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Fruit consumption improvement as an effort to sustainable lifestyle

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Abstract - The integration of healthy diets into sustainable lifestyles faces challenges as modern living often sidelines nutritional choices. While the World Health Organization (WHO) recommends 150 grams of fruit daily per capita, Statistics Indonesia (2021) reports an average consumption of only 81.14 grams, meeting just 54.09% of the WHO's minimum nutritional adequacy. This qualitative descriptive study aims to analyze the knowledge, attitude, and actions influencing fruit consumption in Indonesia. Primary data, collected through questionnaires, reveal that respondents generally possess good knowledge and attitude towards fruit benefits. However, discrepancies arise in the action aspect, with consumption frequency falling below recommended standards. Utilizing the Scopus publication database and Vosviewer software, bibliometric analysis identifies key keywords like female, male, adult, fruit, diet, and food intake in Indonesian fruit consumption research. Despite positive attitudes and awareness, actual fruit consumption remains suboptimal, emphasizing the need for targeted interventions to bridge the gap between knowledge and practice.

Keywords: bibliometric, fruit consumption, healthy diet

1 Introduction

Everyone can adopt various sustainable lifestyles. One is a healthy lifestyle by consuming food that maintains cleanliness and health. Eating fruit, especially those self-grown, is an example of frugal behaviour, and the existing plants will become a source of oxygen. Because of its fertile nature, Indonesia has great potential as a fruit producer. Likewise, many benefits can be obtained if someone consumes fruit regularly and as recommended.

Fulfilment of nutritious and balanced food is also needed in addition to preventing viral infections; it is also essential to speed up the recovery of patients. A person needs to maintain their immune system to prevent certain diseases, especially by avoiding the development of pathogenic microorganisms or counteracting the products' effects [1]. Good nutrition is essential before, during, or after infection. The family food consumption menu should contain complete nutrition such as carbohydrates, protein, fat, vitamins, and minerals.

Regarding increasing immunity or the body's immune system, the consumption of fruit and vegetables is needed by the body as a source of vitamins, minerals, and fiber in achieving a healthy diet as recommended by balanced nutrition guidelines. The vitamins and minerals in fruit and vegetables have an essential function as antioxidants, which are very beneficial for the body. However, the average fruit consumption in Indonesia only reaches 81.14 grams per capita per day

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[2], while the World Health Organization (WHO) generally recommends that the average fruit consumption is 150 grams per capita per day [3]. Thus, the average fruit consumption in Indonesia has only reached 54.09%. However, the 2018 Basic Health Research (Riskesdas) results show that as many as 95.5 percent of Indonesians still need to consume sufficient portions of fruit [4]. This means that fruit consumption is still relatively low, below 10%. In this case, it is only around 4.5%. This is still an ongoing problem.

Various previous studies also show the same thing, namely that the average fruit consumption in Indonesia per capita per day is still low. The low consumption of fruit among Indonesian people has the potential to reduce the general health condition of the community. In fact, in the current boiling climate situation, people are expected to increase their consumption of nutritionally balanced food, including fresh fruit. Based on this, this literature study aims to determine the condition of fruit consumption behaviour in various states in Indonesia based on age classification, socioeconomic classification, and other factors and what efforts can be made to overcome this.

Many studies have been conducted regarding fruit consumption behaviour. For this reason, it is necessary to carry out an analysis of the research results. One method that can be used to analyze the results of research in specific fields is bibliometric analysis [5]. Bibliometric analysis is integral to the research evaluation method, especially in scientific and applied fields. Therefore, the objective of this research is i) to analyze factors in the fruit consumption pattern in Indonesia and ii) to analyze research development on fruit consumption in Indonesia to achieve a sustainable lifestyle in Indonesia.

