



Relationship between Pregnant Women's Knowledge and Consumption Pattern of Vegetables and Fruit in Bandung City

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Abstract.**Background** :The period of pregnancy is a special period where the mother not only fulfill the needs of energy and nutrient for herself but also for the needs of the fetus. During pregnancy, a woman's body undergoes many changes, both physical, mood, and hormonal, which results in the emergence of various complaints and problems. Lack of vegetables and fruit consumption in pregnant women results in various disorders such as constipation, anemia, increased risk of cancer, and chronic diseases (heart disease, diabetes). The purpose of this study is to describe the level of knowledge of pregnant women and their consumption patterns of vegetables and fruits in the city of Bandung.

Methods :This research was conducted from June to August 2018 using a cross sectional design. The research subjects consisted of 60 pregnant women who were selected by consecutive sampling technique. Knowledge data was taken using a questionnaire, while the consumption patterns of vegetables and fruits were measured using an observation sheet. Descriptive data analysis using frequency tables.

Results :Most of the respondents (33%) were pregnant women aged 25-29 years, with an average age of 29.03 years. Most of them (76%) had a secondary education level, and 43% of the respondents had household income equal to or lower than the UMR (Minimum Regional Income Standard). Most of the respondents (57%) had good knowledge on the importance of vegetable and fruit consumption. Most of the vegetable and fruit consumption patterns are categorized as low, where most of respondents (85%) were not practicing fruit and vegetable consumption in accordance with the recommended balanced nutrition of at least five servings per day.

Conclusion :This study has revealed that pregnant women in the city of Bandung have a good level of knowledge about the importance of vegetable and fruit consumption, but this knowledge has not been followed by the consumption of vegetables and fruits according to WHO recommendations at least 5 servings per day.

Keywords: Knowledge; consumption patterns of vegetables and fruit; pregnant women

Introduction

Vegetables and fruit consumption is very important to fulfill the needs of micronutrients for the body. Vegetables and fruit are food sources rich in vitamins and minerals needed for the normal growth, development and function of the human body.¹ Fruits and vegetables contain a lot of dietary fiber both soluble and insoluble, which is important for the optimal functioning of the digestive tract.² Vitamins and minerals contained in vegetables and fruits also play a role in the process of metabolizing

other nutrients such as carbohydrates and fats as an energy source.³

Nutritional problems can be experienced by all age groups, and nutritional problems in a particular age group will affect nutritional status in the period of the next life cycle (intergenerational impact). The paradigm change gives an understanding that for a healthy life the body not only requires protein and calories, but also vitamins and minerals that are contained in many vegetables and fruits with a balanced nutritional consumption pattern.⁴

The period of pregnancy is a special period where the mother not only meets energy and nutrient needs for herself but also the needs of the fetus. During pregnancy, a woman's body undergoes many changes, both physical, mood, and hormonal, which results in the emergence of various complaints and problems during pregnancy. Lack of consumption of vegetables and fruit in that period can cause various disorders such as constipation, anemia, increased risk of cancer, and chronic diseases (heart disease, diabetes)⁵⁻⁷

The incidence of non-contagious and chronic diseases such as cancer, diabetes mellitus, and cardiovascular disease also increases in developing countries, mostly influenced by changes in lifestyle and diet. Lifestyle factors including diet have changed drastically in recent decades, as a result of global shifts, urbanization, industrialization, and technological developments.⁸⁻⁹

The World Health Organization (WHO) in accordance with balanced nutrition guidelines recommends consuming 400 grams of vegetables and fruits per person per day, which consists of 250 grams of vegetables (equivalent to 2 servings or 2 cups of vegetables after being cooked and drained) and 150 grams of fruit, (equivalent to 3 medium size bananas or 1 medium size papaya or 3 medium size oranges). For Indonesian people, especially pregnant women, it is recommended to consume vegetables and fruits as much as 400-600 grams per person per day. About two-thirds of the total consumption recommendations are vegetable portions.^{4,10}

Fulfillment of good and balanced nutrition in pregnant women can optimize fetal growth and development and reduce the risk of pregnancy complications and fetus abnormalities. Therefore, attention to diet and nutrition is also very important for pregnant women. The body not only requires protein and calories, but also requires vitamins, minerals and fiber, which are mostly contained in vegetables and fruits. Sufficient consumption of vegetables and fruits can reduce complaints of constipation and anemia in pregnant women.⁵⁻⁷

