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# Incidence Rates of Risk Factors for Colorectal Cancer's Early Symptoms in the Community in Gondanglegi District, Malang, East Java, Indonesia: An Epidemiological Study

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## ABSTRACT

**Background:** Colorectal cancer (CRC) is one of the most common types of cancer worldwide. CRC is most typical symptom is hematochezia while the risk factors encompass sex, age, genetic predispositions, history of colorectal polyps or cancer, chronic inflammatory bowel diseases, physical exercise, and specific dietary choices, including high red meat intake, fried food, and low fiber consumption. This study aims to screen the risk factors of colorectal cancer.
**Subjects and Method:** This research was conducted on residents in the Sepanjang village, Malang Regency, involved in community service by the Internist Association of Malang. Community service was carried out in July 2023 and 148 residents were involved in collecting data on risk factors for colorectal carcinoma. Data collection was carried out using a questionnaire with a cross-sectional approach. The questionnaire assesses the presence of symptoms of bloody stools and several habits related to colorectal carcinoma risk factors; including age, gender, exercise routine, and dietary history. Data presentation and analysis were carried out as in the table.
**Results:** Among the risk factors listed assessed using the questionnaire, Men (p=0.021), lack of exercise (p= 0.008), consumption of fried food (p= 0.021), and consumption of instant noodles (p= 0.013) significantly affect the prevalence of hematochezia.
**Conclusion:** Men, lack of exercise, consumption of fried food, and consumption of instant noodles significantly affect the hematochezia indicating CRC.

**Keywords:** Colorectal carcinoma, risk factor, lack of exercise, fried food

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## BACKGROUND

Colorectal carcinoma, also referred to as colorectal cancer, is a kind of cancer that starts in the digestive system's colon or rectum. The large intestine is made up of the colon and rectum, which are primarily

responsible for absorbing water and nutrients from meals, and then forming and storing feces until the body can get rid of them (Sawicki et al., 2021).

With 22,187 cases recorded in 2020, colorectal cancer ranks as the fourth most prevalent cancer type in Indonesia (Budianto et al., 2023; Ferlizza et al., 2022). In Indonesia, preliminary investigations on colorectal cancer conducted in 26 cities and 14 provinces between 2008 and 2012 revealed that the disease was more common in males (54%) than in women (46%). Ages 50 to 54 accounted for the majority of cases. The age trend in colorectal cancer instances is changing at the moment, though, as the disease is starting to manifest at a younger age (Purnomo et al., 2023).

Precancerous growths known as polyps, which can begin as tiny, benign collections of cells on the inner lining of the colon or rectum, are usually the precursors of colorectal cancer. These polyps may eventually develop into cancer (Dalal et al., 2020). Since the illness frequently advances slowly, screening can be used to discover it early, greatly improving the effectiveness of treatment. Abdominal discomfort, blood or mucus in the stool, exhaustion, changes in bowel habits, and inexplicable weight loss are some of the common signs of colorectal cancer. It is important to remember, though, that similar symptoms can also be linked to other gastrointestinal disorders (Liang et al., 2023).

Risk factors for colorectal cancer include age, with older adults being more susceptible, and genetics, particularly in persons with a family history of inherited disorders such as Lynch syndrome. Increased risks are associated with a personal history of colon cancer or polyps, chronic inflammatory bowel illnesses, and certain dietary choices, such as consuming a lot of red meat and little fiber. Obesity, smoking, excessive alcohol use, physical inactivity, and smoking are other lifestyle variables linked to a higher risk of colorectal cancer. People with type 2 diabetes may be at a higher risk, and certain racial and ethnic groups may have higher incidence rates. Comprehending these variables is essential for focused preventive actions, such as routine examinations and alterations to lifestyle, to lessen the effects of colorectal cancer (Wagner et al., 2022).

In this study, carried out screening aimed to evaluate the known risk factors for colorectal carcinoma in the residents of villages assisted by the Malang internist association. Data was collected using a questionnaire based on the history and symptoms of the village residents to screen the risk factors of colorectal cancer.

## SUBJECTS AND METHOD

### 1. Study Design

This research is an analytical observational study that uses a cross-sectional approach for statistical analysis at Sepanjang village of Malang in July 2023. Respondents are asked to complete a questionnaire that covers the independent and dependent variables recording the data regarding the risk factors of colorectal carcinoma and some important symptoms regarding colorectal carcinoma.

### 2. Population and Sample

The respondents in this study were residents of the Sepanjang village of Malang Regency who were involved in community service carried out by the Internist Association of Malang. Community service was carried out in July 2023 and the sampling technique used consecutive sampling which all of 148 residents who attended were involved in collecting data on risk factors for colorectal carcinoma.

### 3. Study Variables

The independent variables of this research were the risk factors of colorectal carcinoma,

included the age, gender, exercise routine, and dietary history. The dependent variables of this research are the presence of symptoms of colorectal carcinoma such as abdominal pain, bloody stools, mucous stools, constipation, or a history of ever being diagnosed with colorectal carcinoma.

**4. Operational Definition of Variables**

**The age of the patients:** is measured in years.

**Gender:** is determined as male and female.

**Exercise routine:** was classified as never, 1 to 3 time (s) a week, 4 to 6 times a week, and every day.

**The dietary history:** included history of tofu or tempeh consumption, history of egg consumption, history of consumption of leaf vegetables, history of consumption of papaya, history of consumption of banana, history of consumption of oranges or apples, history of consumption of beef, history of consumption of poultry, history of consumption of seafood, history of consumption of milk, history of consumption of fried food or coconut milk, history of consumption of coffee or tea, and history of consumption of instant noodles.

