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## Research Article

## Awareness And Risk Factors Of Colorectal Cancer, Perceived Benefits And Perceived Barriers Of Colorectal Cancer Screening

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### Abstract:

**Introduction:** Colorectal cancer (CRC) is a growing global health concern, with low awareness of risk factors and screening in many populations. Understanding awareness, perceived benefits, and barriers is essential to improve screening uptake and prevention. **Objectives:** This study aimed to assess awareness and risk factors of colorectal cancer, perceived benefits, and barriers related to CRC screening among adults, and to examine associations and correlations between these variables. **Methodology:** A descriptive study was conducted among 65 adults above 40 years of age at ACS Medical College and Hospital using purposive sampling. Data were collected through a structured questionnaire and analysed using descriptive statistics, chi-square tests, and Karl Pearson's correlation. Pamphlets on CRC awareness were distributed to all participants after data collection. **Results:** The study found that the mean age of participants was 40.8 years (SD = 16.7), with 57.3% females. Awareness of CRC risk factors and warning signs was limited, as reflected in relatively low knowledge scores. Significant correlations were observed: awareness and perceived benefits ( $r = 0.695$ ,  $p < 0.05$ ), awareness and perceived barriers ( $r = -0.512$ ,  $p < 0.05$ ), risk factors and perceived benefits ( $r = -0.254$ ,  $p < 0.05$ ), risk factors and perceived barriers ( $r = 0.453$ ,  $p < 0.05$ ), and perceived benefits with barriers ( $r = -0.306$ ,  $p < 0.05$ ). Awareness was significantly associated with type of physical activity ( $\chi^2 = 15.717$ ,  $p = 0.015$ ), while risk factors were significantly associated with gender ( $\chi^2 = 4.395$ ,  $p = 0.036$ ). Other demographic variables did not show significant associations. **Conclusion:** The findings highlight limited CRC awareness among adults, with gender and lifestyle factors influencing risk perception. Increased awareness is linked to reduced perceived barriers and greater perceived benefits of CRC screening. Targeted education and interventions addressing modifiable risk factors could enhance awareness, reduce barriers, and promote participation in CRC screening programs.

**Keywords:** Colorectal cancer, Awareness, Risk factors, Perceived benefits, Perceived barriers, Health Belief Model

## INTRODUCTION

Colorectal cancer (CRC) is one of the most common cancers worldwide and a leading cause of cancer-related mortality. In 2020, approximately 1.9 million new cases and 930,000 deaths were reported globally, and these numbers are projected to rise substantially by 2040. Asia accounts for nearly half of the global CRC burden, with increasing incidence and mortality rates, particularly among younger populations. In India, CRC is the fourth most common cancer, with more than 64,000 new cases and 38,000 deaths reported in 2022. The incidence of CRC has shown a steady increase over the past two decades, especially in urban regions such as Chennai, Delhi, and Mumbai. Lifestyle and dietary changes associated with urbanization are believed to contribute significantly to this trend. Several modifiable and non-modifiable risk factors have been associated with CRC, including high consumption of red and processed meat, physical inactivity, obesity, diabetes mellitus, smoking, alcohol consumption, inflammatory bowel disease, and family history of CRC. Conversely, a fibre-rich diet, regular physical activity, and routine screening can reduce the risk and improve early detection. Despite the increasing burden of CRC, awareness regarding its risk factors, symptoms, and screening remains inadequate in India. Low public awareness, limited access to screening services, and socioeconomic barriers often result in delayed diagnosis and poor survival outcomes. Therefore, assessing knowledge, attitudes, and practices related to CRC is essential for developing effective educational and screening interventions aimed at reducing the disease burden.

## NEED FOR THE STUDY

Colorectal cancer (CRC) is a significant public health concern because it often remains asymptomatic in its early stages, leading to delayed diagnosis and treatment. Major risk factors include diabetes mellitus, obesity, physical inactivity, consumption of red and processed meat, alcohol use, and family history. Knowledge, attitudes, and practices (KAP) regarding CRC and its screening play a crucial role in early detection and prevention. However, studies from India, particularly Tamil Nadu, have reported low to moderate awareness of CRC risk factors, symptoms, and screening methods. Similar findings have been observed in studies conducted in South Kerala, Saudi Arabia, and Brunei Darussalam, with higher educational levels associated with better awareness. Assessing KAP regarding CRC can help identify awareness gaps and guide the development of effective educational and screening programs to promote early detection and reduce disease burden.

## STATEMENT OF THE PROBLEM

A descriptive study to assess the awareness and risk factors of CRC, perceived benefits and barriers of CRC screening among adults in ACS Medical College and Hospital, Chennai.

## OBJECTIVES

- To assess the awareness of CRC among adults in ACS Medical College and Hospital.
- To assess the risk factors of CRC among adults in ACS Medical College and Hospital.

