Education and Science

Original Article

Vol 46 (2021) No 207 231-258

A Meta-Analytical Evaluation of the Effectiveness of Inclusive Practices on Learning Outcomes

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Abstract

In order to fulfill the principle of equality of educational opportunity, it is necessary to prioritize the education of individuals with special needs in the society and to provide special education services to these individuals. Inclusion is the practice of integrating individuals with special educational needs (IwSEN) with individuals with typically developing (IwTD) in the general education environment. In this study, it is aimed to synthesize recent research quantitatively in order to determine the effectiveness of inclusion practices on learning outcomes through meta-analysis. In this regard, pretest-posttest control group-based studies conducted between 2000-2019 both nationally and internationally were scanned from national and international databases in line with the inclusion criteria. This study was conducted under the guidelines of PRISMA declaration. As a result of the search process, 36 studies (14 PhD dissertations, 10 master's thesis, 11 articles and 1 conference paper) complying with the inclusion criteria and in which semi-experimental and experimental designs were applied and comparisons between the groups were made were selected out of 62 studies. The effect size, heterogeneity test, intermediate variable analyzes and publication bias analyzes of the studies were performed using the Comprehensive Meta-Analysis program (CMA 3.0). The findings were handled according to random effects model and interpreted according to Cohen's classification. The effectiveness of inclusion practices was found to be large effect size (g= 1.328). In addition, the effect sizes of the studies included in the study were calculated according to the variables of group level (teacher, student) and school level. In terms of the group level, the effectiveness of applications in both teachers and students group was found at “large effect size” level. In terms of the school level, while the “moderate effect size” was seen at higher education, all other groups had “large effect size”. Some insights can be obtained from the results of this study, which revealed that the effectiveness of inclusion practices is at a large effect level for students and teachers and moderate effect level for preservice teachers.

Keywords

Inclusive practices

Meta-analysis

Effect size

Special education

Students with special needs

Article Info

Received: 06.15.2020

Accepted: 02.09.2021

Online Published: 03.07.2021

DOI: 10.15390/EB.2021.9853

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Introduction

With the Salamanca Statement published as a result of the meeting on the World Conference on Special Needs Education: Access and Quality organized by UNESCO in 1994, the concept of "inclusive education" was introduced into the human rights terminology (Ainscowa, Sleeb, & Bestb, 2019; Kuyini & Desai, 2007). Inclusive education assumes a central role in providing high quality education for all learners, promoting the belief that education is a fundamental human right and necessary to achieve social equality (Imaniah & Fitria, 2018; Miles & Singal, 2010). As a term, inclusion is the practice of integrating individuals with special educational needs (IwSEN) with individuals with typically developing (IwTD) in the general education environment (Dev & Haynes, 2015; Friend & Bursuck, 2006; Imaniah & Fitria, 2018). It is emphasized that all students must learn according to social inclusion and pre-requisites (Nilholm, 2020). Inclusion provides support education services to IwSEN and enables them to continue their education in the same environment with their peers without disabilities (Batu, Kırcaali- İftar, & Uzuner, 2004; Jahnukainen, 2014; McLeskey, Landers, Hoppey, & Williamson, 2011; Voltz, Brazil, & Ford, 2001). At the same time, educational practices through inclusion allow IwTD to recognize and understand IwSEN in many areas of social life and to understand individual differences more easily (Begeny & Martens, 2007; Kirby, 2017; Winzer & Mazurek, 2010). In this regard, the definition of inclusion includes the general education environment that should be adjusted to meet the individual needs of each child, rather than the IwSEN having to "fit in" to a preexisting system (Rudd, 2002; UNESCO, 2009). In addition, it allows IwTD to recognize, and understand individual differences more easily in the many areas of social life (Hayes & Bulat, 2017; Ministry of National Education Special Education and Guidance Services, 2015; Voltz et al., 2001). In other words, it is also necessary for IwTD to be given awareness of the presence of IwSEN in the society and to adopt that it is inevitable to live with them (Ajuwon, 2008; Gürkan, 2010). Therefore, it is possible to develop many positive behaviors that can be obtained as a result of the interaction between IwTD and IwSEN who live together in a society through inclusion education (Banda, Hart, & Liu-Gitz, 2010; Gürkan, 2010).

In inclusive education, which is the key strategy within the scope of "Education for All", which the education system deals with in an international context, it is aimed to integrate IwSEN with IwTD both socially and educationally (Florian, 2014; Imaniah & Fitria, 2018; UNESCO, 2009).Therefore, inclusive practices, which provides benefit for IwSEN as well as IwTD, increases academic and social success (Asamoah, Ofori-Dua, Cudjoe, Abdullah, & Nyarko, 2018; Montgomery & Mirenda, 2014; McCarty, 2006). In this regard, the UNICEF (2019) stated that inclusive practices increase the chances of active participation and quality of life of IwSEN who are studying together with their peers. On the other hand, the purpose of inclusion is not to make the child normal, but to enable him / her to make the best use of his/her interests and talents and to facilitate his / her life in the community (Gürkan, 2010).

The inclusive practices, which were first initiated in the United States in the 1970s, have influenced the education policy of many countries and have started to take place in other countries (Hossain, 2012). Inclusive practices in Turkey was started in 1983 with the Law on Children in Need of Special Education and since then, with an increasing number of IwSEN have taken education in their general education schools together with their peers (Sucuoğlu, Bakkaloğlu, İşcen Karasu, Demir, & Akalın, 2014).

Inclusive practices include (1) Full inclusion, (2) Part-time inclusion and (3) Reverse inclusion. In full inclusion, the enrollment of students in need of special education is in a regular class and they take daylong education in a regular class (Mastropieri & Scruggs, 2002; Özel Eğitim Hizmetleri Yönetmeliği, 2018, Schnorr, 1990). In full-time inclusion, it is not only that IwSEN should be in the same environment as their participation in the same learning environment as their peers, but also ensure that

they are an active student in the same teaching routines as those experienced by IwTD (Fisher, Sax, & Jorgensen, 1998). In this direction, it is important to make necessary environmental arrangements for IwSEN and to prepare an individual education program (IEP) (Özel Eğitim Hizmetleri Yönetmeliği, 2018,) and support their education in line with the education program of the school where they are registered. In part-time inclusion, the enrollment of the student who needs special education is in the special education class. However, these children are educated in the inclusion class with their peers without disabilities in the courses in which they can be successful or in extracurricular activities (Özel Eğitim Hizmetleri Yönetmeliği, 2018). However, it is a useful practice for children with special needs if applied correctly. Children who attend general education classes learn new social skills. Therefore, part-time inclusion practices are important for their social development as well as their academic development (Batu & Kırcaali İftar, 2011). In reverse inclusion, individuals without disabilities take education services, especially in preschool education, in accordance with their wishes by enrolling in the classes opened in special education schools that provide inclusion in their environment (Ministry of National Education [MoNE], 2008). In Turkey, reverse inclusion practices are carried out in two ways: In the first one, either in the special education schools and institutions where the primary education programs are applied, IwTD are in the same class as their peers, or in the form of separate classes for IwTD within these schools and institutions. In the second one, IwTD are required to enroll in classes in special education schools opened for IwSEN in their environment in line with their wishes (Ministry of National Education Special Education and Guidance Services, 2015).

Teachers have an important role in the successful implementation of inclusive education (Hashim, Ghani, Ibrahim, & Zain, 2014; Reyes, Hutchinson, & Little, 2017). Teachers' attitudes, beliefs, self-efficacy perceptions and professional competencies are powerful predictors of student achievements (Dukmak, Aburezeq, & Khaled, 2019; Hashim et al., 2014; Özokcu, 2018; Sharma & Nuttal, 2016). In this regard, Li, Wang, Block, Sum and Wu (2018) stated that there is a strong relationship between teachers' perceptions of self-efficacy and professional competence and their success in inclusion practices; teachers who do not trust their teaching abilities have problems in including innovative strategies in their practices. However, the more experience and knowledge teachers have about inclusion, the higher and more positive their attitudes and success are towards inclusive practices olmaktadır (Dukmak et al., 2019). Therefore, it is important to provide support with in-service training in order to contribute to the professional development of teachers, to ensure their positive attitudes towards inclusion practices and to improve their self-efficacy skills (Aiello & Sharma, 2018).

