%
– 5	Very High	84–100%

Psychometric properties were evaluated using correlation coefficients, Cronbach's alpha, and factor analysis. Hypothesis testing used Kruskal-Wallis and Mann-Whitney tests to verify study variables. SPSS (version 28) was used for all statistical analysis.

Ethical Considerations

Ethical considerations were taken into account throughout the study. Informed consent was obtained from all participants, and they were informed about the purpose of the study, their rights to withdraw at any time, and the confidentiality of their responses. The study adhered to ethical guidelines for research involving human participants, ensuring their privacy and protection.

Results and Discussion

Main Question: What do teachers know about EBPs for students with severe disabilities and their use and adherence to guidelines when applying them in their classes?

Table 6 shows that the teachers used EBPs at a high level (M = 3.546, SD = 0.680; 70.9%). The factor of teachers' knowledge of EBPs ranked first (M = 3.51, SD = 0.82) at 70.2%; followed by the teachers' use of EBPs factor (M = 3.44, SD = 0.67), with a % score of 68.8%; then the factor of teachers' adherence to guidelines for implementing EBPs (M = 2.262, SD = 0.291; 45.2%). Teachers are aware of the importance and effectiveness of EBPs in improving the educational outcomes and learning for students with severe disabilities. However, they also face some challenges in following the guidelines for implementing these practices correctly and consistently in their classrooms

Table 6: Arithmetic means and standard deviations of the questionnaire factors on teachers' knowledge and use of evidence-based practices and adherence to implementation guidelines (ranked in descending order).

Factors	Mean	SD	%	Level	Rank
Teachers' knowledge of evidence-based practices	3.51	0.82	70.2%	High	1
Teachers' use of evidence-based practices	3.44	0.67	68.8%	High	2
Teachers' adherence to guidelines for implementing evidence-based practices	2.262	0.291	45.2%	Low	3
Total score	3.546	0.680	70.9%	High	

Sub-question 1: What is the level of knowledge and use of EBPs reported by special education teachers teaching learners with severe disabilities?

To answer this question, the researcher calculated the responses of the sample and the percentages, arithmetic means, standard deviations, and rankings for the first factor of knowledge of EBPs by special education teachers (Table 7).

Table 7: Mean and standard deviations of items included in the factor of knowledge and use of evidence-based practices by special education teachers in Saudi Arabia schools (ranked in descending order).

Item No.	Strategy	Mean	SD	%	Level	Rank
7	Reinforcement	4.516	0.808	90%	Very high	1
13	Peer tutoring	4.165	0.958	83%	High	2
11	Video and modeling	4.11	1.251	82%	High	3
12	Computer-assisted instruction	4.011	1.086	80%	High	4
8	Generalization	3.901	1.221	78%	High	5
1	Task analysis	3.615	1.209	72%	High	6
9	Pictorial self-instructional	3.549	1.148	71%	High	7
2	Graduated guidance	3.275	1.202	65%	Medium	8
4	Time delay	3.099	1.35	62%	Medium	9

6	Most-to-least prompting strategy by the teacher	3	1.333	60%	Medium	10
10	Self-determined learning model of instruction	2.989	1.354	60%	Medium	11
5	Least-to-most prompting strategy by the teacher	2.846	1.273	57%	Medium	12
3	Simultaneous prompting	2.571	1.301	51%	Low	13
	General arithmetic mean	3.510	0.816	70%	High	

Table 7 shows the level of knowledge and use of EBPs by special education teachers in Saudi schools. The results indicate that the teachers were well-informed and proficient in applying these practices, as the general arithmetic mean was high (M = 3.51, SD = 0.82). The teachers had a good understanding of the principles and benefits of these practices for improving the learning outcomes of learners with severe disabilities. The most widely known and used practice was reinforcement, with a very high score (90%). This practice involves providing positive feedback and rewards to learners with severe disabilities to increase their motivation and performance. In contrast, the least known and used practice was the simultaneous prompting strategy, which had a relatively low score of 51%. This practice involves providing a prompt along with the instruction to elicit a correct response from the learner, and then fading the prompt gradually. These findings suggest that the teachers were more familiar with – and preferred – practices that involved positive feedback and social interaction over practices that involved systematic prompting and error correction.

