

## CHAPTER II THEORY OVERVIEW

### A. Early Childhood Concept

#### 1. Definition of Early Childhood

Early childhood is a group of individuals who are still at the beginning of life, generally from birth to about six years old. In this age range, the development of the brain, cognition, language, emotions, and sensory abilities is very intense. Simple experiences such as playing, talking to others, or exploring the environment help strengthen neural pathways and form the foundation of a child's learning abilities. A number of international studies confirm that this period is the foundation for school readiness, long-term health, and social success in adulthood. If the stimulation provided is inadequate, the child can experience developmental obstacles and have difficulty reaching his or her best cognitive potential (Dadras *et al.*, 2024).

The early age range is usually divided into several stages with different developmental characteristics. At the age of 0–12 months, children begin to show sensory responses and basic motor movements. After entering the age of 1–3 years (*toddler*), the ability to walk, speak, and recognize objects has increased rapidly. At preschool age (3–6 years), children are able to think symbolically, group objects, recognize numbers, and solve simple problems. This division of developmental stages is important because each phase requires a different form of stimulation and learning experience (Dadras *et al.*, 2024).

#### 2. Early Childhood Growth and Development

Growth is a quantitative change in a child's physical size that includes an increase in weight, height, and head circumference, which can be objectively measured using anthropometric parameters (Clark *et al.*, 2020). Meanwhile, development is a qualitative change that reflects the maturity of organ function, adaptability, interaction, and mastery of new skills as a result of the learning process and experience. Development includes cognitive, linguistic, motor, social, and emotional domains that are integrated with each

other (Prince *et al.*, 2022).

In preschool (3–6 years), cognitive development takes place rapidly, characterized by symbolic abilities, problem-solving, behavior control, and the emergence of increasingly mature executive functions (Earnest) *et al.*, 2022). In addition, the development of language and visual representation begins to appear from the age of 2–3 years, when children begin to be able to draw simple objects, relate them to meaning, and develop symbolic representations (Panesi and Morra, 2021).

According to Prince *et al.* (2022), Child development occurs gradually following the process of biological maturation, nutrition, stimulation, and environmental interaction. These stages can be observed as follows:

- a. Infancy (0–12 months): basic motor development such as lying on the stomach, sitting, crawling, standing, and walking. Monitoring of motor development and physical growth in this period is generally carried out through anthropometric indicators and observation of movement ability (Prince *et al.*, 2022)
- b. Toddlers (1–3 years): early language skills, exploration of the environment by walking and running, and increased independence in simple activities. In this phase, symbolic and language abilities are increasingly developed and related to visual representation and communication skills (Panesi and Morra, 2021).
- c. Preschool (3–6 years): dominant cognitive development, including symbolic abilities (role-playing, drawing, shaping objects), problem-solving, and improvement in fine motor skills and social interaction. In this phase, the child's executive function is more mature and plays a role in the regulation of behavior and play activities (Earnest) *et al.*, 2022).

Early childhood development includes several important domains, namely physical-motor development, cognitive development, language development, social-emotional development, moral development, and religious and cultural scores. In this phase, cognitive abilities develop

rapidly, as seen from the increased ability of children to pay attention, remember, group objects, understand cause-and-effect relationships, recognize patterns, use symbols, and solve simple problems through play activities. All aspects of development interact with each other and form the basis of children's learning readiness (Suryana et al., 2022).

## **B. Basic Concepts of Early Childhood Cognitive Development**

### **1. Definition of Cognitive Development**

Cognitive development is the stage when children begin to build the ability to think, understand information, remember, language, and solve problems through the experiences and learning processes they experience. In early childhood, this ability is greatly influenced by the way parents respond, the quality of interactions at home, and the child's opportunities to explore through symbolic play activities. Positive parenting has been proven to strengthen children's mental development, language skills, and executive functions (Prime) *et al.*, 2023).

The process of cognitive development itself takes place gradually from the first year of life and continues to increase until entering preschool age. Several environmental factors such as adequate stimulation, availability of learning resources, nutritional status, and children's health conditions play a major role in shaping their developmental achievements. Children who grow up in families with a responsive environment and provide adequate learning stimuli tend to have better cognitive scores than children who receive less support (McCormick *et al.*, 2020).

