Exploration of unhealthy food consumption patterns in Sleman region by interprofessional undergraduate health students

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ABSTRACT Despite the average life expectancy of Indonesian people increasing from 63.63 in 1990 to 71.69 in 2016, the gap of life expectancy and healthy age life expectancy also increased from 7.49 to 8.72. RISKESDAS (2018) further highlighted that the proportion of Indonesian people with a healthy diet was poor. These data challenged us to implement an outreach program, Community and Family Health Care – Interprofessional Education (CFHC-IPE), involving our medicine, nursing and nutrition students for assisting families and communities with an aim of improving the population health status. Thus, we assessed their baseline status, in particular, people's dietary habits. We attached batch 2015 and 2016 students to 465 households with 1,254 family members. We deployed them to 15 different sub-villages in Sleman Regency, Yogyakarta. Students surveyed the families and put the data in family folders during field visits in 2018 – 2019. Our focus was to seek eating patterns of the families and performed descriptive analysis of socio-demographic aspects within those with certain dietary habits using chi-squared tests. Of the 1,254 family members, those who routinely consume fried, sweetened, contained preservatives and grilled foods were 70.14%, 61.00%, 38.13%, and 20.08%, respectively. We found the adults tend to consume more sweetened foods and beverages along with grilled foods compared to the elderly, and the differences of proportions are statistically significant. The CFHC-IPE program partner families were often not realizing that a combination of their dietary habits, in particular, the consumption of fried and sweetened meals might result in threats to the family members' health. Fried foods were the most routinely consumed followed by sweetened food, grilled foods and foods containing preservatives. These patterns were also the same in both urban and rural settings.

1. Introduction

Global burden of diseases is shifting from infectious diseases to non-communicable diseases (NCDs), and this phenomenon also occurs in Indonesia. On the other hand, the life expectancy of Indonesians has increased significantly but the healthy age span is not as much as the increase in life expectancy, which means longer illness periods. Furthermore, due to the shifting disease pattern, it is predicted that Indonesians will access more health services related to NCDs such as hypertension, diabetes mellitus, stroke, etc.

Several studies have indicated a high prevalence of NCDs as well as the prevalence of risk factors, such as physical inactivity and an unhealthy diet. High consumption of saturated fats and trans-fatty acids is linked to cardiovascular disease. High salt consumption is an important determinant of hypertension, likewise high free sugar consumption is a determinant of diabetes mellitus. Unhealthy diet has been rising rapidly in lower-middle-income countries since the 1980s.[1]

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There are four types of food that contribute to NCDs if consumed routinely, i.e. sweetened food, fried food, food containing preservatives and grilled food. Those kinds of foods are found in the Indonesian Family Folder questionnaire as an item of people's daily eating habits.

Inappropriate dietary choices and poor diet quality along with other risk factors lead to NCDs.[2] In Indonesia, the government uses family folders to obtain public health data. Data collection of the family folder so far has been charged to primary health care but the data quality assurance cannot properly function since primary health care is already overwhelmed with routine services. Interprofessional education is now becoming a trend in education institutions, particularly in medical and health majors. The Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada (UGM) has implemented interprofessional education since 2013 through the Community and Family Health Care-Interprofessional Education (CFHC-IPE) program. This program is mandatory for undergraduate students in three study programs, i.e. medical, nursing and nutrition. The purpose of this program is our graduates will be able to collaborate in the future with other health professions in order to increase the quality of healthcare, increase the patients' experience and reduce burn out among health workers. In line with a national program named PIS-PK, which is a healthy Indonesia program with a family approach, CFHC-IPE program uses the same approach by deploying a group of students into three families in one hamlet. CFHC-IPE program uses a modified family folder to collect the data related to the health and behavior of family members. There are seven sub-topics in family folders, i.e. demographics, history of communicable and non-communicable disease, unhealthy behavior (smoking and alcohol consumption), eating habits, physical activity, special conditions (pregnancy and under-five children) and environmental health. In this study, we focused on the eating habits of family members from student batches 2015 and 2016. We explored the characteristics of respondents and their eating habits particularly unhealthy food such as sweetened foods/beverages, fried foods, foods containing preservatives and grilled foods as well as the association between age group, gender, setting and occupation with eating habits of unhealthy foods.