- To assess the perceived benefits of CRC screening among adults in ACS Medical College and Hospital.
- To assess the perceived barriers of CRC screening among adults in ACS Medical College and Hospital.
- To correlate knowledge, risk factors, perceived benefits and perceived barriers of CRC.
- To find the association between knowledge, risk factors, perceived benefits and perceived barriers with selected demographic variables.

## HYPOTHESES

**RH1-** There is a significant correlation of knowledge, risk factors perceived benefits and perceived barriers at  $p < 0.05$  level of significance.

**RH2-** There is a significant association between knowledge, risk factors, perceived benefits and perceived barriers with selected demographic variables at  $p < 0.05$  level of significance.

## SCOPE OF THE STUDY

This study aims to assess the awareness of colorectal cancer (CRC), identify associated risk factors, and explore the perceived benefits and barriers to CRC screening among adults aged 40 years and above at ACS Medical College and Hospital. It focuses on evaluating participants' knowledge of CRC, lifestyle and genetic risk factors, and perceptions that influence screening behavior. Data are collected using self-structured questionnaires. The findings will help identify awareness gaps, support the development of educational interventions, and promote early detection strategies to reduce CRC-related morbidity and mortality. Although limited to the selected population, the results may provide valuable insights for similar educational and public health settings.

## DISCUSSION

The present study assessed awareness, risk factors, perceived benefits, and perceived barriers related to colorectal cancer (CRC) screening among adults above 40 years of age. The findings showed that more than half of the participants had inadequate awareness regarding CRC, indicating a significant knowledge gap. This is consistent with the findings of Prashar et al. (2023), who reported low levels of CRC awareness among adults. Most participants were categorized as having a low level of CRC risk factors, which differs from the findings of Ferreira et al. (2021), who identified smoking, alcohol consumption, obesity, and diabetes as major CRC risk factors. This difference may be due to variations in lifestyle and health practices among the study population. The majority of participants reported poor perceived benefits of CRC screening, while most reported low perceived barriers. These findings suggest that lack of awareness about the benefits of early detection may be a greater challenge than perceived barriers to screening. Correlation analysis revealed that awareness was positively associated with perceived benefits and negatively associated with risk factors and perceived barriers, supporting the Health Belief Model. Significant associations were also found between awareness, risk factors, perceived benefits, perceived barriers, and selected demographic variables such as education, gender, marital status, and

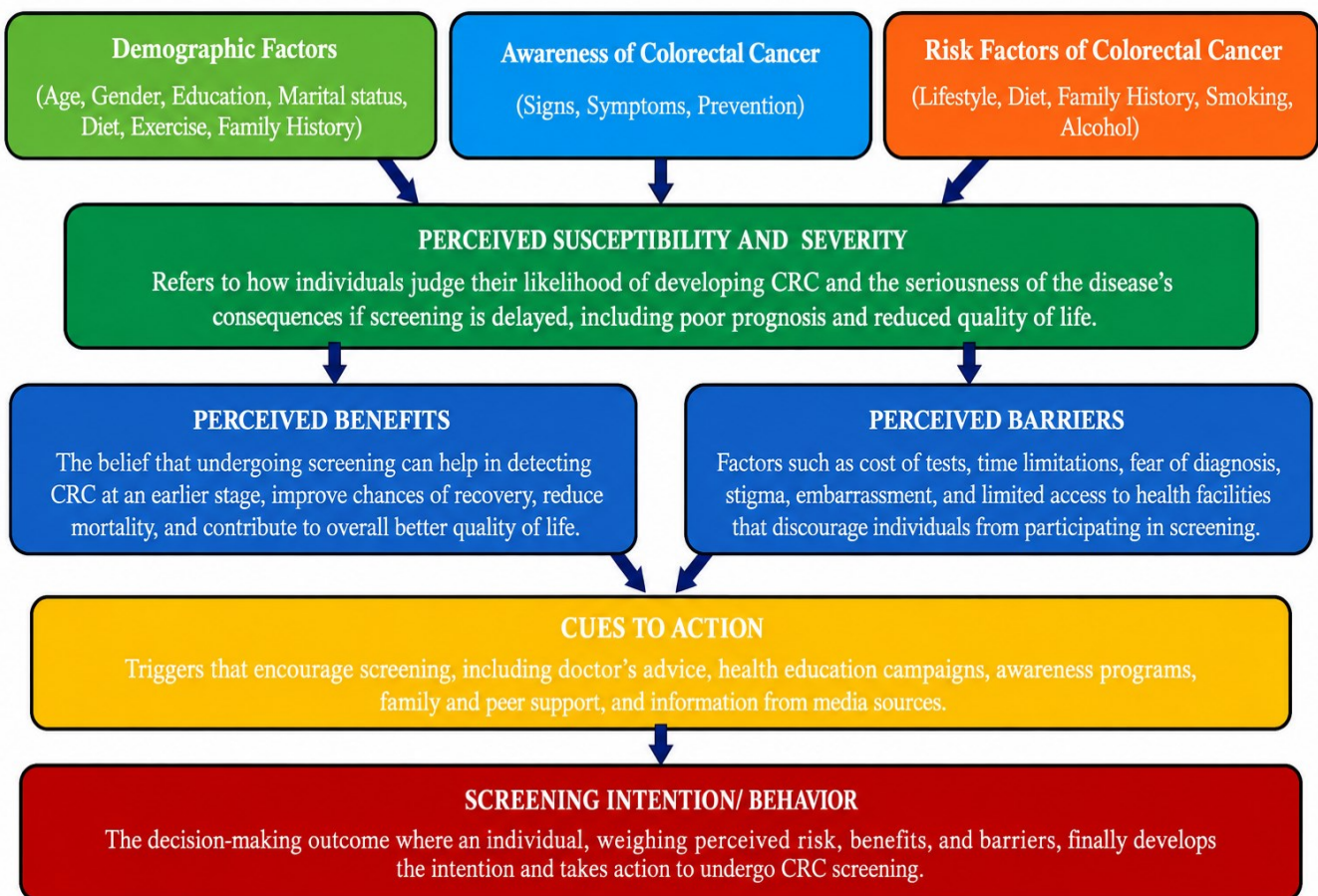
physical activity. Overall, inadequate awareness and poor recognition of screening benefits remain key challenges to CRC prevention. Strengthening health education and promoting awareness of CRC risk factors and screening are essential for improving early detection and reducing the burden of colorectal cancer.