2 Materials and methods

The data used in this research are primary and secondary. Preliminary data were obtained from questionnaires delivered to 136 respondents. The data were collected using random sampling. Following the research objective, no specific criteria were set to capture the respondents' fruit consumption patterns. Secondary data was obtained through reports, documents, journal articles, and other research-related documents. Journals from 2003 until 2023 with the keywords “fruit consumption Indonesia” were collected from Scopus. Two hundred forty-two journal articles were collected and processed using Vosviewer to generate visualization and trend analysis using a Bibliometric map. VOSviewer allows the creation of journal maps based on networks (co-citation) or building keyword maps based on shared networks. Keyword frequency will enable it to be adjusted according to the desire to eliminate less relevant keywords.

3 Results and discussion

Based on the data collected, Table 1. shows the characteristics of the research respondents. The socioeconomic profile of the respondents indicates interesting information, where most respondents are men aged between 26-35 years old, graduated with a master's degree, and currently working. The details of the respondent's characteristics are shown in Table 1.

Food consumption refers to the type and amount of food eaten to meet individual biological, psychological, and social needs. Fruits, scientifically recognized as a source of vitamins, minerals, and fibre, are crucial in preventing deficiencies and various health issues. The vitamins, minerals, and fibre in fruits act as regulatory substances, combating problems such as constipation, anaemia, and immune system deficiencies. Additionally, fruits with high vitamin C content contribute to collagen production, benefiting skin health. Water-rich fruits, like watermelon, aid in hydration, which is essential for digestive health, metabolism, and overall well-being.

Table 1. Socioeconomics characteristics of the respondents.

Gender	(%)
Man	65
Women	35

Age	(%)
26-35	41
36-45	27
18 - 25	14
> 46	18

Education Level	(%)
Senior High School	21
Diploma	5
Bachelor/Applied Bachelor	24
Master's degree	48
Doctoral	7

Working Status	(%)
Yes	90
No	10

Region	(%)
Java	67
Sumatera	15
Sulawesi	8
Kalimantan	7
Nusa Tenggara	2

Number of Family Members	(%)
0	22
1 – 3	64
4 – 6	17
> 6	2

Food Expenditure per Month (IDR/month)	(%)
IDR 0 -500.000	5
IDR 500.001 – Rp 1.000.000	21
IDR 1.000.001 – Rp 5.000.000	64
IDR 5.000.001 – Rp 10.000.000	8
> IDR 10.000.001	1

Fruits are a source of natural antioxidants, including saponins, flavonoids, and alkaloids in avocados, and vitamin A, flavonoids, beta-carotene, and polyphenols in mangoes. Regular fruit consumption is linked to a reduced risk of heart disease, type 2 diabetes, obesity, stroke, and cancer, attributed to the fibre, water, and antioxidant content that supports a healthier digestive system. Papaya, for example, contains papain enzymes that facilitate protein digestion. Fruits that contain high levels of vitamin C in 100 grams of fruit are guava (228,3 mg), papaya (61 mg), orange (53 mg), pineapple (47,8 mg), and mango (36,5 mg). The World Health Organization (WHO) and the Healthy Living Community Movement (GERMAS) recommend a daily fruit intake of 400 grams or 2-3 servings, emphasizing the benefits for overall health.

3.1 Knowledge and attitude aspect of fruit consumption

The survey shows that respondent's knowledge of the benefits of fruit is good. Respondents understand that fruit consumption could benefit their health. Table 2 shows respondents' knowledge and attitudes regarding fruit. Of the eight questions regarding respondents' knowledge and attitudes regarding the nutritional content of fruit and its function for the body, the majority (> 80%) of respondents answered them correctly. Thus, respondents can be classified as having good or even relatively high knowledge regarding knowledge and attitudes.

