

## Application of Education and Paper Quilling to Stimulate Fine Motor Ability in Down Syndrome Children: Case Study

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### ABSTRACT

**Background** : Down syndrome is a chromosomal disorder that can cause fine motor disorders characterized by poor hand-eye coordination and lack of muscle tension. An assessment of 4 parents with children with Down syndrome stated that they did not know about activities that could stimulate their children's fine motor skills. Education is designed to change parents' knowledge for the better.

**Objective** : This research aims to determine parents' knowledge and application of paper quilling therapy to stimulate fine motor skills in children with down syndrome.

**Method** : This research took the form of a case study on 2 respondents which was conducted for 6 consecutive days for 30-60 minutes per meeting. The pretest and paper quilling therapy educational intervention were carried out within 3 days. Paper quilling was applied to parents and children with down syndrome for 3 days.

**Results** : The posttest results of parents' knowledge regarding paper quilling therapy increased after the intervention with a pretest average of 57.5 to 85. Observation results of children's fine motor skills, the pretest average of 0, increased after the intervention to an average of 50 in the posttest.

**Conclusion** : Providing paper quilling educational interventions can increase parents' knowledge of paper quilling. Implementing paper quilling intervention can improve the fine motor skills of children with down syndrome.

### KEYWORDS

Down syndrome, parent, paper quilling, fine motor skills, knowledge

## INTRODUCTION

Children with Special Needs (ABK) or "special needs" are children whose growth and development experience obstacles and disturbances. There are many categories related to ABK, one of which is Down syndrome. The Center for Disease Control and Prevention states that around 6,000 babies are born with Down syndrome, which is about 1 in every 700 babies born each year (Cara *et al.*, 2019). The Indonesian Center for Biodiversity and Biotechnology reports that the number of people with Down syndrome in Indonesia exceeds 300,000 people.

Down syndrome is a disorder of the chromosomal structure characterized by intellectual limitations ranging from moderate to severe and is a congenital syndrome that appears at birth, due to abnormal fetal development. Down syndrome is usually

referred to as mongoloidism because of its distinctive facial characteristics, namely a flat face, a small skull, a large tongue sticking out, a small mouth, a wide face, narrowed bean-shaped eyes with slanted eyebrows, snub nose, the distance between the big toe and the index toe looks wider, and the hands and feet are relatively short (Martati, Sagala and Karmila, 2022). Down syndrome children experience a genetic disorder, namely the formation of chromosome 21 due to the failure of a pair of chromosomes to separate from each other during division. Children born with Down syndrome can occur due to several factors, one of which is that the mother at birth is too old, ranging from 35 to 40 years and over.

Body development and brain performance will change if there are extra chromosomes, and that is what causes Down syndrome to experience intellectual

limitations. They experience a lack of muscle tension which causes them to experience physical obstacles in playing. Down syndrome children also experience difficulties with their memory, especially for information conveyed verbally, which results in them having difficulty learning. They also have difficulty reading, writing and simple arithmetic. People with Down syndrome are often the center of attention of the people around them.

Down syndrome children have a strong relationship between motor and mental development so they often have poor hand-eye coordination, as well as a lack of muscle tension which causes fine motor disorders in Down syndrome children (Rahmayanti, Angriyani and Kulsum, 2018). Several studies have discussed the development of fine motor skills using paper quilling in ABK. Based on previous research, it is known that there is an influence and improvement in fine motor skills through paper quilling in children with special needs.

Fine motor skills are the connection between the fine muscles of the hands and the eyes in forming movements that require flexibility, coordination and precision (Wahyuningtyas, Nugroho and Lestarinigrum, 2020). Some activities that are closely related to fine motor skills are holding small objects, holding a pencil, sticking, cutting, squeezing, tying shoelaces, inserting buttons into button holes, and scribbling on paper (Yusnisari and Tarsidi, 2020). From a study of 2 respondents in Banteran Village, Sumbang District, it was found that fine motor skills in children with Down syndrome were still lacking and had not developed optimally. This is because the child's fingers are still stiff so the child is not yet able to arrange blocks, scribble, there is a lack of eye and hand coordination so

the child has difficulty doing things with his fine motor skills. Previous research stated that in activities there is a link between fine motor skills and the development of flexibility of the hands and fingers. Therapy needs to be given to build a better condition. Therapy must also be carried out regularly so that what the child lacks can be fulfilled gradually. Therapy needs to be given as early as possible before the child is 5 years old. This is because rapid brain development in children generally occurs before the age of 5 years, peaking at the age of 2-3 years (Tialani, Solikhin and Susilo, 2023). Efforts that can be made to improve fine motor skills include using paper quilling.