Table 7 also shows six practices with high scores (ranging from 71% to 83%), indicating that the teachers had a good knowledge and use of these practices too. These practices involve various methods of teaching skills and behaviors to learners with severe disabilities, such as using peers, videos, computers, pictures, or breaking down tasks into smaller steps. Four medium scoring practices (ranging from 57% to 65%) were graduated guidance, time delay, most-to-least prompting by the teacher, and a self-determined learning model of instruction. These practices involve different ways of supporting learners with severe disabilities to achieve their goals, such as using physical guidance, delaying prompts, fading prompts from most to least intrusive, or allowing learners to make choices and self-monitor their progress.

Sub-question 2: What evidence-based practices are frequently used by special education teachers in Saudi Arabia schools?

To answer this question, the researcher calculated the means, standard deviations, percentages and ranks of the responses of special education teachers on the items of the axis of EBPs used frequently to teach learners with severe disabilities among special education teachers in Saudi schools (Table 8).

Table 8: Mean and standard deviations for the items included in the factor of frequently used evidence-based practices in Saudi schools (in descending order)

Item No.	Strategy	Mean	SD	%	Level	Rank
7	Reinforcement	4.473	0.835	89%	Very high	1
11	Video and modeling	4.067	0.915	81%	High	2

Item No.	Strategy	Mean	SD	%	Level	Rank
12	Computer-assisted instruction	3.912	1.142	78%	High	3
13	Peer tutoring	3.778	1.047	76%	High	4
8	Generalization	3.753	0.969	75%	High	5
9	Pictorial self-instructional	3.736	1.031	75%	High	6
10	Self-determined learning model of instruction	3.337	1.224	67%	Medium	7
1	Task analysis	3.264	1.210	65%	Medium	8
2	Graduated guidance	3.088	1.262	62%	Medium	9
5	Least-to-most prompting strategy by the teacher	2.989	1.049	60%	Medium	10
6	Most-to-least prompting strategy by the teacher	2.890	1.038	58%	Medium	11
4	Time delay	2.736	1.084	55%	Medium	12
3	Simultaneous prompting	2.697	1.238	54%	Medium	13
	General arithmetic mean	3.438	0.670	69%	High	

Table 8 shows the frequency and level of use of EBPs by special education teachers in Saudi schools when teaching learners with severe disabilities. Teachers used these practices moderately to highly, as the general arithmetic mean was high (M = 3.438, SD = 0.670). This means that the teachers implemented these practices regularly and effectively in their classrooms to enhance the learning outcomes of learners with severe disabilities. Once again, reinforcement strategy had a high percentage (89%) and simultaneous prompting a medium score (54%). Teachers appeared to use practices that were more natural and less intrusive more often than practices that required more structure and control.

Sub-question 3: What is the level of implementation of the ten steps identified by the American Association of Severe Disabilities when using evidence-based practices?

To answer this question, the researcher calculated the arithmetic means, standard deviations, percentages and ranks of the responses of special education teachers on the items of the axis of the level of implementation of the ten steps identified by the American Association of Severe Disabilities by teachers of severe disabilities when using EBPs (Table 9).

Table 9: Arithmetic means and standard deviations for items included in the factor on the level of implementation of the ten steps identified by the American Association of Severe Disabilities by teachers of severe disabilities when using evidence-based practices (in descending order)

