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The impact of apartment furniture design on children's development and recommendations for multifunctional furniture

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ABSTRACT

People residing in urban environments, particularly children inhabiting apartments, often contend with limited space for movement. Children require sufficient space for physical activity to support their physical and psychological development. This study analyzes furniture design's influence on children's development. It employs a qualitative research approach with a phenomenological orientation and descriptive analysis. The data collection methods employed in this study encompass literature review, observation, and interviews. The study's participants consist of infants (newborn to 18 months) and toddlers (18 to 36 months) residing in apartments within Kalibata City, along with their caregivers. The study's findings indicate that furniture within confined spaces is not adequately tailored to children's activities and needs, consequently negatively impacting their physical and psychological well-being. Therefore, a furniture redesign to accommodate children's activities and support their development is imperative. This research recommends optimizing furniture design, encompassing construction systems, materials, safety measures, dimensions, and age-appropriate usage. The insights gleaned from this study hold significant value for the real estate industry, furniture design sector, interior design profession, and consumers.

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1. Introduction

Residential trends in major cities in Indonesia are gradually shifting from traditional residential houses to apartments. The fast and practical lifestyle of urban communities is driving an increasing demand for apartments. While apartments offer numerous benefits for families, their designs often neglect to consider children as residents, leading to daily challenges in family functioning and overall well-being [1]. Additionally, living in apartments can have a negative impact on one's psychological well-being. High-rise apartment living has been associated with higher rates of psychological distress [2]. Regarding the interior design of dwellings, universality can be expressed through various aspects, including form, typology, and circulation possibilities [3]. Living in apartments has both advantages and disadvantages. Another drawback of apartment living is the inconvenience of mobility, particularly when it comes to moving infants, young toddlers, and groceries [4]. Apartments are less appealing to families because they impose restrictions on children's activities [5]. In fact, children have the right to live safely and comfortably in any living environment [6]. Mallol demonstrated that children's right to play is recognized in Article 31 of the 1989 Convention on the Rights of the Child. This article also acknowledges other rights, such as the right to rest, leisure, and recreational activities, including play, as they are considered indispensable components of the physical, social, cognitive, emotional, and spiritual development of minors [6].

The aim of this study is to analyze how furniture design in apartments affects the psychological and physical development of children, especially infants and toddlers. The study sample is drawn from Kalibata City Apartment, located at Jalan Raya Kalibata No.1, South Jakarta. This apartment complex comprises 18 towers, with 7 of them being of the regency/family type. The regency/family-type apartments have specifications of a net area of 30 m^2 and a gross area of 36 m^2. They consist of two bedrooms, one bathroom, a balcony, and a main room (which includes a pantry and a living room). Family-type apartments are those with one to four rooms, with areas of 25 m^2 for one room, 30 m^2 for two rooms, and 85 m^2-140 m^2 for three and four rooms [7]. In family-type apartments, the master bedroom is equipped with a bathroom, one to three children's bedrooms, one to two shared bathrooms, a family room, a dining room, a kitchen, a laundry room, a maid's room, and a storage area. The plans for family-type apartment rooms are developed based on the activities and space requirements of the occupants, who are primarily young families with infants (aged from birth to 18 months), toddlers (aged 18 to 36 months), or preschoolers (aged 3 to 7 years). However, children's bedrooms in these apartments are designed primarily for sleeping, whereas children engage in various activities such as playing, eating, drinking, and others.

All of these activities require adequate space to support children's growth and development. Infants require approximately 90-100 square feet per infant or about 3 x 3 meters, which includes a sleeping area, a food preparation and feeding area, a diaper changing area, a space for parents, storage, and a play area [8]. Similarly, toddlers require around 65-75 square feet per child or about 2.3 x 3 meters for the same activities as infants, except for a separate sleeping area. However, the size of the children's bedrooms in this apartment unit is only 2.625 x 2.250 meters. Consequently, the size of the children's room falls short of the ideal room size, limiting the range of activities that can be accommodated in the children's room. The limited space within apartments necessitates careful interior design, optimizing every available space. This entails the use of multifunctional furniture that can serve multiple purposes, provide ample storage for various items, and save space. Furniture that does not cater to children's scale can make them feel uncomfortable. Prioritizing furniture that suits the scale of children can significantly enhance their spatial experience [9]. This research contributes to the principles of designing multifunctional furniture within apartments, with a specific focus on children's furniture.