Based on the 2013 Riskesdas national data, the average proportion of households that consume vegetables and fruit is only 10.7% and the national prevalence of lack of vegetable and fruit consumption in residents over the age of 10 years is 93.5%. West Java Province ranks 8th for the lowest consumption of vegetables and fruit with the proportion of vegetable and fruit consumption deficiencies is 95%.¹¹ Wahyuni's research on vegetable and fruit consumption patterns and fiber and micronutrient consumption in pregnant women in Gowa Regency in 2013 showed that the frequency of fruit and vegetable consumption in pregnant women was in the low category.¹² This is indicated by the proportion of pregnant women who often consume fruits and vegetables which is only 45.5%. In the 2014 study of Febriana and Sulaiman in Beji, Depok City also found that some mothers

rarely consumed vegetables and fruits (52.9%).¹³ This shows that the awareness of mothers to consume vegetables and fruits during pregnancy still needs to be improved.

Therefore, this study was conducted to explain the relationship between knowledge and consumption patterns of vegetables and fruits in pregnant women.

Methods

This study uses a cross sectional design to describe the knowledge and patterns of vegetable and fruit consumption in pregnant women in the city of Bandung. This research was conducted from June to August 2018. The research subjects consisted of 60 pregnant women who were selected by consecutive sampling technique. Knowledge of vegetables and fruit in this study includes the definition of vegetables and fruit, the benefits of vegetables and fruit and knowledge of the needs of vegetable and fruit consumption. Assessment of knowledge variables consists of 20 statements with a choice of right or wrong answers. Correct answer is given a score of 1 and wrong answer is given a score of 0. It is categorized as good if the respondent's answer score is ≥ 75 (median value) and not good if < 75 . The consumption pattern of vegetables and fruits is obtained based on the recall results using fruits and vegetables frequency questionnaire form. The consumption pattern of vegetables and fruits is categorized as sufficient if the consumption of vegetables and fruits ≥ 5 times per day and low category if the consumption of vegetables and fruits < 5 times per day. This research has received approval from the ethics commission of the Health Ministry Polytechnic of Health Bandung, number 16 / KEPK / PE / VI / 2018

Results and Discussion

Table 1. Research subjects characteristics

(Subject Characteristics)	Frequency n (%)
Age (years)	
1. < 20 years	1 (2)
2. 20 – 24 years	13 (22)
3. 25 – 29 years	20 (33)
4. 30 – 34 years	13 (22)
5. > 35 years	13 (22)
Education	
1. Basic	4 (7)
2. Secondary	46 (76)
3. Higher Education	10 (17)
Income	
1. \leq UMR	43 (72)
2. $>$ UMR	17 (28)

The sociodemographic characteristics of the research subject indicated that there were 60 pregnant women participating in this study, with most respondents (33%) were pregnant women aged 25-29 years, and the average age was 29.03 years. The majority of the research subjects (76%) had secondary education, with an average household income \leq UMR of 43% (Table 1)

Knowledge of the subject of research on the importance of vegetables and fruit consumption shows that most of them (57%) have knowledge in a good category. (Table 3) While the consumption patterns of vegetables and fruit are mostly in the poor category, which is as much as 85% of the respondents were not consuming vegetables and fruits in accordance with the recommended balanced nutrition of at least five servings per day (Table 4)

Table 2. Knowledge of research subjects about the importance of consumption of vegetables and fruit

Knowledge Attributes	Correct n (%)	Incorrect n (%)
Vegetables and fruit are the main sources of vitamins and minerals	56 (93)	4 (7)
Consumption of vegetables and fruit can prevent anemia in pregnant women	52 (87)	8 (13)
The main benefit of consuming vegetables and fruit is that it can fill the stomach	32(53)	28 (47)
Fat is a nutrient found in many vegetables and fruits	51 (85)	9(15)
The portion of good diet is half (50%) of the total composition of food for each meal are vegetables and fruit	34 (57)	26 (43)
Pregnant women need to consume vegetables and fruits 5-6 servings per week	12 (20)	48 (80)
Pregnant women only need to consume protein and calorie sources	50 (83)	10 (17)
Vegetables and fruits that are cooked too long can lose their nutritional content	56 (93)	4 (7)
Consuming vegetables and fruits during pregnancy can increase the baby's birth-weight	43 (72)	17 (28)
Green vegetables contain a lot of folic acid	47 (78)	13 (22)
The main sources of dietary fiber are from vegetables, whole grains, nuts and fruits	50 (83)	10 (17)
Vegetable tomatoes are foods with a high calorie content	34 (57)	26 (43)
Consuming vegetables and fruit can make the intestine work harder so it is at risk of	52 (87)	8 (13)