2. Method

This was a descriptive study with a cross-sectional approach. We obtained secondary data from the modified family folder applied to families of those involved in the CFHC-IPE program of the FM-PHN UGM. The family folder is a record that contains demographic data, history of health problems, and its cohort which was collected through students interviewing family members. Students monitored the health status of the family members in every visit. Students conducted an assessment for vital signs and anthropometry. Collected data were used as a background to develop simple interventions and health education. The CFHC-IPE program is a 7-semester longitudinal interprofessional education program for medicine, nursing, and nutrition undergraduate students. The inclusion criteria to select participants of this study were: (1) family members of the CFHC-IPE program batch 2015 and 2016; (2) age ≥ 18 years; and (3) signed the informed consent form. The survey was conducted during 2018 - 2019. The data were collected by students of batch 2015 and 2016 who have to assist 486 households with approximately 1,668 family members from 15 different sub-villages in Sleman Regency, Yogyakarta. There are 7 sub-villages that were assisted by students of batch 2015 with a total of 789 subjects from Temulawak, Jaten, Bulan, Jetis, Genitem, Dongkelan and Randusongo, while the other 8 sub-villages were assisted by students of batch 2016 with a total of 879 subjects from Bulaksalak, Daleman, Sumber Kidul, Pondok II, Sempu, Somodaran, Mejing Lor and Kamal Wetan. The socio-demographic data, i.e. gender, age, occupation and setting were collected in the first year of this program, whereas the data of consumption were collected in the second year of the program. There were four questions related of eating habits, for example: "Do you consume sweetened foods/beverages daily?" as well as for fried foods, foods containing preservatives and grilled foods. Our focus was to determine the eating patterns of the families and perform a descriptive analysis of socio-demographics aspects among those with certain dietary habits using chi-squared tests, with 95% level of confidence interval (CI) and level of significance < 0.05.
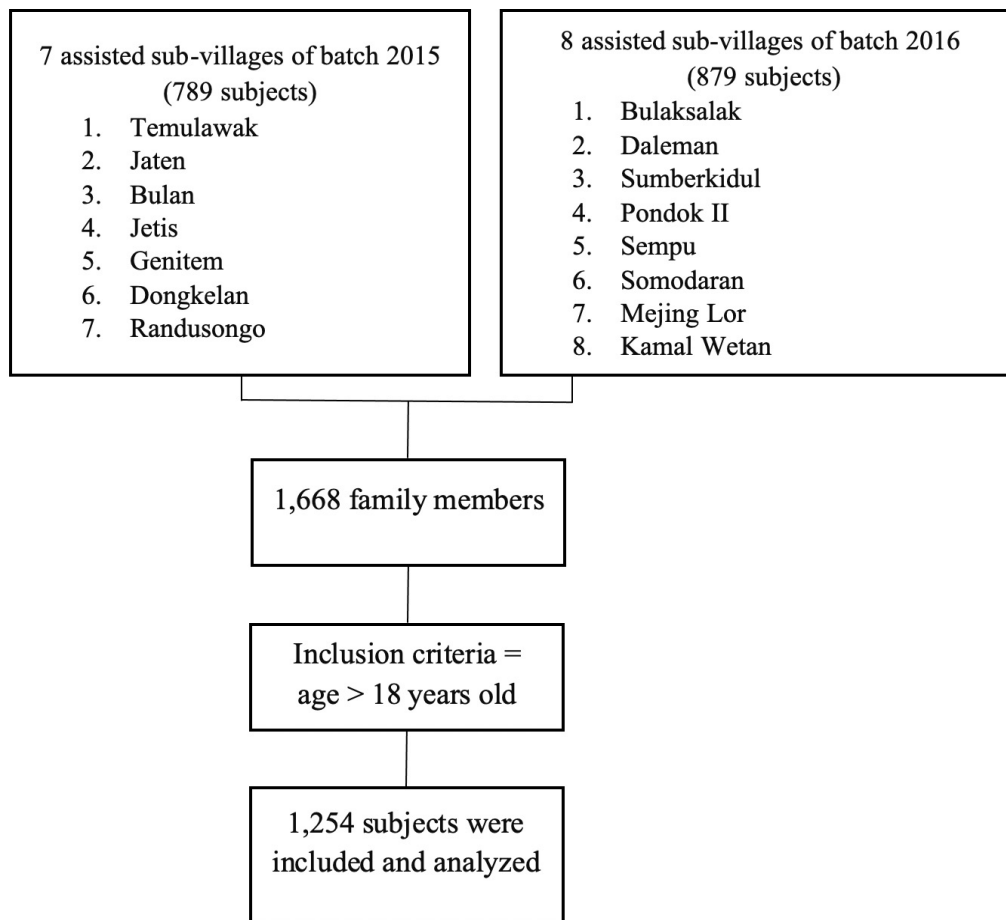
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┌─────────────────────────────┐   ┌─────────────────────────────┐
│  7 assisted sub-villages of │   │  8 assisted sub-villages of │
│       batch 2015            │   │       batch 2016            │
│      (789 subjects)         │   │      (879 subjects)         │
│   1.  Temulawak             │   │   1.  Bulaksalak            │
│   2.  Jaten                 │   │   2.  Daleman               │
│   3.  Bulan                 │   │   3.  Sumberkidul           │
│   4.  Jetis                 │   │   4.  Pondok II             │
│   5.  Genitem               │   │   5.  Sempu                 │
│   6.  Dongkelan             │   │   6.  Somodaran             │
│   7.  Randusongo            │   │   7.  Mejing Lor            │
│                             │   │   8.  Kamal Wetan           │
└─────────────────────────────┘   └─────────────────────────────┘

