

## Pre-service Special Education Teachers' Knowledge about Autism

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### Abstract

There is a great deal of concern in respect to the increase autism prevalence rates. Teachers are responsible for teaching students in their classrooms. However, research findings suggest that special education teachers are underprepared and express ‘low’ to ‘moderate’ levels of knowledge about autism. Analysis of several databases revealed no studies concerning levels of knowledge about autism among pre-service special education teachers. The presented study aimed at investigating pre-service special education teachers’ levels of knowledge about autism. A test was developed for the purpose of this study. Further, a sample of 56 pre-service special education teachers responded to the study test. Participants were enrolled in a training session of 12 hours, 4 times a week. The participants responded to pre- and posttest. Results indicated that the levels of knowledge among the study sample was within the ‘low’ range. However, this shifted toward the ‘moderate’ levels after finishing the training. Additionally, there were no differences between male and female participants and year level in respect to the levels of knowledge about autism either before or after receiving the training. The participants differ in the levels of knowledge on GPA rating in the pretest results, but not the posttest results.

**Keywords:** *autism, pre-service special education teachers, knowledge, Jordan, special education*

## **Introduction**

Autism is a neural developmental disorder that has gained increased attention in the last two decades. This disorder is characterized by social, communication, and unusual behavior patterns impairments. The disorder can begin as early as at birth, or in early years of life (APA, 2013). According to the Centers for Disease Control and Prevention (CDC, 2012), there is an increased prevalence of autism, and the issue of increased prevalence is becoming a strong concern among professionals who work with children with autism, developmental disabilities, and special education.

In addition to prevalence reports, the autism epidemic has gained increased attention in the media, raising awareness among the public (Tipton & Blacher, 2014). Boyd and Shawn (2010) attribute this increase to the increased public attention, and to the lack of true knowledge about autism. However, DeVilbiss and Lee (2014) indicate that there are no validated empirical data to support this point of view. Alternatively, Boyd and Shaw (2010) suggest that the current increase in the prevalence of autism is related to the modern social view of the disorder (e.g., diagnostic criteria, wider spectrum of symptoms, increased awareness) or the increase in biological and environmental factors. Regardless of this, there is a huge increase in the prevalence of autism. In 1990, autism officially became a separate category. The prevalence was then estimated as 5–10 in 10,000; the prevalence now increased to 1 in 68. Recent surveys suggest even higher rates (1 in 36 individuals; Boutot, 2017).

Although there is no known cause of autism, studies suggest several factors that can cause autism. These factors include genetics and environment (Boutot, 2017). Genetics is a risk factor rather than a direct cause of the disorder; it cannot be traced to a single gene dysfunction or chromosome abnormality. Other risk factors are gender, parents' age, family history, and diagnosis of other disorders (Arif, Niazy, Hassn, & Ahmed, 2013). Yet, several tools are used in diagnosing children with autism; many of these are considered to be valid and reliable (Arif et al., 2013; Boutot, 2017).

Special education aims at providing tailored services for every child with special needs based on his/her category and unique needs. Children with autism are no exception. In order to provide such high quality services in all domains, teachers of children with autism should be well qualified. Al-khateeb and Al-hadidi (2013) indicate that special education teachers' role encompasses many responsibilities and duties. Thus, teachers should be trained through well-designed pre- and in-service training programs. Bataineh (2007) states that special education

teachers' role can be accomplished when teachers are to grasp knowledge, as well as cognitive and educational skills needed to effectively work with children with special needs across special education categories.

Special education teachers working with children with autism should be trained and prepared prior and during their service in the field in order to provide them with appropriate competences needed to serve these children. The goal of special education is for these students to reach the maximum levels of their capacities in personal, academic, social, and vocational domains.

The National Research Council (NRC, 2001) concluded that current teachers' preparation programs designed to prepare teachers to work with children with autism is the weakest point in these programs. Hendricks (2011) indicates that this weakness comes from the special nature of these children. Preparation programs (pre- and in-service) require specialized training in order to provide teachers with the needed competences to understand these students' characteristics and to respond to the needs that results from them.

