



# Parents' Role in Optimizing Preschool-Age Children Vision

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**Abstract. Background:** Preschool age children's vision is important for children's survival, visual impairment in children will have an impact on physical, functional, social and psychological problems. The role of parents is very important in the development of children's vision.

**Aim:** The purpose of this study was to describe the role of parents in optimizing the vision of preschool-aged children.

**Methods:** This research is a quantitative research with a descriptive analytic approach. The study was conducted in May–August 2022 on 91 parents of preschool-aged children at Sendangmulyo State Kindergarten, Semarang. The role of parents in optimizing children's vision was obtained by using a questionnaire which included roles in the use of electronic media, reading and writing activities, and providing nutrition.

**Results:** The results showed that the role of parents in the activities of using electronic media, reading and writing drawing activities, and providing nutrition to children were in the good category, respectively 61.5%, 83.5%, and 69.2%

**Conclusion:** The role of parents in optimizing the vision of preschool-aged children is mostly in the good category (51.6%). Suggestions for mothers to increase the role of parents in terms of using smartphones, watching TV all the time, paying attention to the position of children while watching TV, reading and writing books, and paying more attention to vitamin A intake in children in an effort to optimize the vision of preschoolers.

**Keywords:** The role of parents · optimizing vision · preschool age children

## 1 Introduction

Eyes are one of the most important senses, the eyes absorbs more than 80% of visual information used to perform various activities [1]. The eye is a small-shaped organ ball with axial length (AL) maximum of 24 mm which may vary on each individual [2]. Normal eye visual acuity is 6/6, meaning, within 6 m, someone can still see objects with full acuity [3]. Therefore, vision in preschool age is very important for the survival of children [2].

Data from the International Agency for the Prevention of Blindness in 2019 stated that 285 million people in the world have visual impairment with 90% of them being

in the developing countries. Myopia prevalence in children increases with increasing age. Myopia frequency in American children is 3% at 5–7 years, 8% at 8–10 years, 14% at 11–12 years, and 25% at 12–17 years [4]. Research in Taiwan found a myopia frequency of 12% in children aged 6 years and 84% at age 16–18 years [5]. Almost the same number is also obtained in Singapore and Japan [4]. In the last 6 years only 10–20% of the population in China suffer from myopia, but currently the number has increased to almost 90% in adolescents and young adults [6]. Another study in Hong Kong found The incidence of myopia in school-age children is approximately 37%, with the same ratio between boys and girls. Children aged 11 years have a risk of suffering from myopia by 15 times compared to children aged less than 7 years [1]. Refraction abnormalities and visual impairment occupy fourth priority after cataract, onchocerciasis (river blindness), and premature blindness [8]. One of the research results that was conducted in Indonesia shows that as many as 8 (36.36%) of 22 school-age children based at RW X Keramat Jegu Village, Taman Sidoarjo have abnormal visual acuity [9]. Results from a similar study conducted in Kulon Progo showed that there were 38 children 6–12 years old with myopia disorder simplex as much as 63.2% and 38.8% experienced moderate visual impairment [10].

Some of the common causes that causing decreased children's vision are usage of electronic media such as smartphones, computers, television, as well as related reading activities such as visibility, lighting, usage duration and position during the activity (e.g. with sleep), as well as genetic factors from parents [11, 12]. Smartphones tend to be used more often with brighter screens during the day and at night. The eyes can experience decreased function when using a smartphone in a poorly lit bed [2]. The length of time used to use gadgets has a very large negative effect on children's visual abilities so that children are more susceptible to visual disturbances [13]. Playing games using smartphones, computers, or televisions with a duration of more than 2 h/day has a 3-fold chance of experiencing impaired visual acuity compared to children who play games of normal duration [14]. Another study states that there is an effect of viewing distance when using gadgets on visual acuity, the use of gadgets with a viewing distance of less than 30 cm can increase the risk of 3 times the occurrence of visual acuity disorders [15].

Reading in a sleeping position is quite risky to cause eye fatigue. Lying position causes the body can't relax because the muscles of the eye will pull the eyeball downward, following location of the book being read. Eye which is often accommodated for a long time will quickly reduce the long-distance visual ability [16]. Based on one study shows that there is an influence between reading position on visual acuity. Incorrect reading position (sleeping) experiencing visual acuity abnormalities by 58.3%, compared to the correct position (sitting) only has visual acuity by 41.7% [17]. Visual acuity is also closely related to genetic factors. Astigmatism is inherited or occurs from birth with myopia and hypermetropia [2].

Visual impairment in children have multidimensional implications such as physical impacts (decreased visual acuity), functional (barriers to self-care, mobility, and daily activities), social impacts (social contacts and interpersonal relationships), and psychological state (emotional status, well-being, life satisfaction, and happiness). In addition,

some people with limited vision have difficulties in learning such as imitating, understand nonverbal communication [18]. One attempt to overcome these problems includes increasing parents' role in optimizing children's vision.