**5. Study Instruments**

Data collection was carried out using a questionnaire with a cross-sectional approach. The questionnaire assesses the presence of symptoms of colorectal carcinoma such as abdominal pain, bloody stools, mucous stools, constipation, or a history of ever being diagnosed with colorectal carcinoma.

**6. Data Analysis**

Data presentation and analysis were carried out as in previous articles which presented similar data (Tielemans et al., 2013). The age of respondents with or without symptoms of colorectal carcinoma was presented as mean and standard deviation. The difference of age among the respondents with the symptom(s) of colorectal carcinoma was statistically analysed using independent T-test (if normally distributed) or Mann-Whitney (if abnormally distributed). The association between the other risk factors with the symptoms of colorectal carcinoma was assessed statistically using Chi-Square test.

**7. Research Ethics**

The study was approved by the Health Research Ethics Committee of dr. Saiful Anwar General Hospital, (400/164/K.3/-101.7/2023), released on 25th of July 2023.

## RESULTS

**1. Characteristics Samples**

This study involved 148 respondents and the characteristics shown in Table 1. This study was dominated by female subjects (N: 106) with an average age (Mean= 57.47; SD= 11.98). Hematochezia was experienced by 13.5% of subjects; while diarrhea and constipation were experienced by 31.8% and 35.8% of subjects (respectively). Most subjects regularly consumed protein foods with soy sources, namely tofu and tempeh (55.4%). Around 77% of subjects in this study regularly consumed green vegetables. Even though it is not more than 50%, physical activity is something that most subjects have never done (49.3%).

**Table 1. Characteristics of the respondents (N=148)**

| Characteristic | Category | Frequency (N) | Percentage (%) |
|---|---|---|---|
| Sex | Male | 42 | 28.4 |
| | Female | 106 | 71.6 |
| Hematochezia | No | 128 | 86.5 |
| | Yes | 20 | 13.5 |
| Mucoid Stools | No | 131 | 88.5 |

| Characteristic | Category | Frequency (N) | Percentage (%) |
|---|---|---|---|
| | Yes | 17 | 11.5 |
| Frequent diarrhea | No | 101 | 68.2 |
| | Yes | 47 | 31.8 |
| Frequent constipation | No | 95 | 64.2 |
| | Yes | 53 | 35.8 |
| Inexplicable weight loss | No | 117 | 79.1 |
| | Yes | 31 | 20.9 |
| Tofu and Tempeh Consumption | Never. | 1 | 0.7 |
| | 1-3 time(s)/week. | 41 | 27.7 |
| | 4-6 times/week. | 24 | 16.2 |
| | Everyday. | 82 | 55.4 |
| Eggs Consumption | Never | 22 | 14.9 |
| | 1-3 time(s)/week. | 75 | 50.7 |
| | 4-6 times/week. | 26 | 17.6 |
| | Everyday. | 25 | 16.9 |
| Leaves Vegetable | Never. | 1 | 0.7 |
| | 1-3 time(s)/week. | 19 | 12.8 |
| | 4-6 times/week. | 14 | 9.5 |
| | Everyday. | 114 | 77.0 |
| Papaya consumption | Never. | 13 | 8.8 |
| | 1-3 time(s)/week. | 82 | 55.4 |
| | 4-6 times/week. | 39 | 26.4 |
| | Everyday. | 14 | 9.5 |
| Banana Consumption | Never. | 10 | 6.8 |
| | 1-3 time(s)/week. | 79 | 53.4 |
| | 4-6 times/week. | 47 | 31.8 |
| | Everyday. | 12 | 8.1 |
| Oranges or apples Consumption | Never. | 28 | 18.9 |
| | 1-3 time(s)/week. | 80 | 54.1 |
| | 4-6 times/week. | 31 | 20.9 |
| | Everyday. | 9 | 6.1 |
| Beef Consumption | Never. | 69 | 46.6 |
| | 1-3 time(s)/week. | 71 | 48.0 |
| | 4-6 times/week. | 7 | 4.7 |
| | Everyday. | 1 | 0.7 |
| Poultry Consumption | Never. | 42 | 28.4 |
| | 1-3 time(s)/week. | 83 | 56.1 |
| | 4-6 times/week. | 19 | 12.8 |
| | Everyday. | 4 | 2.7 |
| Seafood Consumption | Never. | 20 | 13.5 |
| | 1-3 time(s)/week. | 82 | 55.4 |
| | 4-6 times/week. | 33 | 22.3 |
| | Everyday. | 13 | 8.8 |
| Milk Consumption | Never. | 65 | 43.9 |
| | 1-3 time(s)/week. | 55 | 37.2 |
| | 4-6 times/week. | 12 | 8.1 |
| | Everyday. | 16 | 10.8 |
| Fried food/ coconut milk consumption | Never. | 12 | 8.1 |
| | 1-3 time(s)/week. | 57 | 38.5 |
| | 4-6 times/week. | 21 | 14.2 |
| | Everyday. | 58 | 39.2 |
| Coffee or tea Consumption | Never. | 38 | 25.7 |
| | 1-3 time(s)/week. | 24 | 16.2 |
| | 4-6 times/week. | 17 | 11.5 |
| | Everyday. | 69 | 46.6 |
| Instant noodles Consumption | Never. | 93 | 62.8 |
| | 1-3 time(s)/week. | 46 | 31.1 |
| | 4-6 times/week. | 9 | 6.1 |

| Characteristic | Category | Frequency (N) | Percentage (%) |
|---|---|---|---|
| History of Exercise | Everyday. | 0 | 0.0 |
| | Never. | 73 | 49.3 |
| | 1-3 time(s)/week. | 40 | 27.0 |
| | 4-6 times/week. | 19 | 12.8 |
| | Everyday. | 16 | 10.8 |

**2. The association of the known colorectal risk facto with hematochezia**

The association between the age of respondents and the number of respondents who experienced hematochezia is presented in Table 2. The average age of patients who had experienced hematochezia was (Mean= 51.90; SD= 14.10). The mean age of patients who had never experienced hematochezia was (Mean= 58.34; SD= 11.40). Based on the Table 2, there is a significant association between respondent's age with hematochezia proven by (p= 0.025).