### **2. How to Measure Cognitive Development**

In preschool, the measurement of children's cognitive development is more appropriate through structured observation of children's activities using concrete objects, compared to verbal tests alone, because children's language skills and symbolic meanings are still in the developmental stage. Observations are focused on children's behavior when performing simple cognitive activities, such as counting, counting, recognizing shapes, and

grouping objects. Through direct observation of the child's work process and results during the activity, the researcher can authentically score the child's symbolic thinking and logical thinking skills based on the real performance shown during the activity (Siregar, 2023).

a. Cognitive Development Instruments

The cognitive development instrument in this study uses observational instruments adapted from Siregar (2023) And has gone through the content validation process (*Content validity*) through expert scoring (*Expert judgement*) in previous research. This instrument is designed to measure the cognitive abilities of children aged 5–6 years through manipulative activities using concrete objects, which include the ability to think symbolically and logically think, such as counting, counting the number of objects, recognizing geometric shapes, and grouping objects based on certain characteristics. This instrument uses a scoring scale of 1–4 with the categories of Not Yet Developed (BB), Starting to Develop (MB), Developing As Expected (BSH), and Developing Very Well (BSB).

b. Indicators of Cognitive Development

1) Symbolic thinking

a. Number Concept

The child's ability to pronounce the sequence of numbers 1–10 correctly.

b. Calculating the Amount

The child's ability to count the number of objects 1–10 within 20 seconds.

2) Logical thinking

a) Geometry

The child's ability to recognize and distinguish basic geometric shapes (circles, triangles, squares, and rectangles).

b) Classification

A child's ability to group objects based on certain characteristics, such as shape and color.

c. Cognitive Development Scale

The level of children's cognitive development in this study was assessed through four categories of observations used in observation instruments adapted from Siregar, (2023), namely:

1) Score 1: Not Developed (BB)

Children must do it with guidance or exemplified by an observer

2) Score 2: Start Growing (MB)

Children who do so must still be reminded or assisted by an observer

3) Score 3: Progress On Expectations (BSH)

Children can already do it independently

4) Score 4: Very Good Developed (BSB)

Children can do it independently and consistently without having to be helped and reminded by observers and can help their friends

d. Interpretation of cognitive development

The total score of the child's cognitive development was obtained from the sum of all scores on 8 instrument items, with a minimum score range of 8 and a maximum of 32. The interpretation of the child's level of cognitive development is determined based on the following categories:

1) Score 8–14 = Not Developed (BB)

2) Score 15–20 = Start Growing (MB)

3) Score 21–26 = Progress On Expectations (BSH)

4) Score 27–32 = Very Well Developed (BSB)

**Table 2. 1** Cognitive Development Observation Instrument

| Yes | Item or Statement                                                           | 1<br>(BB) | 2<br>(MB) | 3<br>(BSH) | 4<br>(BSB) |
|-----|-----------------------------------------------------------------------------|-----------|-----------|------------|------------|
| 1   | Children are able to say the numbers 1–10 in order                          |           |           |            |            |
| 2   | The child is able to count the number of objects 1–10 (20-second intervals) |           |           |            |            |

|   |                                                   |  |  |  |  |
|---|---------------------------------------------------|--|--|--|--|
| 3 | The child is able to show a circular object       |  |  |  |  |
| 4 | The child is able to show triangular objects      |  |  |  |  |
| 5 | The child is able to show rectangular objects     |  |  |  |  |
| 6 | The child is able to show a square object         |  |  |  |  |
| 7 | Children are able to group objects based on shape |  |  |  |  |
| 8 | Children are able to group objects by color       |  |  |  |  |

### 3. Levels of Cognitive Development

According to Piaget, early childhood is in the preoperational stage ( $\pm 2-7$  years) with symbolic thinking but concrete logic is still limited (Madanagopal, 2020). To score cognitive achievement during play activities, indicators are arranged according to Bloom's Taxonomy (Sigh) *et al.*, 2023) which includes:

- a. *Remember* : the ability to recognize and recall basic information (e.g., colors, shapes, or numbers) that is presented.
- b. *Understand* : the ability to explain relationships, give simple reasons why two objects belong to the same or different group, and provide other illustrations.
- c. *Apply* : the ability to use a pre-understood concept to complete a task or follow a rule in a new situation.
- d. *Analyze* : the ability to decompose and group based on one specific criterion, then compare it to other criteria to find patterns.
- e. *Evaluate* : the ability to score the accuracy or quality of a result and provide a logical reason for the score.
- f. *Create* : the ability to organize ideas into new original designs or products, and then explain their meaning.

### 4. Factors That Affect Cognitive Development

- a. Internal Factors

1) Attention and executive functions

The ability to focus attention, resist impulses, and working memory mediate learning and problem-solving in early childhood; Meaningful games help strengthen this function (Coelho et al., 2021).

2) Intrinsic motivation and curiosity

The encouragement of exploration from within children makes them actively try, connect concepts, and build symbolic representations during play (Poly & Meyer, 2025).

3) Language and early communication

Language listening and expressing skills correlated with reasoning, memory, and categorization in preschool (Bal, 2024).

4) Neurological and sensory health

Biological conditions such as prematurity or hearing/vision impairment can limit the input needed for cognitive and language development and require early detection and intervention (The et al., 2022).

5) Quality and duration of sleep

Getting enough sleep at age 3–5 years (about 10–13 hours per 24 hours, including naps) is associated with better attention and emotion regulation (Mason *et al.*, 2022).

b. External Factors

1) Nutrition and health status

Adequate nutrition, disease prevention, and quality health services are the foundations for effective cognitive stimulation according to the Nurturing Care framework (WHO-UNICEF, 2021).