Paper quilling is the skill of rolling paper and gluing it to a prepared pattern. Paper quilling is a technique of arranging paper into unique image designs by making the paper into a dense roll using your fingers or a quilling tool. When children become interested and start rolling paper, they are indirectly practicing their fine motor skills. So it is hoped that slowly the child's fine motor skills will be trained and improved.

In this research, the fine motor exercises used consist of elements of flexibility, coordination and accuracy which are interpreted with the word neatness. Flexibility is illustrated through the activity of rolling paper. It can be seen that in the process of making paper quilling, children's fingers work to roll the paper, apply glue, and attach the edges of the paper. The coordination aspect can be seen from the activity of gluing paper rolls according to the pattern provided. This activity requires good eye and hand coordination so that the child's hand movements can be stable. Meanwhile, the aspect of neatness is described by the child's patchwork being neat and finished. The neatness

aspect can help children use their fine motor skills optimally and complete their work well.

Education is a planned effort to influence other people, whether individuals, groups or society, so that they do what is expected by educational practitioners (Hayati, 2022). When a study was carried out on 4 parents with children with Down syndrome, they said they had never known what activities could stimulate their children's fine motor skills. Parents said they had never heard of paper quilling or carried out paper quilling activities.

In fact, paper quilling therapy can be done easily if parents get information about how to do paper quilling. This education is designed to change the level of parents' knowledge to be good regarding paper quilling therapy for children with Down syndrome so that they can stimulate the child's fine motor skills independently. This research aims to increase parents' knowledge and overcome fine motor problems in children with Down syndrome. Providing support to parents through structured education is an effective way to achieve intervention success. Likewise, face to face and booklet media, educating parents is an effective way to support paper quilling therapy.

## RESEARCH METHODS

This type of research is qualitative research compiled from nursing care reports using the nursing process. Based on the implementation of Evidence Based Nursing (EBN) in nursing practice, the case study uses a flow of activities based on Polit and Beck (2012) regarding the process of implementing EBN in nursing practice.

In the preparation stage, the researcher determines the research topic. Researchers conducted

an assessment of potential respondents. The questions presented refer to PICO (problem/population, intervention, comparison and outcome), namely "what interventions can be given to stimulate fine motor skills in toddlers with Down syndrome?". Next, in the second stage, a search was carried out using electronic media, namely the Google Scholar database, and 2 main articles were obtained that were in accordance with the research objectives. Then, after reviewing the article, it was found that paper quilling therapy was a nursing intervention that could be used. The next stage of implementing EBN is adjusted to the problems existing in respondents based on the studies that have been obtained. Researchers determine the title of the research. Informed consent is carried out verbally and in writing to ask for family approval. After the planning was approved by the supervisor, the researcher prepared the instruments in this research, namely a parent knowledge questionnaire sheet and an observation sheet to assess the child's development. The data collection instrument uses a questionnaire sheet obtained from various sources and has been tested for validity by expert lecturers (content validity), namely Mrs. Dian Ramawati, S.Kep., Ns., M.Kep., Ph.D. Child development observation sheets were obtained from research Sukardi, Syamsuddin, & Usman (2023).

The data collection stage uses primary and secondary data. Researchers asked for informed consent from the child's family before carrying out the intervention. The data collection stage was carried out in Banteran Village, Sumbang District, Banyumas Regency. Data collection on parents and children with Down syndrome was carried out in 6 meetings within 30-60 minutes which are described as follows.

1. At the first meeting, the researcher took pretest data on parental knowledge and child development using a questionnaire sheet and observation sheet that had been provided by the researcher.
2. In the second meeting, researchers conducted paper quilling therapy education to the children's parents.
3. In the third meeting, researchers conducted paper quilling therapy education to the children's parents.
4. In the fourth meeting, the researcher held a demonstration with the parents and re-demonstrated with the children.
5. At the fifth meeting, researchers observed and helped parents carry out paper quilling therapy on children.
6. At the sixth meeting, the researcher again observed and helped the parents carry out paper quilling therapy and then carried out a posttest on the parents' knowledge and child development.