            ┌──────────────────────────┐
            │   1,668 family members   │
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            ┌──────────────────────────┐
            │   Inclusion criteria =   │
            │    age > 18 years old    │
            └──────────────────────────┘

            ┌──────────────────────────┐
            │   1,254 subjects were    │
            │   included and analyzed  │
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Figure 1. Data Collection Scheme

3. Result

3.1 Tables

Respondents of this study were homogenous, indicated by the proportion between males and females, age group, setting, and occupation (Table 1). Table 2 shows no difference in the proportion of fried food consumption among gender, age group, setting, and occupation. Whereas for the sweetened foods and beverages consumption pattern, the adults tended to consume more sweetened foods and beverages compared to the elderly, and the difference of proportion was statistically significant. There were no differences in the proportion of preserved food consumption in each of the respondents' characteristics: age, sex, setting, and occupation. Respondents from the adult age group consume more grilled foods compared to the elderly, and it was statistically significant.

3.2 Graphs

The frequency of an unhealthy diet is shown in Figures 2 and 3. Figure 2 shows the order of the type of food routinely consumed. Fried foods were the most routinely consumed followed by sweetened food, grilled foods and containing preservatives.

Table 1. Respondent's Characteristics

Characteristics		n (%)
Gender	Male	625 (49.8)
	Female	629 (50.2)
Setting	Urban	982 (78.31)
	Rural	272 (21.69)
Household head occupation*	Civil servants/TNI/POLRI	87 (18.71)
	Private employee	68 (14.62)
	Entrepreneur	94 (20.22)
	Labor/farmer	137 (29.46)
	Unemployed	79 (16.99)
Total		1254(100)

*Total respondents were 465 household heads

Table 2. Respondents' Characteristics and Eating habits of Unhealthy Food

Fried foods	n (%)	x^2	P value*
Age			
Adults	721 (73.42)	0.655	0.418
Elderly	193 (70.95)		
Gender			
Male	458 (73.28)	0.098	0.755
Female	456 (72.49)		
Setting			
Urban	107 (70.39)	0.544	0.461
Rural	807 (73.23)		
Setting (Randomized)			
Urban	107 (70.39)	0.658	0.408
Rural	123 (74.55)		
Household Head Occupation			
Civil servants/TNI/POLRI	70 (80.46)		
Private employee	53 (77.94)		
Entrepreneur	76 (80.85)	5.939	0.204
Labor/farmer	97 (70.80)		
Unemployed	55 (69.62)		
Sweetened Foods/Beverages			
Age			
Adults	619(63.03)	4.809	0.028
Elderly	191(70.22)		
Gender			
Male	420 (67.20)	3.702	0.054
Female	390 (62.00)		
Setting			
Urban	94 (61.84)	0.572	0.449
Rural	716 (64.97)		
Setting (Randomized)			
Urban	94 (61.84)	1.457	0.227
Rural	91 (55.15)		
Household Head Occupation			
Civil servants/TNI/POLRI	59 (67.82)	4.024	0.403
Private employee	42 (61.76)		
Entrepreneur	70 (74.47)		
Labor/farmer	100 (72.99)		
Unemployed	57 (72.15)		

p-value obtained with chi-squared test

These patterns showed the same results in both urban and rural settings (Figure 3).