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## CONCEPTUAL FRAMEWORK



Conceptual Framework- Health Belief Model, Rosenstock, Hochbaum, Howard and Kegel (1950)

## CONCEPTUAL FRAMEWORK

**Table 2: Frequency and percentage distribution of awareness of CRC screening among adults above 40 years of age.**

N= 65

| Level of Awareness         | F  | %    |
|----------------------------|----|------|
| Inadequate ( $\leq 50\%$ ) | 36 | 55.4 |
| Moderate (51 – 75%)        | 13 | 20.0 |
| Adequate ( $< 75\%$ )      | 16 | 24.6 |

**Table 3: Frequency and percentage distribution of level of risk of developing CRC. N= 65**

| LEVEL OF RISK            | (n) | (%)  |
|--------------------------|-----|------|
| Low Risk ( $\leq 50\%$ ) | 63  | 96.9 |
| Moderate Risk (51-75%)   | 2   | 3.1  |
| High Risk ( $< 75\%$ )   | -   | -    |

**Table 4: Frequency and percentage distribution of Perceived Benefits of CRC Screening among adults above 40 years of age. N= 65**

| Level of Perceived Benefits | F  | %    |
|-----------------------------|----|------|
| Poor ( $\leq 50\%$ )        | 43 | 66.2 |
| Moderate (51 – 75%)         | 6  | 9.2  |
| High ( $< 75\%$ )           | 16 | 24.6 |

**Table 5: Correlation between awareness, risk factors, perceived benefits and perceived barriers of CRC screening among adult boys 40 years of age. N= 65**

| Variables<br>(Mean $\pm$ S.D)             | Variables          | Mean  | S. D  | Karl Pearson's Correlation & p-value |
|-------------------------------------------|--------------------|-------|-------|--------------------------------------|
| Awareness<br>(10.12 $\pm$ 4.47)           | Risk factors       | 2.83  | 2.29  | $r = -0.528$<br>$p=0.0001, S^*$      |
|                                           | Perceived benefits | 21.91 | 13.84 | $r = 0.695$<br>$p=0.0001, S^*$       |
|                                           | Perceived barriers | 48.14 | 20.40 | $r = -0.512$<br>$p=0.0001, S^*$      |
| Risk factors<br>(2.83 $\pm$ 2.29)         | Perceived benefits | 21.91 | 13.84 | $r = -0.254$<br>$p=0.042, S^*$       |
|                                           | Perceived barriers | 48.14 | 20.40 | $r = 0.453$<br>$p=0.0001, S^*$       |
| Perceived benefits<br>(21.91 $\pm$ 13.84) | Perceived barriers | 48.14 | 20.40 | $r = -0.306$<br>$p=0.013, S^*$       |

**\*p<0.05, S – Significant**

The table 5 indicated that the mean score of awareness was 10.12 $\pm$ 4.47, mean score of risk factors was 2.83 $\pm$ 2.29, perceived benefits 21.91 $\pm$ 13.84 and perceived barriers 48.14 $\pm$ 20.40