Table 2. Aspects of Consumer Knowledge and Attitudes in Consuming Fruit

No	Knowledge Aspect	Level of Agreement			
		1	2	3	4
1	The benefits of consuming fruit are as a source of energy, builder, and regulator	71	45	8	8
2	The only nutrients contained in fruit are vitamins	17	19	53	43
3	Someone who doesn't consume enough fruit will not get sick easily	21	30	45	36

No	Knowledge Aspect	Level of Agreement			
		1	2	3	4
4	The benefits of Vitamin C are as an antioxidant, increases the body's immunity, and helps the absorption of iron	65	54	7	6
5	Guava is a food source that contains minimal vitamin C	47	41	23	20
6	The benefits of Vitamin A are to maintain eye health, bone and tooth growth, and reproductive health	62	55	8	6
7	Many sources of Vitamin D are papaya	51	45	18	18
8	Sources of Vitamin A are found in mangoes, tomatoes and papaya	63	32	29	7
9	Fruit is a food that contains many nutrients that the body does not need	5	8	23	96
10	Excellent and nutritious fruit is fruit that is delicious and expensive	6	10	21	95
11	The types of fruit consumed must be diverse	58	47	20	7
12	Consuming fruit regularly cannot prevent the body from disease	10	19	40	63
13	Vitamins, minerals, and fiber are nutrients that the body does not need	8	9	15	99
14	Vitamins, minerals, and fiber are found in many fruits	81	42	24	8
15	Eating oranges cannot prevent us from canker sores and chapped lips	13	24	42	53
16	Eating mango and papaya can prevent vision problems and increase endurance	68	29	27	8

Note: 1: strongly agree; 2: Agree; 3: Disagree; 4: strongly disagree

3.2 Action Aspect of Fruit Consumption

Different from the knowledge and attitude aspect, the survey indicates different results on the action aspect. Based on the data, about 71 percent of the respondents' consumed fruits, while the other 29 percent rarely consumed fruit. This indicates that good knowledge and a positive attitude toward fruit consumption have no direct effect on the fruit consumption actions of the respondents. Most respondents consumed fruits between 2 to 3 times a week, while the number of respondents whose fruit consumption reached more than five times a week was only 21,21 percent. Figure 1 shows the frequency of fruit consumption.

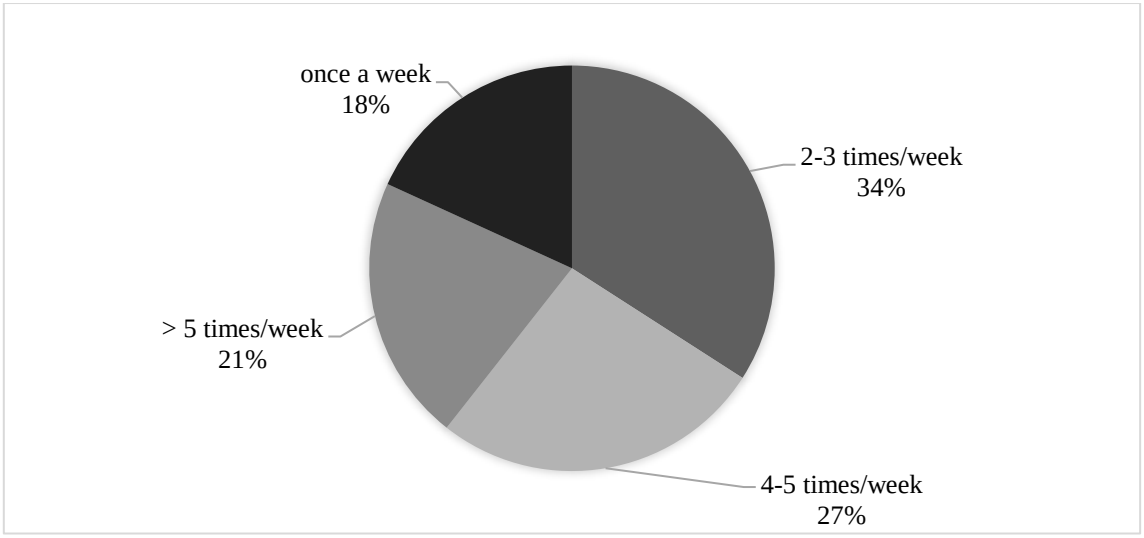

Fig. 1. Fruit consumption frequency

There are several reasons burdening respondents for not consuming fruit as recommended. Most of them consume fruit rarely because of the limited time they have to buy fruit (27 percent) and the long distance to get to the nearest fruit stall (27 percent). Other reasons that are also considered obstacles to consuming fruit are the expensive price (22 percent), not liking fruit (12 percent), often forgetting to consume fruit (6 percent), and other reasons.