developing colon cancer		
Vegetables should be cooked long enough to ensure there are no living germs	46 (77)	14 (23)
Pregnant women who do not consume enough vegetables and fruits that contain folic acid can increase the risk of neurological defects in infants	41 (68)	19 (32)
Consuming enough vegetables and fruit can prevent constipation	53 (88)	7 (12)
Vegetables and fruit can prevent obesity	53 (88)	7 (12)
Many dietary fiber contained in vegetables and fruits	56 (93)	4 (7)
Vegetable and fruit consumption needs for pregnant women are 400 - 600 grams	24 (40)	36 (60)
Pregnant women need to consume vegetables and fruits 5-6 times per day	15 (25)	45 (75)

The table above shows that most of the research subjects did not have the knowledge of the quantity of vegetable and fruit consumption needed, it is known from the answer to the question "pregnant women need to consume vegetables and fruits as much as 5-6 times a day" where respondents who are able to answer correctly only 25%

Table 3 Categories of knowledge of pregnant women about the importance of consumption of vegetables and fruit

Category	Frekuensi (%)
Good	34 (57)
Poor	26 (43)

Table 4 Categories of vegetable and fruit consumption patterns in pregnant women

Category	Frekuensi (%)
Good	9 (15)
Low	51 (85)

DISCUSSION

Knowledge is very important for the formation of a person's behavior. A person's knowledge of objects has different intensities or levels.¹⁴ Knowledge of nutrition is one of the factors that influence changes in food consumption behavior, good knowledge is needed, but it is not enough to be able to change the consumption

behavior in accordance with the recommendations. Many factors influence the consumption behavior of vegetables and fruits, a number of environmental and individual factors, including interest, perception and motivation. The interaction between these factors and information processing is important to produce an expected behavior.¹⁶

Consideration of the domain of nutritional knowledge shows that the consumption patterns of vegetables and fruits tend to be related to the goals and perspectives of certain consumers and nutritionists. A literature study shows that nutritional knowledge may have little effect but plays an important role in behavior change or adopting healthy eating habits including vegetables and fruit.¹⁶

The results of this study indicate that the level of knowledge of the respondents is mostly good, this is because research is carried out in urban areas, the city of Bandung, where the availability and access of information from various media, especially internet, is very accessible, so various information including nutrition and vegetable and fruits consumption are easily obtained. Most of the respondents also have good education level, and a good knowledge of nutrition obtained at school.

Diet is the most important behavior that can affect one's nutritional condition. This is because the quantity and quality of food and drinks consumed will affect the intake of nutrients so that it will affect the health of individuals and society.⁴

Lack of consumption of vegetables and fruit as a source of fiber, vitamins and minerals can trigger obesity and the incidence of diseases such as heart and blood vessel disease, colon cancer, diabetes, hypertension and stroke.¹⁷ Sufficient consumption of vegetables and fruits is one simple indicator of a healthy diet with balanced nutrition.⁴

Maternal diets during pregnancy affect maternal and fetal health¹⁸⁻²⁰ Plant-based diets containing a variety of fruits and vegetables are associated with a reduced risk of congenital abnormalities²¹ preterm birth²⁰, and more favorable fetal growth²² and reduce the risk of complications in the mother such as weight gain excessive pregnancy²⁰, preeclampsia²³ and gestational diabetes²⁴

Consumption of vegetables and fruit is an important part of a healthy and balanced diet, because of the high content of micronutrients, fiber and other bioactive compounds such as phytochemicals.²⁵ The World Health Organization (WHO) in accordance with balanced nutrition guidelines recommends consuming 400 grams of vegetables and fruits per person per day, which consists of 250 grams of vegetables (equivalent to 2 servings or 2 cups of vegetables after being cooked and drained) and 150 grams of fruit, (equivalent to 3 medium size bananas or 1 medium size papaya or 3 medium size oranges). For Indonesian people, especially pregnant women, it is

recommended to consume vegetables and fruits as much as 400-600 grams per person per day. About two-thirds of the total consumption recommendations are vegetable portions.¹⁰⁻¹¹