The association between several risk factors of colorectal carcinoma and hematochezia is also presented in Table 2. Based on the table 2, there is a significant association between the respondent's gender and hematochezia proven by (p= 0.021). There is a significant association between the frequency of physical exercise the hematochezia, proven by (p= 0.008), and this study showed that fried food consumption and frequent consumption of instant noodles are associated significantly with hematochezia.

**Table 2. The association of the risk factors of colorectal carcinoma with Hematochezia**

| Variable | Experienced Mucoid Stools | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **Gender** | | | | | |
| Male | 32 | 21.6 | 10 | 6.8 | 0.021 |
| Female | 96 | 64.9 | 10 | 6.8 | |
| **Physical exercise** | | | | | |
| Never | 65 | 43.9 | 8 | 5.4 | 0.008 |
| 1-3 time(s)/week | 35 | 23.6 | 5 | 3.4 | |
| 4-6 times/week | 12 | 8.1 | 7 | 4.7 | |
| Everyday | 16 | 10.8 | 0 | 0 | |
| **History tofu/tempeh consumption** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.625 |
| 1-3 time(s)/week | 35 | 23.6 | 6 | 4.1 | |
| 4-6 times/week | 19 | 12.8 | 5 | 3.4 | |
| Everyday | 73 | 49.3 | 9 | 6.1 | |
| **History egg consumption** | | | | | |
| Never | 19 | 12.8 | 3 | 2.0 | 0.988 |
| 1-3 time(s)/week | 65 | 43.9 | 10 | 6.8 | |
| 4-6 times/week | 22 | 14.8 | 4 | 2.7 | |
| Everyday | 22 | 14.8 | 3 | 2.0 | |
| **History consumption of vegetables** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.198 |
| 1-3 time(s)/week | 15 | 10.1 | 4 | 2.7 | |
| 4-6 times/week | 10 | 6.8 | 4 | 2.7 | |
| Everyday | 102 | 68..9 | 12 | 8.1 | |
| **History consumption of papaya** | | | | | |
| Never | 11 | 7.4 | 2 | 1.4 | 0.467 |
| 1-3 time(s)/week | 68 | 45.9 | 14 | 9.5 | |
| 4-6 times/week | 36 | 24.3 | 3 | 2.0 | |
| Everyday | 13 | 8.8 | 1 | 0.7 | |

| Variable | Experienced Mucoid Stools | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **History consumption of banana** | | | | | |
| Never | 7 | 4.7 | 3 | 2.0 | 0.284 |
| 1-3 time(s)/week | 67 | 45.3 | 12 | 8.1 | |
| 4-6 times/week | 43 | 29.1 | 4 | 2.7 | |
| Everyday | 11 | 7.4 | 1 | 0.7 | |
| **History consumption of oranges/apples** | | | | | |
| Never | 22 | 14.9 | 6 | 4.1 | 0.101 |
| 1-3 time(s)/week | 67 | 45.3 | 13 | 8.8 | |
| 4-6 times/week | 30 | 20.3 | 1 | 0.7 | |
| Everyday | 9 | 6.1 | 0 | 1 | |
| **History consumption of beef** | | | | | |
| Never | 63 | 42.6 | 6 | 4.1 | 0.310 |
| 1-3 time(s)/week | 59 | 4.1 | 12 | 8.1 | |
| 4-6 times/week | 5 | 3.4 | 2 | 1.4 | |
| Everyday | 1 | 0.7 | 0 | 0 | |
| **History consumption of poultry** | | | | | |
| Never | 38 | 25.7 | 4 | 2.7 | 0.535 |
| 1-3 time(s)/week | 71 | 48.0 | 12 | 8.1 | |
| 4-6 times/week | 15 | 10.1 | 4 | 2.7 | |
| Everyday | 4 | 2.7 | 0 | 0 | |
| **History consumption of seafood** | | | | | |
| Never | 19 | 12.8 | 1 | 0.7 | 0.380 |
| 1-3 time(s)/week | 72 | 48.6 | 10 | 6.8 | |
| 4-6 times/week | 26 | 17.6 | 7 | 4.7 | |
| Everyday | 11 | 7.4 | 2 | 1.4 | |
| **History consumption of milk** | | | | | |
| Never | 58 | 39.2 | 7 | 4.7 | 0.411 |
| 1-3 time(s)/week | 46 | 31.1 | 9 | 6.1 | |
| 4-6 times/week | 9 | 6.1 | 3 | 2.0 | |
| Everyday | 15 | 10.1 | 1 | 0.7 | |
| **History consumption of fried food/coconut milk** | | | | | |
| Never | 11 | 7.4 | 1 | 0.7 | 0.021 |
| 1-3 time(s)/week | 43 | 29.1 | 14 | 9.5 | |
| 4-6 times/week | 20 | 13.5 | 1 | 0.7 | |
| Everyday | 54 | 36.5 | 4 | 2.7 | |
| **History consumption of coffee or tea** | | | | | |
| Never | 34 | 23.0 | 4 | 2.7 | 0.893 |
| 1-3 time(s)/week | 21 | 14.2 | 3 | 2.0 | |
| 4-6 times/week | 14 | 9.5 | 3 | 2.0 | |
| Everyday | 59 | 39.9 | 10 | 6.8 | |
| **History consumption of instant noodles** | | | | | |
| Never | 84 | 56.8 | 9 | 6.1 | 0.013 |
| 1-3 time(s)/week | 39 | 26.4 | 7 | 4.7 | |
| 4-6 times/week | 5 | 3.4 | 4 | 2.7 | |
| Everyday | 0 | 0 | 0 | 0 | |

### 3. The association of the known colorectal risk factors with mucoid stools

The association of several colorectal carcinoma risk factors with mucoid stools is presented in Table 3. The average age of patients who had experienced mucoid stools was (Mean= 57.40; SD= 13.00). The mean age of patients who had never experienced mucoid stools was (Mean= 57.90; SD=11.90). Based on Table 3, there is no significant association between the respondent's age with mucoid stools. There is a significant association between the respon-

dent's gender and mucoid stools proven by (p=0.017); and it is known that consumption of vegetables, poultry, and instant noodles are significantly associated with mucoid stools phenomenon.