The existence of experimental studies in the literature, which address the effectiveness of inclusive practices in different groups and in different dimensions, revealed the need for meta-analysis of these studies. With the interpretation of the data given in these studies that were conducted by different researchers, using different samples, carried out at different times, handling different variables and having different results, more comprehensive studies are needed tobe launched (Akgöz, Ercan, & Kan, 2004). Therefore, rather than examining each of the studies separately, meta-analysis studies provide the opportunity to evaluate a number of studies as a whole (Borenstein, Hedges, Higgins, & Rothstein, 2013; Hunter & Schmidt, 2004; Pigott, 2012; Rothstein, Sutton, & Borenstein, 2005). When the results of inclusive practices conducted within the scope of meta-analysis studies are examined, besides the positive effects of inclusion, it is also seen that there are no differences in the results (Hunt & Goetz, 1997; Wagner, Newman, Cameto, & Levine, 2006). As a matter of fact, Lindsay (2003) stated in his research covering the studies conducted until 1990 that the evidence in meta-analysis studies and systematic reviews does not provide a clear endorsement for the positive effects of inclusion. In the international dimension, In the meta-analysis conducted by Carlberg and Kavale (1980) on inclusion, 50 studies comparing general (inclusion) and special class placements were included in the study. It was found that placement in general classes had better outcomes for students with mild mental reterdation,

but had worse outcomes for students with learning difficulties or behavioral / emotional problems. In the meta-analysis study conducted by Weiner (1985), 50 studies comparing the academic performance of the inclusive students and segregated students with mild handicapping conditions were included. While the mean academic performance of the integrated groups was in the 80th percentile, segregated students scored in the 50th percentile. Baker, Wang, and Walberg (1994) examined three meta-analyzes that address the most effective environment for the inclusive practices of IwSEN, and stated that inclusive practices had a small to moderate beneficial effect on the academic and social outcomes of IwSEN. Murawski and Swanson (2001) conducted a meta-analysis of the research, revealing interventions for co-teaching between general and special education teachers in inclusive practices. To this end, they included six studies in their research and found that co-teaching was moderately effective in inclusive practices. A meta-analysis of 36 research that compare self-concept of IwSEN in different learning environments and conducted by Elbaum (2002) revealed that there was no relationship between these students' self-concept and their learning environments (full-time mainstreaming, part-time mainstreaming, special classes and regular classes). A meta-analysis of attitudes towards IwSEN in school-aged children encompassing 20 studies between 1990 and 2002 and conducted by Nowicki and Sandieson (2002) suggested that girls were generally more accepting of IwSEN than boys. A meta-analysis study by Lindsay (2007) that included 14 studies comparing social and educational outcomes of IwSEN in inclusive practices and published between 2001 and 2005 revealed that the evidence does not provide a clear confirmation for the positive effects of inclusion. Szumski, Smogorzewska, and Karwowski (2017) found a positive but weak effect in their meta-analysis study, which included 47 studies to reveal the effectiveness of inclusion practices in IwTD. The researchers stated that inclusion practices had a positive effect on the success of IwTD in school.

In Turkey, in the meta-analysis study conducted by Karasu (2009), the effectiveness of education methods tested with single subject studies in order to improve the social and communication skills of children and adolescents diagnosed with autism and their derivatives and whether effective methods could be accepted as evidence-based methods were investigated.

Purpose and Importance of Research

It is seen that the meta-analysis research mentioned above regarding inclusive practices have included studies carried out in the 1980s, 90s and early 2000s. This situation reveals the need for an up-to-date and comprehensive meta-analysis study by synthesizing studies on inclusive practices. Therefore, in this study, it is aimed to synthesize research carried out in order to determine the effectiveness of inclusive practices on learning outcomes through meta-analysis. Since there are a limited number of experimental studies on the effectiveness of inclusive practices in the literature and the evaluation of inclusive practices was handled in different dimensions in these studies, the current study is considered within the scope of a generalizable evaluation of the effectiveness of inclusive practices on learning outcomes. As learning outcomes, academic achievement, attitude, self-efficacy skills, professional competence, social acceptance level and language development discussed in the included studies also took place in the scope of this study. In this regard, experimental /quasi experimental studies conducted between 2000-2019 both nationally and internationally were scanned from national and international databases in line with the inclusion criteria. To present a general evaluation of inclusive practices according to the results of the experimental studies, the following questions are addressed in this study:

1. What level of the average / overall effect size do the studies conducted between 2000 and 2019 have?
2. Is there a meaningful difference between the effect sizes of the internal variables considered as the group level (student, teacher) and education level?

Method

In this research, meta-analysis method was used to determine the effectiveness of inclusion practices. The meta-analysis method includes the steps to analyze the data collection studies, examine the theoretical relationships between the study results, encode the studies, calculate the effect size (EB), interpret the results and analyze their distributions and effects according to the variables and report them (DeCoster, 2004). On the other hand, The guidelines outlined in the PRISMA-*P* guidelines are used to guide authors in improving the presentation of meta-analysis research and systematic review studies. PRISMA-*P* is currently one of the most widely used protocol to standardize the reporting of meta-analyzes. It was originally developed as the QUOROM Statement (The Quality of Reporting of Meta-analyzes), but the name was changed to PRISMA in order to include both systematic review and meta-analysis (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). In this study, PRISMA was used.

Literature search procedure

It was attempted to include all studies related to the effectiveness of inclusive education on learning outcomes and carried out between 2000 and 2019 at a national and international level. With this purpose, scanning of studies was carried out through key words "inclusion", "mainstreaming" "inclusive /mainstreaming practices", "inclusive/mainstreaming education", "inclusive/mainstreaming and meta-analysis", "mainstreaming/ inclusive and experimental" in both Turkish and English in search engines and databases of the Higher Education Council National Thesis and Dissertation Center (YOK), Google Scholar, Ebscohost-Eric, Web of Science, ScienceDirect, and Sage Journals Online. As a result of the search process, 36 studies (14 PhD dissertations, 10 master's thesis, 11 articles and 1 conference paper) complying with the inclusion criteria and in which pre-tests and post-tests were applied and comparisons between the groups were made were selected out of 62 studies. The flow chart for literature review is given in Figure 1.

Introducing a set of inclusion criteria

A set of inclusion criteria which was established to examine the effectiveness of inclusive practices included:

1. Studies using experimental and control groups in pretest-posttest control group model
2. Studies including sample sizes, means and standard deviations or t-test values.
3. Studies written in Turkish or English
4. Studies that were available with the full text
5. Studies published within the period 2000 -2019
6. Krathwohl (1998) recommended that a meta-analysis not confine itself to published materials because nonsignificant results are most likely to emerge in unpublished studies. Therefore, articles published in refereed journals as well as unpublished theses were included in the research.

Studies that do not meet the inclusion criteria were excluded (See Figure 1).

