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TECHNICAL ADVANCES ON CURRENT RESEARCH TRENDS: EXPLORING THE FUTURE SCOPE OF NUTRITION EDUCATION

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Abstract

This study tries to identify cutting-edge, trending, and future issues in nutrition research topics from 1994-2023. Systematic Literature Network Analysis was utilized in this study. The method used in this study was a combination of a Systematic Literature Review employing the PRISMA procedure and a Bibliometric Analysis leveraging the VOSviewer program. There were 167 papers from 753 documents in the Scopus database included in the Bibliometric analysis. The results show that nutritional research in education is increasing every year generally. The VOSviewer analysis reveals several emerging keywords associated with nutrition research in four clusters: nutrition education, health behavior, feeding behavior, and nutritional literacy. The results of this study support researchers related to nutrition research trends in education and provide direction for further research. Overall, this review provides an excellent reference point for further research on nutrition in education.

Keywords: Bibliometric analysis, Nutrition literacy, Nutrition, Research, VOSviewer, Young adult.

1. Introduction

The need for preventive interventions and policies in the nutritional field concerns all age groups because the adverse effects of inadequate lifestyles affect all age groups worldwide. The big challenge, therefore, is to start very early with nutrition education programs to encourage the adoption of adequate lifestyles. The school is the most eligible setting to implement strategies to improve students' diets and food choices that are pivotal in promoting health [1]. Multiple studies have discovered that the vast majority of children still need to fulfil the recommendations of food-based nutritional recommendations. The case happens primarily due to a lower vegetable and fruit intake but a higher meat and sugar consumption, resulting in high intakes of SFA and salt and low intakes of PUFA, vitamin D, folate, and iodine [2]. Dietary patterns are formed early in life and persist into adulthood [3]. Approximately 70% of obese adolescents had at least one CVD risk factor [4]. Therefore, childhood and adolescence are crucial for establishing healthy eating habits that can prevent the development of nutrition-related diseases later in life.

Education in school is vital in introducing and developing nutrition knowledge and health habits. Nutrition education for primary [5-7], nutrition education for university students [8], nutrition education for pre-schooler [9, 10], and nutrition education for adults [11, 12] have been widely discussed. Further, nutrition education has been reported to be implemented in schools [13-19]. However, a review that discusses nutrition education at the adolescent or secondary level is present [20, 21] but still scarce. The novelties of this study are (i) trying to explore the nutrition education program specific for young adults from 1994-2023 (ii) This study using the Systematic Literature Network Analysis (SLNA), which combines Systematic Literature Review (SLR) and Bibliometric Analysis (BA) use VOSviewer software, and (iii) trying to find the trending and future research in nutrition education for young adult.

Proper nutrition leads to the improvement of children's health and prospective learning capacity [7, 20], enhancing their academic achievement [20], making them more physically active [5], refraining from smoking [3], and learning to cope with stress and have the potential to experience fewer chronic diseases as adults [5, 11]. Nutrition education is essential for encouraging lifelong good eating and activity habits and should begin early [2, 22]. Previous research indicates that for programs to be successful in changing eating behaviors, they must address individual factors such as knowledge, attitudes, self-efficacy, norms, Behavioral control, and skills, as well as external conditions such as interactions with influential people such as parents [6, 7, 10], teachers [6, 7], and community members [8, 12], the availability of nutritious food and safe water [9], and a physical environment [1, 20] conducive to good eating practices.

2. Method

This study used the SLNA, combining SLR and BA. The SLNA procedure in this study was adapted from previous research [16]. The SLR process in this study adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Protocol [23]. The BA used VOSviewer software, in which detailed protocol to use this software is reported elsewhere [24]. VOSviewer provides three visualizations of a nutrition education research map from 1994 to 2023. Only two maps discussed in this research, there are network visualization, and overlay visualization. We conducted a literature search in February 2023 using the following key terms: ‘‘nutrition AND “education” AND “research.” The Scopus database was

searched with limits to publication after 1993 up to 2023, and all studies published in English resulted in 753 papers. The Scopus database search retrieved a total of 753 articles; 637 were retrieved for full-text review from articles and conference papers. We excluded 588 articles because they: (1) were not a study in the education area (n =404); and (2) the subject of the research was not a school-age population (n=66). After going through a detailed review process based on the abstract, only 167 documents would be analysed.