**Table 3. The Association of Several Colorectal Carcinoma Risk Factors with Mucoid Stools**

| Variable | Experienced Mucoid Stools | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **Gender** | | | | | |
| Male | 33 | 22.3 | 9 | 6.1 | 0.017 |
| Female | 98 | 66.2 | 8 | 5.4 | |
| **Physical exercise** | | | | | |
| Never | 67 | 43.3 | 6 | 4.1 | 0.148 |
| 1-3 time(s)/week | 35 | 23.6 | 5 | 3.4 | |
| 4-6 times/week | 14 | 9.5 | 5 | 3.4 | |
| Everyday | 15 | 10.1 | 1 | 0.7 | |
| **History tofu or tempeh consumption** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.851 |
| 1-3 time(s)/week | 35 | 23.6 | 6 | 4.1 | |
| 4-6 times/week | 21 | 14.2 | 3 | 2.0 | |
| Everyday | 74 | 50.0 | 8 | 5.4 | |
| **History egg consumption** | | | | | |
| Never | 20 | 13.5 | 2 | 1.4 | 0.571 |
| 1-3 time(s)/week | 67 | 45.3 | 8 | 5.4 | |
| 4-6 times/week | 21 | 14.2 | 5 | 3.4 | |
| Everyday | 23 | 15.5 | 2 | 1.4 | |
| **History consumption of vegetables** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.007 |
| 1-3 time(s)/week | 15 | 10.1 | 4 | 2.7 | |
| 4-6 times/week | 9 | 6.1 | 5 | 3.4 | |
| Everyday | 106 | 71.6 | 8 | 5.4 | |
| **History consumption of papaya** | | | | | |
| Never | 13 | 8.8 | 3 | 2.0 | 0.281 |
| 1-3 time(s)/week | 37 | 25 | 11 | 7.4 | |
| 4-6 times/week | 71 | 48.0 | 2 | 1.4 | |
| Everyday | 10 | 6.8 | 1 | 0.7 | |
| **History consumption of banana** | | | | | |
| Never | 7 | 4.7 | 3 | 2.0 | 0.187 |
| 1-3 time(s)/week | 69 | 46.6 | 10 | 6.8 | |
| 4-6 times/week | 44 | 29.7 | 3 | 2.0 | |
| Everyday | 11 | 7.4 | 1 | 0.7 | |
| **History consumption of oranges or apples** | | | | | |
| Never | 22 | 14.9 | 6 | 4.1 | 0.186 |
| 1-3 time(s)/week | 71 | 48.0 | 9 | 6.1 | |
| 4-6 times/week | 30 | 20.2 | 1 | 0.7 | |
| Everyday | 8 | 5.4 | 1 | 0.7 | |
| **History consumption of beef** | | | | | |
| Never | 61 | 41.2 | 8 | 5.4 | 0.056 |
| 1-3 time(s)/week | 65 | 43.9 | 6 | 4.1 | |
| 4-6 times/week | 4 | 2.7 | 3 | 2.0 | |
| Everyday | 1 | 0.7 | 0 | 0 | |
| **History consumption of poultry** | | | | | |
| Never | 35 | 23.6 | 7 | 4.7 | 0.043 |
| 1-3 time(s)/week | 78 | 52.7 | 5 | 3.4 | |
| 4-6 times/week | 14 | 9.5 | 5 | 3.4 | |
| Everyday | 4 | 2.7 | 0 | 0 | |

| Variable | Experienced Mucoid Stools | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **History consumption of seafood** | | | | | |
| Never | 17 | 11.5 | 3 | 2.0 | 0.875 |
| 1-3 time(s)/week | 74 | 50.0 | 8 | 5.4 | |
| 4-6 times/week | 29 | 19.6 | 4 | 2.7 | |
| Everyday | 11 | 7.4 | 2 | 1.4 | |
| **History consumption of milk** | | | | | |
| Never | 58 | 39.2 | 7 | 4.7 | 0.093 |
| 1-3 time(s)/week | 50 | 33.8 | 5 | 3.4 | |
| 4-6 times/week | 8 | 5.4 | 4 | 2.7 | |
| Everyday | 15 | 10.1 | 1 | 0.7 | |
| **History consumption of fried food or coconut milk** | | | | | |
| Never | 11 | 7.4 | 1 | 0.7 | 0.283 |
| 1-3 time(s)/week | 50 | 33.8 | 7 | 4.7 | |
| 4-6 times/week | 21 | 14.2 | 0 | 0 | |
| Everyday | 49 | 33.1 | 9 | 6.1 | |
| **History consumption of coffee or tea** | | | | | |
| Never | 36 | 24.3 | 2 | 1.4 | 0.206 |
| 1-3 time(s)/week | 22 | 14.9 | 2 | 1.4 | |
| 4-6 times/week | 16 | 10.8 | 1 | 0.7 | |
| Everyday | 57 | 38.5 | 12 | 8.1 | |
| **History consumption of instant noodles** | | | | | |
| Never | 85 | 57.4 | 8 | 5.4 | 0.000 |
| 1-3 time(s)/week | 42 | 28.4 | 4 | 2.7 | |
| 4-6 times/week | 4 | 2.7 | 5 | 3.4 | |
| Everyday | 0 | 0 | 0 | 0 | |

### 4. The association of the known colorectal risk factors with frequent diarrhea

The association between the age of respondents and the number of respondents who experienced frequent diarrhea is presented in Table 4 which showed that except the leaves vegetables consumption, there were no other risk factors showed significant association with diarrhea found in this study.

