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DETERMINANTS OF COLORECTAL CANCER SCREENING UPTAKE IN PAKISTAN: A STATISTICAL ANALYSIS OF KNOWLEDGE, ATTITUDES, AND BEHAVIORAL FACTORS

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Abstract
Colorectal cancer (CRC) has become an expanding health issue among the Pakistani population, although there is not much awareness or participation in screening. This cross-sectional research evaluated knowledge, attitudes, and determinants affecting the uptake of CRC screening in 421 adults who were in different regions of Pakistan. A descriptive and inferential statistics analysis of the data was performed with the help of a self-administered questionnaire of the structured type. The results found that there was moderate awareness, but the real screening rates were very low. The level of education was also found to be strongly related to knowledge, and restricted accessibility, prices, and the lack of physician recommendation were identified as the main obstacles. The strength of predictors of screening behavior according to logistic regression was found in knowledge. The outcomes have revealed the presence of a meaningful gap in knowledge and practice and the imminent necessity of structured screening campaigns at the national level, community-oriented education, and free or cheap preventive healthcare. The best approach to reduce preventable morbidity and mortality in Pakistan is to empower the population by imparting more awareness and incorporating CRC screening into the primary healthcare framework.

INTRODUCTION

Cancer of the colorectum (CRC) is one of the most relevant health concerns worldwide nowadays, as it is the third-most widespread and the second-most significant cause of death due to cancer worldwide (Sung et al., 2021). Cases and death rates of CRC are increasing and are currently estimated to cause 1.9 million new cases and almost 935,000 deaths annually in 2020, which indicates its increasing burden on public health. Historically, the incidence of CRC has been most elevated in the high-income countries, but the past few decades have observed an alarming trend of rising incidence of CRCs in the low- and middle-income countries (LMICs) with changes in terms of urbanization, westernization of diet, sedentary lifestyles, and rising life expectancy (Arnold et al., 2017). This change is an indication that there is a dire need to incorporate effective preventive measures and screening programs in countries with poor healthcare facilities. The best way to curb the mortality of CRC is by screening. Existing methods (colonoscopy, fecal occult blood testing (FOBT), and sigmoidoscopy) allow obtaining precancerous lesions at early stages and eliminating them, dramatically reducing the number of cases and mortality (Rex et al., 2017). Organized screening programs have shown significant morbidity and mortality reductions in high-income nations that have adopted the screening measure (Navarro et al., 2017). On the one hand, countries that do not have well-organized screening systems persist in the diagnosis at advanced stages and high mortality rates, mainly because they lack awareness, weak screening facilities, and cultural obstacles (Zahid & Tanveer, 2025).

CRC is a young health issue in Pakistan with a consistent increase in its prevalence, especially in cities (Shamsi et al., 2025). Diets rich in fats and red meat, low amounts of fiber, obesity, smoking, and lack of physical exercise are becoming more and more common. Worryingly, local research has already reported cases of early-onset CRC, where some cases are reported in persons who are under 40 years (Ibrar et al., 2024; Abro et al., 2022). This trend is in contrast to the Western trend, in which CRC normally occurs after the age of 50, and may be indicative of underlying genetic or environmental factors that may be specific to the Pakistani population. Notwithstanding this growing pressure, Pakistan does not have a national CRC screening program, and existing services are scattered in parts, with usually only tertiary hospitals in large cities providing them. CRC screening among Pakistanis is dismal, with the research indicating that less than 10 per cent of them undergo screening (Hasan et al., 2017; Hussain et al., 2021). Awareness of the risk factors and warning signs of CRC, as well as screening rules, is still low even in the case of educated populations like university students or healthcare workers. As an example, Hussain et al. (2021) have identified that just two in five students accessed CRC screening at some time in their university life, and fear, embarrassment, and a deficit of knowledge were key barriers. Similarly, Khan et al. (2024) have found that the knowledge of screening recommendations among healthcare staff is very low in Khyber Pakhtunkhwa, and this highlights the widespread nature of informational gaps among various populations. These results suggest that public and professional education is still not sufficient and plays a part in the delays in diagnosis and high rates of mortality.

The problem is further complicated by the fact that there is no systematic screening policy, and because of the cultural stigma about bowel health and ineffective physicians' prescriptions (Hasan et al., 2017; Hatamian et al., 2021). In addition, the Pakistani healthcare system has been affected by issues of affordability and accessibility because the majority of the citizens lack health insurance coverage and depend on out-of-pocket costs to cover preventive healthcare. Therefore, cellular rectal screening is viewed as needless, costly, or embarrassing. It is imperative to understand how knowledge, attitudes, and sociodemographic issues can have an impact on screening behavior, and hence must be used to design useful, culturally sensitive interventions. There is evidence that indicates that the application of the CRC screening systematically diminishes mortality in many countries worldwide. In the United States and Europe, the initial randomized trials proved that regular screening programs with FOBT and colonoscopy can decrease the mortality of ensuing CRC by 15-33% (Hatamian et al., 2021). Nonetheless, inequalities are experienced around the world. In the low-income countries and most regions of Asia, the screening coverage is low (less than 10 per cent of adults have been screened) primarily because of poor infrastructure, awareness, and stigma. As an illustration, less than 5 percent of adults aged 50+ in Bangladesh are ever screened, no national program exists in Nepal (uptake of any program is less than 7 percent), and Sri Lanka has seen an uptake of about 15 percent with pilot fecal immunochemical test (FIT) programs (Hatamian et al., 2021). At the national level, the statistics indicate lower uptake of less than 10 percent, mainly of urban tertiary hospitals (Pakistan Cancer Registry, 2023). Such numbers underscore a regional trend of underutilization as a socioeconomic, structural, and cultural impediment that is common to South Asia. Recent reports by the Pakistan Cancer Registry (2023) and other institutional reports verify that there is a concerning rise in the incidence of CRC, especially in younger adults. The Karachi Cancer Registry depicts increased trends in men and women. In the Sindh province, almost 41 percent of the cases of CRC were located in people aged 40 years and below, with a mean age of 28 years (Abro et al., 2022). Such cases that occur early are usually diagnosed at late stages and with aggressive tumor histology and a poor prognosis (Shamsi et al., 2025; Ibrar et al., 2024). These combined factors of earlier onset and later diagnosis are creating some policy and clinical problems of their own because they not only strain an already stretched healthcare provision system but also lower the survival rates. Knowledge is an already derived predictor of screening behavior. According to the international studies, it has been proven that people who are aware of the risk factors, symptoms, and the screening programs are much more apt to undergo screening (Shapiro et al., 2012). As an illustration, in the United Kingdom, 80% adults were aware that screening would help prevent cancer, but 30% of them still did not attend because of the fear of cancer and embarrassment (Weller et al., 2009). This suggests that knowledge might not be enough; including attitudes, trust, and emotions also requires uptake.