In the data processing stage, researchers analyzed the increase in parents' knowledge and the development of children with Down syndrome. Researchers then draw conclusions about the existing results. The report preparation stage is carried out by compiling a discussion regarding the data analysis that has been carried out and concluding the results.

## RESULTS AND DISCUSSION

### Research Result

The results of research regarding parental knowledge and the development of children's fine motor skills using paper quilling are described as follows.

**Table 1. Parents' knowledge before and after paper quilling therapy education**

Category	E's parents	J's parents
Pretest	60 (Moderate)	55 (Moderate)
Mean	57,5	
Posttest	90 (Very High)	80 (High)
Mean	85	

**Table 2. Observations of children's fine motor development before and after paper quilling therapy**

Aspect	Criteria	Pretest		Posttest	
		An. E	An. J	An. E	An. J
Flexibility	Rolling paper with your bare hands	0	0	0	0
Eye and hand coordination	Apply glue following a straight line pattern	0	0	0	1
	Apply glue following the circle line pattern	0	0	1	1
	Apply glue following the triangular line pattern	0	0	0	1
	Paste the paper roll in a straight line pattern	0	0	1	1
	Paste the paper roll according to a triangular pattern	0	0	1	1
	Paste the paper roll according to the circle pattern	0	0	1	1
Neatness	Neat and clean line pattern	0	0	0	0
	Neat and clean triangle pattern	0	0	0	0
	Neat and clean circle pattern	0	0	0	0

**Table 3. Development of children's fine motor skills before and after paper quilling therapy**

No.	Child	Pretest	Posttest
1.	An. E	0	40
2.	An. J	0	60
	Mean	0	50

### Discussion

#### 1. Parental Knowledge Level

Knowledge is the result of knowing and this occurs after someone senses a certain object, in this case the sensing process occurs through the human senses. Most human knowledge is obtained through sight and hearing, so knowledge is a very important

domain in shaping one's actions (Gerungan, 2019). The results of this study explain that the average value of parental knowledge regarding paper quilling for 2 respondents before being given the intervention was 57.5. Parents still don't know the meaning of paper quilling, the advantages and disadvantages of paper quilling, the benefits of paper quilling, fine motor function, the importance of fine motor stimulation, the purpose of fine motor stimulation, and how to do paper quilling. Parents as the closest caregivers of a child must know more about the child's growth and development process and the factors that influence that process. Parental knowledge about child development is very important because it can direct parents to interact more with children so that it will indirectly influence the child's development (Puspita and Umar, 2020). Parents who have knowledge about child development tend to create an appropriate environment for the child's abilities to emerge. The influence of knowledge on children's development is very important because parents who have sufficient knowledge will pay more attention to their children's development. On the other hand, if the mother does not pay attention to the child's development and does not stimulate his development, the child will continue to experience delays in development. According to observations at the time of the research, parents did not know about paper quilling therapy. The average parent knowledge pretest result is 57.5, which is in the medium category. The parents admitted that they had never heard of paper quilling therapy and did not know how to do it. Therefore, it is necessary to educate parents about paper quilling therapy to increase parents' knowledge in stimulating the fine motor skills of children with Down syndrome through paper quilling therapy.

Based on the results of observations during the research, after the intervention there was an increase in parents' knowledge after the paper quilling therapy education was carried out. Parent E has a posttest score of 90 and parent J has a posttest score of 80. This shows an increase in knowledge from before the education was carried out to an increase after the education was carried out. Initially, both parents of respondents had a moderate knowledge category when seen on the questionnaire sheet and received very high and high knowledge categories after the education was carried out. Previous research states that there is a relationship between the level of knowledge and the role of parents with the development of gross motor and fine motor skills in 5 year old children at Istiqomah Tlogomas Kindergarten, Malang (Adelia and Purwaningtyas, 2019).

