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NUTRITIONAL IMPROVEMENT INTERVENTIONS FOR MALNOURISHED PRESCHOOL CHILDREN: A SYSTEMATIC REVIEW

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ABSTRACT

Background: Feeding difficulties in children can lead to malnutrition. Parents need to measure their toddler's weight regularly every month so they can find out their child's growth. The nutritional quality of children is strongly influenced by their diet and physical activity. The impact of nutritional problems on children does not only affect childhood and adulthood. The purpose of this literature review is to analyze interventions to improve preschool nutrition to optimize their nutritional status. **Methods**: The research method is a literature review using two electronic databases, namely PubMed and Google Scholar. **Results**: The total number of titles taken from PubMed and Google Scholar is 137,064. From this study, only 5 articles met the inclusion criteria. This article discusses increasing the knowledge, attitudes and practices of parents, caregivers in child care and teachers in early childhood education in providing balanced nutrition to children by increasing their intake of eating fruits and vegetables and increasing children's motor development by increasing physical activity. **Conclusion:** the nutritional status of preschool-age children is strongly influenced by the active role of parents, caregivers in child care, and teachers in PAUD related to patterns of providing healthy and balanced nutrition. As well as paying attention to the level of physical activity of children in monitoring children's motor development.

Keywords: nutrition improvement, preschool, education, knowledge, family

INTRODUCTION

The most common health problem in society is nutrition. This problem is inseparable from dietary factors because this arises as a result of a deficiency or excess of nutrients in food. Fulfillment of nutrition in early childhood / preschool is a very important factor for the period of growth and development in increasing immunity, proper physical, social emotional development and as a vital determinant of future health (Raru1 et al., 2022; Skelton et al., 2020; Juherman, 2022).

Malnutrition in preschool children can be caused by various factors including lack of knowledge, suboptimal health services, cultural behavior in the surrounding environment, inappropriate child care and feeding practices and the presence of infectious diseases (Raru1 et al., 2022).

Nutritious food can affect the development of the brain, if the body experiences a lack of food that contains balanced nutrition for a long time, it will cause changes in metabolism in the brain that will result in impaired growth of the body, the number of brain cells will decrease, and there will be immaturity and biochemical imperfection in the brain, thus affecting the development of the child's intelligence (Juherman, 2022)

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Mothers play a major role in early childhood care or in the first 6 years, mother's knowledge of nutrition and feeding practices in children greatly influences growth and development (E.AYUK et al., 2020). In addition to teachers in early childhood education (PAUD) and babysitters at day care centers, they also have a very important role in determining the diet and food intake of toddlers. For this reason, it is very important for PAUD teachers and caregivers to increase knowledge about children's nutritional needs (Leis et al., 2020 ;Toussaint et al., 2021; (Blue Bird Jernigan et al., 2022). In line with previous research conducted by (Andari et al., 2021) which shows the results of his research are increasing parental knowledge about the importance of the influence of nutritional status on children's learning achievement, the importance of balanced nutrition and meeting nutritional needs for children and knowing how to manage food properly.

Education about the importance of consuming food with the principle of balanced nutrition in children needs to be done to the community. Schools are an effective means of providing nutrition education. Preschoolers generally spend about 3-4 hours a day at school. Teachers also play an important role in instilling healthy living habits in children. Problems related to nutritional problems are the lack of knowledge and awareness of the community, especially mothers about the importance of implementing balanced nutrition in children's daily food intake. Thus, the provision of nutrition education in schools can be an alternative place for effective education for parents, children and teachers in preventing nutritional problems.

METHODS

This study uses literature review by searching for articles related to the theme. Articles are selected based on suitability with keywords, topics and predetermined inclusion and exclusion criteria. The database used in this study was obtained from Google Scholar and PubMed. Articles that fall into the criteria are then assessed and concluded.

This literature review uses the following inclusion criteria: 1). This article contains the results of research on children's nutritional knowledge and feeding patterns of preschoolers. 2). The population includes parents / caregivers / early childhood teachers. 3). Research is available in free full text articles, published starting in 2019, and written in English. The exclusion criteria were: 1) the article was a literature review, systematic review, or scoping review; 2) duplication of publications in two or more journals. 3). Age of children under 3 years and over 6 years.

Combining keywords with Boolean Operators to get more specific literature results and make it easier to select relevant articles. The keywords used are nutrition improvement and preschool and education and knowledge and family. From the results of research articles through the pubmed and google scholar databases with the help of Boolean Operators, the researchers found 137,064 articles that matched these keywords, consisting of 137,00 articles on google schoolar and 64 articles from pubmed

This study used a prism diagram which involved identification, screening, eligibility, and inclusion (Stovold et al., 2014). Screening begins by setting the timeframe since 2019, in English, articles in full text and free of charge, issuing the same articles, taking articles with titles and abstracts that are appropriate to the topic and issuing design literature reviews, scoping reviews, and systematic reviews. . then read for further examination of the exclusion criteria. After reading, 5 articles were submitted for final review.