2. Method

This research employed qualitative research methods. The data gathered are not numerical but consist of text, documents, images, photos, artifacts, or other objects discovered in the field during the research [10]. Qualitative research addresses questions related to understanding the meaning and experiential dimensions of human lives and social worlds [11]. Qualitative research involves a creative process for data analysis to elucidate patterns [12]. The principle of credibility in qualitative research pertains to the extent to which research findings and conclusions can be considered credible [13]. In this qualitative research, a phenomenological approach was utilized. Qualitative phenomenological research methodology serves as a means to characterize the theoretical foundation of phenomenology, focusing on "what experiences are like." Once this theoretical standpoint is established in a qualitative context, the methodological approach that follows heavily relies on straightforward descriptions of an individual's experiences, as these descriptions are believed to convey the essence of the experience [14]. Regarding the intersubjectivity of experience, two approaches can be employed when examining human experiences: imaginative self-transposition and joint encounter and exploration. In the first approach, imaginative self-transposition, the researcher envisions themselves as someone else and represents others while studying their experiences. In the second approach, known as joint encounter and exploration, researchers collaborate with others to explore these experiences.

The data collection techniques employed in this study include literature reviews, observations, and interviews. The literature review encompasses previous research conducted by other scholars, specifically in the fields of furniture, children's psychology, and communication, with a focus on gathering information relevant to the research topic.

Observation is utilized as a method to observe all observable behaviors during specific time periods or developmental stages. These observations are conducted in a naturalistic setting, with the researcher documenting all aspects without altering the environment or introducing planned situations [15]. Naturalistic observations were performed to directly observe how residents interact with the furniture in their apartment units. Researchers documented this through photographs and videos, with a particular focus on observing children's daily activities, their execution of various tasks, caregiver behavior during caregiving and activity participation, caregiver habits, and the interaction between children and caregivers. These observations encompassed three children: one aged less than a year, one aged 1-2 years, and one aged 2-3 years. Interviews were conducted with two key parties: caregivers and apartment managers. Caregiver interviews aimed to gather insights into their concerns and expectations regarding stimulating child growth and development, space availability, and preferred design elements. The caregivers consisted of three individuals: two biological mothers of the children and one babysitter. Additionally, interviews were conducted with the apartment manager, specifically from the Fit Out division, to discuss matters such as the determination of unit wall structures that can and cannot be dismantled, renovation regulations, renovation procedures, and consumer facilities. Following data collection, the researcher conducted data analysis using descriptive analysis techniques. The results of the analysis were subsequently discussed and reviewed with experts in the interior design field.

3. Results and Discussion

Two types of furniture analysis are conducted in this study: furniture analysis for infants (newborn to 18 months) and furniture analysis for toddlers (18 to 36 months). These categorizations are based on anthropometric data related to children. The anthropological approach in this context focuses on the built environment and its connection to space or structure as a symbol of culture [16]. Infants and toddlers exhibit distinct body sizes and physical development stages, necessitating different furniture requirements tailored to each age group. The relatively short time span between the infant and toddler stages has implications for the furniture's lifespan of use. It is crucial to analyze which furniture items can be used during both the infant and toddler stages. Additionally, the construction system and selection of furniture materials must align with the needs and characteristics of children. A summary of the furniture analysis in apartment units is provided in Table 1. While the existing room program includes furniture items designed for adults, there are a few pieces intended for children. However, upon consideration of their size and scale, it becomes evident that this furniture is not suitable for infants.

Table 1. Furniture Needs for Infants

Space Needed	Furniture needed
Sleeping	Baby boxes/Cribs/Cradles
Eating and Drinking	Booster Seats/Tables & Chairs, Nursing sofas
Body care (changing diapers and clothes)	Baby Tafel changing table, storage
Taking a bath	Baby bath-up/Baby tub
Playing	Table and chair

The height of the mattress in the master bedroom is 40 cm, with storage space underneath utilized as a drawer. Toddlers cannot reach this mattress's height. Quality sleep is crucial for children's health and development [17]. However, allowing a child to sleep on an adult mattress without supervision can pose safety risks, primarily the risk of falling. Educational interventions should emphasize to parents and caregivers not to place infants in unsupervised beds, as they could fall from the bed. Furthermore, parents and caregivers should closely supervise toddlers and older children, as they may attempt to climb onto and jump from beds or other pieces of furniture. They might unintentionally push younger siblings from the bed [18]. Other furniture in the master bedroom includes the wardrobe and a dressing table. The dimensions of the dressing table and the activities carried out at it are designed for adults, making it unsuitable for use by children. Images of the mattress, wardrobe, and dressing table can be found in Fig. 1.