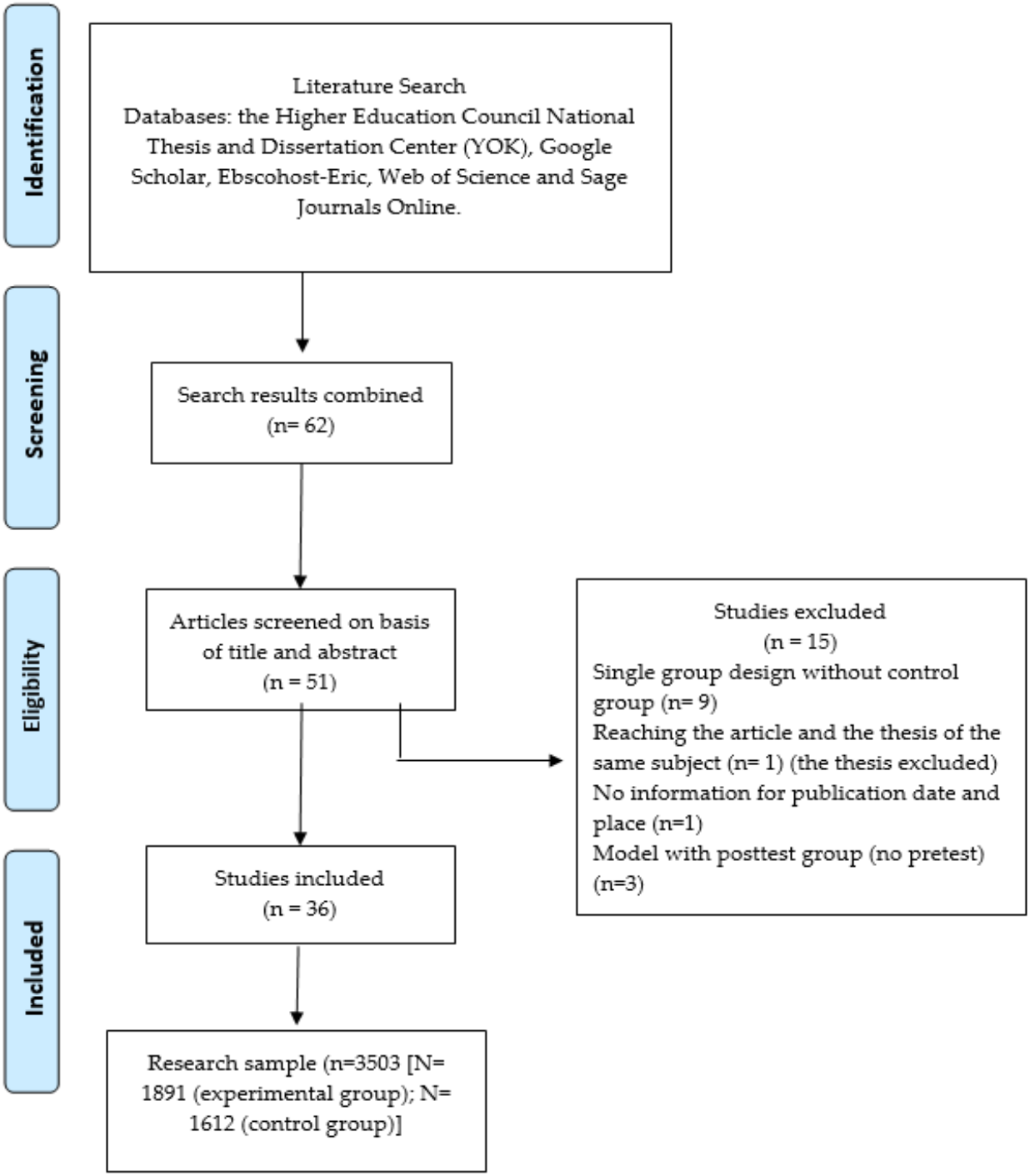

Figure 1. Literature Flowchart (PRISMA flowchart) (Moher et al., 2009)

Coding Process

A detailed coding form was developed to show the general characteristics of the research included in the study before the statistical analysis was conducted. The coding form developed in this study consisted of three parts. The first part, "study identity", presented the study code, study title, author information and study year. The second part included "information about moderators" such as group level, education level, implementation level and study type. The third part, "study data", provided information such as population size, mean and standard deviation values. The data regarding the coding information, effect sizes and results obtained in line with this coding form of the studies were given in Appendix 1 (see Appendix 1).

On the other hand, the coding reliability value was calculated to obtain a certain level of reliability of the research outcomes in the meta-analytic part of the research (Cooper, 2017). For this aim, another reader who is academically reliable was asked to examine all the review research and note down the results to the final evaluation form. Then, the consistency in the form was examined comparing two readers' evaluations following this process and calculated as 89% which indicated that the reliability between the researchers and coder was very high according to Miles and Huberman's (1994) formula. However, in meta-analysis studies, it is an effective approach that coders come together and resolve to conflicts (Cooper & Hedges, 2009). Therefore, the mismatch between the coders was discussed together and a consensus requiring 100% agreement was reached in terms of calculating the effectiveness of inclusion practices on teachers and students and on school level separately.

Data Analysis

In the meta-analysis studies, fixed effects model and random effects model are used to analyze and calculate the effect size of the data. It is assumed that each of the studies included in the analysis has a real effect size based on the fixed effect model. Accordingly, the differences between the observed effects in all distributions are due to sampling error. However, under the random effects model, some of this distribution reflects the actual differences in effect size between studies (Borenstein et al., 2013). Hedges and Vevea (1998) emphasize that the analyst, on the assumption of constant effects, only wants to make inferences about the studies collected for synthesis. If the average effect size is estimated using the assumption of REM as discussed by Raudenbush (2009), the actual impact varies from work to work. For example, the effect size may be higher (or lower) when participants are older, educated, or healthier than others, or where a more intensive form of intervention is used.

Field and Gillett (2010) argued that the use of a direct random effects model should be made as a standard rule in the calculation of the effect sizes in the social sciences without determining the heterogeneous distribution. In this regard, the data were analyzed statistically through the Comprehensive Meta-Analysis (CMA 3.0) software program. CMA software was used since it has the most complete set of analytical features such as computation descriptive statistics (Hedges'g, standard error, variance, p-values, effect size weights), tests for heterogeneity and tests for random and fixed-effects models (Bax, Yu, Ikeda, & Moons, 2007). For the estimation of effect size, Hedges'g formula revealing the standardized mean difference between groups was used (Hedges & Olkin, 1985) and in order to test whether there is heterogeneity between the studies, the (Q-statistic) chi-square ($\chi 2$) heterogeneity test with degree of freedom (k-1) was used as well. Additionally, random effects model was used to determine the effect sizes and finally in order to interpret all the statistical data which were converted into a common effect size, Cohen's (1992) guidelines suggesting that ≤ 0.2 is a small effect size, 0.5 is a moderate effect size and ≥ 0.8 is a large effect size were used.

Results

The descriptive data related to the studies included in the meta-analysis within the scope of this research are given in Table 1.

Table 1. Descriptive Data related to the Studies Included in the Meta-Analysis

Study Variables		**Frequency**	**Percent**
Publication Year (k=36)	2004-2008	4	11.11
	2009-2013	9	25.00
	2014-2018	23	63.89
Study Place (k= 36)	Turkey	23	63.89
	Other Countries	13	36.11
	PhD	14	38.89
Study Type (k=36)	Master's Thesis	10	27.78
	Artical	11	30.55
	Conference Paper	1	2.78

Table 1. Continued

Study Variables		Frequency	Percent
Group Level (*k*= 36)	Student	28	77.78
	Teacher	8	22.22
Duration of the Experimental	6-38 hour	3	8.33
Process (*k*= 36)	5-12 day	4	11.11
	3-7 week	12	33.34
	8-12 week	9	25.00
	13- 17 week	3	8.33
	18 ve + week	3	8.33
	Not specified	2	5.56
Education Levels	Preschool Education	4	14.29
(*k*= 28 studies conducted on	Primary Education	11	39.28
students)	Secondary Education	9	32.14
	Higher Education (Preservice Teachers)	4	14.29

When the descriptive data for the studies in Table 1 are analyzed, it is seen that there is an increase between the years 2014 and 2018 in the number of publications of experimental studies regarding inclusive education. 11.11% of experimental studies (*f* = 4) were between 2004-2008; 25.00% (*f* = 9) were between 2009-2013; 63.89% (*f* = 23) were between 2014-2018. While 63.89% (*f* =23) of the studies were performed in Turkey, 36.11% (*f* = 13) were conducted in other countries. Of the studies, 38.89% (*f* = 14) were published as PhD dissertations, 27.78% (*f* = 10) as master's theses, 30.55% (*f* = 11) as articles and 2.78% (*f* = 1) as conference papers. While 77.78% (*f* = 28) of the studies were conducted on students, 22.22% (*f* = 8) were performed on teachers. Considering the duration of the implementation of experimental procedures, the time spent on most experimental implementations was found to be in the range of 3-7 weeks (33.34%; *f*=12). This is followed by the range of 8-12 weeks (25.00%; *f* = 9). In 8.33% of the studies (*f* = 3), the time allocated to experimental procedures was 6-38 hours; in 11.11% (*f* = 4), it was 5-12 days; in 8.33% (*f* = 3), it was 13-17 weeks; in 8.33% of them (*f* = 3), it was 18 and above weeks; in 5.56% (*f* = 2), it was not specified. When the studies performed on the students (*k* = 28) were classified according to education level, it was revealed that the studies were mostly carried out on primary school students (39.28%; *f*=11). 32.14% (*f* = 9) of the other studies were conducted with the students in the secondary education, 14.29% (*f* = 4) with the preschool students and 14.29% (*f* = 4) with the university students (pre-service teachers).