Item No.	Statement	Mean	SD	%	Level	Rank
3	"I choose one of the strategies that have been scientifically proven to be evidence-based and that I will apply to the target student"	2.714	0.501	54.30%	Medium	1
1	"I identify the target student, the appropriate environment, and the student's characteristics and needs"	2.678	0.493	53.60%	Medium	2
2	"I search for sources of the evidence-based strategy that I will use in the teaching process of the student"	2.637	0.506	52.70%	Medium	3
10	"I then share with my colleagues and become a source for others on how to choose, implement, and evaluate evidence-based practices"	2.6	0.524	52.00%	Medium	4
9	"I then make an educational decision based on the data of monitoring the progress of the target student"	2.143	0.864	42.90%	Low	5
6	"I monitor the accuracy of implementing the strategy correctly"	2.11	0.836	42.20%	Low	6
8	"I adapt the strategy if necessary in case of no improvement and progress in the student's results"	2.055	0.861	41.10%	Low	7
7	"I monitor the improvement and progress of the student by collecting data before and after implementing the strategy"	1.966	0.832	39.30%	Low	8
5	"I then apply the strategy within a cycle of effective learning"	1.912	0.812	38.20%	Low	9
4	"After reviewing the best research that used the evidence-based strategy that I will apply to the target student, I identify the key elements"	1.9	0.654	38.00%	Low	10
General mean		2.262	0.291	45.20%	Low	

Table 9 indicates that the teachers used the steps at a low level, as the general arithmetic mean was low (M = 2.262, SD = 0.291). This means that the teachers rarely implemented these practices in their classrooms to enhance the learning outcomes of learners with severe disabilities. The most frequently used procedure was choosing one of the scientifically proven strategies shown to be evidence-based (score: 54.3%).

Sub-question 4: Are there statistically significant differences in teachers' knowledge and use of EBPs attributed to variables such as gender, school stage, and school type?

Gender

To determine the differences among teachers in terms of their knowledge and use of EBPs in their classrooms, attributed to gender, Mann-Whitney (U) test and Z-values were used as nonparametric methods to identify differences between the ranked means of the two groups' scores (Table 10).

Table 10: Differences between mean ranks of scores for male and female teachers' knowledge and use of evidence-based practices in teaching students with severe disabilities

Axis	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Teachers' knowledge of evidence-based practices	Male	73	41.75	3048.00	347.000	-3.093	0.002
	Female	18	63.22	1138.00			
Teachers' use of evidence-based practices	Male	73	41.24	3010.50	309.500	-3.468	0.001
	Female	18	65.31	1175.50			
Teachers' adherence to guidelines for implementing evidence-based practices	Male	73	44.35	3237.50	536.500	-1.204	0.229
	Female	18	52.69	948.50			
Total score	Male	73	41.06	2997.50	296.500	-3.595	0.000
	Female	18	66.03	1188.50			

Table 10 shows significant differences in teachers' views of using EBPs in the total score and the sub-dimensions, according to their gender. Female teachers had higher scores than males in all aspects of EBP. The differences were statistically significant in the total score ($Z = -3.595$, $p < .001$), the factor of teachers' knowledge of EBPs ($Z = -3.093$, $p = .002$), and teachers' use of EBPs ($Z = -3.468$, $p = .001$). However, the difference was not statistically significant in the factor dimension of teachers' adherence to guidelines for implementing EBPs ($Z = -1.204$, $p = .229$). These results suggest that female teachers are more aware, more frequent, and more consistent in using EBPs in their classrooms than male teachers.

Type of School

Again, Mann-Whitney (U) test and Z-values were used as nonparametric methods to determine differences among teachers attributed to type of school (Table 11).

Table 11: Differences between mean ranks of scores for teachers' knowledge and use of evidence-based practices by type of school

Type of school	Groups	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Teachers' knowledge of evidence-based practices	Integration schools	66	45.15	2980.00	769.000	-0.499	0.618
	Special education institute	25	48.24	1206.00			
Teachers' use of evidence-based practices	Integration schools	66	40.67	2684.00	473.000	-3.135	0.002
	Special education institute	25	60.08	1502.00			
Teachers' adherence to guidelines for implementing evidence-based practices	Integration schools	66	44.10	2910.50	699.500	-1.119	0.263
	Special education institute	25	51.02	1275.50			
Total score	Integration schools	66	42.98	2836.50	625.500	-1.775	0.076
	Special education institute	25	53.98	1349.50			