2) Responsive parenting

Warm, sensitive, and consistent interaction from parents/caregivers enriches the child's language, attention, and executive function (Wolf *et al.*, 2024)

3) Early learning opportunities and play environment

Access to educational play materials, reading activities together, and

constructive games such as *playdough* and *loose parts* Supports exploration, classification, and troubleshooting (UNICEF, 2023).

4) Physical environment and toxic exposure

Exposure to lead and fine air pollution is associated with decreased cognitive function; Prevention of exposure is highly recommended (Rees et al., 2020).

5) Physical activity patterns, *screen time*, and daily routines

WHO guidelines for children under 5 years of age emphasize daily physical activity, adequate sleep, and screen time restrictions to support cognitive and health outcomes (WHO, 2020).

c. Demographic and Family Factors

1) Child's age

As we age, the maturity of cognitive function increases so that the ability to understand, remember, and solve problems also develops. Febrina *et al.*, (2023) showed different cognitive development in the age range of 0–36 months.

2) Gender

Boys have a higher risk of being late cognitive compared to women. In the study Febrina *et al.* (2023), male sex is significantly associated with cognitive retardation.

3) Parent/guardian education

Parental education is related to the ability to provide cognitive stimulation at home and better access to learning. Study by González *et al.* (2020) who found that parental education affects the cognitive scores of children aged 5–6 years.

4) Occupation/Family socioeconomic status

Family socioeconomics affect access to learning resources, nutrition, and mentoring time which are factors that can contribute to children's cognitive development. Study González *et al.* (2020) It also shows that family social class plays a role in differences in children's cognitive outcomes.



## 5. Ways to stimulate early childhood cognitive development

Stimulation of cognitive development in early childhood needs to be provided through an approach that is appropriate to the stages of development, involving play, exploration, and meaningful social interactions. Broadly speaking, ways to stimulate cognitive development include:

### a. *Play-Based Learning*

This approach utilizes play activities that are designed in a directional way to encourage children to hold, change, and explore various objects, as well as use imagination when following the rules of the game. Children are trained to recognize symbols, focus attention, remember the stages of the activity, and adjust the way to complete tasks according to the situation (Coelho et al., 2021)

### b. Play Therapy and Educational Media

Play therapy and the use of educational media such as storybooks, constructive games, and teaching aids provide a space for children to learn through safe and interactive hands-on experiences. Koukourikos *et al.* (2021) Explains that play therapy helps children convey ideas, make decisions, and develop symbolic thinking skills. Educational media enrich the understanding of concepts and stimulate the thought process, so that both can be used as a form of directed cognitive stimulation.

## C. Play Therapy Concept

### 1. Definition of Play Therapy

Play therapy is a form of nursing intervention that uses play activities as a medium to help children express emotions, reduce anxiety, and increase comfort during treatment. Through this activity, children can better adapt to medical procedures that cause fear, so that communication and collaboration between children and health workers become more effective (Hermalinda *et al.*, 2025).

In addition, the play approach also functions as a stimulation of children's cognitive development. Various games that are arranged in a directed manner are able to hone thinking skills such as memory, concentration, problem-solving, and creativity. Thus, play therapy contributes to the optimization of children's growth and development, especially when they are in health services (Godino-Iáñez *et al.*, 2020).

## 2. Benefits of Play Therapy

According to Istamb (2021), play provides a wide range of benefits for children, including physical, gross and fine motor, social, language, emotional, and cognitive development:

### a. Physical aspects

Through games, children get the opportunity to move their body actively, for example walking, running, jumping, crawling, or doing rolling movements. This kind of physical activity helps strengthen the muscular system, improve body coordination, and support overall fitness and physical health.

### b. Aspects of coarse and fine motor development

Games also provide space for children to develop motor skills, both involving large movements and detailed movements. Activities such as drawing, scissors, meronce, or playing with materials such as sand and *playdough* encourage increased precision of movement, hand-eye coordination, and manipulative skills that are essential for daily activities.

### c. Social aspects

In the context of play, children learn to build relationships with peers through the experience of sharing, waiting for their turn, working collaboratively, and obeying the rules of the game. These interactions help children understand different social roles as well as expand their ability to adjust to the social environment.

d. Language aspects

Play situations provide ample opportunities for children to practice language skills. They are encouraged to express opinions, negotiate, and use a variety of new vocabulary. The communication patterns that develop during play support speaking skills, language comprehension, and fluency in communicating in various contexts.

e. Emotional and personality aspects

Games provide space for children to express feelings, both fun and uncomfortable. Through group interactions, children learn to recognize their strengths, build confidence, and develop a positive self-concept. Play activities also help reduce tension and provide opportunities for children to manage their emotions more adaptively.

f. Cognitive aspects

Play stimulates children's thinking skills through activities that require creativity, problem-solving, focus, and memory. Through direct experience and exploration, children's insights increase and their reasoning skills develop more maturely.