**Table 7: Association of level of awareness of CRC among adult boys 40 years of age with their selected demographic variables.**

| Demographic Variables                                                           | Inadequate |      | Moderate |      | Adequate |      | Chi-Square & p-value |
|---------------------------------------------------------------------------------|------------|------|----------|------|----------|------|----------------------|
|                                                                                 | F          | %    | F        | %    | F        | %    |                      |
| <b>Age</b>                                                                      |            |      |          |      |          |      | $\chi^2=7.848$       |
| 40 – 49                                                                         | 12         | 18.5 | 6        | 9.2  | 7        | 10.8 | d.f=4                |
| 50 – 59                                                                         | 11         | 16.9 | 6        | 9.2  | 8        | 12.3 | p=0.097              |
| 60 and above                                                                    | 13         | 20.0 | 1        | 1.5  | 1        | 1.5  |                      |
| <b>Gender</b>                                                                   |            |      |          |      |          |      | $\chi^2=2.678$       |
| Male                                                                            | 21         | 32.3 | 5        | 7.7  | 6        | 9.2  | d.f=2                |
| Female                                                                          | 15         | 23.1 | 9        | 12.3 | 10       | 15.4 | p=0.262              |
| <b>Education level</b>                                                          |            |      |          |      |          |      | $\chi^2=12.584$      |
| No formal education                                                             | 12         | 18.5 | 4        | 6.2  | 13       | 20.0 | d.f=6                |
| Primary education                                                               | 17         | 26.2 | 7        | 10.8 | 3        | 4.6  | p=0.050              |
| Secondary education                                                             | 6          | 9.2  | 2        | 3.1  | 0        | 0    | N.S                  |
| Postgraduate degree                                                             | 1          | 1.5  | 0        | 0    | 0        | 0    |                      |
| <b>Marital status</b>                                                           |            |      |          |      |          |      | $\chi^2=2.832$       |
| Single                                                                          | 3          | 4.6  | 1        | 1.5  | 0        | 0    | d.f=6                |
| Married                                                                         | 31         | 47.7 | 11       | 16.9 | 15       | 23.1 | p=0.830              |
| Divorced                                                                        | 1          | 1.5  | 0        | 0    | 0        | 0    | N.S                  |
| Widowed                                                                         | 1          | 1.5  | 1        | 1.5  | 1        | 1.5  |                      |
| <b>DIET</b>                                                                     |            |      |          |      |          |      | $\chi^2=9.424$       |
| <b>Frequency of consumption of fruits and vegetables</b>                        |            |      |          |      |          |      | d.f=8                |
| Daily                                                                           | 22         | 33.8 | 7        | 10.8 | 9        | 13.8 | p=0.308              |
| Several times a week                                                            | 10         | 15.4 | 2        | 3.1  | 3        | 4.6  | N.S                  |
| Once a week                                                                     | 3          | 4.6  | 2        | 3.1  | 1        | 1.5  |                      |
| Rarely                                                                          | 0          | 0    | 1        | 1.5  | 3        | 4.6  |                      |
| Never                                                                           | 1          | 1.5  | 1        | 1.5  | 0        | 0    |                      |
| <b>Frequency of consumption of red or processed meats</b>                       |            |      |          |      |          |      | $\chi^2=6.145$       |
| Daily                                                                           | 6          | 9.2  | 4        | 6.2  | 4        | 6.2  | d.f=8                |
| Several times a week                                                            | 14         | 21.5 | 6        | 9.2  | 8        | 12.3 | p=0.631              |
| Once a week                                                                     | 5          | 7.7  | 2        | 3.1  | 1        | 1.5  | N.S                  |
| Rarely                                                                          | 3          | 4.6  | 1        | 1.5  | 0        | 0    |                      |
| Never                                                                           | 8          | 12.3 | 0        | 0    | 3        | 4.6  |                      |
| <b>Frequency of consumption of high-fibre foods</b>                             |            |      |          |      |          |      | $\chi^2=7.362$       |
| Daily                                                                           | 20         | 30.8 | 6        | 9.2  | 13       | 20.0 | d.f=6                |
| Several times a week                                                            | 6          | 9.2  | 2        | 3.1  | 3        | 4.6  | p=0.289              |
| Once a week                                                                     | 5          | 7.7  | 3        | 4.6  | 0        | 0    | N.S                  |
| Never                                                                           | 5          | 7.7  | 2        | 3.1  | 0        | 0    |                      |
| <b>EXERCISE</b>                                                                 |            |      |          |      |          |      | $\chi^2=4.286$       |
| <b>Frequency of engaging in physical exercise (e.g., walking, running, gym)</b> |            |      |          |      |          |      | d.f=8                |
| Daily                                                                           | 20         | 30.8 | 7        | 10.8 | 8        | 12.3 | p=0.830              |
| Several times a week                                                            | 9          | 13.8 | 3        | 4.6  | 3        | 4.6  | N.S                  |
| Once a week                                                                     | 1          | 1.5  | 0        | 0    | 1        | 1.5  |                      |
| Rarely                                                                          | 1          | 1.5  | 2        | 3.1  | 1        | 1.5  |                      |
| Never                                                                           | 5          | 7.7  | 1        | 1.5  | 3        | 4.6  |                      |
| <b>Type of physical activities engaged in</b>                                   |            |      |          |      |          |      | $\chi^2=15.717$      |
| Walking                                                                         | 28         | 43.1 | 6        | 9.2  | 12       | 18.5 | d.f=6                |
| Running                                                                         | 4          | 6.2  | 6        | 9.2  | 0        | 0    | p=0.015              |
| Cycling                                                                         | 1          | 1.5  | 1        | 1.5  | 1        | 1.5  | S*                   |
| Others                                                                          | 3          | 4.6  | 0        | 0    | 3        | 4.6  |                      |
| <b>FAMILY HISTORY OF COLO-RECTAL CANCER</b>                                     |            |      |          |      |          |      | $\chi^2=4.475$       |
| Yes                                                                             | 1          | 1.5  | 2        | 3.1  | 0        | 0    | d.f=2                |
| No                                                                              | 35         | 53.8 | 11       | 16.9 | 16       | 24.6 | p=0.107              |
|                                                                                 |            |      |          |      |          |      | N.S                  |