### **Research Focus**

The presented study aims at measuring levels of knowledge about autism among a sample of pre-service special education teachers. Future teachers are required to serve several special education categories that include autism. Therefore, they are required to acquire knowledge and tailored competences concerning autism.

#### *Knowledge about autism*

The earliest documented study of knowledge about autism was conducted by Stone (1987). The study aimed to investigate professionals' fundamental knowledge about autism: definition, etiology, and diagnosis. The sample of the study consisted of 239 pediatricians, clinical psychologists, speech/language pathologists, and school psychologists. Other professionals were included, as well. The findings of the study demonstrated that there were misunderstandings among all groups although these specialists had the most updated knowledge.

Heidgerken, Geffken, Modi, and Frakey (2005) conducted a replicate study investigating 111 pediatricians and other care providers in health care settings. Yet, the findings of the study suggest that specialists were provided outdated information about autism. However, in another study, Huws and Jones (2010) found that participants had clear beliefs about autism, but not always correct.

Baker (2012) compared levels of knowledge about autism in special education paraprofessionals and parents of children with autism. Findings indicated significantly higher levels of knowledge among the parents. However, the study found that the paraprofessionals present higher levels of knowledge about autism

than the parents when considering the number of training courses and years of experience working with children with autism. Although there are no significant differences that can be attributed to gender, the overall results suggest a severe lack of knowledge about autism among the paraprofessionals, up to the point that the parents do not trust their competences and training programs they attended.

As for pre-service teachers, Johnson, Porter, and McPherson (2012) assessed levels of knowledge in a sample of 148 pre-service teachers enrolled in four universities in programs that should prepare them for teaching children with autism; the levels of knowledge were found to be moderate, and sometimes low. The authors concluded that courses provided are less than sufficient in increasing the levels of knowledge and competences for pre-service teachers.

Williams, Schroeder, Carvalho, and Cervantes (2011) found that the perceived levels of knowledge among 54 professionals working with children with autism are higher than their actual levels of knowledge. Hence, professionals perceived the levels of knowledge as moderate, while they were, in fact, low on the study scales. Further, Hendricks (2011) surveyed (498) special education teachers in the State of Virginia for their knowledge of autism. Results indicate that the teachers' knowledge ranged from moderate to low in respect to autism.

In Jordan, Al Jabery, Melhem, and Al Abdallat (2014) surveyed levels of knowledge about autism of (70) special education teachers working with children with autism. Results indicate that the teachers' levels of knowledge were moderate. The number of years of experience (over 5), affects the teachers' knowledge while there were no effects of gender and educational qualifications.

Melhem (2013) investigated levels of educational competences among special education teachers working with children with autism, and the effect of a training program on increasing these competences. Results suggest varied levels of competences in several domains. Further, training positively affected the teachers' competences. Hence, such training programs are needed for teachers of children with autism.

Katanani (2005) evaluated a pre-service special education program at the University of Jordan and found general satisfaction among pre-service teachers in respect to the program. However, the students indicated a strong need to add more components to the program, including autism, due to the increased need for such knowledge and competences.

Al-hiary, Almakani, and Tabbal (2015) surveyed problems faced by pre-service special education teachers in four universities in Jordan. The pre-service teachers indicated the need to enhance the programs through including more knowledge and competences in order to better serve students with disabilities, which include autism.

In 2017, Jordan officially passed Law No. 20, which specifies that all students with disabilities should be shifted to the Ministry of Education (MoE). Students should be educated in inclusive schools, regardless of their disabilities, starting with a year of developing a detailed strategy ensuring providing proper services in public schools. The direct implication of this law is that school personnel should possess knowledge and competences to comply with new responsibilities imposed by law. In order to do so, educators (general and special education teachers) and other professionals are required to have the minimum levels of knowledge and skills concerning all disabilities, and how to fulfil their unique needs, including autism.

