
Storybooks As A Tool For Nutrition Education In The Prevention Of Obesity And Type 2 Diabetes In Children: A Literature Review

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Abstract

Obesity and Type 2 Diabetes Mellitus (DM) in children is a health problem related to changes in diet and lifestyle. Nutrition education from school age is needed to increase children's knowledge about healthy food choices. One approach that can be used is story-based educational media that combines narrative and visual elements. This literature review aims to examine the use of storybooks as a nutrition education medium in increasing knowledge and supporting the prevention of obesity and type 2 DM in children. The literature studied discusses the relationship between diet and the risk of obesity and type 2 DM, the characteristics of children's educational media, and the effectiveness of narrative and visual approaches in conveying health messages. The results of the study show that storybooks have potential as an educational medium because they can convey health information through characters, storylines, illustrations, and situations that are close to children's lives. Story-based media can also increase children's involvement in the learning process and help connect nutritional information with daily decision-making. The development of media that is tailored to the cultural context and characteristics of children's development is one of the important factors in media acceptance. The storybook "PILAH-PILIH" is an example of narrative- and visual-based educational media developed to help children understand healthy food choices. The independent use of storybooks has the potential to be an alternative nutrition education media that is simple, interesting, and suitable for school-age children.

Keywords: *Schoolchildren, Storybooks, Nutrition Education, Obesity, Type 2 Diabetes Mellitus.*

INTRODUCTION

Obesity in children is a growing health problem and is related to various factors, including imbalances between energy intake and physical activity, unhealthy diets, and environmental influences (Sumarni et al., 2023). The condition of obesity in childhood is not only related to nutritional status problems, but can also increase the risk of chronic diseases in the future, including type 2 Diabetes Mellitus. The increased incidence of type 2 DM in the age group of 10–24 years globally emphasizes the importance of early intervention (Xu et al., 2025). Accumulation of visceral fat has been shown to be associated with insulin resistance and decreased pancreatic beta cell function (Weiss et al., 2021).

The increase in cases of type 2 diabetes in the young age group is a concern because the disease was previously more common in the adult age group. Insulin resistance, impaired pancreatic beta cell function, obesity, a diet high in sugar and fat, and low physical activity are some of the factors related to the risk of type 2 diabetes in children. This condition shows that prevention efforts need to be carried out from school age through approaches that can increase children's knowledge and awareness of healthy living behaviors (Lee et al., 2022).

Eating behavior is one of the important aspects in the prevention of obesity and type 2 diabetes. Children's food choices can be influenced by family, school, media, advertising, and food availability. Exposure to foods high in sugar, salt, and fat can affect children's food preferences (Vaughan et al., 2025). Therefore, education about healthy food choices needs to be provided in methods that suit children's characteristics and development.

Story-based educational media is one of the approaches that can be used in children's health education. The delivery of health concepts through narrative approaches and visual illustrations has been proven to make it easier for children to understand abstract concepts

(Vahedi et al., 2018; Paraiso-Galang et al., 2020). Storybooks can combine narratives, illustrations, and characters so that complex information can be conveyed through situations that are more concrete and close to the child's experience. This approach can make the learning process more interesting than textual or one-way information delivery. Story-based interventions are able to improve nutritional knowledge and shape fruit and vegetable consumption preferences in school children (Green et al., 2020; Alfina et al., 2024). The integration of interactive elements has also been shown to increase children's emotional engagement and information retention (Taylor et al., 2023).

The use of local contexts in nutrition education media makes it easier for children to reflect moral messages in daily life (Wijaya & Sari, 2020). The integration of educational packages in the form of games and storybooks in the early stages of PILAH-CHOOSE shows an increase in positive responses and enthusiasm of children (Sari et al., 2024). The involvement of parents and educators remains the main determining factor for the sustainability of this behavior change (Brown et al., 2021). Based on this, this study aims to review the potential use of storybooks as a nutrition education medium in increasing children's knowledge about healthy food choices and supporting efforts to prevent obesity and type 2 diabetes in children.

RESEARCH METHODS

This literature review uses a narrative review approach to examine the use of storybooks as a medium for children's nutrition education. Literature searches were conducted through the PubMed, Google Scholar, ScienceDirect, and Garuda Portal databases. Keywords used in Indonesian and English include: "childhood obesity", "type 2 diabetes mellitus in children", "nutrition education", "storybook", "storytelling", "child nutrition education", and "storybook". Inclusion criteria include publication of journal articles, official reports of governments/international organizations (WHO, UNICEF, Ministry of Health of the Republic of Indonesia), as well as studies that examine eating behaviors, visual media, or narrative approaches in school-age children (6–12 years). The sources of the synthesized literature include studies published in the range of 2018–2025.

The study was carried out by grouping literature based on several main themes, namely: (1) obesity and type 2 diabetes in children; (2) eating behavior and healthy food choice; (3) health education media for children; (4) the effectiveness of narrative and visual approaches; and (5) the development of storybooks "PILAH-PILIH" as a nutrition education medium.