Table 11 shows that type of school had no effect on teachers' views of using EBPs in the total score and the sub-dimensions. Teachers in integrated and special schools have similar levels of knowledge and adherence to EBPs, although teachers in special education institutes use these practices more frequently and effectively in their classrooms than teachers in integrated schools. The differences were not statistically significant in the total score ($Z = -1.775$, $p = .076$), teachers' knowledge of EBPs ($Z = -0.499$, $p = .618$), and teachers' adherence to guidelines for implementing EBPs ($Z = -1.119$, $p = .263$). However, the difference was statistically significant for the factor of teachers' use of EBPs ($Z = -3.135$, $p = .002$), where teachers in special education institutes had higher scores than teachers in integrated schools. These results suggest that both types of schools provide similar opportunities for teachers to learn about and follow the EBPs, but teachers in special education institutes have more experience and confidence in applying these practices to their students with severe disabilities.

Educational Stage

Primary, intermediate and secondary school teachers were compared in terms of their knowledge and use of EBPs in their classrooms, using Kruskal-Wallis tests and chi-square values as nonparametric methods (Table 12).

Table 12: Differences between mean ranks of scores for teachers' knowledge and use of evidence-based practices in teaching students with severe disabilities by educational stage

Factor	Groups by educational stage	N	Mean Rank	Kruskal-Wallis H	Asymp. Sig.
Teachers' knowledge of evidence-based practices	Primary	43	46.65	0.309	0.857
	Intermediate	20	43.13		
	Secondary	28	47.05		
Teachers' use of	Primary	43	40.41	3.910	0.142

evidence-based practices	Intermediate	20	53.23		
	Secondary	28	49.43		
Teachers' adherence to guidelines for implementing evidence-based practices	Primary	43	46.84		
	Intermediate	20	44.83	0.091	0.955
	Secondary	28	45.55		
Total score	Primary	43	42.69		
	Intermediate	20	50.45	1.393	0.498
	Secondary	28	47.91		

Table 12 shows that there are no significant differences in teachers' views of using EBPs according to the educational stage they teach. Teachers in primary, intermediate, and secondary stages have similar levels of knowledge, use, and adherence to EBPs in their classrooms. The differences were not statistically significant for any of the factors, as shown by the values of the Kruskal-Wallis H test and the asymptotic significance levels. For example, for the total score, $H(2) = 1.393$, $p = .498$; teachers' knowledge of EBPs, $H(2) = 0.309$, $p = .857$; teachers' use of EBPs, $H(2) = 3.910$, $p = .142$; and teachers' adherence to guidelines for implementing EBPs, $H(2) = 0.091$, $p = .955$. These results suggest that the type of educational stage does not affect the teachers' views or behaviors regarding EBPs.

This study of special education teachers' knowledge and use of EBPs for students with severe disabilities in Saudi schools was the first of its kind conducted in the Saudi Arabia special education context to explore teacher knowledge and implementation in relation to CEC and WWC standards. This study differs from earlier studies in many ways. One, it revolves around the prevalent practices of teachers such as, reinforcement, peer mentoring, computer-assisted learning etc. This nuanced comprehension of teachers' practices could shape future interventions and professional development programs. Secondly, the study pinpoints challenges regarding teachers' adherence to implementation guidelines and offers valuable recommendations on overcoming these barriers. It emphasizes the importance of continuous and comprehensive professional development, with special focus on EBPs to enhance teachers' professionalism (Atas et al., 2023; Alatifi et al., 2023). Guidelines for implementation supported by adequate mentoring and coaching are needed to guide the teachers along.

Moreover, the research underscores the importance of collaboration and peer-learning opportunities among teachers, fostering knowledge exchange and enhancing teaching practices collectively. It emphasizes the necessity of access to suitable resources, ongoing assessment, and feedback to facilitate effective EBP implementation. Additionally, the study advocates for advancing research and innovation in special education, acknowledging the substantial contribution of parental and community involvement in enhancing educational outcomes for students with severe disabilities. By involving various stakeholders—researchers, educators, parents, and the broader community—the study underscores the collective effort crucial for promoting inclusive education for students with special needs. It highlights the need for substantial policy changes by the ministry of education (Alhammad, 2017).