Reviewing the above studies indicates a strong need to assess levels of knowledge among professionals serving, or preparing to serve, students with autism. Previous studies indicate overall low levels of knowledge about autism. Moreover, studies investigating in-service special education teachers and professionals working with children with autism yielded similar results. Additionally, none of the above studies conducted on a sample of pre-service special education teachers or professionals aimed specifically to investigate levels of knowledge or competences concerning autism in Jordan or other countries, except for Johnson et. al. (2012). Therefore, the present study aims at investigating levels of knowledge among pre-service special education teachers enrolled in a university program prior to and after taking a general introduction training session.

## **Methodology**

### **Sample**

A semi-experimental method was used in this study. The sample was not chosen randomly. The total sample were 56 pre-service special education teachers enrolled in a training session concerning autism. The pre-service teachers were originally enrolled in a pre-service special education university program. Participation in the study was optional, but all the teachers decided to participate.

### **Instrumentation**

For the purpose of this study, the authors developed a 40-item test, which covers all basic domains of the training session. The test had the form of multiple-choice questions; some questions were true/false ones. This test was a criterion-reference test comprising all basic domains of autism covered in the training. Nevertheless, the participants were requested to include their demographic information on the

coversheet of the test: name, gender, year level (freshman, sophomore, junior, and senior), and GPA rating (fair, good, very good, and excellent). This demographic information served as the study independent variables.

### **Procedures**

The participants registered optionally in training sessions aimed to introduce them to the basic knowledge of autism. The sessions encompassed the history, definition, characteristics, etiology, diagnosis and assessment of autism, educational programs, and families of autistic children. The total number of training sessions amounted to 12 hours, spread over 4 days. The participants took a test before the beginning of the training, and took the same test after finishing the training. Then, the tests were graded based on a preset answer sheet; correct answers (1) and wrong answers (0). For each participant, a total score was calculated for the pre- and posttest.

### **Study Questions**

The study aimed to answer the following questions:

1. What are participants' current levels of knowledge about autism?
2. Do current differences between participants in their levels of knowledge about autism depend on gender, year level, and GPA rating?
3. Is there an effect of training on increasing participants' knowledge about autism?
4. Does training have any effect on participants' knowledge about autism in variables of gender, year level, and GPA rating?

### **Results**

Table 1 presents a summary of the participants' demographic information. Results indicated that 56 pre-service special education teachers responded to the study tests. 71.4% (40) of the study sample were females, whereas 42.9% (24) were in their junior year in the program and 41.1% (23) were in their final year. However, 53.6% (30) indicated that their GPA rating is fair (in Jordan, fair GPA ranges from 60% to 66.9%).

**Table 1.** Summary of participants' demographic information, means, and standard deviations on pre- and posttests

Variable	N	%	Pretest		Posttest		
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Gender	Male	16	28.6	16.44	5.24	21.44	4.76
	Female	40	71.4	16.75	3.33	22.1	2.92
Year Level	Sophomore	9	16.1	17.56	3.24	21.33	1.58
	Junior	24	42.9	16.04	3.54	21.33	3.19
	Senior	23	41.1	16.96	4.54	22.74	4.26
GPA Rating	Very Good	4	7.1	17.75	5.44	23.5	4.51
	Good	22	39.3	17.36	3.27	22.09	3.22
	Fair	30	53.6	16.00	4.16	21.27	3.65
Total	56			16.66	3.92	21.91	3.51

### Current Levels of Knowledge

The participants' mean on pretest was 16.66 ( $SD = 3.92$ ). To determine the extent of their knowledge about autism, the authors used the following formula:

$$\text{Range} = (\text{Highest Score} - \text{Lowest Score}) \div 4; \text{Range} = (40-0) \div 4 = 10.$$

Thus, the following four classifications of the levels of knowledge were used: Poor (0–10), Low (11–20), moderate (21–30), and excellent (31–40). The participants' levels of knowledge about autism before taking training were "low" ( $m = 16.66$ ,  $SD = 3.92$ ).

### Current levels of knowledge and gender

To examine whether there were differences between the participants in the gender variable, Independent Samples t-test was used. T-test results ( $F = 6.613$ ) indicate that the female participants were more knowledgeable about autism ( $m = 16.75$ ). However, knowledge about autism is still at low levels (cf., Table 2).

