A meta-analysis of the effects of parental education on children with disabilities

Meta-analysis of parental education

JongSik Jang, Geonwoo Kim, hyewon Jeong, Narae Lee, Seri Oh

Abstract

BACKGROUND
Children with disabilities have delays in various areas, such as cognitive, verbal, and physical, and are often at a specific stage of development because of slow motor development and inexperience in physical coordination

AIM
To conduct a meta-analysis targeting parents of children with disabilities to reveal the effects of parental education on children.

METHODS
Data from 2002 to 2022 were searched using Pubmed, Embase, Web of Science, Directory of Open Access Journals, and Europe PMC.[1] The search terms were “disabled children,” “handicapped children,” “parent education,” “parent training,” and “parent coaching.” Twelve studies were eligible for inclusion in the meta-analysis. The average and standard deviation of the experimental and control groups and the number of samples were analyzed to calculate the effect sizes, and a meta-analysis was conducted using RevMan version 5.4.1. To analyze statistical heterogeneity, a chi-
square test was performed to assess the significance of the Q statistic, and a $P$ value of less than .10 was considered to indicate statistical heterogeneity.

RESULTS
A total of 20,011 Literatures collected from the database were selected according to the criteria for analysis. Twelve articles were included in the final analysis. Five studies of parental depression were included. Heterogeneity was 98%, and the effect size for parental depression was 0.35 (confidence interval [CI]:0.30-0.40), indicating a small but statistically significant effect size. Four papers were published on the effects of parenting on parenting attitudes. Heterogeneity was 100%, and the effect size for parenting attitude was 0.41 (CI:0.36-0.45), indicating a medium effect size, with the $P$ value showing a statistically significant score. As a result of a meta-analysis targeting parents of children with disabilities, both parenting attitude and parental depression showed significant effect sizes, and [E1] face-to-face parental education had a larger effect size than non-face-to-face education. Regarding the parental education methods, face-to-face parental education had a medium effect size (0.57 [CI:0.53-0.61]), whereas non-face-to-face parental education had a small effect size (0.23 [CI:0.18-0.28]).

CONCLUSION
Future studies based on the results of this study and revealing strong evidence would provide more useful guidelines for parents of children with disabilities.

Key Words: Children; Children with disabilities; Education; Meta-analysis; Parents; Parent education

Core Tip: Although there have been studies on meta-analysis targeting parent education of children with disabilities, it is limited to domestic papers or meta-analysis on parental depression, parenting attitude, child development, and the effectiveness of face-to-face vs non-face-to-face is lacking. Through this study, we learned about the effective educational methods and future research directions of parents of children with disabilities, and if high-based studies supplement the limitations based on the results of this study, it is considered to have been applied as a guideline for more useful parent education for parents of children with disabilities.

INTRODUCTION
Children with disabilities have delays in various areas, such as cognitive, verbal, and physical, and are often at a specific stage of development because of slow motor development and inexperience in physical coordination[1,2]. Thus, it is difficult for children with disabilities to lead independent daily lives. Therefore, parents of children with disabilities must continue to [EI] care for them[3]. Parents of children with disabilities experience excessive stress in managing their children's behavior and needs, leading to changes in their overall family life[4,5]. In addition, parents of these children feel a psychological burden and experience relational and emotional difficulties in daily life while raising a child with disabilities[6,7]. Therefore, great effort is required from parents to acknowledge, nurture, and educate their children[7,8]. However, parents often have difficulty understanding their children's behavior and sometimes miss early education because they do not know how to cope with problems[8]. Therefore, proper parental education is essential for families of children with disabilities to enable them to perform their roles and function in a healthy manner[9]. The importance of parental education is growing in the sense that the more the parent of a disabled child understands the child correctly, the more effective the child's education is[8].

Parental education for children with disabilities is essential for family support in special education; it is an activity that changes parents' behavior, emotions, and
thinking, helps improve family relationships, and provides parenting skills and knowledge\cite{10}. Parental education plays a role in correctly understanding the disability and developmental characteristics of children, and home guidance methods, behaviors, habits, thoughts, and methods related to childrearing\cite{11}. Education for parents of children with disabilities has various purposes, such as acquisition of skills and knowledge for raising their children, improvement of family relationships, and psychological and emotional support\cite{12}. Considering that the need for parental care decreases in children without disabilities as they develop, and that children with disabilities require continued parental care even after becoming adults, parents of children with disabilities should have access to support systems. Therefore, education is essential to strengthen the capacity of parents of children with disabilities\cite{13}.

Studies have demonstrated the effectiveness of parental education programs for children with disabilities. \cite{13-17}. However, even though most studies examining these programs have proven their effectiveness, it is difficult to conclude a valid effect by analyzing the programs individually because of differences in the study populations, measurement tools, and program contents\cite{18}. Therefore, it is necessary to obtain scientific and objective results to establish the effectiveness of parental education for children with disabilities. Meta-analysis is an effective statistical method for deriving objective results\cite{19} and determining their clinical applicability by forming new knowledge through the integration of multiple studies and the synthesizing of results\cite{20}. Meta-analyses are more accurate and reliable than single-study results and can be of great help in clinical decisions regarding interventions\cite{20}. It is a statistical method used to draw new implications by classifying numerous research results implicitly rather than simply listing data; it can also reduce the risk of generalization\cite{21}.