### 3. Purpose of Play Therapy

Goals of play therapy according to Koukourikos *et al.* (2021):

- a. Create a supportive environment so that children feel comfortable expressing their feelings, so that anxiety that arises during the treatment process can be reduced.
- b. Encourage the development of socializing and problem-solving skills through interaction dynamics and rules applied in play activities.
- c. Providing space for children to explore and hone their creativity and thinking skills through games that are in accordance with their growth and development stages.

### 4. Characteristics of Play Therapy

Characteristics of play therapy according to Chauhan *et al.* (2024):

- a. Driven by motivation from within the child

Play is done at the child's own wishes, so that it takes place spontaneously

and provides a sense of pleasure during the activity.

b. Not bound by strict rules

Children have the freedom to determine how to play according to their imagination and creativity, so that activities remain fun and increase participation.

c. Contains real and meaningful activities

During play, children interact directly with their environment through physical and mental activities, so they get a natural learning experience from what they do.

d. Emphasis more on process than end result

The focus in play is the experience and abilities that develop during the child's involvement in the game, not the product or the resulting result.

e. Children are the center of play activities

Games should allow children to take control of the course of activities. Adult intervention is enough to be limited to mentoring so that the meaning of play is not lost.

f. Requires active involvement from children

Children need to be directly involved in play to gain new knowledge and skills, as play is an important part of their learning process.

## 5. Playing Methods

According to Chauhan *et al.* (2024), play therapy has a variety of play approaches and techniques that can be utilized to stimulate early childhood physical, social, emotional, and cognitive development. However, in this study, the main focus is on the based play method *Playdough* and *Loose Parts Play*, because both are empirically proven to provide optimal stimulation to cognitive development. Other methods still have benefits, but they are only used as contexts or groups of comparisons.

### a. Play *Playdough*

*Playdough* is a soft, safe, and malleable medium. Children can create various geometric shapes, animals, or objects according to their imagination. These activities stimulate fine motor skills, creativity,

symbolization, and simple problem-solving skills, which are an important foundation for cognitive development (Cankaya) *et al.*, 2023).

*b. Loose parts play*

*Loose parts play* using free objects such as rocks, wooden sticks, geometric educational buttons, or bottle caps. Children are free to arrange, combine, and modify these objects according to creative ideas. This method encourages divergent thinking, classification, spatial logic, and cognitive flexibility (Cankaya) *et al.*, 2025).

*c. Puzzle*

*Play Puzzle* It is an activity to arrange pieces of images to form a whole unit. This activity helps children develop a variety of cognitive abilities, such as concentration, visual memory, coordination between vision and hand movements, and simple problem-solving skills. In addition, *Puzzle* also stimulates children to understand the relationship between forms and spatial positions, thus contributing to the growth of visual-spatial skills from an early age (Mubarroroh & Hidayah, 2022).

*d. Other Playing Methods*

According to UNICEF and the LEGO Foundation (2020), there are various other forms of play activities that also contribute to children's development, such as:

- 1) *Block play* to practice the construction and concept of space.
- 2) *Role play* to develop language skills and social symbols.
- 3) *Storytelling* and *puppet shows* to enhance imagination and narrative skills.
- 4) *Sorting* and *pattern games* to stimulate basic mathematical logic.

## **D. Playdough Concept**

### **1. Definition of Playdough**

*Playdough* is a soft-based play medium that can be shaped according to the child's imagination, usually made from a mixture of flour, salt, oil, and natural dyes. As an educational game tool, *Playdough* It serves to stimulate fine motor skills while strengthening cognitive abilities through squeezing,

rolling, and shaping activities. Play with *Playdough* Train children to recognize the concepts of shapes, sizes, patterns, and colors. This is in line with Piaget's theory of constructivism, in which children learn through direct exploration, as well as Vygotsky's sociocultural theory which emphasizes the role of social interaction in building new understandings (Yuniyartika & Sudaryanti, 2024).

## 2. Types of *Playdough*

*Playdough* It is a play medium with soft texture and plastic properties that can be modified in the aspects of color, shape, and surface so that it is effectively used in stimulating fine motor and cognitive development in early childhood, including the ability to distinguish, group, and solve problems through manipulative activities. The intervention of this study grouped *playdough* based on the characteristics of the ingredients and the purpose of stimulation as follows (Yuniyartika & Sudaryanti, 2024).

### a. *Commercial Playdough*

Ready-to-use products available on the market, easy to obtain and immediately used in activities. The safety of the material must still be considered, especially the non-toxic labels that are child-friendly.

### b. *Homemade Playdough*

It is made from simple ingredients commonly found at home, such as wheat flour, oil, water, and food coloring. This type is more economical and safe, as well as providing additional learning opportunities when children are involved in the manufacturing process.

### c. *Natural Playdough*

It is composed of ingredients enriched with natural dyes sourced from fruits, vegetables, or spices, thereby reducing exposure to chemicals and supporting the process of recognizing basic scientific concepts through color and texture.