Fig. 1. Built-in Furniture in the Main Room

Next, we consider the critical aspect of the shape and dimensions of the television table. Children often tend to reach out and touch the television screen while watching. Therefore, it is important to position the TV table appropriately to ensure that children do not sit too close to the TV. However, the TV table features sharp edges, which can pose a danger to children in case of accidents (as depicted in Fig. 2). Moreover, the table's height may allow children to climb onto it. Additionally, we must consider the viewing distance when children watch television, as it can adversely affect their eyesight. Being too close to the screen can hurt children's vision, potentially leading to harm from television emissions [19]. Furthermore, other external factors should be considered, such as the type of programs watched, the duration of viewing, and the overall health conditions of the children. However, these factors are not within the scope of this study and will not be discussed here.

Fig. 2. Child Interaction with TV and Furniture

The ideal viewing distance for a television is five times the diagonal measurement of the television screen [20]. For instance, if you have a 21-inch television, the ideal viewing distance would be 5 x 21 inches, which equals 105 inches or 2.6 meters. Therefore, as the diagonal size of the television screen increases, the recommended viewing distance also increases. This ideal viewing distance relaxes the eyes and reduces the strain of capturing images. Furniture requirements for infants (newborn to 18 months) are provided in Table 1.

3.1. Analysis of the Furniture Impact on Toddler Development (18 to 36 months)

The furniture items in the apartment are designed to meet the needs of adults. While some furniture is intended for children, the dimensions of this furniture are not suitable for toddlers. Observational data regarding furniture items and an analysis of their impact on toddler development are presented in Table 2.

Table 2. Analysis of the Furniture Impact on Toddler Development

	Impact for Children				
Design Elements	**Physical Impact**	**Psychological Impact**	**Health Impact**	**Safety Impact**	**Economic Impact**
Furniture in Main bedroom: 1. Bed + drawers 2. 3-door wardrobe. MDF wood with HPL-coated, full mirror outer furnishings 3. Dressing table + chair 4. Bedside table	The child cannot reach the height of the mattress. Mattress dimensions for adults. The dimensions of the dressing table for adults do not function optimally	Some furniture does not function optimally, so it wastes space, the space feels cramped, and the occupants are uncomfortable.	Furniture finishing is not harmful to children's health	High mattresses are risky for children because they can fall while sleeping or playing on them.	Hard, dense, and heavy material. If exposed to stains, it must be cleaned with a special liquid.
Furniture in the child's bedroom: 1. Single bed 2. Study table + chair (built-in)	The child cannot reach the height of the mattress. The design and dimensions of the study table are for elementary school-age children, so toddlers cannot use them.	Children are not comfortable with high mattresses.	Wood furniture made from HPL plywood. The mixture of oil solvent and adhesive glue has a strong smell at first use.	High mattresses are risky for children because they can fall while sleeping or playing on them.	The material is not durable.
Furniture in the living room: 1. TV table 2. Sofa 3. Kitchen set + dining table	The furniture in the living room is based on adult activities. There is no furniture for children in this room, even though children can use this space for playing, eating and drinking	The dominant color of the furniture is like natural wood, such as light brown, maroon, and white. Dark colors seem gloomy and mentally depressing.	Kitchen set furniture is made from MDF with duco coating, not harmful to children's health	Dining tables with sharp edges can harm children. They can stumble while running.	Furniture materials are from MDF, not durable

The kitchen set is furnished with a dining table. Its placement creates an "L" shape with the kitchen set furniture, and it is a permanent fixture. Its presence disrupts the space for children to move around and play in the living room. Additionally, the sharp-edged corner of the table, as seen in Fig. 3, poses a safety hazard for children. Children may trip over it or even collide with the table while running. Furniture designed for children should prioritize safety, with sharp corners and elements like glass and mirrors that could potentially harm children need to be eliminated [21]. All wooden edges and corners must be rounded and smoothed to prevent scratches [22]. The mattress in the child's bedroom measures approximately 60 cm in height. Toddlers require low mattresses to foster their independence when getting in and out of bed and to reduce the risk of falling while sleeping. Additionally, the underside of this mattress cannot be utilized, resulting in wasted space. In this child's bedroom, you will also find a study table and a built-in wardrobe. These pieces are constructed as integral parts of the wall, making them permanent fixtures that cannot be relocated.