Analyzing previous studies, we found a meta-analysis targeting parental education of children with disabilities, but it was limited to domestic papers or meta-analyses on parents' depression and parenting attitudes, while the effectiveness of face-to-face vs. non-face-to-face education is lacking\cite{18,22,23}. This meta-analysis assessed the effectiveness of parental education for children with disabilities.
MATERIALS AND METHODS

Study design
In this study, the Participants, Interventions, Comparisons, Outcomes, Timing of outcome measurement, Setting, Study Design (PICOTS-SD) method by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used to systematically review the literature.

Literature search strategy
PubMed, Embase, Web of Science, Directory of Open Access journals, and European PMC were used as databases and papers published between 2002 and 2022 were selected. The main search terms were “disabled children,” “handicapped children,” “parent education,” “parent training,” and “parent coaching.” Literature search, selection, and data extraction were conducted by two researchers according to the systematic literature review criteria, and discrepancies were resolved by a third reviewer. The intervention effects of the studies selected by the three researchers were analyzed using a meta-analysis.

Literature standards
Studies published between 2002 and 2022 and conducted within 20 years of randomized clinical trials on parents of children with disabilities were selected. The clinical trials conducted at this time were limited to those that applied parental education. Studies that did not meet the purpose of the study were removed by reviewing titles and abstracts, and those that presented values that could be compared before and after the test were selected.

Data analysis
Data coding
The studies selected according to the research topic were coded by author, publication year, intervention method, main result, sample size, etc., according to the research
characteristics. Subsequently, to analyze the effect size, the mean and standard deviation and sample size were coded according to the evaluation purpose of the experimental and control groups.

Analysis method

After receiving an institutional review board exemption approval (KWNUIRB-2023-03-002) from the Bioethics Committee of Kangwon National University, we analyzed the general characteristics of the participants, characteristics of the interventions, and results of the 12 selected studies. In addition, the average and standard deviation of the experimental and control groups and the number of samples were analyzed to calculate the effect sizes, and a meta-analysis was conducted using RevMan version 5.4.1. To analyze statistical heterogeneity, a chi-square test was performed to assess the significance of the $Q$ statistic, and a $P$ value of less than .10 was considered indicative of statistical heterogeneity$^{[24]}$. The effect size shows the difference in the effectiveness of the experimental group compared to the control group, and publication bias refers to an error that occurs depending on the direction or nature of the research results$^{[25]}$(Figure 1).

RESULTS

Selection of studies for the analysis

A total of 8641 Literatures collected from the database were selected according to the criteria for analysis by three doctoral students with more than three years of clinical experience and majors in occupational therapy. When the level of research evidence was analyzed, a meta-analysis was performed on the 12 studies that were finally selected as documents corresponding to the first stage with the highest level of evidence.

Meta-analysis of the effects of parental education
Twelve articles were included in the final analysis. First, when five articles on parental depression and four on parenting attitudes were analyzed to determine the effect of parental education, the literature on the effect on parental depression was the most common. A comparative analysis of ten studies on face-to-face parental education and four studies on non-face-to-face parental education showed that face-to-face parental education resulted in a higher effect size.

**Effects of parental education on parents’ depression**

Five studies of parental depression were included in the analysis (Table 1). Heterogeneity was 98%, and the effect size for parental depression was 0.35 (confidence interval [CI]:0.30-0.40), indicating a small but statistically significant effect size (Table 1).

**Effects of parental education on parenting attitudes**

Four papers were published on the effects of parenting on parenting attitudes (Table 2). Heterogeneity was 100%, the effect size for parenting attitude was 0.41 (CI:0.36-0.45), indicating a medium effect size, and the P value showed a statistically significant score.

**Meta-analysis of parental education methods**

Regarding the parental education methods, face-to-face parental education had a medium effect size (0.57 [CI:0.53–0.61]), whereas non-face-to-face parental education had a small effect size (0.23 [CI:0.18–0.28]) (Table 3 and 4).

**Publication convenience**

As a result of analyzing publication convenience for this study, it was found that parental depression, parenting attitude, face-to-face parental education, and non-face-to-face parental education were symmetrical, and publication errors did not appear to be significant (Figure 2,3,4,5).

**DISCUSSION**

Parental education for children with disabilities is important for recognizing habits, behaviors, and thoughts related to the development and rearing of children with disabilities; improving family relationships; and ensuring emotional stability for
parents. Therefore, this study conducted studies were analyzed to examine the effects of parental education.