Findings for Effectiveness of Inclusive Practices

The mean effect size and confidence interval distribution results of the 36 studies (14 PhD dissertations, 10 Master's theses, 11 articles and 1 conference paper) that met the inclusion criteria of this study are given in Table 2. Related to Fixed Effect Model calculation, the standard error was .039 and the upper limit for 95% of the confidence interval was .913, the lower limit was .759 and the effect size (Hedges'*g*) was .836. Additionally, *Z* test calculations revealed statistically significant at .01 level (*Z* = 21.210; *p* = .000). As a result of the homogenous test, the *Q* statistical value was calculated to be 714.504. In a 95 percent significance level from the chi-square($\chi 2$) table, the approximate critical value of 49.80 and 35 degrees of freedom were accepted. Since *Q* statistical value was found to exceed the critical value ($\chi 2(.95)=49.80$), the distribution of the effect sizes was determined to be heterogeneous. In addition, the I^2 value, which is the complement of *Q* statistics, indicates a high level of heterogeneity with 95.101% according to the Higgins and Thompson (2002) classification. The average effect sizes and confidence intervals for the studies included in the meta-analysis were given in Table 2.

Table 2. The Mean Effect Sizes and Confidence Interval Distribution of the Studies Included in the Meta-Analysis

Model type	*k*	Hedges'*g*	SE	95% Confidence Interval		*Q*	df	*Z*	I^2	*p*
				Lower Limit	Upper Limit					
SEM	36	.836	.039	.759	.913	714.504	35	21.210	95.101	.000
REM	36	1.328	.184	.967	1.689			7.209		.000

FEM(Fixed Effect Model); REM(Random Effect Model)

As given in Table 2, according to random effect model calculation, the standard error was .184 and while the upper limit for 95% of the confidence interval was 1.689, the lower limit was .967. The effect size was Hedges'*g*= 1.328, which is a large effect size according to Cohen's (1992) classification. When the statistical significance was calculated according to the *Z*-test, it was found to be 7.209 (p = .000).

Forest plot of 36 studies examined within the scope of the research is given in Figure 2.

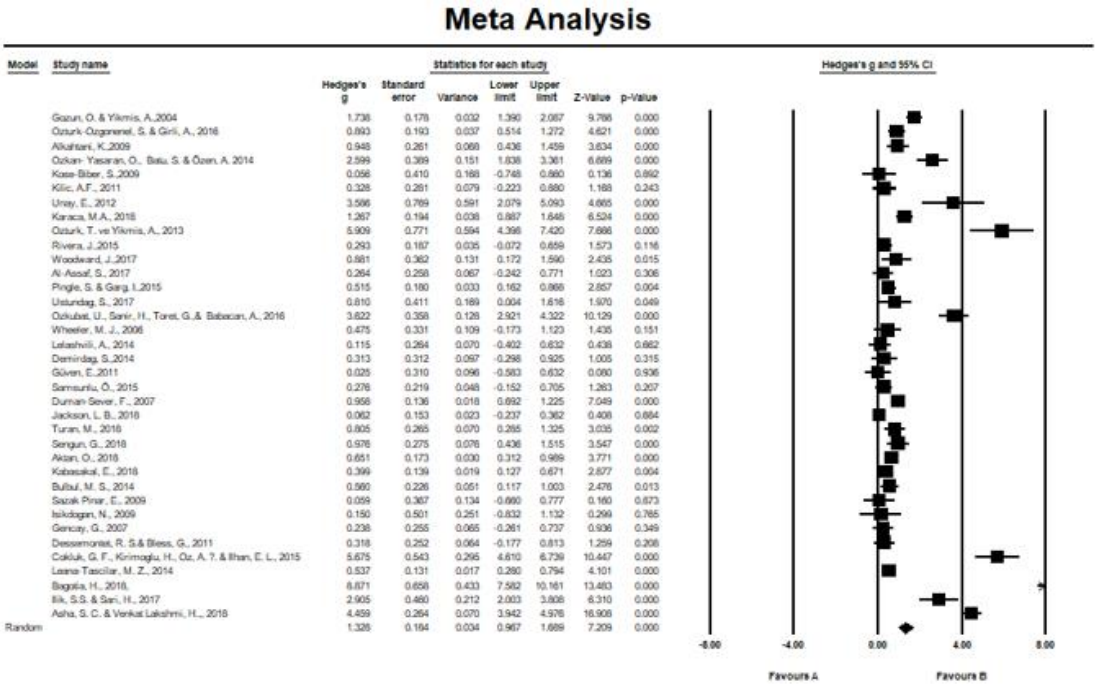

Figure 2. Forest Plot of the Studies

When the forest plot given in Figure 2 is examined, the black squares indicate the effect size, and the lines next to the squares indicate the upper and lower limits of the effect size within the 95% confidence interval. The diamond symbol shows the overall effect size. While Bagotia's (2018) study has the widest range of confidence interval, Güven's (2011) study has the narrowest confidence interval. The fact that all of the 36 studies included had a positive effect shows the effect in favor of experimental groups in inclusive practices.

The Effectiveness of Inclusion According to Group Level

The studies were separated into two different groups as students and teachers in order to examine the the effectiveness of inclusive practices according to group level. According to the results, given in Table 3, the effect size (Hedges'*g*=1.725), was higher in the "teachers" group than the "students" group (Hedges'*g*=1.234). The total effect size for the groups occurred at 1.284 which is a large effect size according to Cohen's (1992) classification.

Table 3. The Effectiveness of Inclusive Practices Considering Group Level of the Studies

Random Effect Model	*k*	Hedges'*g*	SE	%95 Confidence Interval		Test of heterogeneity in effect size		
				Lower Limit	Upper Limit	*Q*	df	*p*
Teachers	8	1.725	.194	.600	2.850			
Students	28	1.234	.574	.854	1.614			
Total	36	1.284	.184	.924	1.644	.659	1	.000*

p<.05

As seen in Table 3, the studies were grouped according to group levels. When the heterogeneity test for the inter groups were examined, the Q value occurred at .659. In the 95% significance level from the $\chi 2$ table, the value for 1 degree of freedom was 3.841. As the Q statistical value (Q=.659) with 1 degree of freedom did not exceed the critical value calculated according to 1 degree of freedom ($\chi 2$ (.95) = 3.841), the homogeneous hypothesis concerning the effect size distribution was accepted. On the other hand, there were statistically significant differences between the groups in favor of the teachers' group (Z = 6.990; p = .000). The forest plot with the effect sizes of the studies examined according to the group level is given in Figure 3.