The results of this study indicate that as many as 85% of pregnant women are still low in the level of consumption of vegetables and fruits compared to the recommended consumption of vegetables and fruits by WHO and balanced nutrition guidelines. The findings of this study show that vegetable and fruit consumption in pregnant women is still low, although culturally and habitually Sundanese people in Bandung West Java tend to consume plant-based food sources, but the fact is pregnant women do not consume vegetables and fruits in accordance with WHO recommendations and balanced nutritional recommendations which is a minimum of 5 servings of vegetables and fruit per day. 41.7% of respondents consume <three servings of fruits and vegetables per day, 41.3% between 3 - 4 servings per day and only 15% consume ≥ 5 servings per day.

The low proportion of vegetable and fruit consumption in this study is in accordance with the Riskesdas data in 2013 in which nationally the average proportion of households consuming vegetables and fruits was only 10.7% and the national prevalence of population aged >10 years who did not consume enough vegetables and fruits is 93.5%.¹¹ Likewise the research conducted by Hermina and Prihatini S, in 2016 found that the level of consumption of vegetables and fruits in as many as 97.1% of the Indonesian population in all age groups was still low, with the highest proportion of population not consuming enough vegetables and fruits: youth group (13-18 years) 98.4 percent, adult age group (96.9%) and elderly (97.2%).¹⁵

Similar research conducted by Wahyuni about the pattern of vegetable and fruit consumption and fiber and micronutrient intake in pregnant women in Gowa Regency in 2013 showed that the frequency of fruit and vegetable consumption in pregnant women was relatively low. This is indicated by the proportion of pregnant women who often consume fruits and vegetables only 45.5%.¹² Likewise, the research of Febriana and Sulaiman in 2014 in Beji, Depok City, found that some mothers rarely consumed vegetables and fruits (52.9%).¹³ This shows that the awareness of mothers to consume vegetables and fruits during pregnancy still needs to be improved.

The research of Blumfield et al. in 2011 found no evidence that pregnant women try to increase their consumption of nutrient-rich foods such as vegetables and fruit.²⁶ Several other studies also found that only a small proportion of women consume vegetables and fruits according to the recommended portion, both pre-pregnancy and during pregnancy.²⁷ A national study in Australia reports that only 10% of pregnant women who consume vegetables and fruits are in accordance with WHO recommendations.²⁷ While a study in

Finland found that only between 16 and 30% of pregnant women who consumed vegetables and fruit according to recommendations.²⁸

Although pregnancy is perceived as a time when women are more motivated to change towards a positive lifestyle, a qualitative study in Australia reports that the proportion of pregnant women who consider pregnancy as a difficult period to change their lifestyle towards healthier ones is higher than those who consider easier. Factors in pregnancy complications such as nausea, fatigue and cravings are the obstacles.²⁹ Another study shows that the level of consumption of vegetables and fruit even when fruiting season (available at a cheaper price), remains low.³⁰

Many factors can affect fruit and vegetable consumption in pregnant women, these factors include internal factors and external factors. A number of studies show that consumption of vegetables and fruit is influenced by preference, education, social groups, number of family members, type of work and also the level of household income.³¹ Pre-pregnancy diet patterns also greatly influence the consumption patterns of vegetables and fruits during pregnancy.³² Knowledge is not the only component that affects the consumption behavior of vegetables and fruits, several other factors are: (1) The perceived consequences of behavior. (2) Attitudes and beliefs about behavior and behavioral objects (3) Skills such as knowing how to process food are important (4) Belief or self-efficacy to be able to perform these behaviors. (5) Social and physical environment, internal and external. (6) Motivation or social influence is very important.¹⁶

Low vegetable and fruit consumption can be influenced by various factors such as the cost of availability, familiarity, and time for preparation^{28,33,34} Worldwide, higher socioeconomic status tends to choose healthier foods³⁵ Further research is needed to further explore the individual and social factors associated with vegetable and fruit consumption throughout the life cycle, especially during pregnancy.

Conclusion

This study has revealed that pregnant women in the city of Bandung have a good level of knowledge about the importance of vegetable and fruit consumption, but this knowledge has not been followed by the consumption of vegetables and fruits according to WHO recommendations at least 5 servings per day

Competing Interest

The authors of this paper have no competing interest to report.

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