### d. *Sensory Playdough*

Modified with the addition of textured or flavorful elements, such as safe grains or fragrances, to enhance multi-sensory stimulation and enrich

cognitive processing as the child explores differences in shapes, textures, and patterns (Yuniyartika & Sudaryanti, 2024).

### 3. Purpose of *Playdough*

Main purpose of use *Playdough* is to provide an active, creative, and cognitively challenging learning experience. Children practice hand-eye coordination, comparing sizes, counting numbers, and grouping shapes. Thus, *Playdough* Help children understand basic mathematical logic concepts, classification, and problem solving (Yuniyartika & Sudaryanti, 2024). From a cognitive perspective, *Playdough* It also functions to develop imagination and symbolic thinking, which is the basis for the development of literacy and numeracy.

### 4. Benefits of *Playdough*

Cognitive benefits of *Playdough*:

- a. Classification and categorization skills: children learn to group shapes, colors, or sizes.
- b. Problem solving and creativity: children are challenged to create shapes according to certain themes, thus practicing divergent thinking.
- c. Attention and concentration: the activity of manipulating *Playdough* demands continuous focus.
- d. Academic readiness: fine motor skills acquired through *Playdough* supports writing, numeracy, and other cognitive exploration skills (Yuniyartika & Sudaryanti, 2024).

### 5. How to Play *Playdough*

According to Yuniyartika and Sudaryanti, (2024)), play activities *playdough* This is done by giving children the opportunity to manipulate the dough freely through pressing, rolling, and shaping activities without specific shape instructions. This activity stimulates hand-eye coordination and children's cognitive development, especially the ability to think symbolically and logically through the recognition of shapes, number concepts, and object grouping. Giving simple triggering questions helps children understand the concepts generated from play activities.

- a. Position the child comfortably on a table or flat floor, and place *the playdough* in an easy-to-reach container.
- b. Provide opportunities for free exploration of *the playdough* through basic manipulations such as squeezing, rolling, and shaping.
- c. Invite your child to recognize and name the basic geometric shapes that are produced, such as circles, triangles, squares, and rectangles.
- d. Instruct your child to group the results of *the playdough* based on certain characteristics, such as shape and color, to stimulate classification skills.
- e. Stimulate the ability to think symbolically by inviting children to form or say the symbol of numbers from the *playdough*.
- f. Invite your child to count the number of *playdough* shapes made in the range of 1–10.
- g. Give the child the opportunity to match the number of shapes to the number mentioned.
- h. End the play session by asking the child to tell you about the shape made and give positive feedback on the play process.

#### **E. Loose parts play concept**

##### **1. Definition of *Loose parts play***

*Loose parts play* is the concept of play that uses loose objects or unstructured materials that can be moved, combined, separated, or modified according to the needs and imagination of children. Nicholson as the initial initiator stated that children's creativity will increase if they interact with an environment rich in manipulative materials. *Loose parts play* It can be natural materials such as stones, gravel, twigs, and leaves, as well as artificial materials such as bottle caps, plastic pipes, ice cream sticks, or used cardboard (Cankaya) *et al.*, 2024). This concept not only provides a sensorimotor experience, but also stimulates cognitive aspects such as problem-solving, symbolic thinking, and children's creativity.

##### **2. Characteristics *Loose parts play***

*Loose parts play* has the main characteristics of being flexible, *open-ended*, multisensory, and *child-centered*. The materials used do not have a



single function so they can be changed, combined, or reshaped according to the child's ideas. The variety of materials, both natural and artificial, provides an opportunity for children to expand their sensory experiences while practicing divergent thinking skills and *Problem solving* (Karyadi & Rosa, 2023).

### 3. Types of *Loose parts play*

*Loose parts play* can be grouped by material source used (Cankaya *et al.*, 2025):

- a. *Natural loose parts* : using natural materials such as stones, sand, twigs, leaves, and bark that foster a love for the environment and the ability to classify.
- b. *Artificial loose parts* : in the form of human-made materials such as geometric educational buttons, bottle caps, straws, ice cream sticks, or simple legos that encourage creativity and constructive skills.
- c. *Loose parts Recycling*: using used materials such as cardboard, plastic bottles, patchwork, or tissue rolls that are still safe to use. In addition to stimulating creativity, this type also instills a sustainability score.
- d. *Loose parts Combination*: a combination of natural, artificial, and recycled materials that enrich a variety of children's cognitive exploration.

### 4. Function *Loose parts play*

Main functions *Loose Parts Play* is as a medium of cognitive stimulation through exploration, classification, and problem-solving activities. In addition, *Loose Parts Play* It serves as a means of developing creativity, improving fine motor skills, and contextual learning that instills sustainability scores through the use of natural and recycled materials (Cankaya *et al.*, 2023).