**Table 2.** Gender t-test results

Variable	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>F</i>	<i>Sig.</i>
Gender	Male	16	16.44	5.24	6.613
	Female	40	16.75	3.33	

*Sig. on  $\alpha = 0.05$*

**Current levels of knowledge and year level**

One-Way ANOVA was used to investigate significant statistical differences between the participants’ knowledge about autism at the year level. The participants’ year levels were: sophomore, junior, and senior; none of them were in their first year. One-Way ANOVA indicates that there were no statistical differences ( $F = .591$ ). Table 3 presents ANOVA results in respect to the year level.

**Table 3.** One-Way ANOVA by year level

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.416	2	9.208	.591	.558
Within Groups	826.137	53	15.587		
Total	844.554	55			

Sig. on  $\alpha = 0.05$

**Current levels of knowledge and GPA rating**

The respondents indicated that their GPA ratings were fair, good, and very good; none of them falls into the excellent category. To examine the existence of any statistical differences, One-way ANOVA was used.  $F$  value ( $F = .933$ ) suggests that there were significant statistical differences. Further examination was needed. Thus, Scheffé’s post hoc tests were utilized. The participants whose GPA rating was “good” were more knowledgeable about autism than the students with “fair” rating. No differences were found between those with “very good” ratings and other ratings. Tables 4 and 5 present One-Way ANOVA and Scheffé’s post hoc results, respectively.

**Table 4.** One-Way ANOVA results by GPA rating

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28.713	2	14.356	.933	.400
Within Groups	815.841	53	15.393		
Total	844.554	55			

Sig. on  $\alpha = 0.05$

**Table 5.** Scheffé’s post hoc tests

	Rating	Mean	Sig.	
			Good	Fair
GPA Rating	Good	16.36	-	.47
	Fair	16	.47	-

Sig. on  $\alpha = 0.05$



### The effect of training on increasing knowledge

After completing the training, the participants were asked to retake the test. The goal was to assess their knowledge. The participants' scores were then compared to their results of the pretest using Paired Samples T-test. Table 6 presents results of this comparison. The results indicate that the participants increased their knowledge about autism significantly ( $t = -9.910$ ). The participants had more knowledge about autism than before they had taken the training ( $m = 21.91$ ). The levels of knowledge shifted from the "low" category to the "moderate" category.

**Table 6.** Paired Samples T-test of training

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i>
Pretest	16.66	3.92	-9.910	55	.000
Posttest	21.91	3.51			

*Sig. on  $\alpha = 0.05$*

### Effect of training and gender

After completing the training, the female participants showed significantly better knowledge about autism than the male ones ( $m = 22.1$ ). Table 7 presents Independent Samples t-test results.

**Table 7.** Gender t-test posttest results

Variable	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>F</i>	<i>Sig.</i>
Gender	Male	16	21.44	4.76	5.703 .020
	Female	40	22.1	2.92	

*Sig. on  $\alpha = 0.05$*

### Effect of training, year level, and GPA rating

Two One-Way ANOVA tests were used to examine differences within the year level groups and GPA rating categories. However, no significant statistical differences were found among and between the groups. Tables 8 and 9 present One-Way ANOVA results for posttest for these two variables.

**Table 8.** One-Way ANOVA by year level

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>Sig.</i>
Between Groups	26.75	2	13.393	1.089	.344
Within Groups	651.768	53	12.298		
Total	678.554	55			

*Sig. on  $\alpha = 0.05$*

**Table 9.** One-Way ANOVA results by GPA rating

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
Between Groups	14.369	2	7.184	.573	.567
Within Groups	664.185	53	12.532		
Total	678.554	55			

*Sig. on  $\alpha = 0.05$*

## **Discussion**

Autism disorder is gaining increased attention in the media, among the public, and education system. Additionally, a huge increase in the estimated prevalence rates in the last two decades has raised concern about teachers' competences for work with children with autism in public schools and special education settings. This increased attention raises our expectations to observe increased knowledge and competences among pre- and in-service special education teachers, and other professionals.