\*p&lt;0.05, S – Significant

N.S – Not Significant, p&gt;0.05

The table 7 denotes that the demographic variable type of physical activity usually engages in ( $\chi^2=15.717$ ,  $p = 0.015$ ) had statistically significant association with level of awareness of CRC among adult boys 40 years of age at p<0.05 level and the other demographic variables did not show statistically significant association with level of awareness of CRC among adult boys 40 years of age at p<0.05 level.

**Table 8: Association of level of risk factors of CRC among adult above 40 years of age with their selected demographic variables.**

| Demographic Variables                                                           | Low |      | Moderate |     | Chi-Square & p-value                      |
|---------------------------------------------------------------------------------|-----|------|----------|-----|-------------------------------------------|
|                                                                                 | F   | %    | F        | %   |                                           |
| <b>Age</b>                                                                      |     |      |          |     | $\chi^2=3.126$<br>d.f=2<br>p=0.210<br>N.S |
| 40 – 49                                                                         | 22  | 33.8 | 3        | 4.6 |                                           |
| 50 – 59                                                                         | 25  | 38.5 | 0        | 0   |                                           |
| 60 and above                                                                    | 14  | 21.5 | 1        | 1.5 |                                           |
| <b>Gender</b>                                                                   |     |      |          |     | $\chi^2=4.395$<br>d.f=1<br>p=0.036<br>S*  |
| Male                                                                            | 28  | 43.1 | 4        | 6.2 |                                           |
| Female                                                                          | 33  | 50.8 | 0        | 0   |                                           |
| <b>Education level</b>                                                          |     |      |          |     | $\chi^2=3.674$<br>d.f=3<br>p=0.299<br>N.S |
| No formal education                                                             | 29  | 44.6 | 0        | 0   |                                           |
| Primary education                                                               | 24  | 36.9 | 3        | 4.6 |                                           |
| Secondary education                                                             | 7   | 10.8 | 1        | 1.5 |                                           |
| Postgraduate degree                                                             | 1   | 1.5  | 0        | 0   |                                           |
| <b>Marital status</b>                                                           |     |      |          |     | $\chi^2=2.801$<br>d.f=3<br>p=0.423<br>N.S |
| Single                                                                          | 3   | 4.6  | 1        | 1.5 |                                           |
| Married                                                                         | 54  | 83.1 | 3        | 4.6 |                                           |
| Divorced                                                                        | 1   | 1.5  | 0        | 0   |                                           |
| Widowed                                                                         | 3   | 4.6  | 0        | 0   |                                           |
| <b>DIET</b>                                                                     |     |      |          |     | $\chi^2=1.601$<br>d.f=4<br>p=0.809<br>N.S |
| <b>Frequency of consumption of fruits and vegetables</b>                        |     |      |          |     |                                           |
| Daily                                                                           | 36  | 55.4 | 2        | 3.1 |                                           |
| Several times a week                                                            | 14  | 21.5 | 1        | 1.5 |                                           |
| Once a week                                                                     | 5   | 7.7  | 1        | 1.5 |                                           |
| Rarely                                                                          | 4   | 6.2  | 0        | 0   |                                           |
| Never                                                                           | 2   | 3.1  | 0        | 0   |                                           |
| <b>Frequency of consumption of red or processed meats</b>                       |     |      |          |     | $\chi^2=1.613$<br>d.f=4<br>p=0.807<br>N.S |
| Daily                                                                           | 13  | 20.0 | 1        | 1.5 |                                           |
| Several times a week                                                            | 26  | 40.0 | 2        | 3.1 |                                           |
| Once a week                                                                     | 7   | 10.8 | 1        | 1.5 |                                           |
| Rarely                                                                          | 4   | 6.2  | 0        | 0   |                                           |
| Never                                                                           | 11  | 16.9 | 0        | 0   |                                           |
| <b>Frequency of consumption of high-fibre foods</b>                             |     |      |          |     | $\chi^2=1.561$<br>d.f=3<br>p=0.668<br>N.S |
| Daily                                                                           | 37  | 56.9 | 2        | 3.1 |                                           |
| Several times a week                                                            | 10  | 15.4 | 1        | 1.5 |                                           |
| Once a week                                                                     | 8   | 12.3 | 0        | 0   |                                           |
| Never                                                                           | 6   | 9.2  | 1        | 1.5 |                                           |
| <b>EXERCISE</b>                                                                 |     |      |          |     | $\chi^2=3.200$<br>d.f=4<br>p=0.525<br>N.S |
| <b>Frequency of engaging in physical exercise (e.g., walking, running, gym)</b> |     |      |          |     |                                           |
| Daily                                                                           | 33  | 50.8 | 2        | 3.1 |                                           |
| Several times a week                                                            | 14  | 21.5 | 1        | 1.5 |                                           |
| Once a week                                                                     | 2   | 3.1  | 0        | 0   |                                           |
| Rarely                                                                          | 3   | 4.6  | 1        | 1.5 |                                           |
| Never                                                                           | 9   | 13.8 | 0        | 0   |                                           |
| <b>Type of physical activities engaged in</b>                                   |     |      |          |     | $\chi^2=4.170$<br>d.f=3<br>p=0.244<br>N.S |
| Walking                                                                         | 44  | 67.7 | 2        | 2.1 |                                           |
| Running                                                                         | 8   | 12.3 | 2        | 2.1 |                                           |
| Cycling                                                                         | 3   | 4.6  | 0        | 0   |                                           |