The average age of patients who had experienced frequent diarrhea was (Mean= 55.90; SD= 12.50). The mean age of patients who had never experienced frequent diarrhea was (Mean= 58.2; SD= 11.27).

**Table 4. The Association of Several Colorectal Carcinoma Risk Factors with Frequent Diarrhea**

| Variable | Experienced Frequent Diarrhea | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **Gender** | | | | | |
| Male | 31 | 20.9 | 11 | 7.4 | 0.360 |
| Female | 70 | 47.3 | 36 | 24.3 | |
| **Physical exercise** | | | | | |
| Never | 11 | 7.4 | 5 | 3.4 | |
| 1-3 time(s)/week | 13 | 8.8 | 6 | 4.1 | 1.000 |
| 4-6 times/week | 27 | 18.2 | 13 | 8.8 | |
| Everyday | 50 | 33.8 | 23 | 15.5 | |
| **History tofu or tempeh consumption** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | |
| 1-3 time(s)/week | 27 | 18.2 | 14 | 9.5 | 0.550 |
| 4-6 times/week | 19 | 12.8 | 5 | 3.4 | |

| Variable | Experienced Frequent Diarrhea | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| Everyday | 54 | 36.5 | 28 | 18.9 | |
| **History egg consumption** | | | | | |
| Never | 15 | 10.1 | 7 | 4.7 | 0.282 |
| 1-3 time(s)/week | 54 | 36.5 | 21 | 14.2 | |
| 4-6 times/week | 19 | 12.8 | 7 | 4.7 | |
| Everyday | 13 | 8.8 | 12 | 8.1 | |
| **History consumption of vegetables** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.035 |
| 1-3 time(s)/week | 12 | 8.1 | 7 | 4.7 | |
| 4-6 times/week | 5 | 3.4 | 9 | 6.1 | |
| Everyday | 83 | 56.1 | 31 | 20.9 | |
| **History consumption of papaya** | | | | | |
| Never | 6 | 4.1 | 7 | 4.7 | 0.296 |
| 1-3 time(s)/week | 57 | 38.5 | 25 | 16.9 | |
| 4-6 times/week | 27 | 18.2 | 12 | 8.1 | |
| Everyday | 11 | 7.4 | 3 | 2.0 | |
| **History consumption of banana** | | | | | |
| Never | 7 | 4.7 | 3 | 2.0 | 0.469 |
| 1-3 time(s)/week | 50 | 33.8 | 29 | 19.6 | |
| 4-6 times/week | 34 | 23.0 | 13 | 8.8 | |
| Everyday | 10 | 6.8 | 2 | 1.4 | |
| **History consumption of oranges or apples** | | | | | |
| Never | 16 | 10.8 | 12 | 8.1 | 0.229 |
| 1-3 time(s)/week | 53 | 35.8 | 27 | 18.2 | |
| 4-6 times/week | 25 | 16.9 | 6 | 4.1 | |
| Everyday | 7 | 4.7 | 2 | 1.4 | |
| **History consumption of beef** | | | | | |
| Never | 50 | 33.8 | 19 | 12.8 | 0.354 |
| 1-3 time(s)/week | 47 | 31.8 | 24 | 16.2 | |
| 4-6 times/week | 3 | 2.0 | 4 | 2.7 | |
| Everyday | 1 | 0.7 | 0 | 0 | |
| **History consumption of poultry** | | | | | |
| Never | 31 | 20.9 | 11 | 7.4 | 0.649 |
| 1-3 time(s)/week | 56 | 37.8 | 27 | 1.8 | |
| 4-6 times/week | 11 | 7.4 | 8 | 5.4 | |
| Everyday | 3 | 2.0 | 1 | 0.7 | |
| **History consumption of seafood** | | | | | |
| Never | 16 | 10.8 | 4 | 2.7 | 0.504 |
| 1-3 time(s)/week | 53 | 35.8 | 29 | 19.6 | |
| 4-6 times/week | 24 | 16.2 | 9 | 6.1 | |
| Everyday | 8 | 5.4 | 5 | 3.4 | |
| **History consumption of milk** | | | | | |
| Never | 40 | 27.0 | 25 | 16.9 | 0.318 |
| 1-3 time(s)/week | 42 | 28.3 | 13 | 8.8 | |
| 4-6 times/week | 9 | 6.1 | 3 | 2.0 | |
| Everyday | 10 | 6.8 | 6 | 4.1 | |
| **History consumption of fried food or coconut milk** | | | | | |
| Never | 8 | 5.4 | 4 | 2.7 | 0.298 |
| 1-3 time(s)/week | 36 | 24.3 | 21 | 14.2 | |
| 4-6 times/week | 18 | 12.2 | 3 | 2.0 | |
| Everyday | 39 | 26.4 | 19 | 12.8 | |
| **History consumption of coffee or tea** | | | | | |
| Never | 22 | 14.8 | 16 | 10.8 | 0.217 |
| 1-3 time(s)/week | 20 | 13.5 | 4 | 2.7 | |
| 4-6 times/week | 12 | 8.1 | 5 | 3.4 | |
| Everyday | 47 | 31.8 | 22 | 14.8 | |

| Variable | Experienced Frequent Diarrhea | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **History consumption of instant noodles** | | | | | |
| Never | 67 | 45.3 | 26 | 17.6 | 0.205 |
| 1-3 time(s)/week | 30 | 20.3 | 16 | 10.8 | |
| 4-6 times/week | 4 | 2.7 | 5 | 3.4 | |
| Everyday | 0 | 0 | 0 | 0 | |