3. Results and Discussion

Based on Scopus Analyses from 167 papers, publications increased significantly every 5 years from 2005 to 2022. The Number of publications produced per year in 2005 (5 documents), 2010 (9 documents), 2015 (10 documents), 2020 (21 documents), and 2021 (20 documents). Many research documents were published in another year fewer than the years mentioned above and no articles have been published in the first term of 2023. The fluctuating Number of research articles in nutrition education may happen because they involve humans and consider the ethical issue, so only a few publications produce yearly. This fact shows that nutrition education research still deserves to be carried out, proven by the significant increment of publications produced in the last three decades.

The publications search is limited to the English language only. The top 10 countries recorded to give a contribution to nutrition education are the United States (79), United Kingdom (14), South Africa (5), India (3), Hong Kong (5), Finland (3), Denmark (4), Canada (14), Brazil (5), and Australia (24). Based on the data, search results indicate no research publication from Indonesia, giving ample opportunity for Indonesian researchers to make a worldwide contribution to nutrition education.

The state-of-the-art on Nutrition Education begins with mapping the number of articles (journals, conferences) indexed by Scopus for 30 years of study from 1994 – 2023. The relationship between concepts was analysed and visualized using VOSviewer, as can be seen in Figs. 1 and 2. Table 1 shows the mapping of clusters and keywords along with the number of repetitions. With a minimum number of keywords, occurrences are 6; from 1,602 keywords, 129 meet the threshold. From 129 keywords divided into 3 clusters (red: 60 items, green:43 items, and blue: 26 items). The colour of each cluster is shown in Fig. 1.

According to the most frequently mentioned terms in each cluster and their corresponding research themes, cluster 1 is about nutrition (82), nutrition education (48), young adult (30), human experiment (35), female (94), male (82), qualitative research (35). Cluster 2 is about health education (52), diet (31), health behavior (18), obesity (20), procedures (34), and controlled study (27). Cluster 3 is about an adolescent (36), attitude to health (29), health-knowledge-attitude (28), and feeding behavior (31). Cluster 4 is about humans (139), health promotion (58), methodology (21), and education (64). Table 1 presents a relatively diverse number of keywords in each cluster, similar terms grouped into one.

The close relationship between concepts occurs in one cluster, such as nutrition education and young adult in the red cluster, health education and health behavior in the green cluster, health promotion and education tools in the yellow cluster, and attitude to health and adolescent in the blue cluster. Concept proximity also occurs between clusters such as nutrition (red) adjacent to health promotion (yellow) and adolescence (blue).

Table 1. Keywords representing each cluster in nutrition education.

No.	Cluster	Keywords
1	Cluster 1 (60 items)	cooking (29), curriculum(22), diet healthy(7), eating(9), education program (7), female (94), food (16), food literacy(9), food processing(8), food security (5), health literacy(15), healthy diet (15), high school(6), human experiment(35), information processing(11), internet(10), knowledge(11), learning(10), literacy (11), male (82), nutrition (82), nutrition education (48), nutrition survey(6), nutritional services (41), nutritional value (5), nutritionist (5), parent (5), perception (12), primary school (12), school child (6), school teacher (5), self-efficacy (12), skill (42), student (36), teaching (7), young adult (30)
2	Cluster 2 (46 items)	Behavior (14), body mass index (22), child-parent relation (7), community diabetes mellitus (6), dietary intake (62), health behavior (18), health care delivery (5), health education (52), health status (6), lifestyle (13), lifestyle modification (6), meal (5), motivation (8), obesity (20), outcome assessment (7), parents (10), physical activity (13), physiology (6), procedures (34), psychology (23), self-care(9), socioeconomic (7), statistic and numerical (5)
3	Cluster 3 (24 items)	Adolescents (43), attitude to health (29), cognition(5), cross-sectional study (37), educational status (9), feeding behavior (31), food habit (10), fruit (9), health knowledge attitude(28), nutritional status (16), poverty (7) school health service (22), vegetable(20), wellbeing (6)
4	Cluster 4 (22 items)	education (64), food service (7), health (5), health care policy (5), health care quality (5), health promotion (58), health service research (5), human (139), leadership (6), methodology (21), organization Management (18), program development (7), program evaluation (16), psychological aspect (5), public health (10).