The table 8 denotes that the demographic variable gender ( $\chi^2 = 4.395$ ,  $p = 0.036$ ) had a statistically significant association with the level of risk factors of CRC among adults above 40 years of age at  $p < 0.05$  level, and the other demographic variables did not show statistically significant association with the level of risk factors of CRC among adults above 40 years of age at  $p < 0.05$  level.

**Table 9: Association of level of perceived benefits of CRC among adult boys 40 years of age with their selected demographic variables.**

| Demographic Variables                                                           | Poor |      | Moderate |     | High |      | Chi-Square & p-value                       |
|---------------------------------------------------------------------------------|------|------|----------|-----|------|------|--------------------------------------------|
|                                                                                 | F    | %    | F        | %   | F    | %    |                                            |
| <b>Age</b>                                                                      |      |      |          |     |      |      | $\chi^2=4.049$<br>d.f=4<br>p=0.399         |
| 40 – 49                                                                         | 15   | 23.1 | 3        | 4.6 | 7    | 10.8 |                                            |
| 50 – 59                                                                         | 15   | 23.1 | 3        | 4.6 | 7    | 10.8 |                                            |
| 60 and above                                                                    | 13   | 20.0 | 0        | 0   | 2    | 3.1  |                                            |
| <b>Gender</b>                                                                   |      |      |          |     |      |      | $\chi^2=3.233$<br>d.f=2<br>p=0.199         |
| Male                                                                            | 19   | 29.2 | 5        | 7.7 | 8    | 12.3 |                                            |
| Female                                                                          | 24   | 36.9 | 1        | 1.5 | 8    | 12.3 |                                            |
| <b>Education level</b>                                                          |      |      |          |     |      |      | $\chi^2=15.949$<br>d.f=6<br>p=0.014<br>S*  |
| No formal education                                                             | 13   | 20.0 | 3        | 4.6 | 13   | 20.0 |                                            |
| Primary education                                                               | 23   | 35.4 | 1        | 1.5 | 3    | 4.6  |                                            |
| Secondary education                                                             | 6    | 9.2  | 2        | 3.1 | 0    | 0    |                                            |
| Postgraduate degree                                                             | 1    | 1.5  | 0        | 0   | 0    | 0    |                                            |
| <b>Marital status</b>                                                           |      |      |          |     |      |      | $\chi^2=4.746$<br>d.f=6<br>p=0.577<br>N.S  |
| Single                                                                          | 2    | 3.1  | 1        | 1.5 | 1    | 1.5  |                                            |
| Married                                                                         | 38   | 58.5 | 4        | 6.2 | 15   | 23.1 |                                            |
| Divorced                                                                        | 1    | 1.5  | 0        | 0   | 0    | 0    |                                            |
| Widowed                                                                         | 2    | 3.1  | 1        | 1.5 | 0    | 0    |                                            |
| <b>DIET</b>                                                                     |      |      |          |     |      |      | $\chi^2=12.921$<br>d.f=8<br>p=0.115<br>N.S |
| <b>Frequency of consumption of fruits and vegetables</b>                        |      |      |          |     |      |      |                                            |
| Daily                                                                           | 26   | 40.0 | 2        | 3.1 | 10   | 15.4 |                                            |
| Several times a week                                                            | 10   | 15.4 | 2        | 3.1 | 3    | 4.6  |                                            |
| Once a week                                                                     | 5    | 7.7  | 1        | 1.5 | 0    | 0    |                                            |
| Rarely                                                                          | 1    | 1.5  | 0        | 0   | 3    | 4.6  |                                            |
| Never                                                                           | 1    | 1.5  | 1        | 1.5 | 0    | 0    |                                            |
| <b>Frequency of consumption of red or processed meats</b>                       |      |      |          |     |      |      | $\chi^2=5.334$<br>d.f=8<br>p=0.721<br>N.S  |
| Daily                                                                           | 8    | 12.3 | 2        | 3.1 | 4    | 6.2  |                                            |
| Several times a week                                                            | 18   | 27.7 | 3        | 4.6 | 7    | 10.8 |                                            |
| Once a week                                                                     | 4    | 6.2  | 1        | 1.5 | 3    | 4.6  |                                            |
| Rarely                                                                          | 4    | 6.2  | 0        | 0   | 0    | 0    |                                            |
| Never                                                                           | 9    | 13.8 | 0        | 0   | 2    | 3.1  |                                            |
| <b>Frequency of consumption of high-fibre foods</b>                             |      |      |          |     |      |      | $\chi^2=5.082$<br>d.f=6<br>p=0.533<br>N.S  |
| Daily                                                                           | 22   | 33.8 | 5        | 7.7 | 12   | 18.5 |                                            |
| Several times a week                                                            | 8    | 12.3 | 1        | 1.5 | 2    | 3.1  |                                            |
| Once a week                                                                     | 7    | 10.8 | 0        | 0   | 1    | 1.5  |                                            |
| Never                                                                           | 6    | 9.2  | 0        | 0   | 1    | 1.5  |                                            |
| <b>EXERCISE</b>                                                                 |      |      |          |     |      |      | $\chi^2=8.335$<br>d.f=8<br>p=0.401<br>N.S  |
| <b>Frequency of engaging in physical exercise (e.g., walking, running, gym)</b> |      |      |          |     |      |      |                                            |
| Daily                                                                           | 26   | 40.0 | 3        | 4.6 | 6    | 9.2  |                                            |
| Several times a week                                                            | 10   | 15.4 | 2        | 3.1 | 3    | 4.6  |                                            |
| Once a week                                                                     | 1    | 1.5  | 0        | 0   | 1    | 1.5  |                                            |
| Rarely                                                                          | 1    | 1.5  | 0        | 0   | 3    | 4.6  |                                            |
| Never                                                                           | 5    | 7.7  | 1        | 1.5 | 3    | 4.6  |                                            |
| <b>Type of physical activities engaged in</b>                                   |      |      |          |     |      |      | $\chi^2=7.860$<br>d.f=6<br>p=0.249<br>N.S  |
| Walking                                                                         | 34   | 52.3 | 3        | 4.6 | 9    | 13.8 |                                            |
| Running                                                                         | 5    | 7.7  | 2        | 3.1 | 3    | 4.6  |                                            |
| Cycling                                                                         | 1    | 1.5  | 1        | 1.5 | 1    | 1.5  |                                            |
| Others (please specify)                                                         | 3    | 4.6  | 0        | 0   | 3    | 4.6  |                                            |
| <b>FAMILY HISTORY OF COLORECTAL CANCER</b>                                      |      |      |          |     |      |      | $\chi^2=0.388$<br>d.f=2<br>p=0.824         |
| Yes                                                                             | 2    | 3.1  | 0        | 0   | 1    | 1.5  |                                            |
| No                                                                              | 41   | 63.1 | 6        | 9.2 | 15   | 23.1 |                                            |