RESULTS

The data base used in this study is Google Schoolar and PubMed. At the identification stage, they found 137,064 articles. Then filtering articles published starting from 2019 - 2023, in English,

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articles in full text and free of charge, remaining 17,517 articles. Then further screening is carried out related to issuing the same article, taking articles with titles and abstracts that are appropriate to the topic and issuing literature review article designs, scoping reviews, and systematic reviews. 41 articles were then read for further examination of the exclusion criteria. After reading, 5 articles were submitted for final review.

The results of 5 research articles conducted by researchers at day care centers and early childhood schools (PAUD) in America, the Netherlands, Canada, Poland and South India provide an overview of increasing the knowledge and skills of PAUD teachers, caregivers in child care centers , and also parents about the importance of balanced nutrition of preschoolers in increasing the role or pattern of nutritious feeding in children. To get good nutrition, good nutritional knowledge is needed from parents so they can provide a balanced menu of choices. 9 The level of one's nutritional knowledge influences attitudes and behavior in food selection (Olsa et al., 2018).

3 articles discuss the prevention of obesity in children by adding physical activity skills to preschoolers and increasing fruit and vegetable intake in addition to providing education about balanced nutrition. This finding is in line with research conducted (Novitasary, 2022). Physical activity is included in human needs which become activities for humans. In children, physical activity is crucial because children experience rapid growth and development and can change their physical condition. Vegetables and fruit are the main sources of Vitamin C and A intake at this age, vegetables such as spinach are a source of folic acid and iron intake needed for growth. In addition to vitamins and minerals, fruit is also a source of intake and food for toddlers. Toddlers consume vegetables and fruit respectively by 68.5% and 30.6% (HD Kusumawardani and H Ashar, 2022).

2 articles discuss the prevention of malnutrition in children by optimizing home nutrition, namely nutritious food prepared from home including processing, presentation and natural ingredients. This child's eating pattern is influenced by the environment, friends, parents, and also the mass media (HD Kusumawardani and H Ashar, 2022)

DISCUSSION

The results of the analysis of educational delivery regarding healthy, nutritious food and physical activity in preschool children must be given to several parties simultaneously, namely mothers, caregivers at home / caregivers in daycare and early childhood teachers and also children in early childhood education, so that there is harmony and mutual supplement and carried out on an ongoing basis in order to achieve optimal nutritional status.

CONCLUSION

The results of this systematic literature review conclude the nutrition education program given to parents, PAUD teachers. And caregivers at daycare centers are very effective in increasing knowledge of attitudes and feeding practices which include managing children's diets, increasing food intake, fruit, vegetables. Nutrition education is also very influential for early childhood or preschool teachers in increasing the knowledge/skills of PAUD teachers in providing healthy food education to preschool children. As well as including the healthy eating program together in the learning curriculum at school

Increasing the knowledge of caregivers in child care and preschool teachers in motivating children's physical activity at school and at home so that preschool children's motor skills can increase.

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Table 1. Literature Analysis Table