### 5. Benefits of *Loose Parts Play*

*Loose parts play* has wide benefits in supporting early childhood development. From a cognitive aspect, this game stimulates the ability to think logically, symbolic thinking, imagination, and creativity. From the

motor aspect, the activity of composing, lifting, and combining materials helps to practice hand-eye coordination and fine motor skills as the basis for pre-writing. From the social-emotional aspect, *Loose Parts Play* Train children to cooperate, negotiate, share roles, and foster confidence. Meanwhile, the use of recycled materials provides additional scores in the form of ecological awareness and responsibility for the environment from an early age (Cankaya) *et al.*, 2023).

#### 6. How to Play *Loose parts play*

According to São Paulo *et al.* ( 2025), *Loose Parts Play* is a play activity using loose objects that are *open-ended* and can be manipulated freely by the child. In this intervention, *loose parts* which is used in the form of geometric educational buttons that allow children to explore, arrange, and group objects to stimulate logical thinking and symbolic thinking skills, especially in understanding the concept of numbers, counting numbers, recognizing geometric shapes, and classifying.

- a. Position the child comfortably on a low floor or table with a flat surface, and make sure the geometry educational buttons are within reach of the child.
- b. Give your child the opportunity to freely touch, move, and explore geometric educational buttons to observe your child's initial response to play media.
- c. Invite your child to recognize and show the basic shapes on geometry educational buttons, such as circles, triangles, squares, and rectangles.
- d. Invite your child to group geometric educational buttons based on specific characteristics, such as color and shape, to stimulate classification skills.
- e. Invite your child to count the number of geometric educational buttons used in the range of 1-10.
- f. Invite your child to match the number of geometric educational buttons with the number mentioned or shown.

- g. Give your child the opportunity to arrange geometric educational buttons based on simple patterns, such as a certain order of colors, shapes, or quantities.
- h. Give your child the opportunity to knit geometric educational buttons using the rope as instructed by the researcher, such as based on a simple color, shape, or pattern.
- i. End the session with a simple reflection, where the child is asked to rename the color, shape, number, or pattern of geometric educational buttons that have been played, while the nurse gives positive feedback on the play.

## **F. Concept of Puzzle Playing Therapy**

### **1. Definition of *Puzzle***

*Puzzle* is one of the educational games that trains children's visual and cognitive abilities through the activity of arranging pieces of images into whole forms. This game requires children to recognize shapes, colors, and patterns of drawings and match them precisely to produce a complete final shape. The process provides visual stimulation and fine motor coordination as the child must hold, twist, and place each piece in the appropriate position (Mulyana & Nurcahyani, 2022).

According to Mulyana and Nurcahyani (2022), *Puzzle* This includes constructive games that help children think systematically, remember picture patterns, and develop problem-solving skills through the process of trying and improving. In addition, *Puzzle* facilitates cognitive stimulation as the child learns to understand the relationship between the parts and the whole picture.

### **2. Types of *Puzzles***

*Puzzle* can be grouped by form of media and how to play it (Mutiarasari *et al.*, 2025):

- a. *Jigsaw Puzzle*: a puzzle consisting of pieces of pictures that are locked together and must be arranged to form a whole picture.

- b. *Peg (Inset) Puzzle*: a *puzzle* that is played by inserting pieces into a suitable place or slot. Each piece is usually equipped with a *peg (knop)* so that it is easy for children to hold.
- c. *Stacking Puzzle*: a *puzzle* that is played by stacking pieces on pegs according to the shape, size, or number of holes each piece has. *The puzzles* used in this study are a type of *geometric stacking puzzle*.
- d. *Tangram Puzzle*: a *puzzle* consisting of several geometric flat shapes arranged into various shapes or specific patterns.

### 3. Benefits of *Puzzles*

*Puzzle* It is used as a cognitive stimulation medium that involves the process of recognizing geometric shapes, distinguishing colors, matching pieces, and arranging parts into a whole image. This activity provides a visual experience that helps children understand the relationship between parts and wholes, thus stimulating logical thinking and symbolic thinking skills. Through the activity of arranging and matching pieces, children learn to group shapes and colors and count the number of pieces used during play (Mulyana & Nurcahyani, 2022).

According to Mulyana and Nurcahyani (2022), Play *Puzzle* It is useful for improving concentration, eye and hand coordination, and children's logical thinking skills. In addition, the success of compiling *Puzzle* It also gradually helps the child recognize geometric shapes and understand the concept of grouping simply, which is part of early childhood cognitive development.

### 4. How to play *Puzzle*

Steps in doing play therapy *Puzzle* according to Nazilah and Aliza, (2022) namely:

- a. Position your child comfortably on a table or flat floor, and make sure the *puzzle* is within reach of the child.
- b. Give your child the opportunity to observe and touch the *puzzle* freely before starting to put together.
- c. Invite children to choose and match puzzles one by one according to the

right shape and position.