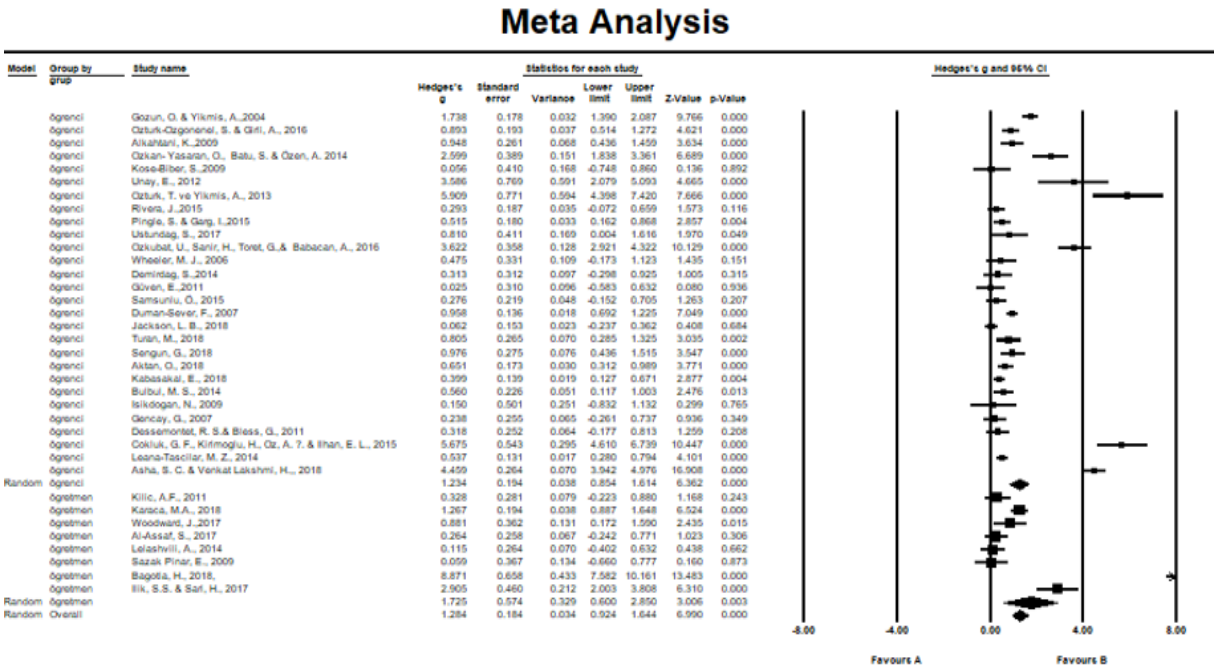

Figure 3. Forest Plot with the Effect Sizes of the Studies Examined According to the Group Level

In the forest plot given in Figure 3, it is seen that while Öztürk and Yıkmış' (2013) study has the widest range of confidence interval, Güven's (2011) study has the narrowest confidence interval among the studies conducted on students. In the studies conducted on teachers, it was revealed that Bagotia's (2018) study has the widest confidence interval, and Lelashvili's (2014) study has the narrowest confidence interval.

The Effectiveness of Inclusion According to Education Level

In relation to the education level where the studies were conducted, the studies were separated into four different groups as preschool education, primary education, secondary education and higher education (studies conducted on preservice teachers) and given in Table 4. The analyses revealed that all groups (Hedges'*g* preschool=1.578; Hedges'*g* primary=1.233; Hedges'*g* secondary=1.360) except higher education (Hedges'*g* higher education= 0.770) had a large effect size. The total effect size for the groups occurred at 1.128 which is a large effect size according to Cohen's (1992) classification.

Table 4. The Effectiveness of Inclusive Practices Considering Education Level of the Studies

Random Effect Model	*k*	Hedges'*g*	SE	%95 Confidence Interval		Test of heterogeneity in effect size		
				Lower Limit	Upper Limit	*Q*	df	*p*
Preschool education	4	1.578	.583	.435	2.721			
Primary education	11	1.233	.282	.681	1.784			
Secondary education	9	1.360	.492	.396	2.323			
Higher education (preservice teachers)	4	0.770	.315	.151	1.388			
Total	28	1.128	.183	.769	1.487	2.249	3	.522

p>.05

As given in Table 4, the studies were grouped according to educational levels. When the heterogeneity test for the inter groups were examined, the Q value occurred at 2.249. In the 95% significance level from the $\chi 2$ table, the value for 3 degrees of freedom was 7.815 ($\chi 2(0.95) = 7.815$). As the Q statistical value was lower than the critical value in $\chi 2$ table, this value can be said to have a homogeneous distribution. On the other hand, there are no significant differences amongst the inter groups ($Z = 6.152$; $p = .522$). The forest plot showing the effect sizes of the studies examined according to the education level is given in Figure 4.

In the forest plot given in Figure 4, it is seen that the study with the widest confidence interval belongs to Öztürk and Yıkmış (2013), and the study with the narrowest confidence interval is Gençay's (2007) study among the studies carried out at preschool education level. Among the studies carried out at primary education level, it was revealed that the study of Özkubat, Sanır, Töret, and Babacan (2016) has the widest confidence interval and the study of Güven (2011) has the narrowest confidence interval. While the study with the widest confidence interval is the study of Çokluk, Kırımoğlu, Öz, and İlhan (2015), the study with the narrowest confidence interval is the study of Jackson (2018) among the studies conducted in secondary education. Among the studies conducted on preservice teachers, it was revealed that the study of the Gözün ve Yıkmış (2004) has the widest confidence interval and the study of Pingle and Garg (2015) has the narrowest confidence interval.

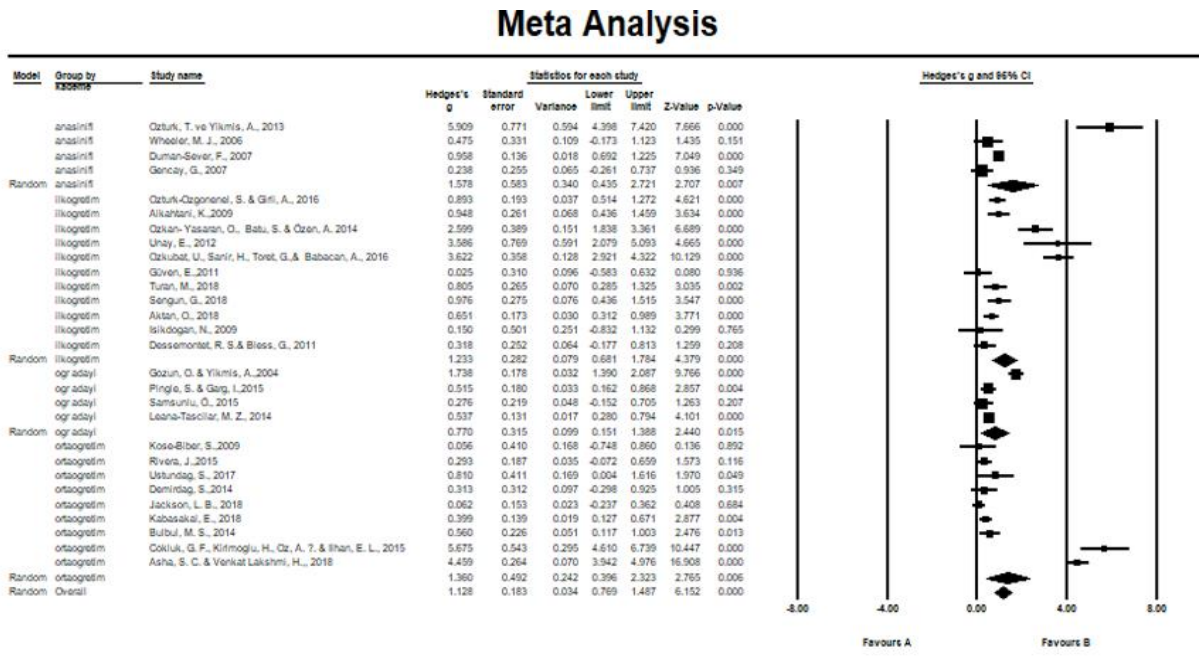

Figure 4. Forest Plot Belonging to the Effect Sizes of the Studies Examined According to the Education Level

Publication Bias

Publication bias is described as the tendency of more published studies to be included in the meta-analysis and the tendency of researchers to publish only their results that are significant statistically or clinically (Greenhouse & Iyengar, 2009). In this study, the Funnel Plot, Begg and Mazumdar Rank Correlation, Egger's Regression Intercept, Rosenthal's Fail-safe Number (FSN), Orwin's Fail-safe Number and Duval and Tweedie's Trim and Fill method were used to determine the publication bias (Begg & Mazumdar, 1994; Borenstein et al., 2013; Duval & Tweedie, 2000; Egger, Smith, Schneider, & Minder, 1997; Sterne, Gavaghan, & Egger, 2000; Sutton, 2009).