First, when parental education was provided for parents of children with disabilities, both parenting attitudes (0.41) and parental depression (0.35) showed significant effects. The purpose of the parental education program is to understand the child's disability and developmental stage and to acquire direct parenting methods to influence the child's behavior and attitude[14]. Parental education was found to positively affect childrearing attitudes. Ultimately, parental education not only provides general knowledge and understanding of children's development, but also acquires parenting knowledge suitable for social and temporal changes and correct attitudes as a parent. This seems to be because it helps obtain[26]. This result is consistent with the existing thesis that parental education for parents raising children with disabilities shows positive results for parenting attitudes[27]. It is believed that the reason for the effect on parental depression is that the parental education program provides an opportunity to control the parents' psychological state through conversations with the leader so that the child has confidence and expectations for improvement[28]. This suggests that parental education for children with disabilities needs to be actively implemented in clinical phenomena because it has a significant effect on both parenting attitudes and parental depression.

Second, regarding the effectiveness of the parental education method for children with disabilities, face-to-face parental education showed a medium effect size (0.57), whereas non-face-to-face parental education showed a small but significant effect size (0.23). Many factors are believed to induce learning immersion, including immediate real-time feedback and various interactions during the learning process. However, the reason for the greater effectiveness of face-to-face education is that both verbal and nonverbal communication is involved, increasing immersion. In addition, in face-to-face education, parents can communicate with educators in one space, expand their understanding through real-time questions and answers, and concentrate better[28,29].
These results are consistent with those of previous studies showing that face-to-face education is more effective than non-face-to-face education\cite{50,51}. These data suggest the importance of actively conducting face-to-face education in future parental education programs.

This study had some limitations. Because all parental education studies were analyzed as one and detailed parental education methods were not analyzed, it seems necessary to conduct various meta-analyses by subdividing parental education studies. In addition, most studies used in the meta-analysis did not specify the exact diagnosis of children with disabilities; therefore, it was not possible to examine the effects of the parent education program on each diagnosis group. However, when this study was conducted on parental education for children with disabilities, and since the effectiveness of parental depression was analyzed separately, parenting attitude is considered significant in that clinicians who mediate and manage parents of children with disabilities can more effectively attempt education according to the intervention goals of parents of children with disabilities. Additionally, the results of the analysis of face-to-face and non-face-to-face parental education provide a basis for developing more effective education strategies. The results of this study provide information on effective educational methods for parents of children with disabilities and future research directions.

**CONCLUSION**

In this study, we searched the literature on parental education of children with disabilities and conducted a meta-analysis to provide clinicians with a clinical basis for intervention. A meta-analysis of 12 studies was conducted to analyze the effect size of parental education. The analysis showed that parental education was effective in improving parenting attitudes and depression, and it proved more effective when face-to-face parental education was conducted, suggesting more effective and objective data. Therefore, further research on parental education using various diagnostic groups
should be conducted based on the effectiveness of parental education for children with disabilities shown in this study.

**ARTICLE HIGHLIGHTS**

*Research background*

Children with disabilities have delays in various areas, such as cognitive, verbal, and physical, and are often at a specific stage of development because of slow motor development and inexperience in physical coordination.

*Research motivation*

It is necessary to obtain scientific and objective results to establish the effectiveness of parental education for children with disabilities.

*Research objectives*

Meta-analysis of parents of children with disabilities is conducted to reveal the impact of parental education on children.

*Research methods*

Data from 2002 to 2022 were searched using Pubmed, Embase, Web of Science, Directory of Open Access Journals, and Europe PMC. The search terms were “disabled children,” “handicapped children,” “parent education,” “parent training,” and “parent coaching.” Twelve studies were eligible for inclusion in the meta-analysis. The average and standard deviation of the experimental and control groups and the number of samples were analyzed to calculate the effect sizes, and a meta-analysis was conducted using RevMan version 5.4.1. To analyze statistical heterogeneity, a chi-square test was performed to assess the significance of the Q statistic, and a P value of less than .10 was considered to indicate statistical heterogeneity.

*Research results*
A total of 20,011 Literatures collected from the database were selected according to the criteria for analysis. Twelve articles were included in the final analysis. Five studies of parental depression were included. Heterogeneity was 98%, and the effect size for parental depression was 0.35 (confidence interval [CI]:0.30–0.40), indicating a small but statistically significant effect size. Four papers were published on the effects of parenting on parenting attitudes. Heterogeneity was 100%, and the effect size for parenting attitude was 0.41 (CI:0.36–0.45), indicating a medium effect size, with the $P$ value showing a statistically significant score. As a result of a meta-analysis targeting parents of children with disabilities, both parenting attitude and parental depression showed significant effect sizes, and [E1] face-to-face parental education had a larger effect size than non-face-to-face education. Regarding the parental education methods, face-to-face parental education had a medium effect size (0.57 [CI:0.53–0.61]), whereas non-face-to-face parental education had a small effect size (0.23 [CI:0.18–0.28]).

**Research conclusions**

Future studies based on the results of this study and revealing strong evidence would provide more useful guidelines for parents of children with disabilities.

**Research perspectives**

Based on the effectiveness of parental education for children with disabilities shown in this study, research on parental education using various diagnostic groups should be conducted in the future.

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