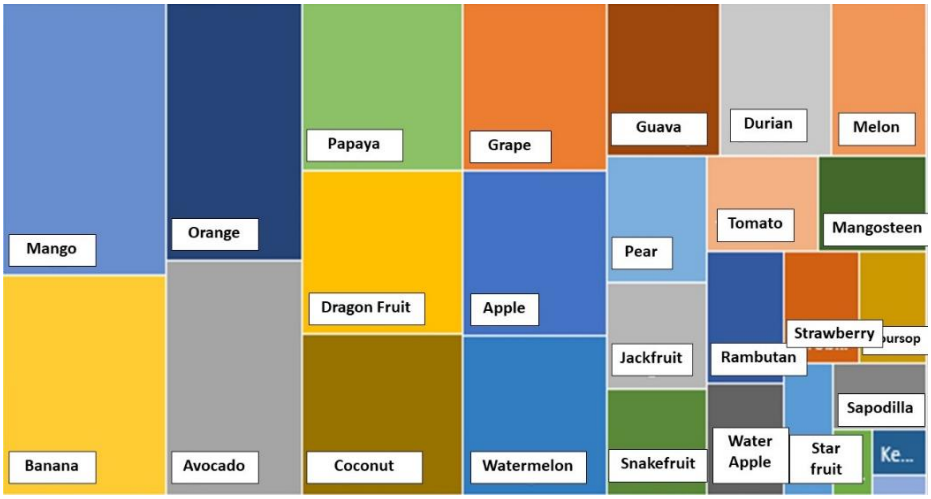

Fig. 2. Most Consumed Fruit in Indonesia

The survey also found that Indonesians' ten most popular fruits are mango, bananas, orange, avocado, papaya, dragon fruit, coconut, grapes, apple, and watermelon. The survey is in line with the data from Indonesia Statistics Bearau regarding the most produced local fruits in Indonesia, including bananas, mangoes, pineapples, oranges, durian, snake fruit, papaya, avocado, rambutan, and jackfruit [6].

3.3 Bibliometric Analysis of Fruit Consumption

The database was obtained from Scopus, using the document search keyword "fruit consumption Indonesia." There are 242 exported documents limited to the years 2000 to 2023. The export data is saved and then processed using Vosviewer software. This process aims to find essential issues discussed within the scope of publications related to fruit consumption in Indonesia. Co-occurrence analysis was carried out, with a minimum number of occurrences of a keyword five times, then 115 keywords were selected. The results of co-occurrence analysis using Vosviewer are shown in Figure 3.

Based on the results of data processing using Vosviewer, it is known that there are five clusters formed in the co-occurrence analysis. Several keys, such as female, male, adult, major clinical study, cross-sectional study, fruit, and controlled research, show the highest link strength. Furthermore, the word also has the highest co-occurrence rate. The size of the circle indicates this. It can be said that these words are the keywords that are most frequently associated. Keywords are labeled with colored circles. The size of the circle is positively correlated with the appearance of keywords in the title and abstract. Therefore, the size of letters and circles is determined by the frequency with which they appear. The more frequently a keyword appears, the larger the size of the letters and circles.