NO.ID	PENULIS DAN IDENTITAS JURNAL	JUDUL JURNAL	TUJUAN	POPULASI DAN SAMPEL	METODE	RINGKASAN HASIL
C 1	Valarie Blue Bird Jernigan1 *, Tori Taniguchi 1, Alyson Haslam 2, Mary B. Williams 3,Tara L. Maudrie 4, Cassandra J. Nikolaus 5, Marianna S. Wetherill 6, Tvli Jacob1 ,Charlotte V. Love 7 and Susan Sisson Amerika serikat (Blue Bird Jernigan et al., 2022)	Design and Methods of a Participatory Healthy Eating Intervention for Indigenous Children: The FRESH Study	Assessing the effectiveness of HSDS in increasing children's fruit and vegetable intake and increasing children's physical activity	Population: teachers/caregivers in child care centres. Sample: children in child care Sampling technique: Cluster random	Experimental Desain: pre and post test Intervention: for 6 months consisting of (1) PAUD-based nutrition and gardening curricula; (2) nutrition education and food sovereignty curriculum for adults; And (3) modification of the PAUD program menu. Main	1. The fres study is the first comprehensive study to investigate the impact of multi-level and multi-component interventions to build community food sovereignty capacity and optimize the nutritional status of children in America India who are in preschool 2. increased intake of fruits and vegetables
C 2	Anne Leis1*, Stéphanie Ward 2, Hassan Vatanparast 3, M. Louise Humbert 4, Amanda Froehlich Chow 4, Nazeem Muhajarine 1, Rachel Engler-Stringer1 and 5. Mathieu Bélanger Leis et al. BMC Public Health (2020) 20:523 https://doi.org/10.1186/s12889-020-08621-9 Kanada (Leis et al., 2020)	Effectiveness of the Healthy Start-Départ Santé approach on physical activity, healthy eating and fundamental movement skills of preschoolers attending childcare centres: a randomized controlled trial .	1. Increase the knowledge and skills of teachers/caregivers at daycare centers in providing knowledge and skills about healthy food to children at daycare centers. 2. Increase the knowledge and skills of teachers/caregivers in child care centers in providing skills regarding the development of basic movement as a physical activity in children	Population : Children in the Osage nation of Oklahoma. Sample : Preschoolers attending an early childhood care center (ECC) ages 3-5 in Osage Nation Oklahoma Technique: cluster random sampling	Method: experimental Design : pre post test 1. consisting of the intervention group and the control group. 2. The teacher intervention group (HSDS) is given training for 3 hours covering: implementation manual. 3. Manual of physical activity and healthy eating 4. Active play kit implementation in children for 6 months	The HSD Sha intervention is only effective in promoting some healthy behaviors in preschool children in day care centers, namely physical activity and healthy eating, this is effective in efforts to prevent obesity in children.
C 3	Nicole Toussaint1* , Martinette T. Streppel1, Sandra Mul1, Anita Schreurs2, Marielle Balledux3, Karen van Drongelen4, Mirka Janssen1, Ruben G. Fukkink5,6 and Peter J. M. Weijs1 Toussaint et al. BMC Public Health (2019) 19:278 https://doi.org/10.1186/s12889-019-6611-x Belanda (Toussaint et al., 2021)	A preschool-based intervention for Early Childhood Education and Care (ECEC) teachers in promoting healthy eating and physical activity in toddlers: study protocol of the cluster randomized controlled trial PreSchool@HealthyWeight	3. Evaluate the effect of preschool-based systems on PAUD teachers in increasing the knowledge and practices of early childhood teachers regarding healthy eating patterns and children's physical activity, so that teachers can set a healthy example 4. Gain insight into the effects of preschool-based interventions	Population: PAUD teacher in Amsterdam, west of the Netherlands. Sample : 41 PAUD consists of 115 PAUD teachers, 249 mothers and toddlers who are in PAUD Technique: cluster random sampling	Metode: Experimental Desain : Pre post test ,	1. There is an increase in knowledge of attitudes, healthy eating practices and physical activity in children, 2. Preschool-based intervention is an early intervention to prevent obesity and optimize nutritional status.
C 4	Ansuya B1, Baby S. Nayak2*, Unnikrishnan B3, Ravishankar N4, Shashidhara Y. N5 and Suneel C. Mundkur6	Impact of a home-based nutritional intervention program on nutritional status of preschool children: a cluster randomized controlled trial	To determine the effect of home nutrition intervention programs on improving the nutritional status of	Population : Children in rural areas of South India who are included in the working area of	Metode : Experimental Desain : pre post test	1. With the home-based intervention the nutritional status of preschool children was

	B et al. BMC Public Health (2023) 23:51 https://doi.org/10.1186/s12889-022-14900-4 (B et al., 2023)		preschool children living in rural areas of South India	the Angan Wadi Public Health Center Sample: Underweight or moderately underweight preschool children aged 3-5 years enrolled at Aganwadi center in Udupi District, Karnataka, India Cluster random sampling technique.		significantly improved. Because home diet therapy involves caregivers in preparing nutritious food which leads to the practice of feeding children so that they can reduce malnutrition in children. 2. Home-based diets are a more affordable therapeutic option for reducing child mortality and morbidity.
C 5	Malgorzata Kosteck J. Environ. Res. Public Health 2022, 19, 1981. https://doi.org/10.3390/ijerph19041981 (Kostecka, 2022)	The Effect of the “Colorful Eating Is Healthy Eating” Long-Term Nutrition Education Program for 3- to 6-Year-Olds on Eating Habits in the Family and Parental Nutrition Knowledge	Evaluate the effect of Long-term nutrition education in children aged 3 to 6 years on parents' nutritional knowledge	Population : Parents with children aged 3-6 who are in kindergarten in ublin poland Sample: 211 children and parents from kindergarten were randomly selected Technique: andom	Metode : Mixmethod Desain : Pre post test	Multi-stage Long nutrition education for children aged 3-6 years can help shape family eating habits and improve parental nutrition. However, this program was less effective in eliminating respondents' preference for sweet foods