### 5. The association of the known colorectal risk factors with frequent constipation

The association between the known colorectal risk factors with frequent constipation is presented in Table 5. The average age of patients who had experienced frequent constipation was (Mean= 57.40; SD= 12.90). The mean age of patients who had never experienced frequent constipation was (Mean= 57.60; SD= 2.40)

The frequency of physical exercise showed a significant association with the number of respondents who experience frequent constipation proven by (p=0.030). Table 5, showed the consumption of oranges or apples is significantly associated with the number of respondents who experience frequent constipation as fruit consumption prevents constipation. This study showed that the other risk factors had no significant association with frequent constipation.

**Table 5. The Association of The Known Colorectal Risk Factors with Frequent Constipation**

| Variable | Experienced Frequent Constipation | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **Gender** | | | | | |
| Male | 24 | 16.2 | 18 | 12.2 | 0.260 |
| Female | 71 | 48.0 | 35 | 23.6 | |
| **Physical exercise** | | | | | 0.030 |
| Never | 40 | 27.0 | 33 | 22.3 | |
| 1-3 time(s)/week | 30 | 20.3 | 10 | 6.8 | |
| 4-6 times/week | 11 | 7.4 | 8 | 5.4 | |
| Everyday | 14 | 9.5 | 2 | 1.4 | |
| **History tofu or tempeh consumption** | | | | | |
| Never | 0 | 0 | 1 | 0.7 | 0.185 |
| 1-3 time(s)/week | 30 | 20.3 | 11 | 7.4 | |
| 4-6 times/week | 17 | 11.5 | 7 | 4.7 | |
| Everyday | 78 | 52.7 | 34 | 23.0 | |
| **History egg consumption** | | | | | |
| Never | 13 | 8.8 | 9 | 6.1 | 0.690 |
| 1-3 time(s)/week | 46 | 31.1 | 29 | 19.6 | |
| 4-6 times/week | 18 | 12.2 | 8 | 5.4 | |
| Everyday | 18 | 12.2 | 7 | 4.7 | |
| **History consumption of vegetables** | | | | | |
| Never | 0 | 0 | 1 | 0.7 | 0.051 |
| 1-3 time(s)/week | 14 | 9.5 | 5 | 3.4 | |
| 4-6 times/week | 5 | 3.4 | 9 | 6.1 | |
| Everyday | 76 | 51.4 | 38 | 25.7 | |
| **History consumption of papaya** | | | | | |
| Never | 6 | 4.1 | 7 | 4.7 | 0.233 |
| 1-3 time(s)/week | 50 | 33.8 | 32 | 21.6 | |
| 4-6 times/week | 29 | 19.6 | 10 | 6.8 | |

| Variable | Experienced Frequent Constipation | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| Everyday | 10 | 6.8 | 4 | 2.7 | |
| **History consumption of banana** | | | | | |
| Never | 5 | 3.4 | 5 | 3.4 | 0.308 |
| 1-3 time(s)/week | 47 | 31.8 | 32 | 21.6 | |
| 4-6 times/week | 34 | 23.0 | 13 | 8.8 | |
| Everyday | 9 | 6.1 | 3 | 2.0 | |
| **History consumption of oranges or apples** | | | | | |
| Never | 13 | 8.8 | 15 | 10.1 | 0.040 |
| 1-3 time(s)/week | 50 | 33.8 | 30 | 20.3 | |
| 4-6 times/week | 25 | 16.9 | 6 | 4.1 | |
| Everyday | 7 | 4.7 | 2 | 1.4 | |
| **History consumption of beef** | | | | | |
| Never | 38 | 25.7 | 31 | 20.9 | 0.171 |
| 1-3 time(s)/week | 51 | 34.5 | 20 | 13.5 | |
| 4-6 times/week | 5 | 3.4 | 2 | 1.4 | |
| Everyday | 1 | 0.7 | 0 | 0 | |
| **History consumption of poultry** | | | | | |
| Never | 21 | 14.2 | 21 | 14.2 | 0.079 |
| 1-3 time(s)/week | 57 | 38.5 | 26 | 17.6 | |
| 4-6 times/week | 13 | 8.8 | 6 | 4.1 | |
| Everyday | 4 | 2.7 | 0 | 0 | |
| **History consumption of seafood** | | | | | |
| Never | 12 | 8.1 | 8 | 5.4 | 0.778 |
| 1-3 time(s)/week | 52 | 35.1 | 30 | 20.3 | |
| 4-6 times/week | 21 | 14.2 | 12 | 8.1 | |
| Everyday | 10 | 6.8 | 3 | 2.0 | |
| **History consumption of milk** | | | | | |
| Never | 40 | 27.0 | 25 | 16.9 | 0.924 |
| 1-3 time(s)/week | 37 | 25 | 18 | 12.2 | |
| 4-6 times/week | 8 | 5.4 | 4 | 2.7 | |
| Everyday | 10 | 6.8 | 6 | 4.1 | |
| **History consumption of fried food or coconut milk** | | | | | |
| Never | 5 | 3.4 | 7 | 4.7 | 0.103 |
| 1-3 time(s)/week | 33 | 22.3 | 24 | 16.2 | |
| 4-6 times/week | 14 | 9.5 | 7 | 4.7 | |
| Everyday | 43 | 29.1 | 15 | 10.1 | |
| **History consumption of coffee or tea** | | | | | |
| Never | 25 | 16.9 | 13 | 8.8 | 0.592 |
| 1-3 time(s)/week | 16 | 10.8 | 8 | 5.4 | |
| 4-6 times/week | 13 | 8.8 | 4 | 2.7 | |
| Everyday | 41 | 27.7 | 28 | 18.9 | |
| **History consumption of instant noodles** | | | | | |
| Never | 61 | 41.2 | 32 | 21.6 | 0.443 |
| 1-3 time(s)/week | 30 | 20.3 | 16 | 10.8 | |
| 4-6 times/week | 4 | 2.7 | 5 | 3.4 | |
| Everyday | 0 | 0 | 0 | 0 | |