The goal of this study was to investigate whether pre-service special education teachers possess the minimum knowledge needed to develop competences for work with children with autism. Knowledge is the introductory level that teachers can use as a starting point in gaining necessary competences. The findings of this study indicate "low" levels of knowledge among its sample. Unfortunately, this finding strongly suggests that the current content of special education teacher preparation programs does not comply with the global concern about and attention to autism. However, even when the posttest results improved significantly, the results shifted from "low" to "moderate," suggesting that this increase is less than expected of this short introductory training. University programs should be developed as "customer-oriented" preparation programs.

This finding, although it is limited to the study sample, may be similar to that in other universities; all universities in Jordan are now committed to standards published by the Accreditation and Quality Assurance Commission for Higher Education Institutions (HEAC). Most universities are using the old standards that do not emphasize providing students with many domains of knowledge, including autism. Recently, the HEAC has published new standards, according to which autism is an essential domain in any special education degree plan. However, it is not expected to see promising outcomes in the nearest future.

Previous studies of special education teachers' knowledge about autism reached the same conclusion; knowledge about autism is at its "low" to "moderate" levels.

These findings suggest the need for better training programs at pre- and in-service levels for special education teachers and other professional in respect to autism.

The female participants have more knowledge about autism than the male ones. This may be attributed to the personal characteristics of female pre-service teachers. It is well documented that females are more committed to their personal growth and education. Additionally, females are more concerned about children as natural mothers; this is a part of their social role in the Eastern cultures. Hence, the size sample of the study females comprises 71.4% of females.

The vast majority of the study sample are in their junior and senior year (84%). Yet, their previous and post knowledge levels are "low" and "moderate", respectively. This finding suggests that regardless of their year level, the participants are exposed to the same knowledge and experiences, which does not prepare them to fulfill their role as future special education teachers. There were no significant differences between the three year levels. Again, this raises the question about the type and quality of content knowledge of the program they attend.

When investigating the levels of knowledge based on the participants' GPA rating, differences were found between those of "good" rating as compared to those with "fair" rating, in the favor of "good" rating. The participants' three GPA ratings were categorized as "low." However, the posttest scores shifted them to the "moderate" category. Yet, there were no significant differences between the three GPA ratings. These findings can be attributed to the content of the preparation program they attend. The participants are exposed to the same content knowledge and experiences during their college years.

## **Conclusion**

The presented study is the first one conducted in Jordan that investigates pre-service special education teachers' levels of knowledge about autism. The findings of the study suggest "low" levels of knowledge about autism, increased to "moderate" after attending the short training course. This suggests that university special education preparation programs lack content knowledge related to autism. Other universities present the same results. The students, regardless of their gender, year level, and GPA ratings showed lower than expected levels of knowledge about autism. Universities should revise and update the content knowledge and skills included in their pre-service special education preparation programs. Further, instructors who teach and train pre-service special education teachers should be specialized in autism; educational programs developed for children with autism

require special training and competences. Although the results are limited to this study sample, other universities follows the HEAC standards, as well. Thus, it is expected to see the same outcomes from their students.

Teachers currently serving students with autism are the product of these universities. Al Jabri et al. (2013) surveyed a sample of in-service teachers; they found insufficient levels of knowledge about autism among them. Special education teachers serving children with autism should receive better training, which should provide them with knowledge and competences to enable them to serve students with autism. If we leave those teachers with no such competences, then we will leave children with autism with no proper services.

This study should be replicated on a larger sample, and in other universities. Further, the study should investigate detailed levels of knowledge (e.g., definition, etiology, identification, assessment, programming, etc.). Results of these studies should serve as a guide to plan our pre- and in-service training programs.