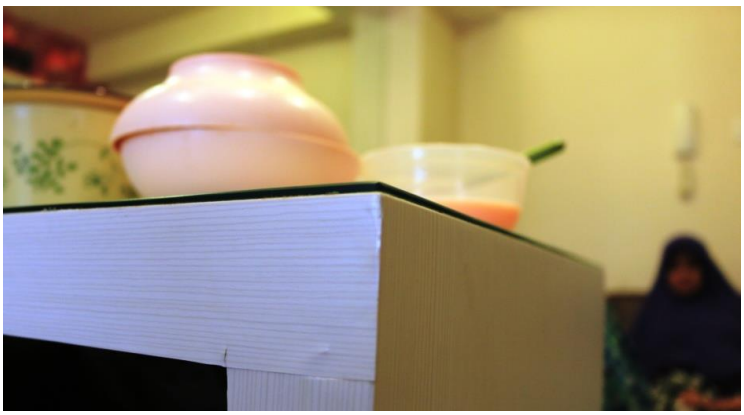

Fig. 3. The Sharp-edged Dining Table

The advantage of built-in furniture lies in its adaptability to the room's shape and size, allowing optimal space utilization. However, the design of the study table, as depicted in Fig. 4, is unsuitable for infants and toddlers. The table's dimensions were optimized based on their height to accommodate children of different genders aged 2-6 years. Consequently, the table's length, width, and height are 850mm, 550mm, and 650mm, respectively [23]. There is also a 400mm space beneath the table. Unfortunately, the child's furniture is not serving its intended purpose correctly; instead, it is being used to store various items such as toys, bicycles, bags, shoes, and clothes.

Fig. 4. A Study Table and Toys Storage

Ideally, children's furniture should be designed considering children's activities. The necessity for children's furniture tailored to toddler activities is outlined in Table 3. Furniture design for infants and toddlers should also consider the furniture's intended age range. While some furniture items serve both infants and toddlers, others are designed exclusively for infants and unsuitable for toddlers.

Table 3. Furniture Needs for Toddler

Toddler Activities	Furniture needed
Sleeping	Low mattress
Eating and Drinking	Booster Seats/Tables & Chairs, Nursing sofas
Body care (changing diapers, and clothes)	*storage*
Taking a bath	Toilet seat
Playing	Table and Chair

3.2. Multifunctional Furniture Recommendations

Furniture design recommendations for infants and toddlers are as follows: (1) Infant furniture is designed according to an adult scale because caregivers assist with all activities. Toddler furniture is designed according to the children's scale because children of this age have developed motor skills; (2) Utilize wall beds (foldable beds against the wall), truckle beds

(sliding beds), or storage beds; (3) Create multifunctional wardrobes. In addition to storing clothes, wardrobes can serve as a medium for children's dramatic play, such as a puppet stage. For instance, the wardrobe door can be hollowed out to create a window, which can be curtained to provide a space for imaginative puppet plays.

3.3. Multifunctional Furniture Recommendations

Furniture designed for infants and toddlers considers the space required to support their activities. The requirements for infant and toddler furniture are outlined in Table 4.