RESULTS AND DISCUSSION

Obesity and Type 2 Diabetes Mellitus in Children

The literature shows a link between obesity in children and an increased risk of metabolic diseases, including type 2 diabetes (Weiss et al., 2021). Obesity is related to an energy imbalance influenced by diet, physical activity, and the environment (Sumarni et al., 2023). Visceral fat accumulation can be associated with insulin resistance and impaired pancreatic beta cell function, increasing the risk of developing type 2 diabetes. Pathophysiologically, visceral fat accumulation is directly related to the incidence of insulin resistance and decreased pancreatic beta cell function, thereby accelerating the onset of type 2 diabetes at a young age (Xu et al., 2025).

These risk factors show the importance of promotive and preventive interventions carried out from a young age. Health education can be one of the approaches because

knowledge about healthy food and lifestyle is part of the basis for shaping health behaviors in the long term (UNICEF, 2023).

Children's Eating Behavior

Children's eating behavior is influenced by various environmental factors. Family, school, media, advertising, and food availability can influence the food choices children make (Brown et al., 2021). Patterns of consumption of foods high in sugar, salt, and fat and low consumption of fruits and vegetables can contribute to the risk of obesity and metabolic disorders (Sumarni et al., 2023). In addition, the habit of skipping breakfast (breakfast skipping) has also been shown to contribute to metabolic health disorders in children and adolescents (Lee et al., 2022).

Exposure to food promotion through digital media is also a challenge in forming healthy eating behaviors (Vaughan et al., 2025). Therefore, education is not enough to only provide information about healthy foods, but it is necessary to help children understand the reasons behind these choices and relate them to the situations they encounter on a daily basis (Wijaya & Sari, 2020).

Storybooks as Health Education Media

Storybooks have characteristics that suit children's educational needs because they combine information with storylines and illustrations. The narrative approach allows children to obtain information through characters and events that can be related to their experiences. The literature reviewed shows that story-based media can help convey complex health concepts in a more enjoyable and easy-to-understand way (Paraiso-Galang et al., 2020).

The use of visual elements can also increase the appeal of the media. Illustrations help provide a concrete representation of the information conveyed through text (Green et al., 2020). Thus, a combination of narrative and visuals can be an appropriate approach to convey health messages to school-age children (Alfina et al., 2024).

Interactive Media in Nutrition Education

The development of educational media is not limited to conventional storybooks. The integration of interactive activities and games can increase children's involvement in the learning process (Taylor et al., 2023). The literature shows that approaches that combine narrative, visual, and social interaction have the potential to increase children's involvement in understanding health information (Smith et al., 2023; Taylor et al., 2023).

Educational media developed based on the local context also have advantages because the situations and characters displayed can be closer to the child's experience (Wijaya & Sari, 2020). This can help children connect the information obtained with their daily lives (Tanu, 2022).

Storybook "SELECTIVE"

The storybook "PILAH-PILIH" was developed as an educational medium for elementary school children with a narrative, visual, and reflective approach. The story uses Rina and Roni's characters who face daily situations related to food selection. This situation provides an opportunity for children to understand the decision-making process about food through a context that is close to their lives (Tanu, 2022).

The book "SELECT-CHOOSE" was initially used as part of an educational package consisting of board games, introductory storybooks, and partner guidebooks. The media has been used in educational activities on healthy eating and physical activity. The results of previous activities showed that there was a positive response and enthusiasm of children to the approach of playing and storytelling (Wijaya & Sari, 2020).

One of the characteristics that is the advantage of the media is the use of local contexts. The characters and situations in the stories are designed to be close to the lives of Indonesian children so that the nutritional message can be conveyed in a more contextual way. This

approach also provides an opportunity for children to connect the messages in the story with their own experiences.

In subsequent development, the "SELECT-CHOOSE" storybook was used independently without a board game. This approach allows the use of storybooks as a simpler intervention medium that can be applied more easily in the school environment. The independent use of books also allows for a more specific assessment of the contribution of narrative and visual elements in healthy food selection education (Green et al., 2020; Alfina et al., 2024).

Challenges of Using Storybooks as Educational Media

Despite its potential, the use of storybooks as an educational medium also has several challenges. Access to quality educational media can vary between regions. In addition, the success of media in increasing knowledge has not automatically shown that such changes will result in changes in eating behavior in the long term (Smith et al., 2023).

The involvement of parents and educators is also an important factor. Children need a supportive environment so that the information obtained through educational media can be applied in daily life (Brown et al., 2021). Media content also needs to be adjusted to the child's age, ability to understand information, and cultural context (Paraiso-Galang et al., 2020).

Research Gap and Implications

Based on the literature studied, story-based media has the potential to deliver health and nutrition education to children (Vahedi et al., 2018; Green et al., 2020). However, there is still a need to evaluate the use of storybooks independently as an educational medium, especially in the context of choosing healthy food for elementary school children.

"SELECTIVE" offers an approach that combines narratives, illustrations, and decision-making situations that are close to the child's life. Its use independently is a different approach from the early development of media that combined storybooks with board games. Thus, storybooks can be studied more specifically as a narrative-visual educational medium.