### 6. The association of the known colorectal risk factors with inexplicable weight loss

The association of the known colorectal risk factors with inexplicable weight loss is presented in Table 6. The average age of patients who had experienced inexplicable weight loss was (Mean= 56.70; SD= 12.10). The mean age of patients who had never experienced inexplicable weight loss was (Mean= 60.30; SD= 11.30). There is a significant association between the respon-

dent's gender and inexplicable weight loss proven by (p=0.020). It is known that consumption of eggs is significantly associated with the number of respondent who experience inexplicable weight loss as egg consumption prevents the weight loss.

**Table 6. The Association of the Known Colorectal Risk Factors with Inexplicable Weight Loss**

| Variable | Experienced Inexplicable Weight Loss | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **Gender** | | | | | |
| Male | 28 | 18.9 | 14 | 9.5 | 0.020 |
| Female | 89 | 60.1 | 17 | 11.5 | |
| **Physical exercise** | | | | | |
| Never | 58 | 39.2 | 15 | 10.1 | 0.990 |
| 1-3 time(s)/week | 31 | 20.9 | 9 | 6.1 | |
| 4-6 times/week | 15 | 10.1 | 4 | 2.7 | |
| Everyday | 13 | 8.8 | 3 | 2.0 | |
| **History tofu or tempeh consumption** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.650 |
| 1-3 time(s)/week | 31 | 20.9 | 10 | 6.8 | |
| 4-6 times/week | 21 | 14.2 | 3 | 2.0 | |
| Everyday | 64 | 43.2 | 18 | 12.2 | |
| **History egg consumption** | | | | | |
| Never | 12 | 8.1 | 10 | 6.8 | 0.009 |
| 1-3 time(s)/week | 62 | 41.9 | 13 | 8.8 | |
| 4-6 times/week | 24 | 16.2 | 2 | 1.4 | |
| Everyday | 19 | 12.8 | 6 | 4.1 | |
| **History consumption of vegetables** | | | | | |
| Never | 1 | 0.7 | 0 | 0 | 0.340 |
| 1-3 time(s)/week | 17 | 11.5 | 2 | 1.4 | |
| 4-6 times/week | 9 | 6.1 | 5 | 3.4 | |
| Everyday | 90 | 60.8 | 24 | | |
| **History consumption of papaya** | | | | | |
| Never | 10 | 6.8 | 3 | 2.0 | 0.833 |
| 1-3 time(s)/week | 63 | 42.6 | 19 | 12.8 | |
| 4-6 times/week | 32 | 21.6 | 7 | 4.7 | |
| Everyday | 12 | 8.1 | 2 | 1.4 | |
| **History consumption of banana** | | | | | |
| Never | 7 | 4.7 | 3 | 2.0 | 0.593 |
| 1-3 time(s)/week | 61 | 41.2 | 18 | 12.2 | |
| 4-6 times/week | 38 | 25.7 | 9 | 6.1 | |
| Everyday | 11 | 7.4 | 1 | 0.7 | |
| **History consumption of oranges or apples** | | | | | |
| Never | 19 | 12.8 | 9 | 6.1 | 0.277 |
| 1-3 time(s)/week | 63 | 42.6 | 17 | 11.5 | |
| 4-6 times/week | 27 | 18.2 | 4 | 2.7 | |
| Everyday | 8 | 5.4 | 1 | 0.7 | |
| **History consumption of beef** | | | | | |
| Never | 54 | 36.5 | 15 | 10.1 | 0.896 |
| 1-3 time(s)/week | 57 | 38.5 | 14 | 9.5 | |
| 4-6 times/week | 5 | 3.4 | 2 | 1.4 | |
| Everyday | 1 | 0.7 | 0 | 0 | |
| **History consumption of poultry** | | | | | |
| Never | 30 | 20.3 | 12 | 8.1 | 0.525 |
| 1-3 time(s)/week | 68 | 45.9 | 15 | 10.1 | |
| 4-6 times/week | 16 | 10.8 | 3 | 2.0 | |
| Everyday | 3 | 2.0 | 1 | 0.7 | |