Parents' role is very important in children's vision development. In today's increasingly advanced era, most parents are demanded more for their work, so that supervision of children becomes less. One of the impacts of a decrease in parental supervision is related to children's habits that can affect the ability to see. Families with middle and upper economic groups have an increasing incidence of myopia. The role of parents in optimizing children's vision needs to be improved, including by supervising children in carrying out activities using computers, TV, gadgets, as well as reading, writing, and drawing, especially with regard to the duration of time, the position of activities that should not be too close, and lighting in the room. The room should not be too dark, and provide good nutrition for eye health [19–21].

The results of a preliminary study conducted by researchers in Sendangmulyo State Kindergarten Semarang with interviews involving 10 students' parents, 8 out of 10 parents say that still lack of parents' supervision of children related to activities that are associated with children's visual ability. Parents often give smartphones or turn on television cartoons in the long run for a long time or more than 2 h so that children don't cry and 7 out of 10 parents students are workers. Examination results with use of an E-chart shows that out of 10 children who were tested for visual ability, there are 3 children with vision disorders like inability to adjust letters within 3 m, children can only read up to the second line on the E-chart. This study aims to describe the role of parents in optimizing the vision of preschool children.

## 2 Methods

This type of research is quantitative research with descriptive analytical design. The number of respondents was 91 mothers of preschool age children. The research was carried out at Sendangmulyo State Kindergarten, Semarang in May–August 2022.

The variables of this study are the role of parents in optimizing the vision of preschool children, including parents' role when using electronic media, the role of parents in reading, writing and drawing activities, and the role of parents in providing nutrition to children.

The instrument used to measure the role of parents is a questionnaire compiled based on related references. The questionnaire consisted of 19 questions which included 10 questions related to the role of parents in the use of electronic media, 3 questions containing the role of parents in reading and writing activities, and 6 questions related to the role of parents in providing nutrition. The questionnaire has been tested for validity with  $r$  count  $0.533\text{--}0.866 > r$  table  $0.444$  and reliability test  $0.963 > 0.6$ .

This research begins with the licensing process at the Sendangmulyo State Kindergarten, Semarang. Then, the process of further research by providing explanations to respondents when taking their children to school, mothers who are willing to be respondents fill out informed consent. Finally, the researcher waited while the respondent filled out the questionnaire.

**Table 1.** Parent's role in optimizing preschool age children vision (n = 91)

Parent's role	Good n(%)	Poor n(%)
Activities with usage of electronic media	5 (61.5)	35 (38.5)
Reading, writing, and drawing membaca	76 (83.5)	15 (16.5)
Nutritional fulfillment	63 (69.2)	28 (30.8)

Univariate analysis was conducted in this study to describe the role of parents in optimizing children's vision. The frequency distribution and central tendency values are presented to explain the variables.

Research ethics carried out in this study include giving consent forms, keeping identity confidential and keeping information confidential. Accordingly, research has obtained ethical clearance No.0045/KEPK/VII/2022.

### 3 Results

This study describes the role of parents in optimizing the vision of preschoolers. Respondents were 91 mothers, the average age of children was 5 years with a minimum age of 3 and a maximum of 6 years, most of the mothers' education was undergraduate (62.6%) and most of the respondents' occupations were private employees (35%) (Table 1).

The role of parents in the use of electronic media consists of 10 questions, including allowing children to use smartphones, allowing children to use smartphones so that they do not cry, admonishing children when they use smartphones for more than two hours, allowing children to use smartphones in a dark room, allowing children to use them at home when the mother is working, allowing children to watch television at close range, allowing children to watch cartoons at any time, watching television at close range in a dark room and in a sleeping position.

The role of parents in reading, writing and drawing activities consists of questions related to allowing children to read and write while sleeping, allowing children to read books in a dimly lit room and allowing children to read books at a distance that is too close.

The role of parents in providing nutrition includes questions about providing food in the form of vegetables, side dishes and fruit containing vitamins A and D, giving multi-vitamin A tablets in February and August.

### 4 Discussion

The results showed that the role of parents in optimizing the vision of preschool age children was mostly in the 'good' category in the use of electronic media, reading, writing, drawing, and nutrition. Most of the parents' education level is high school and college.

Mother's education determines attitudes and actions in facing various problems. A mother has an important role in child health and growth. This matter can be shown by the facts, among others: children of mothers with higher education background will most likely get opportunity to live and grow better and easily accept broader insights (Kundre & Bataha, 2019). Children of mothers with lower education backgrounds have a higher mortality rate than children with higher education backgrounds mothers (Nurmaliza & Herlina, 2018). Parents' role are very influential, especially mothers, because mother plays a role in managing the household (Akbar & Aidha, 2020). This is supported by one of the research results that shows a correlation between parents' education background and parenting style (Baiti, 2020). Parenting in optimizing the quality of children is a shared responsibility. Efforts to have posyandu to provide services in monitoring child growth and development, early childhood education to provide services for children's interests and needs and family development groups are able to provide services to parents who have toddlers in providing counseling, guidance and consultation [22].