Table 4. The Needs of Furniture

Space Needed	Subject	Furniture needed
Bedroom	Infant	Baby boxes/Cribs/Cradle, rocking chair/bouncer
Bedroom	Toddler	Low mattress
Bedroom	Caregiver	Mattress
Nursing room	Caregiver	Sofa
Active play zone	Infant	Storage, carpet, TV/CD player/sound system
Quiet play zone	Infant	Bookshelf, storage
Toys Storage	Infant	Storage
Active play zone	Toddler	Storage, TV/CD player/sound system
Quiet play zone	Toddler	Low shelf, storage
Toys Storage	Toddler	Storage
Family Room	Caregiver	Sofa, TV
Clothing Storage	Infant	Wardrobe
Clothing Storage	Toddler	Wardrobe
Clothing Storage	Caregiver	Wardrobe
Ironing room	Caregiver	Table, chair
Baby care room	Infant	Babytafel, storage
Baby care room	Toddler	Storage
Messy play zone	Infant	Table, chair
Messy play zone	Toddler	Table, chair
Dining room	Infant	Booster Seat/High Chair, Nursing Sofa
Dining room	Toddler	Table, chair
Dining room	Caregiver	Table, chair
Kitchen	Caregiver	Kitchen set, sink, stove, refrigerator
Laundry Room	Caregiver	Washing machine
Bathroom	Infant	Shower, baby bath up/baby tub
Bathroom	Toddler	Shower, toilet seat
Bathroom	Caregiver	Shower, toilet seat

The application of multifunctional furniture follows the concept of space zoning. Furniture in a particular zone can be converted into a single unit with multiple functions, thus saving space. Here is an example of the application of multifunctional furniture:

- The bed also serves as storage, similar to the chest bed model. The chest bed is a built-in bed that combines the functions of a mattress and drawers in one unit. The underside of the mattress is utilized as a drawer, typically containing at least two drawers. Another application model is the trundle bed. This type of bed utilizes the bottom side to store additional mattresses. The critical advantage of trundle beds is that children can easily pull out the mattress.
- A bed that can be used from infancy to toddlerhood, such as a crib that can be converted into a low mattress for toddlers.
- An infant bed and a nursing chair combine a rocking chair and a cradle. Multifunctional tables, chairs, and rocking chairs for active play, when this table is rolled, it can also function as a rocking chair.
- Tables, chairs, sofas, mattresses, and ball pools (for active play) are illustrated in Fig. 5. This design incorporates multiple functions within a set of baby blocks, taking the form of geometric and Tetris pieces that can be arranged into various shapes. When configured as a mattress or sofa, it sits at floor level and can be used to develop infant and toddler

gross motor skills (for active play). This design caters to the needs of children's play, which plays a crucial role in helping children understand their world through hands-on activities, often restricted by developmental perspectives [24].

Fig. 5. Multifuncional Tetris Sofa

- Tables, chairs, and storage. Children can use tables and chairs for activities such as drawing, coloring, playing with dough, and other forms of play (quiet play). When rolled over, the table can also function as an adult-sized chair.
- Chairs and toy storage. The seat cushion is removable and serves as a storage area for toys or books.
- A table with toy storage. The table can serve as a place to store toys. Additionally, the table can function as a sandbox (for messy play). When the table is closed, it can be used for other play activities. To facilitate this functionality, the materials used for the table and chairs are made of plastic for easy cleaning.
- Babytafel and storage. Babytafel is a piece of furniture designed for infant care, such as changing diapers and clothing. This furniture is exclusively used during infancy, which is why it must be multifunctional and capable of serving the children as they grow older. The babytafel design includes tiered drawers (credenza) and removable cushions, allowing it to function both as a credenza and a multi-purpose table. The table can also be used as an ironing table. The babytafel takes the form of a foldable diaper deck that can be mounted against the wall to save space.
- Wardrobe as well as an ironing table. The wardrobe is used to store adult clothes as well as children's clothes. The ironing board can be folded into the cupboard or folded against the wall to save space.
- Multifunctional high chairs. High chairs serve as both chairs and dining tables for infants, and this furniture can still be used as the child grows into the toddler stage. The bottom part can be utilized as a table by removing the top chair. In other design variations, a high chair can also function as a rocking horse to enhance children's gross motor skills (for active play) and as a chair for adults or caregivers.