| Variable | Experienced Inexplicable Weight Loss | | | | p |
|---|---|---|---|---|---|
| | No | | Yes | | |
| | N | % | N | % | |
| **History consumption of seafood** | | | | | |
| Never | 13 | 8.8 | 7 | 4.7 | 0.080 |
| 1-3 time(s)/week | 71 | 48 | 11 | 7.4 | |
| 4-6 times/week | 24 | 16.2 | 9 | 6.1 | |
| Everyday | 9 | 6.1 | 4 | 2.7 | |
| **History consumption of milk** | | | | | |
| Never | 48 | 32.4 | 17 | 11.5 | 0.463 |
| 1-3 time(s)/week | 46 | 31.1 | 9 | 6.1 | |
| 4-6 times/week | 9 | 6.1 | 3 | 2.0 | |
| Everyday | 14 | 9.5 | 2 | 1.4 | |
| **History consumption of fried food or coconut milk** | | | | | |
| Never | 9 | 6.1 | 3 | 2.0 | 0.377 |
| 1-3 time(s)/week | 43 | 29.1 | 14 | 9.5 | |
| 4-6 times/week | 15 | 10.1 | 6 | 4.1 | |
| Everyday | 50 | 33.8 | 8 | 5.4 | |
| **History consumption of coffee or tea** | | | | | |
| Never | 29 | 19.6 | 9 | 6.1 | 0.676 |
| 1-3 time(s)/week | 21 | 14.2 | 3 | 2.0 | |
| 4-6 times/week | 14 | 9.5 | 3 | 2.0 | |
| Everyday | 53 | 35.8 | 16 | 10.8 | |
| **History consumption of instant noodles** | | | | | |
| Never | 73 | 49.3 | 20 | 13.5 | 0.961 |
| 1-3 time(s)/week | 37 | 25.0 | 9 | 6.1 | |
| 4-6 times/week | 7 | 4.7 | 2 | 1.4 | |
| Everyday | 0 | 0 | 0 | 0 | |

## DISCUSSION

The finding that respondents' age, sex, frequent consumption of fried food and instant noodles, and lack of exercise were significantly associated with hematochezia highlights the intricate relationship that exists between individual habits and colorectal health. These results highlighted necessity of focused interventions that address dietary decisions as well as the role that regular exercise plays in preventing colorectal cancer and its symptoms. As stated in an epidemiological study conducted in Iran in 2015, it is known that men have a greater percentage of experiencing hematochezia (Mansour-Ghanaei et al., 2015). In another study evaluating the diet of patients experiencing rectal bleeding, it was found that a diet high in fat, fried foods, and fast-foods increased the incidence of rectal bleeding (O'Sullivan et al., 2022).

According to the study, there was a substantial correlation between the respondents' sex, frequent consumption of instant noodles, frequent eating of poultry meat, and lack of vegetable consumption and mucoid stools. There is also a significant association shown between a diet lack in vegetables and recurrent episodes of diarrhea. A systematic review published in 2014 explains that a diet dominated by processed meat foods, especially red meat, and chicken, has a greater risk of experiencing colorectal carcinoma because processed meat foods contain many compounds that are carcinogenic and increase the induction of tissue changes. Normal epithelium becomes hyperplastic epithelial tissue (Oostindjer et al., 2014). In another systematic review published in 2022, it was stated that a plant-based diet reduces the risk of colorectal carcinoma by acting as a

prebiotic for the intestinal microbiota. A healthy gut microbiota prevents chronic inflammation and abnormal transformation of the colonic mucosa (Dacrema et al., 2022). This information emphasizes the importance of foods high in fiber in preserving intestinal health. This complex association also implies that dietary decisions may show up as particular clinical presentations, which is important information for developing dietary guidelines unique to colorectal health.

Beyond dietary practices, this study also clarified the relationship between inactivity or lack of physical exercise and a lack of citrus fruits or apples towards recurrent constipation. As stated previously, plant-based diets have a role as a protective factor against the pathogenesis of colorectal cancer. Apart from that, fruits are also high in phenolic compounds which inhibit gene mutations due to free radicals produced by cellular activity (Macharia et al., 2022). The phenolic compounds contained in citrus fruits and apples play an important role as antioxidants (Costea et al., 2018). On the other hand, physical activity, especially regular exercise, can provide a protective effect against the formation of malignant cells. Exercise inhibits abnormal cell proliferation, induces apoptosis, activates tumor suppressor genes, inhibits pathological angiogenesis, and inhibits metastasis (Amirsasan et al., 2022). These results highlight how lifestyle decisions affect colorectal health holistically and highlight the significance of a thorough strategy for symptom treatment and risk reduction.

Finally, this study found that respondents' sex and lack of eggs' consumption are important contributors to their unexplained weight reduction. Long-term lack of egg consumption can cause hypoalbuminemia which is the main cause of wasting syndrome experienced by patients with colorectal carcinoma (Nazha, 2015). Apart from that, there is a systematic review that also states that men are more likely to experience significant weight loss due to colorectal carcinoma. Although the cause is not clear, it is suspected that hormonal influences play a role in this condition (Sawicki et al., 2021).

The necessity of a comprehensive strategy for colorectal health is highlighted by this thorough examination of many relationships. Public health campaigns should take into account the complex interactions between lifestyle choices and the development of colorectal cancer and its symptoms, rather than concentrating simply on one or two risk factors. Healthcare providers can more effectively direct people towards individualized preventative treatment and early detection techniques by using a multimodal approach.

The study's conclusions highlight the need for all-encompassing approaches to support colorectal health, taking into account the complex interactions between dietary practices, lifestyle choices, and particular symptom presentations. The complex nature of colorectal cancer demands a comprehensive approach to early identification and preventive treatments, going beyond individual risk factors and highlighting the importance of customized interventions. Furthermore, the significance of taking into account sex-based variations in colorectal health is underscored by the study's discovery of gender-specific relationships in both risk factors and symptoms. This gender-specific perspective not only deepens our knowledge of the illness but also opens the door for more individualized and successful healthcare programs. In order to promote a more complex and effective approach to colorectal health, it will be essential to incorporate these discoveries into clinical procedures and public health initiatives.

## AUTHOR CONTRIBUTION

This research was chaired by dr. Djoko Heri Hermanto. Data collected by dr. Nina Nurarifah, dr. Herwindo Pudjo Brahmantyo, dr. Shinta Oktya Wardhani, dr. Naya Adi Darmesta, dr. Nadia Alfiani and dr. Princess Ardiyanti. Data analyzed by dr. Putri Ardiyanti, and a manuscript written by dr. Nina Nurarifahon.

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## CONFLICT OF INTEREST

There is no conflict of interest in this study.

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