The questions on the parent knowledge questionnaire that the two respondents could not answer correctly were about the weaknesses and strengths of paper quilling, as well as the application of paper quilling. Judging from the observation results, respondents seemed to be more focused on using paper quilling as a medium for children's play, so they still did not pay attention to the weaknesses and advantages of paper quilling. Both respondents also answered incorrectly in applying paper quilling, stating that both respondents agreed that paper quilling can be attached anywhere such as floors, chairs and tables. According to the observation results, it was stated that both respondents knew that paper quilling could be used to decorate gift items such as jewelry boxes, frames and decorative items (Damayanti, 2015). However, the two respondents also thought that other items such as chairs and tables could be used as the basis for paper

quilling. This can be done, but considering the weakness of paper quilling in the form of paper which is easily damaged, if it is used as decoration on chairs and tables that are often used then paper quilling cannot be applied to these items (Yuli, 2012).

To be able to help optimize the development of children with Down syndrome, the role and attitude of the family is highly expected for children with Down syndrome. One form of growth and development disorders in children with Down syndrome is fine motor disorders. Fine motor skills are the development of movements that include small muscles with eye-hand coordination, such as paper quilling. Paper quilling is done using the fingers, so that the fingers will become flexible, stable, and make it easier for children to write or carry out activities that use their fingers. Apart from that, increasing flexibility in children's hands by rolling paper, improving hand and eye coordination by applying glue and gluing the edges of paper, increasing children's neatness in carrying out a task by following patterns, and improving children's concentration and cognitive abilities. The results of this paper quilling activity can be used as decoration that has artistic value. This paper quilling has affordable tools and materials and can be done independently for children with Down syndrome with parental assistance. Therefore, knowledge about paper quilling therapy needs to be increased among parents of children with Down syndrome to train or stimulate the fine motor skills of children with Down syndrome. The quality of care must be based on Family Care Indicators (FCI), namely by providing a variety of games such as paper quilling therapy (Gerungan, 2019).

## 2. Children's Fine Motor Development

The results of this study explain that the average score for fine motor skills of 2 respondents before being given the intervention was 0. In the flexibility section, namely the activity of rolling paper with their bare hands, both respondents were not able to roll paper with their bare hands as instructed, so they were given a score of 0. Both respondents just hold and pull the quilling paper then crumple it. In the eye and hand coordination section, both respondents were given a score of 0 because the children were not able to follow the instructions to apply glue following a circle, triangle or straight line pattern. E just wastes glue and is unable to apply glue to the pattern paper. Meanwhile, J just held, squeezed and played with applying glue to his own hands. The two respondents were also not able to carry out the tidiness aspect, namely the criteria of being clean and neat, both respondents were also given a score of 0 because the respondents tended to just tear, crumple and throw away paper. Of the 10 aspects assessed, the two respondents had not been able to implement all aspects well before implementing paper quilling.

The fine motor skills of children with Down syndrome are delayed compared to children in general (Dekayati, Asih and Nurulita, 2016). According to the results of observations during the research, children were not yet able to master the fine motor development that had been prepared by researchers. On average, respondents were not able to roll, glue and stick. This may be an obstacle because the child's mental age is not the same as his chronological age. Apart from that, there are differences in intellectual development with normal children which results in the emergence of obstacles for children with Down syndrome themselves



(Wong, 2009). Santoso (2005) added that the motor skills of children with Down syndrome are slow, because the child's cognitive function is also low (Dekayati, Asih and Nurulita, 2016). Therefore, it is necessary to carry out activities that can be carried out independently by families to improve children's fine motor development, one of which is paper quilling. Children need more time and opportunities to continue practicing so they can get used to doing activities according to what children generally do (Suyadi, Calista and Puspita, 2018).

Based on the results of observations during the research, after the intervention there was an increase in the children's fine motor activities, namely paper quilling. The results of observations carried out by researchers, at the first paper quilling demonstration meeting with children, showed that E was still trying to learn about paper quilling activities, the child still had unstable emotions, the child still liked to throw away things in front of him. After it was explained and practiced several times by the researcher and the respondent's parents, the respondent started trying to hold the glue and paper without throwing it away, the respondent tried to attach the quilling paper that had been formed but it was still messy and sometimes the shape was still damaged. Meanwhile, J has more regular emotions. J is still adapting to paper quilling but the child can already follow the instructions of the respondent and parents. It's just that children still prefer to place it according to the child's wishes, such as gluing it to the hand, gluing it to the outside of the pattern paper, sticking it to the outside of the pattern paper and taking it back to stick it into the pattern or vice versa.