3.4. Recommendations for Furniture Construction System

Children's furniture comes in various options, depending on the needs and available budget. These options include ready-to-use furniture, modular pieces, furniture sets, or custom-made furniture. Modular design is characterized by the close integration of related components into modules, simplifying manufacturing and assembly processes [25]. Suggestions and recommendations for children's furniture construction systems are as follows: (1) Free-standing or stand-alone construction systems can be applied to movable furniture such as tables, chairs, bookshelves, toy storage, and baby cribs. Some children's furniture in this model is already available in the market and sold individually. For example, tables and chairs made of plastic, seating units, and bookshelves, among others; (2) The built-in construction system is

suitable for immovable (permanent) furniture, such as cupboards, beds, and bookshelves. Built-in models can be custom-made to fit the size and shape of the room, optimizing space utilization; (3) The modular construction system is applied to furniture in which the shape and functionality can be expanded in the future as the child grows, such as tables, cupboards, and bookshelves. Several modular systems are available in knockdown form. Knockdown furniture refers to products that can be assembled and disassembled using a freelance or loading plug system. In other words, knockdown furniture can be seen as furniture that can be easily dismantled and reassembled [26]. This system is practical for children's furniture that needs to adapt as they grow.

3.5. Recommendation of Furniture Material

The selection of children's furniture materials plays a very important role because, from the furniture materials, children can learn about the mass of objects that support their learning process. The following are suggestions and design recommendations for children's furniture materials: (1) Some movable furniture, such as chairs, small tables, or toy storage, should be made of lightweight materials so that children can lift or push them easily. This technology uses a combination of wild thistle particles (Cynara cardunculus) and polyurethane foam, which is proposed to produce a furniture concept that is lighter and mechanically resistant, which competes with other materials on the market and is used in the construction of several types of furniture [27]; (2) Permanent furniture can be constructed from solid wood to ensure sturdiness and durability. Woods such as teak, *nyatoh*, meranti, Dutch teak, rubber wood, pine, rosewood, and others are suitable choices; (3) Synthetic materials, such as imitation leather, can be used for sofas. It is important that furniture made from plastic is safe for children, free from strong odors, and meets safety standards, as indicated by the safety label on the packaging or product. In the case of furniture production, the selection of secondary raw materials may include recycled PP, HDPE, PET, natural and synthetic fibers, fillers, and more [28]; (4) Furniture made of wood and other wood processing typically requires finishing. It is important to use safe finishing substances such as varnish, melamine, wax, bleach, and paint; (5) Paint thinner and polish can emit strong odors and may cause eye irritation. Therefore, after applying paint, it is advisable to place the furniture in a well-ventilated room. The pungent odor should dissipate within a week; (6) Upholstery for furniture can utilize soft materials like fabric and vinyl. This type of upholstery can be applied to sofas, chairs, cribs or cradles, mattress covers, and headboards.

3.6. Recommendations of Safety and Furniture Standards

Primary considerations for children's furniture include safety, health, as well as comfort, and the appearance of the furniture [29]. Safety considerations are paramount in the design of children's furniture, as inappropriate design can pose risks to their safety and well-being. Here are suggestions and recommendations for safety factors related to children's furniture: (1) Tailor the size of the furniture to the child's age group. For instance, infants require cribs with high railings for safety, while toddlers benefit from low beds to prevent falls and encourage independence. Other infant furniture, like baby tafels, should be proportionate to an adult's body size; (2) Utilize sturdy furniture that doesn't easily tip over, ensuring it's safe for children to climb on. If a piece of furniture is prone to tipping, secure it to the wall with nails or bolts; (3) Minimize narrow sections or sharp corners on furniture that could pinch or injure a child; (4) Avoid placing tables, chairs, or beds near windows; (5) Store children's toys and books in low storage areas to make them easily accessible. Placing items out of reach may encourage climbing; (6) Ensure that drawers, storage units, or cupboards are childproof, as children are inclined to open and close them; (7) Place a table in front of the television to maintain a healthy viewing distance. The ideal distance is five times the diagonal of the television screen; (8) For cribs, ensure that the bars are spaced 3.7 to 5 cm apart. For other openings, spacing should be less than 10 cm or greater than 20 cm to prevent head entrapment; (9) Baby fences should have adjustable heights and sides that can be securely locked; (10) Install a soft material coating on crib railings to prevent babies from stumbling on them; (11) Look for safety standards marked with an SNI (Indonesian National Standard) label on Indonesian furniture products.

3.7. Recommendations of Safety and Furniture Standards

Furniture design for infants and toddlers needs to consider the age of use of the furniture. There is some furniture that is used at infant age until toddler age. However, there are also some furniture that are used for infant age only and are not suitable for toddlers. Suggestions for furniture usage can be seen in Table 5.