3.3 Figures

Our students were explaining the family folder to respondents (Figure 4 a). In advance of obtaining data, students must explain the purpose of collecting the data. In addition, questions related to family health will be the basis for providing education and community service programs that will be carried out. Family health data were obtained from medical check-up for instance, blood pressure, height, weight, etc. Meanwhile, medical history will be asked through several questions in the family folder (figure 4.b). The respondents come from CFHC-IPE partner families in the Sleman district. In this study, those who were interviewed and got the medical check-up were respondents aged> = 18 years (figure 4.c).

Table 2. (Cont.) Respondents' Characteristics and Eating habits of Unhealthy Food

Foods containing preservatives	n (%)	x^2	P value*
Age			
Adults	208 (21.18)	2.844	0.092
Elderly	45 (16.54)		
Gender			
Male	127 (20.32)	0.016	0.899
Female	126 (20.03)		
Setting			
Urban	34 (22.37)	0.516	0.472
Rural	219 (19.87)		
Setting (Randomized)			
Urban	34 (22.37)	0.155	0.694
Rural	40 (24.24)		
Household Head Occupation			
Civil servants/TNI/POLRI	18 (20.69)	4.450	0.349
Private employee	8 (11.76)		
Entrepreneur	21 (22.34)		
Labor/farmer	23 (16.79)		
Unemployed	11 (13.92)		
Grilled Foods			
Age			
Adults	362 (36.86)	16.884	0.000
Elderly	64 (23.53)		
Gender			
Male	210 (33.60)	0.08	0.78
Female	216 (34.34)		
Setting			
Urban	41 (29.97)	3.78	0.05
Rural	385 (34.94)		
Setting (Randomized)			
Urban	41 (29.97)	2.12	0.15
Rural	57 (34.55)		
Household Head Occupation			
Civil servants/TNI/POLRI	33 (37.93)	5.39	0.25
Private employee	22 (32.35)		
Entrepreneur	37 (39.36)		
Labor/farmer	46 (33.58)		
Unemployed	19 (24.05)		

p-value obtained with chi-squared test

4. Discussion

This study showed no difference in the proportion of fried food and preserved food consumption among gender, age group, setting, and occupation. On the other hand, adults tend to consume more sweetened foods and beverages compared to the elderly. Similar to sweetened foods, respondents from the adult age group consume more grilled foods compared to the elderly. Fried foods were the most routinely consumed followed by sweetened food, foods containing preservatives and grilled foods, and these patterns were also the same in both urban and rural settings.