The overlay visualization in Fig. 2, allows us to distinguish currently trendy research topics. Topics recently published in articles will be shown in warmer colours like red, orange, and yellow representing scholarly activity in the last 5-8 years. For instance, literacy in nutrition is a relatively trendier topic, and its average publication year is 2020, while health behavior in terms of nutrition is a relatively older topic, and its average publication year is 2013.

Nutrition research in education started to gain momentum, as well as citations, in 1996. The first influential studies in this cluster were mainly Guidelines for school health programs to promote lifelong healthy eating. In 2005, another research started to discuss health promotion in schools. These researches give a new awareness about teacher competency in nutrition teaching skills, pupils' knowledge and skills of nutrition, and curriculum materials for future use. As nutrition awareness was raised in 2010, the research discusses lifestyle and health behavior with a broader strategy, including community-based health intervention.

Research trends in 2015 still discuss health behavior, but many publications discuss health promotion through eating behavior and food skills, including cooking techniques. The education side takes part by giving support to teachers in designing programs that would address Behavioral capabilities to improve young people's food preparation and eating behaviors. Since 2015 the interest in conducting nutrition education research has been increasing, as shown by the number of publications that keep increasing.

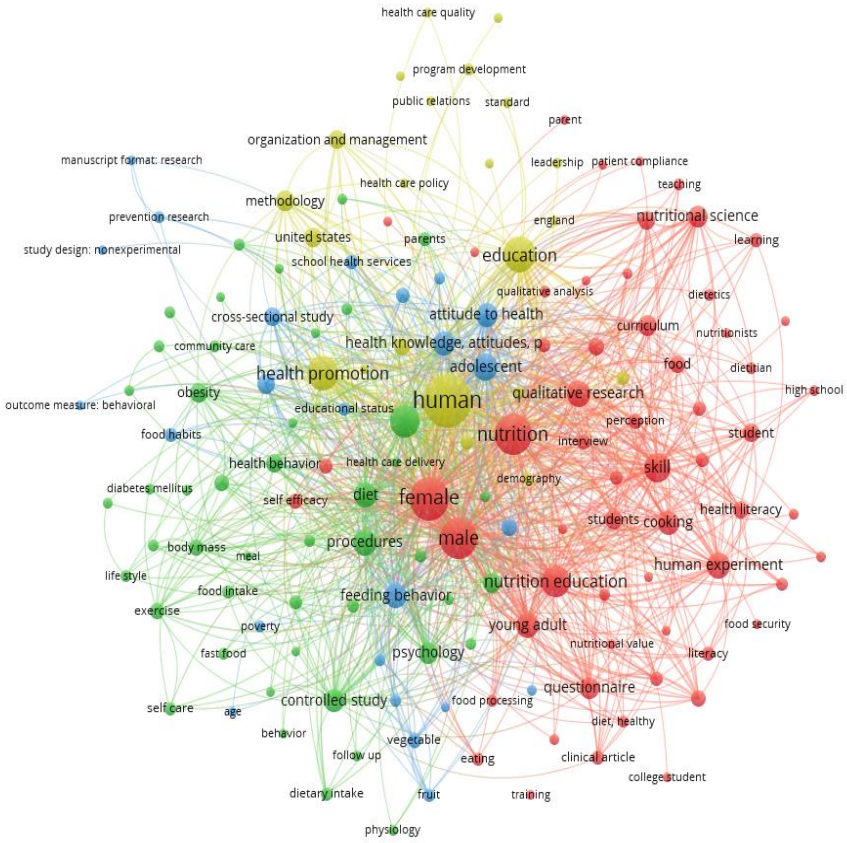

Fig. 1. Network visualization map related to nutrition education from 1994-2023.