A funnel plot is a graph considered as a visual summary of the current data set (Cooper & Hedges, 2009) in the discovery of the probability of publication bias in the meta-analysis. It is a scatter plot comparing the study magnitudes with the measurement of effect sizes and shows the effect size on the horizontal axis (x-axis), sample size, variance or standard error on the vertical axis (y-axis) (Sutton, 2009). An asymmetry was determined in the graphical distribution of the funnel plot. It was observed that most of the studies were clustered to the left of the mean. The funnel plot with the studies added to the right of the mean and the corrected effect size according to the trim and fill method of Duval and Tweedie (2000) is shown in Figure 5.

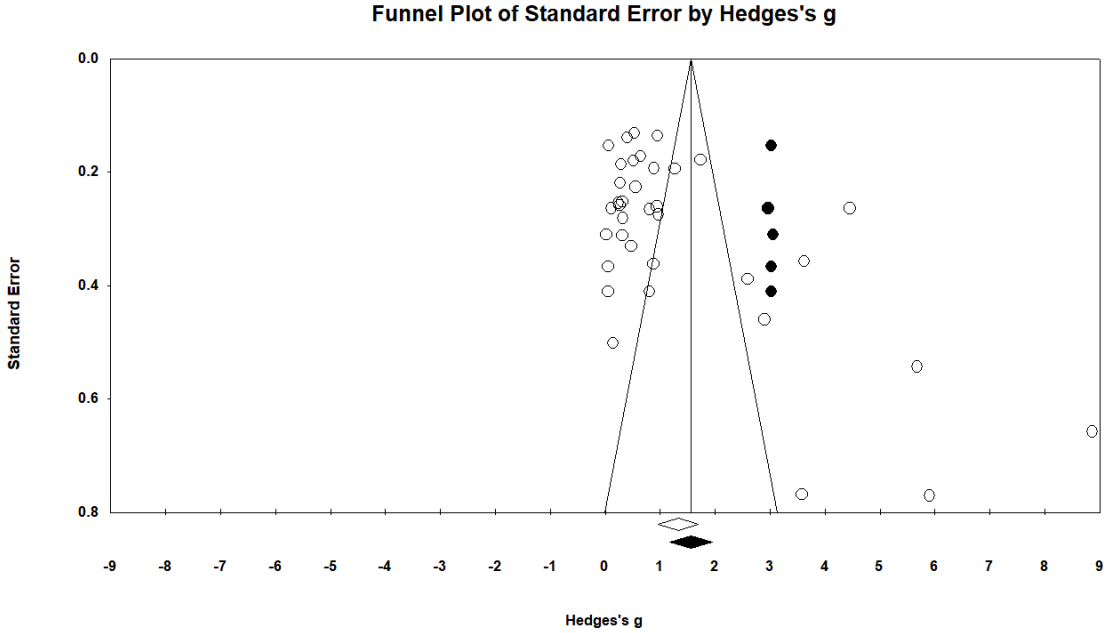

Figure 5. Adjusted Effect Size Funnel Plot According to Duval and Tweedie's Trim and Fill Method

Figure 5 shows the adjusted funnel plot, where the studies are added to the right of the mean, according to the trim and fill method. The 5 studies included in the meta-analysis later are shown in black circles. In addition, the black diamond in the figure shows the estimate of adjusted general Hedges'*g*. The adjusted effect size value (Hedges'*g* = 1.558) and the observed effect size value (Hedges'*g* = 1.327) are very close to each other (See Table 5). However, Card (2012) stated that if the difference between the adjusted effect size and observed effect size values is large, there may be publication bias. In this case, it can be said that the publication bias observed in this study is not at a level that will affect the below limit of the plot. Because, it is observed that there is no change in the proximity of both values to zero effect. But it should be noted that the basic assumption underlying the trim and fill method, that is, the perfect symmetry assumption in the distribution of effects around the mean is not very realistic (Peters, Sutton, Jones, Abrams, & Rushton, 2007).

Table 5. Duval and Tweedie's Trim and Fill Method

	Studies Trimmed	Point Estimate	Confidence Interval		*Q*
			Lower Limit	Upper Limit	
Observed values		1.327	.966	1.688	714.503
Adjusted values	5	1.558	1.174	1.942	1056.909

The results given in Table 5 revealed that in order to generate a symmetrical funnel plot, 5 more studies would be added to the meta-analysis. However, the new result (1.558) and the previous one (1.327) have the same positive direction and large effect size.

However, although publication bias can be evaluated visually, it is requested to be tested statistically. If the number of studies is less than 10, statistical evaluation is not recommended (Sterne et al., 2000). Therefore, it was attempted to verify whether publication bias has existed by including other statistical tests.

According to the result of the Egger test (Egger et al., 1997), 95% confidence interval between 1.708 lower limit and 8.667 upper limit, Intercept = 5.187, t = 3.029 and p = .0047< 0.5. In the Egger test, which is mostly used to test funnel plot asymmetry, "p value of 0.5 or less indicates that asymmetry is statistically significant" (Rothstein et al., 2005, p. 102). Therefore, the funnel plot asymmetry was confirmed by the Egger test. In Begg and Mazumdar (1994) test, Kendall's tau b coefficient was calculated. As a result of the value obtained (Tau b = .32 <.05), it can be said that the funnel graph shows an asymmetrical distribution. These results indicate that studies with smaller samples have reported more positive results than those with larger samples on the effectiveness of inclusive practices; or studies with positive results on the effectiveness of inclusive practices are more likely to be published than studies containing results that are not statistically significant (Hackshaw, Law, & Wald, 1997). However, when interpreting these tests, it is necessary to pay attention to situations such as the studies included in the meta-analysis are of different sample sizes and contain at least one medium effect study (Borenstein et al., 2013).

Orwin's Fail-safe Number was 53, suggesting that there would need to be over 53 studies with a mean risk ratio of 0.001 added to the analysis before the cumulative effect would become trivial.

Whether the study has publication bias was also examined by Rosenthal's Fail-safe Number. Mullen, Muellerleile, and Bryant (2001) suggested following the $N / (5k + 10)$ rule in the Rosenthal's Fail-safe Number calculation. They stated that if the resulting value exceeds 1, it is the evidence that there is no publication bias. Rosenthal's Fail-safe number is 5524. The results of the calculations according to this formula $N/(5k+10)=5524/(5.36+10)=5524/190=29.07>1$ can be interpreted that this study is tolerant enough for future studies.

Discussion

In this study, which aimed to synthesize recent research by means of meta-analysis in order to determine the effectiveness of inclusive practices on learning outcomes, 36 studies that met the inclusion criteria among the experimental studies on the effectiveness of inclusive practices between 2000 and 2019 were analyzed using Comprehensive Meta-Analysis program (CMA 3.0). Data regarding the effectiveness of inclusive practices were evaluated in the meta-analytic procedure according to random effect models and the effect size value (Hedges'g) was found to be 1.328. This value was interpreted as at a large level and significant according to Cohen's (1992) classification. This value shows that the effectiveness of inclusive practices is positive, significant and large. This positive and significant result was consistent with the effect coefficients of the studies which included in the analysis and showed the effectiveness of inclusion in favor of the experimental group (i.e., Aktan, 2018; Alkahtani, 2009; Asha &

Venkat Lakshmi, 2018; Bagotia, 2018; Demirdağ, 2014; Gözün & Yıkmış, 2004; Güven, 2011; Işıkdoğan, 2009; İlik & Sarı, 2017; Jackson, 2018; Kabasakal, 2018; Karaca, 2018; Köse-Biber, 2009; Leana-Taşcılar, 2014; Özkubat et al., 2016; Öztürk-Özgönenel & Girli, 2016; Pingle & Garg, 2015; Sazak-Pınar, 2009; Sever-Duman, 2007; Şengün, 2018; Turan, 2018; Özkan-Yaşaran, Batu, & Özen, 2014; Ünay, 2012; Üstündağ, 2017; Wheeler , 2006). Additionally, the results of the study also showed consistency in terms of positive impact with those that were conducted nationally and internationally but excluded from the analysis (i.e., Akalın, 2014a, 2014b; Bayraklı & Sucuoğlu, 2018; Conley, Thomas, & Thornton, 2018; Desoete & Praet, 2013; Güner, 2010; Güven & Tufan, 2010; İşcen-Karasu, 2017; Karasu & Şimşek, 2018; McDonnell et al., 2003; Özsırkıntı, 2018; Schroeder, 2018; Sucuoğlu, Bakkaloğlu, Akalın, Demir, & İşcen-Karasu, 2015; Tanrıkulu, 2011). In parallel with this result, in the meta-analysis studies conducted by Camargo et al., (2014); Carlberg and Kavale (1980) and Szumski et al. (2017), a large positive impact also emerged on the inclusive practices.