## References

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders DSM-5*. Washington, DC: APA.
- The Centers for Disease Control and Prevention (2012). *Prevalence of Autism Spectrum Disorders-Autism and Developmental Disabilities Monitoring Network, 14 Sites, United States, 2008*. Retrieved from <http://www.cdc.gov/Features/CountingAutism/>.
- Tipton, L.A. & Blacher, J. (2014). Autism awareness: News from a campus community. *Journal of Autism and Developmental Disorders, 44*, 477–483. DOI 10.1007/s10803-013-1893-9
- Boyd, B.A. & Shaw, E. (2010). Autism in the classroom: A group of students changing in population and presentation. *Preventing School Failure, 54*, 211–219.
- DeVilbiss, E.A. & Lee, B. K (2014). Brief report: Trends in U.S. national autism awareness from 2004 to 2014: The impact of national autism awareness month. *Journal of Autism and Developmental Disorders, 44*(12), 3271–3273. DOI 10.1007/s10803-014-2160-4
- Boutot, E.A. (2017). *Autism spectrum disorders: Foundations, characteristics, and effective strategies* (2<sup>nd</sup> Ed.). Pearson Education, Inc., Boston: MA.
- Arif, M.M., Niazy, A., Hassan, B., & Ahmed, F. (2013). Awareness of Autism in primary school teachers. *Autism Research and Treatment, Vol. (2013)*, Article ID 961595, 1–5.
- Bataineh, O.M. (2007). A survey of the special education students opinions of the degree of their acquisition of the competencies needed for teaching the special needs students in regular schools. *Damascus University journal for educational sciences, (23)*1, 369–401.
- Al-khateeb, J.M. & Al-hadid, M.S. (2013). *Teaching methods and strategies in special education* (3<sup>rd</sup> ed.). Dar Alfecker, Amman: Jordan.
- National Research Council (2001). *Educating Children with Autism*. Committee on

- Educational Intervention for Children with Autism, Division of Behavioral and Social Sciences and Autism. Washington, D.C.: National Academy Press.
- Hendricks, D. (2011). Special education teachers serving students with autism: A descriptive study of the characteristics and self-reported knowledge and practices employed. *Journal of Vocational Rehabilitation, 35*, 37–50.
- Al Jabery, M.A., Melhem, A.M., & Al Abdallat, B.M. (2014). Levels of knowledge about autism disorder among special education teachers who teach individuals with autism in the city of Amman. *Dirasat: Educational Sciences, (41)2*, 881–899.
- Stone W.L. (1987). Cross-Disciplinary Perspectives on Autism. *Journal of Pediatric Psychology, 12*(4), 615–630.
- Heidgerken, A.D., Geffken, G., Modi, A., & Frakey, L. (2005). A survey of autism knowledge in a health care setting. Review and recommendations. *Focus on Autism and Other Disabilities, 24*, 77–88.
- Huws, J.C., & Jones, R.S.P. (2010). “They just seem to live their lives in their own little world”: Lay perceptions of autism. *Disability and Society, 25*(3), 331–344. doi:10.1080/09687591003701231.
- Baker, L. (2012). *Perceived levels of confidence and knowledge of autism between paraprofessionals in Kentucky schools and parents of children with autism*. Unpublished doctoral dissertation. Eastern Kentucky University, Richmond, Kentucky, USA.
- Johnson, P., Porter, K., & McPherson, I. (2012). Autism knowledge among pre-service teachers specialized in children birth through age five: Implications for health education. *American Journal of Health Education, 43*(5), 279–287.
- Williams, K., Schroeder, J., Carvalho, C., & Cervantes, A. (2011). School personnel knowledge of Autism: A pilot study. *The School Psychologist, 65*(2), 7–18.
- Melhem, A.M. (2013). *Levels of educational competences of teachers of students with autism and efficacy of an in-service training program in developing these competences*. Unpublished doctoral dissertation. World Islamic Science and Education University, Amman, Jordan.
- Katanani, H. (2005). *Evaluating the bachelor of special education program at University of Jordan*. Unpublished doctoral dissertation. The University of Jordan, Amman, Jordan.
- Al-hiary, G.M.; Almakani, H.A.; & Tabbal, S.A. (2015). Problems faced by preservice special education teachers in Jordan. *International Education Studies, 8*(2), 128–141, doi:10.5539/ies.v8n2p128.