This study shows that the development of nutrition education media for children needs to consider not only the accuracy of the information, but also the visual appeal, language suitability, cultural context, and opportunities for children to connect information with everyday experiences. Further evaluation is needed to determine the influence of media on eating attitudes and behaviors and the sustainability of changes after the intervention (Alfina et al., 2024).

CONCLUSION

The literature shows that obesity and type 2 DM in children are related to various factors, one of which is unhealthy eating behavior. Nutrition education from school age is one of the promotive approaches that can be used to increase children's understanding of healthy food choices.

Storybooks have the potential as an educational medium because they combine narrative and visual elements that are in accordance with the characteristics of children's learning. The use of characters, storylines, illustrations, and situations that are close to daily life can help convey nutrition messages in a more contextual and interesting way.

The "SELECT-SELECT" storybook is a form of educational media that uses this approach. The independent use of books provides an opportunity to develop nutrition education media that is simple and easy to apply in the school environment. However, further research is needed to evaluate its effectiveness in changing children's knowledge, attitudes, and eating behaviors in the long term.

REFERENCES

- Alfina, T. Y., Sumaryono, D. and Ismiati (2024) “The Effect of Storytelling Method through Fairy Tale Book Media on Children’s Knowledge and Attitudes about Fruit And Vegetable Consumption”, *Media Gizi Indonesia*, 19(1SP), pp. 76–78. doi: <https://doi.org/10.20473/mgi.v19i1SP.76-78>
- Brown, A. et al. (2021) ‘Parental Involvement in Children’s Health Education: Challenges and Opportunities’, *Health Education Research*, 36(4), pp. 567–579.
- Green, M. et al. (2020) ‘The Effectiveness of Story-Based Health Education in Improving Children’s Nutritional Knowledge and Behavior’, *Journal of Child Health*, 12(3), pp. 123–135. Doi: <https://doi.org/10.1093/nutrit/nuac057>
- Lee, H., Kim, M. and Park, Y. (2022) ‘Breakfast skipping and metabolic health in children and adolescents: A systematic review’, *Nutrients*, 14(15), p. 3010. doi: <https://doi.org/10.3390/nu14153010>
- Lee, H., Kim, M. and Park, Y. (2022) ‘Breakfast skipping and metabolic health in children and adolescents: A systematic review’, *Nutrients*, 14(15), p. 3010. doi: <https://doi.org/10.3390/nu14153010>
- Paraiso-Galang, C., et al. (2020) ‘The role of storytelling in health education: A review’, *Journal of Educational Psychology*, 112(3), pp. 456–468.
- Riskesdas (2018) *Laporan Nasional Riset Kesehatan Dasar 2018*. Jakarta: Badan Penelitian dan Pengembangan Kesehatan.
- Riskesdas (2021) Riskesdas (2021) *Riset Kesehatan Dasar Nasional*. Jakarta: Badan Litbangkes, Kementerian Kesehatan RI. Available at: <https://www.litbang.kemkes.go.id/riskesdas-2021>
- Smith, J., et al. (2023) ‘The role of story-based interventions in promoting healthy eating habits among children’, *Journal of Child Health and Nutrition*, 15(3), pp. 245–260.
- SSGI (2022) *Survei Status Gizi Indonesia 2022*. Jakarta: Kementerian Kesehatan RI. Doi: <https://www.litbang.kemkes.go.id/laporan-ssgi-2022>
- Sumarni, S., et al. (2023) ‘Pola makan dan aktivitas fisik sebagai faktor risiko obesitas pada anak’, *Jurnal Gizi dan Kesehatan*, 14(1), pp. 33–45.
- Tanu, J. (2022) ‘Efektivitas media edukasi berbasis cerita dalam mencegah obesitas pada anak’, *Jurnal Pendidikan Kesehatan*, 10(1), pp. 22–35.
- Taylor, R., et al. (2023) ‘Digital storytelling in health education: A systematic review’, *Educational Technology Research and Development*, 71(1), pp. 123–145.
- UNICEF (2023) *The State of the World’s Children 2023: For Every Child, Nutrition*. New York: UNICEF. Available at: <https://www.unicef.org/reports/state-of-worlds-children-2023>.
- Vahedi, S., et al. (2018) ‘The role of storybooks in teaching health concepts to children: A systematic review’, *Health Education Journal*, 77(4), pp. 456–468
- Vaughan, E. et al. (2025) ‘A scoping review of children's and parents' attitudes to and awareness of digital food marketing’, *Health Promotion International*, 40(2), daae189. doi: <https://doi.org/10.1093/heapro/daae189>
- Wijaya, D. and Sari, P. (2020) ‘Edukasi gizi melalui media cerita: Studi kasus di sekolah dasar’, *Jurnal Pendidikan dan Kesehatan*, 8(2), pp. 89–102.
- Xu, S.-T., Sun, M. and Xiang, Y. (2025) ‘Global, regional, and national trends in type 2 Diabetes Melitus burden among adolescents and young adults aged 10–24 years from 1990 to 2021: A trend analysis from the Global Burden of Disease Study 2021’, *World Journal of Pediatrics*, 21(1), pp. 73–89. doi: <https://doi.org/10.1007/s12519-024-00861-8>