\*\*p&lt;0.05, S – Significant

N.S – Not Significant, p&gt;0.05

The table 9 denotes that the demographic variable education level ( $\chi^2=15.949$ ,  $p=0.014$ ) had statistically significant association with level of perceived benefits of CRC among adult boys 40 years of age at  $p<0.05$  level and the other demographic variables did not show statistically significant association with level of perceived benefits of CRC among adult boys 40 years of age at  $p<0.05$  level.

**Table 10: Association of level of perceived barriers of CRC among adult boys 40 years of age with their selected demographic variables.**

| Demographic Variables                                                           | Low |      | Moderate |      | High |     | Chi-Square & p-value |
|---------------------------------------------------------------------------------|-----|------|----------|------|------|-----|----------------------|
|                                                                                 | F   | %    | F        | %    | F    | %   |                      |
| <b>Age</b>                                                                      |     |      |          |      |      |     | $\chi^2=6.849$       |
| 40 – 49                                                                         | 20  | 30.8 | 5        | 7.7  | 0    | 0   | d.f=4                |
| 50 – 59                                                                         | 24  | 36.9 | 1        | 1.5  | 0    | 0   | p=0.144              |
| 60 and above                                                                    | 11  | 16.9 | 3        | 4.6  | 1    | 1.5 |                      |
| <b>Gender</b>                                                                   |     |      |          |      |      |     | $\chi^2=1.260$       |
| Male                                                                            | 26  | 40.0 | 5        | 7.7  | 1    | 1.5 | d.f=2                |
| Female                                                                          | 29  | 44.6 | 4        | 6.2  | 0    | 0   | p=0.533              |
| <b>Education level</b>                                                          |     |      |          |      |      |     | $\chi^2=20.249$      |
| No formal education                                                             | 28  | 43.1 | 1        | 1.5  | 0    | 0   | d.f=6                |
| Primary education                                                               | 23  | 35.4 | 3        | 4.6  | 1    | 1.5 | p=0.003              |
| Secondary education                                                             | 3   | 4.6  | 5        | 7.7  | 0    | 0   | S*                   |
| Postgraduate degree                                                             | 1   | 1.5  | 0        | 0    | 0    | 0   |                      |
| <b>Marital status</b>                                                           |     |      |          |      |      |     | $\chi^2=19.881$      |
| Single                                                                          | 2   | 3.1  | 2        | 3.1  | 0    | 0   | d.f=6                |
| Married                                                                         | 52  | 80.0 | 4        | 6.2  | 1    | 1.5 | p=0.003              |
| Divorced                                                                        | 0   | 0    | 1        | 1.5  | 0    | 0   | S*                   |
| Widowed                                                                         | 1   | 1.5  | 2        | 3.1  | 0    | 0   |                      |
| <b>DIET</b>                                                                     |     |      |          |      |      |     | $\chi^2=12.783$      |
| <b>Frequency of consumption of fruits and vegetables</b>                        |     |      |          |      |      |     | d.f=8                |
| Daily                                                                           | 35  | 53.8 | 2        | 3.1  | 1    | 1.5 | p=0.120              |
| Several times a week                                                            | 12  | 18.5 | 3        | 4.6  | 0    | 0   | N.S                  |
| Once a week                                                                     | 3   | 4.6  | 3        | 4.6  | 0    | 0   |                      |
| Rarely                                                                          | 4   | 6.2  | 0        | 0    | 0    | 0   |                      |