In this study, the role of parents in optimizing preschool children's visual skills related to activities involving electronic media still plays a minor role, e.g., mothers still frequently allow their children to use a smartphone, they allow them to watch cartoons all the time, and they allow them to watch TV while lying down/sleeping.. Usage of electronic media such as smartphones, computers, and televisions can causes a decrease in children's vision [11, 12]. The experts said that smartphones are likely to be used more often with brighter screens during the day and at night. Eyes can experience decreased function when using a smartphone in bed with lack of lighting [2]. The duration of time used for gadgets usage has a big negative effect on children's eyesight, making children more prone to visual impairment [13].

Playing games using a smartphone, computers, and televisions out of normal duration (more than 2 h/day) has a 3 times higher chance of a visual acuity disorder than students who played games with normal duration [14]. Other studies state that there is an effect of visibility when using gadgets against visual acuity. Respondents who have a habit of using gadgets with visibility less than 30 cm have abnormal visual acuity of 66.7% and only 39.3% of respondents experienced abnormal visual acuity with visibility habit when using gadgets more than 30 cm away. Gadget usage with visibility less than 30 cm can increase the risk 3 times of visual acuity abnormalities [15].

In this study, there are several roles of parents in optimizing the visual power of preschool children related to reading, writing, and drawing activities which are still low. This is shown by mothers still allowing their children to read and write books in a sleeping position. One of the reasons for the decline in children's vision is the activity of reading with close visibility, dim lighting, long usage duration, and position during activities like sleeping position [11, 12]. Reading while in a sleeping position is quite risky and can cause eyestrain easily. The lying position causes the body to be unable to relax because the eye muscles will pull the eyeball downwards, following the current position of the book being read. Eyes that are often accommodated in a long time will quickly reduce the long distance vision [16]. One of the research shows that there is an influence between position while reading on visual acuity. Position reading incorrectly (sleeping) experiences visual acuity abnormalities by 58.3%, compared to the correct position (sitting) only has visual acuity by 41.7% [17]. Another study also showed that the

results of vision screening from the WHEELS program in the last 4 years were 12,402 (82%) children received vision screening and 3,018 (24%) failed screening and were advised to take follow-up with an eye care specialist for a comprehensive examination [23].

In this study, the role of parents related to nutrition in optimizing the vision of preschool-aged children was still poor, mothers never gave side dishes to children containing vitamin A such as (salmon, eggs, liver) and never gave vitamin A to children. In February and August as given by the officers of the Integrated Service Post (Posyandu). One of the factors that influence the development of children is nutrition. Good nutrition is given from the age of the baby (0–6 months) by giving exclusive breastfeeding [24]. However, in addition to exclusive breastfeeding for infants, the provision of nutrition containing vitamins is also important in toddlers' growth.

Vitamin A maintains cell's health in various types of eye structures and are required for transfer of light to existing nerves in the retina. Therefore, vitamin A is very good for eyes' health. Avocados contain more lutein compared to other fruits. This substance is very important to prevent macular degeneration and cataracts. Carrots are rich in beta carotene which the body will convert into vitamin A. Salmon is rich in omega-3 which is very important to maintain eyes health in general. Salmon also contains folic acid, vitamin D, vitamin B6, vitamin B12, and vitamin A [9].

Vitamin D has an anti-hypertrophic role on the ciliary muscle, such as its role in preventing other smooth muscle hypertrophy such as bladder. Sunlight can help synthesis of vitamin D from existing pro vitamin D inside the body. One of the research results in line with the theory of David A. Goss said that the main factor of myopia is an increase in axial length of the eyeball due to decrease in quantity and changes in anatomical characteristics of the scleral collagen network. Those conditions due to lack of nutrients and vitamins network builder which is dopamine, when stimulated by bright light outside space can inhibit axial growth of the eyeball [25].

## 5 Conclusions

Based on the analysis of the research results and the above discussion, it can be concluded that the role of parents in optimizing the visual skills of preschool children in activities that use electronic media in the government kindergarten Sendangmulyo, Semarang, is in the category of "good" (61.5%), the role of parents in optimizing preschoolers' visual skills in reading, writing, and drawing in Sendangmulyo Semarang Government Kindergarten is mostly in the "good" category (83.5%), and the role of parents in optimizing preschoolers' visual skills in nutrition in Sendangmulyo Semarang Government Kindergarten is also mostly in the "good" category (69.2%).

Students' parents are expected to increasing their role as parents related in supervising their children in using smartphone, watching cartoons at all times, pay more attention to the child's current position while watching TV, reading and writing books (e.g. by sleeping position), and pay more attention to vitamin A intake for children such as salmon, eggs, liver, or tablets multivitamin A especially in February and August as given by Posyandu worker as an effort to optimize preschoolers visual ability.

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