When the effect sizes of the studies in the meta-analysis were examined according to the group levels, the studies were separated into two different groups as students and teachers andaccording to the results, the effect size was found to be high in both teachers group (Hedges'g = 1.725) and students group (Hedges'g = 1.234) according to Cohen's (1992) classification. Some studies (i.e., de Boer, Pijl, & Minnaert, 2011; Kurniawati, de Boer, Minnaert, & Mangunsong, 2014; Qi & Ha, 2012) have shown that as the knowledge and experience of the teachers, who play a key role in inclusive practices, increase, their positive attitudes, success and desires towards inclusive education increase as well. in a meta-analysis study conducted by Szumski et al. (2017) on the academic success of IwTD students in inclusive classes revealed that providing educational support to special education teachers increases success in inclusive practices. Similarly, Seçer (2010), who conducted a single-group experimental study, revealed that in-service training led to a positive change in the attitudes of preschool teachers towards inclusion. Accordingly, Dickens-Smith (1995) remarked that in-service trainings for inclusion are key to success in personnel development. Avramidis, Bayliss, and Burden (2000) stated that the more training on inclusive practices the more positive attitudes of teachers towards inclusion. A meta-analysis study by Scruggs and Mastropieri (1996) reviewed 28 studies in which American teachers' perceptions towards IwSEN from 1958 to 1995 and the results indicated that two-thirds of the participants supported the inclusion and inclusive practices for IwSEN, while one-third of teachers did not believe that they had time, skills, training or resources necessary for inclusive practices. Interestingly, the authors reported no change in teachers' attitudes over the years. A meta-analysis study by Unianu (2012) that aimed at emerging teacher attitudes towards inclusive practices revealed that most of the studies were based on the idea that teachers should have a positive attitude towards inclusive practices. Sucuoğlu et al., (2015) conducted a single-group experimental study to examine the level of knowledge about the inclusive practices of 30 preschool teachers by applying a 16-week comprehensive training program, which included effective techniques and strategies that should be involved in inclusive practices. At the end of the application, it was found that the teachers' knowledge about inclusive practices increased. Seçer (2010), who conducted a single-group experimental study, revealed that in-service training led to a positive change in the attitudes of preschool teachers towards inclusion.

The large effect size of the students coincides with the results of some studies in the literature. In this regard, in the meta-analysis study conducted by Ahmad (2016), the researcher examined the effect of inclusion education on mathematics academic performances of IwSEN and in this respect, 14 studies that meet the inclusion criteria were included in the study and statistical analysis was performed. The results of the meta-analysis revealed the positive effects of inclusion in both IwSEN and IwTD. Similarly, the meta-analysis study by Szumski et al. (2017), who examined the academic achievement of IwTD in the mainstreaming classes and included 47 studies, revealed a positive effect

on the achievement of both IwTD and IwSEN. Another study conducted by Kalambouka, Farrell, Dyson, and Kaplan (2007) examines the effect IwSEN on the academic achievement of IwTD in mainstreaming practices. As a result of this study, it was found out that IwSEN had positive or neutral effects on the academic achievement of IwTD. On the other hand, in the meta-analysis study conducted by McGregor and Vogelsberg (1998), in which the practices related to inclusive education were evaluated, the researchers stated that the IwSEN were accepted by the IwTD in social environment and exhibited high level of social interaction, but the effect of inclusive education on the academic achievement of the IwSEN had a moderate effect. In addition, in the meta-analysis study conducted by Kim (2012), the effect of situational learning on the knowledge transfer of both IwTD and IwSEN was tried to be determined and statistical analysis results of 19 studies included according to the research criteria revealed that the situational learning method did not affect the knowledge transfer of IwSEN.

In relation to the education level, the studies were separated into four groups as preschool education, primary education, secondary education and higher education (studies conducted on preservice teachers). No significant differences were found among the groups but moderate effect size was observed at higher education level, while all other groups had a large effect size. The reason that the preservice teachers have lower effect size than the other groups may be due to their missing knowledge or insufficient knowledge about special education. This may be due to the fact that they do not take special education courses at a desired level or that this course, which is considered important in terms of creating awareness about IwSEN and started to be given in teaching programs of education faculties (Çitil, Karakoç, & Küçüközyiğit, 2018) does not provide the desired effect. As a matter of fact, İlgar (2017) stated in his study that pre-service teachers who do not take special education courses have very negative thoughts for IwSEN. Çitil et al. (2018) reported in their study that although special education courses increased preservice teachers' knowledge about special education and IwSEN, there were no significant changes in their attitudes towards IwSEN. In the experimental study conducted by Kayılı, Koçyiğit, Yıldırım-Doğru, and Çiftçi (2010), it was found that Inclusive Education course did not affect the preservice teachers' views on "Benefits of Inclusion". In the study conducted by Gümüş and Tan (2015) it was demonstrated that while there was an increase in positive attitudes towards IwSEN at primary level, negative attitudes have increased with the increasing of age and school level.

Conclusion and Suggestions

In order to conclude about the effectiveness of inclusive practices, it is necessary to reach a consensus about definition and practices (Florian 2014). However, since such a consensus is not possible today, although there are many studies on inclusion practices and outcomes, the results show variable characteristics (Göransson & Nilholm, 2014), controversies and confusions (Haug, 2017). On the other hand, "there is lack of a firm research base for inclusive education to support either whether this is a preferable approach in terms of outcomes, or how inclusion should be implemented' (Lindsay, 2007, p. 16). However, some researchers have argued that empirical evidence does not play a particularly important role in developing inclusive practices, and that this evidence is not all convincing either (i.e., Haug, 2017; Kavale & Mostert, 2004; Mostert, Kavale, & Kauffmann, 2008). Accordingly, it is argued that contemporary studies and meta-analysis studies alone cannot give a clear answer about the effects of inclusive practices (Cara, 2013; Haug, 2017; Lindsay, 2007; Mostert et al., 2008). Therefore, many researchers think that it is more appropriate to use evidence obtained from descriptive and experimental research methodologies in inclusive practices to reinforce qualitative case study results (Heath et al., 2004; Lindsay, 2007). In this context, by selecting methods appropriate to the nature of the problem investigated and within the scope of methodological pluralism, it is recommended to carry out studies in which quantitative data are supported by qualitative data and especially involving meta-analysis.

In addition, based on this research findings that the effect size of the preservice teachers is lower, it is recommended to give more importance to longitudinal studies. It is also recommended to identify practical problems based on observations made by experts and develop a solution-oriented process within the scope of action research. Eliminating imperfect knowledge through pre-service and in-service training, eliminating misconceptions or prejudices, exchanging of teachers or preservice teachers by establishing international agreements may take place in this process.

Limitations

This study has some limitations. The most important limitation is that limited number of studies have been reached due to the fact that the current experimental studies on inclusive practices are less in the literature. Evaluation of practices from different dimensions in the existing studies has increased the possibility of encountering criticism of the apple and pear problem by combining the data obtained from very different variables and different samples and different measurements made for meta-analysis studies (Maksimovic, 2011). However, as the Borenstein et al. (2013) stated, the aim of bringing different studies together is to make a generalizable evaluation on the inclusive practices by paying less attention to the effects of individual studies. As a matter of fact, according to Glass (1982), who emphasized the comparison of different studies rather than comparison of the studies which are the same in all aspects, in other studies, data are not always collected from the same type of people, data are collected from different people and these people are as different as apples and pears.