| Never                                                                           | 1   | 1.5  | 1        | 1.5  | 0    | 0   |                      |
| <b>Frequency of consumption of red or processed meats</b>                       |     |      |          |      |      |     | $\chi^2=5.773$       |
| Daily                                                                           | 14  | 21.5 | 0        | 0    | 0    | 0   | d.f=8                |
| Several times a week                                                            | 21  | 32.3 | 6        | 9.2  | 1    | 1.5 | p=0.673              |
| Once a week                                                                     | 7   | 10.8 | 1        | 1.5  | 0    | 0   | N.S                  |
| Rarely                                                                          | 3   | 4.6  | 1        | 1.5  | 0    | 0   |                      |
| Never                                                                           | 10  | 15.4 | 1        | 1.5  | 0    | 0   |                      |
| <b>Frequency of consumption of high-</b>                                        |     |      |          |      |      |     | $\chi^2=2.028$       |
| Daily                                                                           | 34  | 52.3 | 4        | 6.2  | 1    | 1.5 | d.f=6                |
| Several times a week                                                            | 9   | 13.8 | 2        | 3.1  | 0    | 0   | p=0.917              |
| Once a week                                                                     | 6   | 9.2  | 2        | 3.1  | 0    | 0   | N.S                  |
| Never                                                                           | 6   | 9.2  | 1        | 1.5  | 0    | 0   |                      |
| <b>EXERCISE</b>                                                                 |     |      |          |      |      |     | $\chi^2=4.728$       |
| <b>Frequency of engaging in physical exercise (e.g., walking, running, gym)</b> |     |      |          |      |      |     | d.f=8                |
| Daily                                                                           | 29  | 44.6 | 6        | 9.2  | 0    | 0   | p=0.786              |
| Several times a week                                                            | 12  | 18.5 | 2        | 3.1  | 1    | 1.5 | N.S                  |
| Once a week                                                                     | 2   | 3.1  | 0        | 0    | 0    | 0   |                      |
| Rarely                                                                          | 4   | 6.2  | 0        | 0    | 0    | 0   |                      |
| Never                                                                           | 8   | 12.3 | 1        | 1.5  | 0    | 0   |                      |
| <b>Type of physical activities engaged in</b>                                   |     |      |          |      |      |     | $\chi^2=4.526$       |
| Walking                                                                         | 37  | 56.9 | 8        | 12.3 | 1    | 1.5 | d.f=6                |
| Running                                                                         | 10  | 15.4 | 0        | 0    | 0    | 0   | p=0.606              |
| Cycling                                                                         | 2   | 3.1  | 1        | 1.5  | 0    | 0   | N.S                  |
| Others (please specify)                                                         | 6   | 9.2  | 0        | 0    | 0    | 0   |                      |
| <b>FAMILY HISTORY OF COLORECTAL CANCER</b>                                      |     |      |          |      |      |     | $\chi^2=0.572$       |
| Yes                                                                             | 3   | 4.6  | 0        | 0    | 0    | 0   | d.f=2                |
| No                                                                              | 52  | 80.0 | 9        | 13.8 | 1    | 1.5 | p=0.751              |

\*p&lt;0.05, S – Significant

N.S – Not Significant, p&gt;0.05

The table 10 denotes that the demographic variables education level ( $\chi^2=20.249$ ,  $p=0.003$ ) and marital status ( $\chi^2=19.881$ ,  $p=0.003$ ) had statistically significant association with level of perceived barriers of CRC among adult boys 40 years of age at  $p<0.05$  level and the other demographic variables did not show statistically significant association with level of perceived barriers of CRC among adult boys 40 years of age at  $p<0.05$

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