At the second meeting, all respondents experienced good improvement. E, who initially had passionate emotions and was more active, has now

been able to stabilize his emotions. Children are able to position themselves when their parents are preparing the tools and materials that will be used for the paper quilling activity. Children are able to glue pattern paper even though it is still messy, children can be guided to glue quilling paper even though it is still out of pattern. Meanwhile, in J, the child is able to glue the ends of the quilling paper to form a circle, the child is also able to glue the pattern paper inside the pattern well even though it is still gluing outside the pattern too. J is able to roll quilling paper but only up to 2 rolls. Parents who do not feel embarrassed by the condition of their children who have shortcomings and hope for the best according to their children's abilities ensure that their children continue to be supported in their development (Rachmawati and Masykur, 2016). Supported by previous research which states that parents play a very important role in delivering educational success to the independence of children with Down syndrome (Wiryadi, 2014).

The third meeting and posttest at E was able to glue the circle pattern, stick the paper quilling in a circle, triangle and straight line pattern. Meanwhile, J has been able to glue on circle, triangle and straight line patterns, as well as stick paper quilling on circle, triangle and straight line patterns. J is also able to roll quilling paper but only up to 3 rolls. This is proven by the difference in mean scores between the pretest and posttest, namely from 0 after being given paper quilling therapy to 40 and 60. This agrees with the results of previous research which stated that fine motor skills in class IV Down syndrome children at SLBN 1 Soppeng increased by using paper quilling (Sukardi, Syamsuddin and Usman, 2023). This research is also supported by previous research, namely that paper quilling has an effect of

81.5% on improving the fine motor skills of moderately mentally retarded children. (Yusnisari and Tarsidi, 2020).

The difference in the increase in child development could be caused by the difference in age between the two respondents which is one year apart. At the age of 3 years, children generally like to break rules and are difficult to manage so parents need patience. Meanwhile, aged 4 years, children are more willing to show off themselves but are easily encouraged to follow the behavior they are instructed to do because children usually expect rewards (praise) (Subagia, 2021). Apart from that, having family support or having siblings who are still at school makes J understand more quickly because he often observes his siblings when they do their schoolwork. Several factors influence physical motor development in early childhood, including food factors, stimulus factors, physical readiness, gender, and cultural factors (Wiyani, 2020). Gender can influence motor development, boys are faster at learning control skills and girls are more at mastering locomotor skills (Bardid *et al.*, 2017).

After the intervention activities, aspects that children cannot yet do are aspects of flexibility such as rolling paper and neatness. Making paper rolls up to several rolls takes longer for children to learn. Neatness is also based on how often the child tries it. The intervention carried out by researchers in demonstrating paper quilling to children was only 3 days for 30-45 minutes each day so there were still aspects that had not been fulfilled by the children. In addition, intervention is only limited to when the researcher is present or once a day to minimize bias. It is possible for children to have a maximum score of 100 in improving fine motor development if trained for a longer time. Previous

research stated that with 9 meetings children can achieve an increase of up to 81.5% (Yusnisari and Tarsidi, 2020). Therefore, to achieve maximum value, paper quilling can be applied to children with Down syndrome more than 10 times.

Fine motor development is movements that control coordinated nerve centers, nerves and muscles. Increasing the development of children's small muscles is very important because carrying out more detailed activities requires more concentration so that activities can run more smoothly. Fine motor skills can include rolling, gluing and sticking paper. This activity has been included in paper quilling therapy. If a child's fine motor skills are not developed optimally, then when the child carries out certain activities it can become disrupted, even the worst condition that occurs if the child's fine motor skills are not developed properly, there is a high possibility that the child will experience tremors when carrying out activities due to the finger muscles not being trained. from an early age (Idris, 2022). Therefore, it is highly recommended for children with Down syndrome to carry out paper quilling therapy to stimulate their fine motor skills.

## CONCLUSIONS AND RECOMMENDATION

Based on the research results described above, it can be concluded that nursing care with a nursing diagnosis of knowledge deficit (stimulation of fine motor skills in children with Down syndrome) was obtained as a result of paper quilling education which can increase parents' knowledge regarding activities to stimulate fine motor skills in children with Down syndrome. Nursing care with a nursing diagnosis of child growth and development disorders showed that paper quilling therapy was able to improve fine motor skills in children



with Down syndrome. This paper quilling therapy can be applied independently by parents of children with Down syndrome to stimulate their fine motor skills because they have received education about paper quilling therapy.

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