There is currently a global issue concerning palm oil in Europe being banned because the oil is considered unhealthy. Meanwhile the origin country producers are mostly from South-East Asia countries including Indonesia[3], and it is interesting that about 70% of the families of our study routinely consume
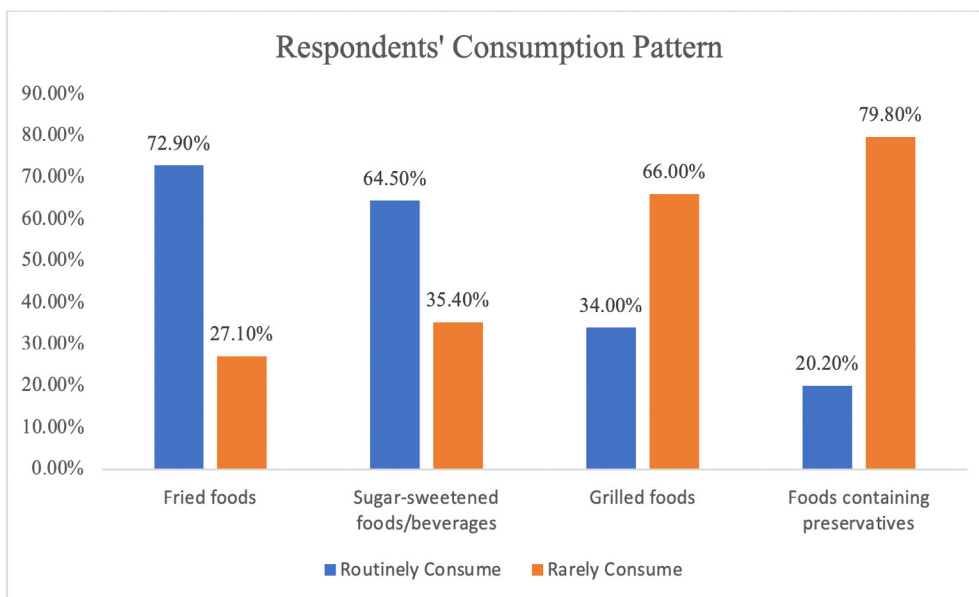
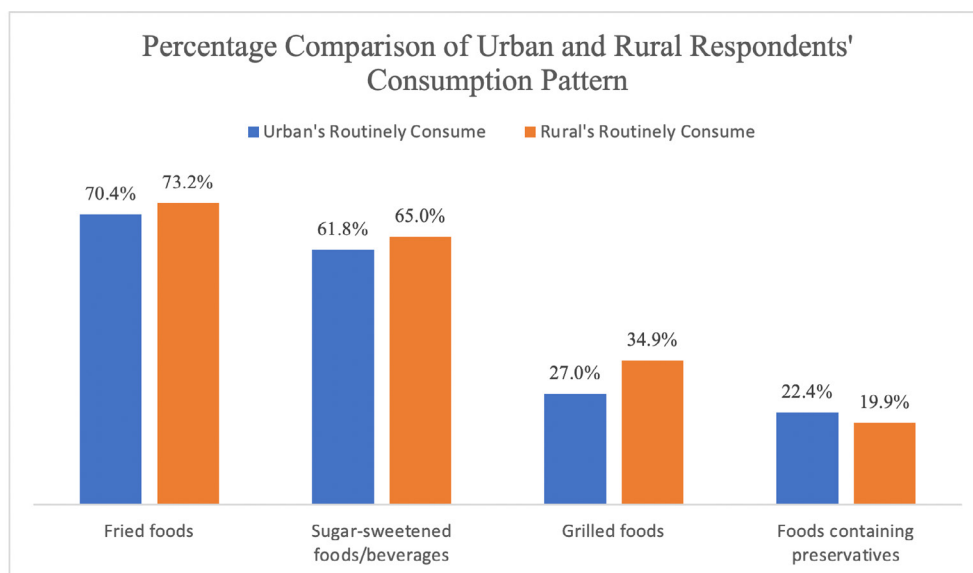**Figure 2.** Respondents' Consumption Pattern

Figure 3. Comparison of Urban and Rural Respondents' Consumption Pattern

fried foods. Indonesia has been a sugar producer country with no sugar added product restriction yet[4,5]. Additionally, the European Union countries also set up the restriction to sugar added products[6,7], while about 60% of the families of our study sites routinely consumed the sugar added foods. Consumption of those products combined with sedentary lifestyle are estimated to increase the associated NCDs, e.g. hypertensive heart disease, stroke, diabetes mellitus, and other vascular and metabolic syndromes. In Indonesia, the top three leading DALYs were associated with that unhealthy lifestyle, i.e. ischemic

heart disease, stroke and diabetes.[8]

Similar phenomena are occurring in other regions in Indonesia, where studies found there are 24% of children, 41% of adolescents and 33% of adults reported to consume sugar-sweetened beverages (SSB) at least one serving per day.[9] Indonesia Basic Health Research (2019) stated that 41.12% and 71.01% people of D.I.Yogyakarta province consumed more than one serving per day of high sugar-sweetened food and beverage.[10] This unhealthy food consumption pattern is one of the risk factors to increase metabolic syndrome cases, i.e

(a)

(b)

(c)

Figure 4. CFHC-IPE programs. (a) One of our students was explaining family folder to respondents. (b) Medical check-up and family folder data collection. (c) A student was collecting data from an elder by interviewing.

diabetes mellitus, dyslipidemia, obesity, etc. Some studies found that urban areas have higher obesity rates than rural. Several factors that influenced the results include changes in nutrition status, unhealthy food patterns and sedentary lifestyle.[11]

Moreover, a school-based study in Jakarta assessing the fast-food consumptions that are risks for obesity revealed that 76.0%, 67.7%, 76.9%, and 65.8% of school children routinely consumed fried chicken, potato fries, chicken nugget, and other fried foods, respectively.[12] Another school-based study in Surabaya assessing the snacking pattern and obesity revealed that school children within a month routinely consumed 16 times, 8 times, 12 times, and 16 times of fritters, sausages, a glass of sweetened condensed milk, and other added sugar products, respectively.[13]

Studies in the mid-20th century mentioned high-fat products were responsible for the increasing number of people with obesity worldwide.[7,14] The accusation on high-fat products led the global products to promote "less fat" taglines, e.g. "no trans-fat oil", and "skimmed milk". Moreover, obesity rates including the following disorders i.e. diabetes and hypertension continue increasing.[15] Meanwhile the more current studies argued that high-sugar foods were responsible for those disorders. Additionally, 24-hour convenient shops, restaurants, and supermarkets created trends in selling high-calories snacks and high-sugar drinks in which some of them were part of the global or chain merchant stores making the interconnected distribution much easier.