Acknowledgements

This study was supported by Sivas Cumhuriyet University BAP Project (Scientific Research Project), Turkey (project number: 2018/09/ EĞT-081).

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Appendix 1. Studies Included in the Research

	Studies (Author, year)	The number of participants	Group level	Application Period	Effect Size (Hedges'*g*)	Result
1	Gözün, Ö., & Yıkmış, A., 2004	Treatment group: 83 (45 M; 38 F) Control group: 91 (39 M; 52 F)	Preservice teachers	5 weeks	1.738	Positive effect on the attitudes of preservice teachers towards inclusive education
2	Öztürk-Özgönenel, S., & Girli, A., 2016	Treatment group: 49 (24 M; 25F) Control group: 71 (42 M; 29 F)	Primary education Students	11 weeks	0.893	positive effect on on social competence and school adjustment behavior of inclusive students with autism
3	Alkahtani, K., 2009	Treatment group: 32 Control group: 32	Primary education Students	10 weeks	0.948	Positive effect of creativity education on developing creative abilities of inclusive students diagnosed with attention deficit and hyperactivity disorder
4	Özkan- Yaşaran, Ö., Batu, S., & Özen, A., 2014	Treatment group: 24 (13 M; 11F) Control group: 24 (11 M; 13 F)	Primary education students	10 days 40 minutes	2.599	positive effects of inclusive activities on increasing social acceptance for individuals with special needs
5	Köse-Biber, S., 2009	Treatment group: 11 Control group: 11	Secondary education students	10 weeks	0.056	An increase in academic achievement and performance levels of inclusive students with special education support through web-based teaching method
6	Kılıç, A. F., 2011	Treatment group: 27 Control group: 23	Teachers	5 days	0.328	The opinions of the teachers in the Experimental and Control groups on theinclusive students are positive and there are no significant difference between them.
7	Ünay, E., 2012	Treatment group: 8 Control group: 9	Primary education Students	6 weeks	3.586	positive effect of support education on mathematics achievement and self-efficacy of inclusive students
8	Karaca, M. A., 2018	Treatment group: 63 Control group: 63	Teachers	9 weeks	1.267	The Inclusive Competence Training Program for Teachers is effective in increasing teachers' professional competence related to inclusion.
9	Öztürk, T., & Yıkmış A., 2013	Treatment group: 15 (9 M; 6 F) Control group: 21 (10 M; 11 F),	Preschool children	3 weeks	5.909	Positive effect on treatment group students' attitudes towards peers with intellectual disabilities
10	Rivera, J., 2015	Treatment group: 54 Control group: 61	Secondary education students	6 weeks	0.293	No significant difference between the groups in reading comprehension skills.
11	Woodward, J., 2017	Treatment group: 16 Control group: 16	Teachers	9 weeks	0.881	No significant difference between the groups in terms of teachers' attitudes towards inclusion.

12	Al-Assaf, S., 2017	Treatment group: 31 Control group: 28	Teachers	Not specified	0.264	No significant difference between the groups in teachers' self-efficacy beliefs for inclusion.
13	Pingle, S., & Garg, I., 2015	Treatment group: 77 Control group: 53	Preservice teachers	5 weeks	0.515	An increase in the awareness of treatment group teachers in inclusive education
14	Üstündağ, S., 2017	Treatment group: 12 (4 F;8 M), Control group: 12 (6 F; 6 M),	Secondary education students	11 weeks	0.810	A significant difference was observed in terms of physical competence, physical appearance, peer relationships and general self-concept dimensions of the Self Concept Scale in favor of the students in the treatment group.
15	Özkubat, U., Sanır, H., Töret, G., & Babacan, A., 2016	Treatment group: 41 Control group: 41	Primary education Students	12 days	3.622	The inclusive preparatory activities applied significantly increased the social acceptance levels of the participants in the experimental group
16	Wheeler, M. J., 2006	Treatment group: 18 Control group: 18	Preschool children	1 year	0.475	Teachers' experience was found to be the most important factor contributing to the general preparation skills of children in inclusion programs.
17	Lelashvili, A., 2014	Treatment group: 28 Control group: 28	Teachers	5 weeks	0.115	More positive attitude in the teachers in treatment group
18	Demirdağ, S., 2014	Treatment group: 20 Control group: 20	Secondary education students	3 weeks	0.313	Inclusive science education has a positive effect on conceptual understanding; the negative effect of concept retention; negative effect of IwTD students on their attitudes towards inclusive IwSEN students
19	Güven, E., 2011	Treatment group: 20 Control group: 20	Primary education Students	6 weeks	0.025	An increase in the success of music lesson and attitudes towards music of all students in the study group
20	Samsunlu, Ö., 2015	Treatment group: 37 Control group: 47	Preservice teachers	12 weeks	0.276	There were no statistically significant differences between the post-test scores of the teachers in the treatment and control groups
21	Sever-Duman, F., 2007	Treatment group: 120 Control group: 120	Preschool children	7 months	0.958	The teacher-assisted program for inclusion was found to be effective in supporting the self-care skills, motor, social, cognitive and language development of both the IwTD and IwSEN students
22	Jackson, L. B., 2018	Treatment group: 110 Control group: 69	Secondary education students	1 year	0.062	Inclusive students showed an increase in success
23	Turan, M., 2018	Treatment group: 30 Control group: 30	Primary education Students	8 weeks	0.805	Positive effect on inclusion students to increase activity preference
24	Şengün, G., 2018	Treatment group: 31 (16 F; 15 M), Control group: 27 (14 F; 15 M),	Primary education Students	13 weeks	0.976	Social acceptance of IwTD students in treatment group increased

25	Aktan, O., 2018	Treatment group: 70 Control group: 70	Primary education Students	6 weeks	0.651	An increase in the academic achievement of both groups
26	Kabasakal, E., 2018	Treatment group: 97 Control group: 115	Secondary education students	12 weeks	0.399	A decrease in non-rational beliefs and an increase in subjective well-being, self-efficacy and social acceptance levels of treatment group students
27	Bülbül, M. Ş., 2014	Treatment group: 30 Control group: 59	Secondary education students	38 hours	0.560	Students in treatment group are more successful than students in control group
28	Sazak Pınar, E., 2009	Treatment group: 12 Control group: 17	Teachers	6 hours	0.059	An increase in frequency of teaching techniques used by teachers in treatment group
29	Işıkdoğan, N., 2009	Treatment group: 7 Control group: 7	Primary education Students	16 weeks	0.150	An increase in reading comprehension skills of treatment group students
30	Gençay, G., 2007	Treatment group: 33 Control group: 28	Preschool children	4 weeks	0.238	No significant difference between the groups
31	Dessemontet, R. S., & Bless, G., 2011	Treatment group: 31 Control group: 31	Primary education Students	3 evaluation in 2 years	0.318	Although there was little progress in reading skills of inclusive students, there were no significant differences in mathematics and adjustment behaviors among the groups.
32	Çokluk, G. F., Kırımoğlu, H., Öz, A. Ş., & İlhan, E. L., 2015	Treatment group: 38 Control group: 30	Secondary education students	Not specified	5.675	An increase in perception of success
33	Leana-Taşcılar, M. Z., 2014	Treatment group:420 Control group:120	Preservice teachers	14 weeks	0.537	The training program positively influenced the special education competence of the preservice teachers
34	Bagotia, H., 2018	Treatment group:50 Control group:50	Teachers	20 hours	8.871	Positive effect of special education program on teachers
35	İlik, Ş. Ş., & Sarı, H., 2017	Treatment group:19 Control group:19	Teachers	6 days	2.905	Significant difference in favor of treatment group
36	Asha, S. C., & Venkat Lakshmi, H., 2018	Treatment group:100 Control group:100	Secondary education students	4 weeks	4.459	An increase in both groups