- d. Instruct your child to recognize and name geometric shapes on *puzzles*, such as circles, triangles, squares, and rectangles.
- e. Invite your child to count the number of *puzzles* that have been installed in the range of 1–10.
- f. Invite your child to match the number of *puzzles* attached to the number mentioned
- g. Give children the opportunity to group puzzles by color or shape after the compilation process.
- h. End the session with reflection, the nurse gives positive feedback on the playing process.

#### **G. The Effect of *Playdough Play Therapy* and *Loose Parts Play* on Cognitive Development**

When early childhood is in a period of accelerated brain growth, they urgently need the right stimulation to optimize cognitive development. At this stage, most of the thinking processes are still concrete, so the child is not able to manage abstract information in its entirety and cannot explain verbally what he thinks or the difficulties he faces. In the context of nursing, nurses play an important role in designing interventions that are not only safe and enjoyable, but also have a strong scientific basis in stimulating cognitive function. One of the most widely used forms of intervention is play therapy using *playdough media*, because it involves sensorimotor activities that are rich and in accordance with the characteristics of early childhood development.

*Play therapy playdough* It is a manipulative activity that is carried out through kneading, pressing, rolling, pinching, and shaping the dough according to the child's ideas. This activity involves fine motor movements and hand-eye coordination, while stimulating children's cognitive abilities through the recognition of geometric shapes, number concepts, counting numbers, and the ability to group objects based on certain characteristics. Through the activity of forming and arranging dough, children learn to recognize the difference in shapes, amounts, and colors concretely during the play process. In pediatric

nursing practice, play therapy *playdough* It can be used as a simple and fun non-pharmacological cognitive stimulation medium, both in the waiting room, outpatient and growth and development services, so that children still get cognitive stimulation that is in accordance with their developmental stage (Ardianti, 2023).

Based on research Yuniyartika and Sudaryanti (2024) which was carried out at Kindergarten Negeri Pembina Sekayu for 60 children aged 5-6 years who were divided into 30 children in the intervention group and 30 children in the control group. The results of the study show that the use of media *playdough* has a significant influence on children's cognitive development, ( $p < 0.0001$ ). Intervention groups given play therapy *playdough* obtained an average cognitive score of 52.93, while the control group had an average of 46.77, with an average difference of 6.16 points. Other research by Septiani *et al.* (2024) which was carried out at SDLB Prof. Dr. Sri Soedewi Masjchun Sofwan Jambi City for 10 children. The results of the study showed that play therapy using the medium *playdough* had a significant effect on children's cognitive abilities, ( $p = 0.017$ ). The average cognitive score before the intervention was 11.1 and increased to 13.6 after the intervention, so there was a difference in improvement of 2.5 points. These findings show that the use of *playdough* Able to improve children's ability to recognize numbers and letters.

Physiologically, manipulative activities such as playing *playdough* and managing various concrete objects are able to activate the sensorimotor system and support the neuroplasticity process. Tactile and proprioceptive stimuli received through the fingers and palms will be transmitted to the somatosensory cortex and then integrated in the area of the associative cortex as well as the prefrontal cortex. At the same time, the brain releases neuromodulators such as dopamine and *Brain-Derived Neurotrophic Factor* (BDNF) that play a role in strengthening synaptic connections, promoting dendrite growth, and improving the efficiency of nerve networks involved in attention, working memory, decision-making, and problem-solving. Since early childhood is a golden period with high levels of brain plasticity, repeated stimulation through concrete play

will have a long-term impact on a child's cognitive capacity.

In the framework of stimulating cognitive development, *loose parts play* is another form of play therapy that provides ample opportunities for children to explore using *open-ended materials* such as kancng, shells, rocks, wooden branches, bottle caps, and natural or used objects in the surrounding environment. Children can move, arrange, group, sort, combine, and disassemble the material according to their ideas and imagination. This freedom encourages children to think flexibly, make simple hypotheses, try different strategies, and correct mistakes independently. For nurses or educators in the children's health care environment, the use of *loose parts* allows the implementation of cognitive stimulation with low-cost, easy-to-obtain, but function-rich media, while teaching children to recognize the surrounding environment as a source of learning.

Based on research Shirley *et al.* (2024) which was carried out at Permata Selatpanjang Kindergarten, Tebing Tinggi District, Meranti Islands on 50 children aged 5–6 years consisting of 25 children in the intervention group and 25 children in the control group. The results showed that the use of loose parts media had a real effect on children's cognitive development, with a score of ( $p < 0.0001$ ). The intervention group showed an average improvement in cognitive development scores of 14,320, while the control group experienced an average improvement of 11,600, with a mean difference of about 2.72 points. Other research conducted by Umami *et al.*, (2022) at Al Azhar Islamic Kindergarten 63 Pekalongan for 20 children aged 4-5 years. The results showed that the use of loose parts media had a significant effect on children's cognitive abilities, with a score of ( $p = 0.0001$ ). The average cognitive score increased from 32.5 before the intervention to 45.3 after the intervention, with a difference of 12.8 points. These results illustrate that loose parts are able to improve children's ability to group objects, recognize patterns, understand sizes, and complete cognitive tasks through the exploration of loose materials.