Table 5. Age of Use of Infants and Toddlers' Furniture

Items	Infant	Toddler	Usage Suggestions
Baby boxes/cribs/cradle	√	X	The shape of the crib can be converted into a low mattress for toddlers by lowering the legs of the crib and extending the crib rails on the short side of the bed
Low mattress	X	√	Convert with crib
High chair/booster seat, table and chair	√	√	Convertible form: You can remove the high chair legs so that they become chairs and tables for toddlers
Table	√	√	It can be functioned as a storage. The shape of the table and chairs can be converted
Chair	√	√	It can be functioned as a storage. The shape of the table and chairs can be converted
Nursing sofa	√	X	Rocking chair plus cradle: serves as a nursing sofa and a cradle for cradling the baby.
Wardrobe	√	√	Can be functioned as a stage/ironing board
Toys Storage	√	√	Can be functioned as a table/chair / babytafel
Babytafel	√	X	Choose one in the form of a credenza (chest of drawers) so that when the mattress pad is removed, it can turn into a credenza (storage) or ironing board.

The sign √ means required, and X means not required. Suggestions and recommendations for the age of use of furniture as follows: (1) Furniture that is only used for an infant must be able to accommodate the needs of children in the toddler period so that the furniture has longer age of use; (2) Furniture that can be used from infant to toddler and even to a later age must be convertible so that it can accommodate toddler needs.

4. Conclusion

The results of the study show that furniture in a confined space is not designed based on children's activities and needs. This resulted in a negative impact on children's physical and psychological development. This research produces recommendations for furniture designs that are suitable for children based on evaluations of construction systems, materials, safety, standard dimensions, and age of use. The findings of this research will be useful for real estate developers, furniture designers, interior designers, and consumers. Multifunctional furniture in the apartment is designed to accommodate the needs of children and caregivers. Furniture construction systems that are suitable for confined spaces are built-in, knockdown, modular, and mobile. The other system is either a folded system (folding technique) or multipurpose furniture (one piece of furniture with many uses). The material for children's furniture must be light and sturdy so that children can move it on their own but still safe if the child climbs on the furniture. Avoid furniture with sharp corners so that it is safe and avoids injury. The age of using children's furniture must be considered so that it is efficient. Children's furniture must be able to be converted into other forms needed in the future. Interior designers and children's furniture designers can apply the recommendations from this research in an effort to create a healthy environment and support the optimal growth and development of children.

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AJ: analyzed the data.
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Appendix 1. Analysis of the Impacts of Furniture on Infant's Development

Impact for Children					
Design Elements	**Physical Impact**	**Psychological Impact**	**Health Impact**	**Safety Impact**	**Economic Impact**
Furniture in Main bedroom: 1. Bed + drawers 2. 2-door wardrobe. MDF wood with HPL-coated, full mirror, outer furnishings 3. Dressing table + chair 4. Bedside table	The dimensions of the mattress are for adults. There are no cots and nursing sofas for mothers. The dimensions of the dressing table are also for adults, the existence of this furniture does not function optimally. There is no table for changing diapers and baby clothes	The existence of some furniture does not function optimally, so it wastes space, the space feels cramped, the occupants are uncomfortable.	Furniture finishing is not harmful to children's health	High mattresses are at risk for children falling while sleeping or playing on them. Babies sleeping in one bed with adults can be at risk of SIDS	Hard, dense and heavy material. If it is stained must be cleaned with a special liquid
Furniture in the child's bedroom: Single bed Study table + chair (built-in)	The design & dimensions of study table sizes are for elementary school-age children, so this furniture is not suitable for infant needs	Children are not comfortable with high mattresses	Wood furniture made from HPL plywood. The mixture of oil solvent and adhesive glue has a strong smell at first use	High mattresses are risky for children because they can fall while sleeping or playing on them	The material is not durable
Furniture in the living room: 1. TV table 2. Sofa 3. Kitchen set + dining table	The furniture in the living room is based on adult activities. There is no furniture for children's activities, such as eating, playing, etc	The dominant color of the furniture is like natural wood, such as light brown, maroon & white. Dark colors seem gloomy and mentally depressing.	Kitchen set furniture is from MDF with duco coating, not harmful to children's health	Dining tables with sharp edges can harm children. They can stumble while running.	The material made from MDF is not durable