Policy needs to mediate the gap between theory and practice, and provide incentives for those involved in the different stages of implementation of such an initiative (Abu-Alghayth et al., 2022). Battal (2016) called on the government to allocate appropriate funds to assist learners with disabilities, developing hand in hand with the provision of a training for the teachers. Altogether, this study contributes to the extant body of research

by providing concrete findings on the knowledge and use of EBPs among special education teachers in Saudi schools. The study identifies challenges and offers recommendations to inform future interventions and strategies to improve educational experiences and outcomes for students with severe disabilities.

The study has several limitations that should be considered when interpreting the findings. The sample size was relatively small and specific to Saudi Arabia. Thus, findings should be generalized to settings beyond Saudi Arabia with caution. Self-report was used to gain insights into participants' knowledge and use of EBPs, but future studies could incorporate an objective observational component to determine actual implementation in classrooms. Future studies could also investigate the opinions and experiences of learners and their parents regarding the use of EBPs and outcomes.

Conclusion

Results in this study established that Saudi schoolteachers are well aware of the theory and practice of EBPs in the children with disabilities classroom. Moreover, their knowledge, competence, and ability to implement the EBPs is also remarkable, the highest scores being for the factor of teachers' knowledge of EBPs and their actual use of these practices. This means that Saudi teachers have good grasp of the principles and pros of Evidence-Based Practices (EBPs) in enhancing the educational gains of students with severe disabilities. However, the study shows some variability in understanding and utilization of select EBPs. Among these, reinforcement emerges as the most familiar and applied practice, trailed by peer tutoring, video modeling, computerized instruction, and generalization strategies. These methods encompass diverse approaches in teaching and supporting students with severe disabilities, encompassing positive feedback, peer involvement, technology integration, and skill generalization.

Yet, the study also highlights certain challenges for teachers in EBP implementation guidelines. Teacher adherence scores lower compared to other aspects, indicating difficulties in consistent and accurate implementation of these practices in classrooms. While teachers display a strong foundation in EBP knowledge and usage, additional support and professional development are essential to enhance compliance with implementation guidelines. Targeted training and resource provisions can address these challenges, fostering effective EBP utilization and ultimately benefiting students with severe disabilities in Saudi schools.

Based on these findings, several recommendations emerge to further enhance EBP knowledge and implementation among special education teachers in Saudi schools catering to students with severe disabilities:

Professional Development: Offer continuous, comprehensive development opportunities for special education teachers, focusing on evidence-informed practices. On-job developmental programs such as seminars and short courses can educate teachers in the principles and practices of EBPs.

Guidelines: It is important to lay down specific guidelines for EBP implementation in the severely disabled children's classrooms. These guidelines should offer step-by-step instructions, examples, and resources to assist teachers. Establish support systems like mentoring or coaching initiatives involving experienced educators guiding their peers in EBP implementation.

Collaboration and Peer Learning: Foster a culture of collaboration among special education teachers. Create platforms for sharing experiences, exchanging ideas, and learning from one another through professional learning communities, online forums, or regular meetings to discuss challenges, successes, and strategies related to EBP.

Resources and Materials: Ensure teachers have access to suitable resources and materials to support EBP implementation. Providing instructional materials, visual aids, technology tools, and assistive devices tailored for students with severe disabilities will empower teachers to effectively implement EBPs.

Continuous Assessment and Feedback: Implement a system for continuous assessment and feedback to monitor EBP implementation. Regular observations, evaluations, and feedback sessions involving administrators, special education coordinators, and instructional coaches can identify areas needing improvement and offer targeted support to teachers.

Research and Innovation: Encourage and support research initiatives in special education, specifically focusing on EBPs for students with severe disabilities. This emphasis on research can develop, test, and refine new strategies to improve the teaching and learning experiences of these students.

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