Eating high calorie foods, apart from personal choices are also due to the social environment factor. According to studies in developing countries, people who live near fast-food restaurants are more likely to consume fast food and moreover, nowadays it is easy to find a fast-food restaurant both in rural and urban areas as a consequence of food globalization.[16] This finding also became an issue in developed countries,

since the availability of many types of fast-food restaurants and limited availability of healthy foods have been associated with unhealthy diet behavior. A large number of fast-food restaurants have been associated with higher fat intake and lower fruits and vegetables intake among urban people particularly for low-income neighborhoods.[17-19]

We believe that this research is among the first studies in Indonesia to explore the family's consumption pattern of unhealthy foods on a large scale within a region. The mass surveys, e.g. RISKESDAS by the Ministry of Health, SUSENAS by the National Statistical Bureau, and HDSS by UGM are focusing on healthy behaviors rather than unhealthy behaviors. Moreover, studies exploring those secondary data giving information about unhealthy behaviors in particular unhealthy food consumption are rare.

This study might inform the policymakers in Indonesia to be aware of the phenomena to be addressed, e.g. by providing the people better access to have good health, i.e. to have more healthy food and to increase physical activity, setting up necessary regulations and infrastructures, and conducting more precise health promotion activities. We are still struggling to overcome health problems related to diet. A sedentary lifestyle as a consequence of modern society should be changed with a cultural approach and local wisdom. "Healthy Living Community Movement" or GERMAS launched by the Indonesians Ministry of Health should be campaigned routinely and massively by involving the villages' apparatus.

Several limitations should be acknowledged. First, our study was based only on the CFHC-IPE program where the respondents' selection was by the design of the program, i.e. a group of students for three families in a neighborhood and the selection criteria was through a subjective decision of the sub-village chiefs. However, we managed to survey 486 households with 1,668 family members from 15 sub-villages within Sleman Region.

Second, recall bias is always the concern of a survey that can lead to underestimates of the family consumption patterns. However, this study minimized this concern by deploying students to conduct a survey not only once but twice within an academic period for cross-checking.

Third, the family folders were applied to collect minimal information about their consumption patterns. Further investigation is required to collect a more comprehensive food consumption pattern of the families. Applying the Food Frequency Questionnaire (FFQ) should be able to capture more comprehensive information. Nevertheless, the family folders collected provided general information on the families' characteristics and healthy behaviors.

In order to provide suggestions for a healthier community lifestyle, CFHC-IPE students were trained and equipped with knowledge and skills supervised by a lecturer and field instructors before they implement the community service program. Through this program, nutrition students in collaboration with medical and nursing students of UGM have done several activities in communities to promote healthy consumption patterns. They introduced healthy foods by conducting healthy eating campaigns and nutrition counseling. Additionally, they demonstrated safe preparations of food and its consumption, provided information about lifestyle-related health i.e. diabetes mellitus, hypertension, metabolic syndrome, etc. and made educational media for the communities. The students also collaborate with health cadres to monitor and encourage people to maintain healthy lifestyles.

5. Conclusion

The study showed that the majority of adults tend to routinely consume sweetened and fried foods, while non-routine consumption included preservative and grilled foods compared to the elderly. However, there was no difference in the proportion of fried and preserved food consumption in each of the respondents' characteristics: age, sex, setting, and occupation. Based on the frequency of unhealthy diet, the most routinely consumed food was fried food followed by sweetened food, grilled foods, and foods containing preservatives. This study might inform the Indonesian policymakers in particular Sleman Regency Government to increase the awareness of their citizens concerning engaging in healthy behavior such as following a nutritious

and balance diet through improving access, health education, and prevention of diseases. The Healthy Community Movement or GERMAS campaigns needs to be conducted in collaboration with hamlets and local Puskesmas. Furthermore, providing education regarding healthy food consumption can be accompanied through increasing provision of access to healthy food ingredients that are easy to obtain from an economic perspective and availability.

Acknowledgements

Competing interests

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