One recommendation for further research in nutrition education from the analytical map is about the nutrition concept to promote health promotion and develop student health literacy. Literacy research in nutrition has gained more attention since 2015 and is still growing. The research scope from 2015 is health literacy, nutrition literacy, and food literacy. This kind of research likely developed from previous research about food skills in 2011.

Promoting nutrition literacy (NL) is usually a big part of programs that try to stop basic nutrition problems from happening [25, 26]. NL has become an important issue, especially for young adults, because of how little they know about the role of nutrition in a healthy life, how many different nutrients there are, and how many more nutrients they eat away from home [25]. NL is thought to include training programs that teach people how to get and use the right foods. NL is how much people learn about nutrition and how well they can read and understand the information they need to make good nutrition choices. To stop the growing number of health problems caused by poor nutrition, people and society need to learn more about nutrition and develop healthy eating skills and habits [26, 27].

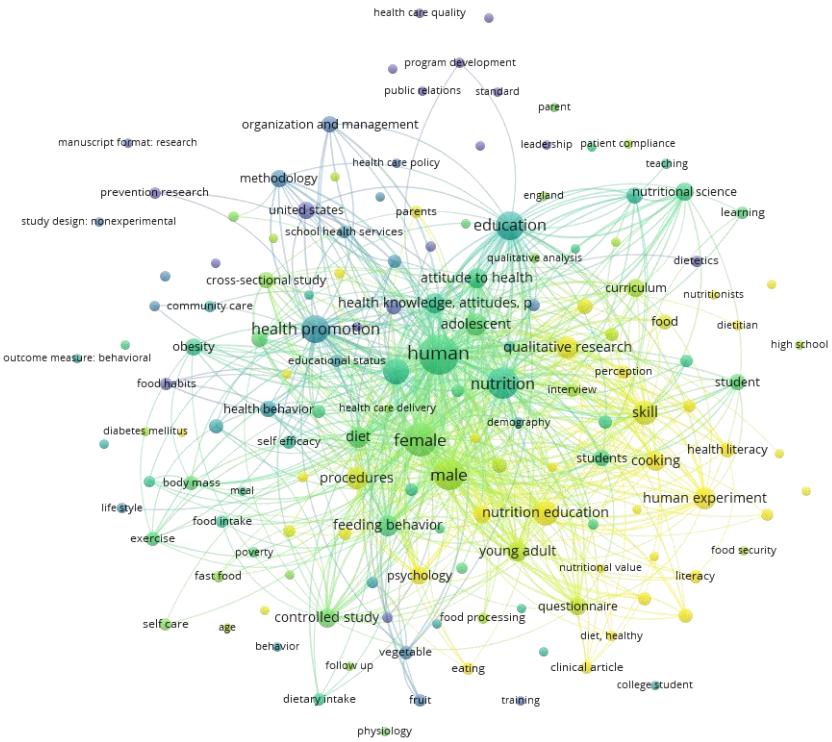

Fig. 2. Overlay visualization map related to nutrition education from 1994-2023.

4. Conclusion

Based on the data, this research has succeeded in showing several aspects: (1) research related to nutrition education shows a positive trend from year to year. Co-occurrence analysis on the VOSviewer feature showed the relationship between the concepts and the strength of the relationship, and (2) The overlay image shows one recommendation for nutrition education relating to literacy, such as NL. NL has become an important issue, especially for young adults, because of how little they know about the role of nutrition in a healthy life, how many different nutrients there are, and how many more nutrients they eat away from their needs.

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