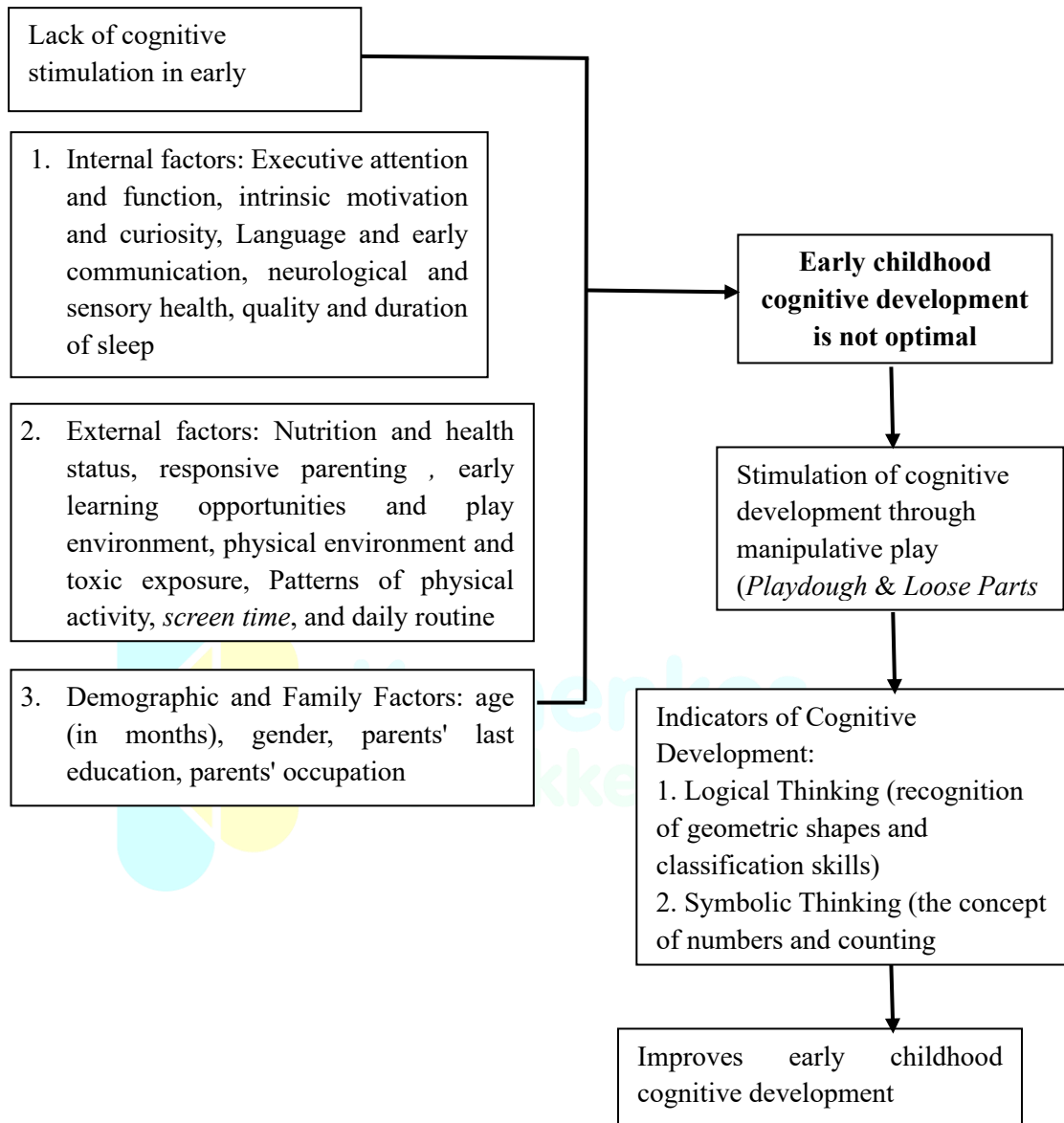
The findings reinforce that *playdough* and *loose parts play* therapy have a strong theoretical and physiological basis in supporting early childhood

cognitive development. From a nursing perspective, these two forms of therapy not only serve as a medium of stimulation, but also as a humanistic approach that creates a safe, comfortable, and fun learning atmosphere. Children are given space to explore, try, and learn from first-hand experience, while caregivers and parents can act as facilitators who provide support, reinforcement, and guidance as needed. Thus, the integration of *playdough* and *loose parts play therapy* in growth and development nursing practice has great potential to optimize children's cognitive function holistically.





## H. Theoretical Framework



**Chart 2. 1** Theoretical Framework

Source: Piaget Modifications; Vygotsky; Nicholson; Papalia and Martorell, 2020; UNICEF 2023 Muzaimah 2025, Koukourikos et al. (2021)