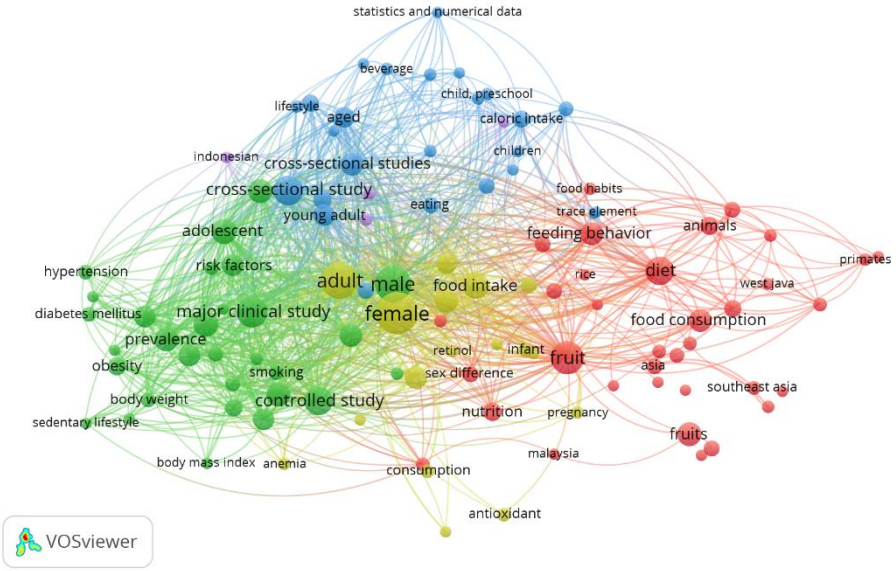

Fig. 3. Network visualization of research related to fruit consumption in Indonesia.

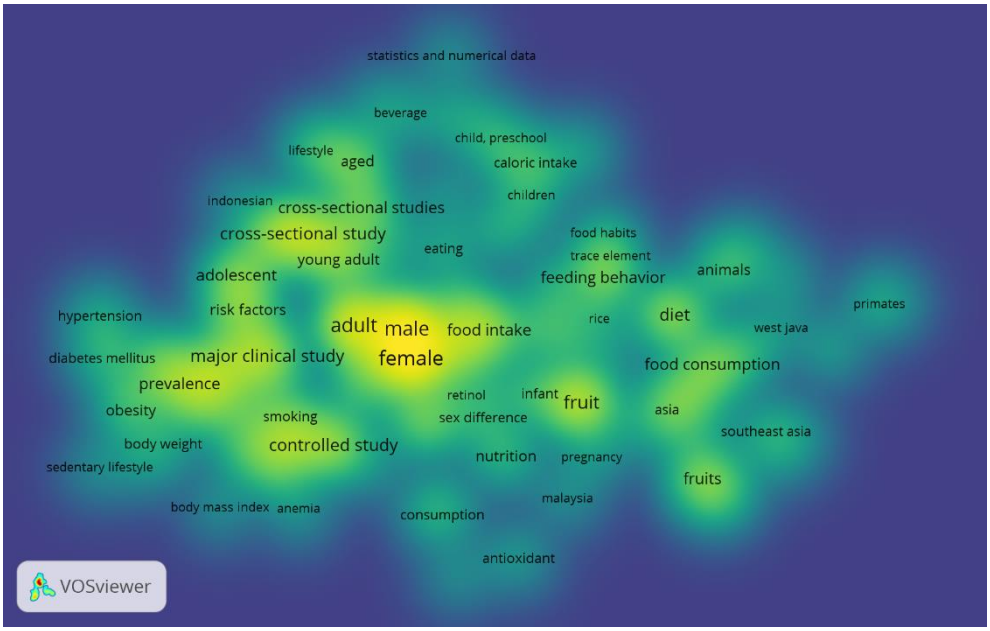

Fig. 4. Density Visualization of Research Related to Fruit Consumption in Indonesia

4 Conclusion

Based on the research, it can be concluded that most respondents have good knowledge and attitude towards fruit consumption and its benefits. However, it is found contradictory when it comes to the action aspect. The fruit consumption frequency tends to be low and still under the recommended frequency of fruit consumed. The fruit consumption frequency tends to be low and still under the recommended frequency of fruit consumed. Keywords regarding fruit consumption in Indonesia, such as female, male, adult, fruit, diet, food intake have shown high occurrence and most substantial connection regarding this issue.

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