The level of knowledge in Pakistan is still alarming. Research states that 60 percent of the participants are familiar with risk factors of CRC, but only 40 percent are familiar with the major symptoms (Hussain et al., 2021). Among the adults in Karachi, 75% of the adults recognized the preventive effect of screening, with only 2.6% having undergone screening (Shamsi et al., 2025). These results demonstrate the existence of a knowledge practice gap, in which awareness is not always translated into preventive action. These determinants are social taboos, fear of cancer diagnosis, shame linked to colonoscopy, and low referral by the doctor (Hasan et al., 2017; Hussain et al., 2021). Attitudinal variables (trust in doctors and the perceived seriousness of the disease, fear of the procedure) are crucial determinants of whether persons will act on their knowledge. In Karachi, 72 percent of the respondents affirmed that they would undergo screening of CRC, provided that a physician recommends the test (Hasan et al., 2017). This underlines the role of healthcare providers as influential agents in the determination of screening behavior, provided that they, as providers, are properly trained and motivated. International and local sources also point to education, income, and access to healthcare as the powerful predictors of participation in the screening of CRC (Hasan et al., 2017; Hatamian et al., 2021). The higher education and the urban population are more likely to be aware of the screening guidelines and to take the testing. Conversely, rural citizens are subject to various obstacles such as inadequate healthcare facilities, financial limitations, and cultural disgrace in relation to gastrointestinal illnesses. The impediments to screening for CRC in Pakistan are complex. These entail the low awareness and misconceptions, financial limitations, unavailability of subsidized or insurance-provided schemes, embarrassment, and patient-physician advice. The screening methods that may be facilitated include free or subsidized screening, physician recommendation, family encouragement, and community-based awareness (Hasan et al., 2017; Hussain et al., 2021). Such barriers must be dealt with using a multi-dimensional approach, which involves educating, policy intervention, and culturally sensitive communication. Although there seems to be increasing acknowledgments of the CRC burden in Pakistan, gaps in existing literature exist. Not many population-based, large data studies have been conducted on the knowledge, attitudes, and screening behavior of CRC. The bulk of the current literature is limited to either side of awareness or attitude without upholding behavioral determinants in broad frameworks. More to the point, the rural and low-income populations are still underrepresented, and there is limited qualitative information about the cultural interpretation of the CRC screening. These knowledge gaps restrict the ability to evolve evidence-based interventions that can be used to address Pakistani realities. The evidence available demonstrates a high priority in terms of public health: colorectal cancer is increasing in Pakistan, and earlier onset, poor awareness, and insignificant screening coverage were noted. Although there is evidence on how other countries with organized screening programs can lead to a drastic decrease in mortalities, the absence of the systems, coupled with low knowledge and a bad attitude, makes Pakistan continue to cause deaths that could be prevented. It is important to reinforce the general knowledge about the risk factors of CRC, develop positive attitudes to preventive screening, and enhance access to affordable services. These knowledge and behavioral gaps can be filled in by employing specific training programs and counseling programs led by physicians, screening programs facilitated by policies, and making a way to mitigate the CRC burden. The research is therefore aimed at evaluating the level of knowledge, attitudes, and determinants of CRC screening uptake among Pakistani adults with an essential evidence base on which the national initiatives can be developed to foster early detection and enhance the health outcomes.

Methodology

Study Design

The research design used in this study is a cross-sectional descriptive study that will consider the knowledge, attitudes, and determinants of colorectal cancer (CRC) screening among Pakistani adults. Since a cross-sectional design was deemed the best design to offer a picture of the present awareness, perceptions, and the behavioral patterns of the population regarding CRC, then the design was the best choice. The design was associated with the ability to collect data on a high number of people at a single point in time, which made it possible to identify the relationships between demographic, cognitive, and attitudinal variables, without the need to have a longitudinal follow-up. This method is especially applicable in the health behavior study, where the aim will be to determine the levels of current awareness and screening attendance as opposed to monitoring the changes as time passes. The framework that was used to conduct the study was based on the Health Belief Model (HBM), which presupposes the influence of cancer screening behavior on individual perceptions of susceptibility, severity, benefit, and barriers. Within this framework, this research attempted to establish the relationship between sociodemographic variables, knowledge, and attitudes, and predict the uptake of screening in adult Pakistan. The estimation of such relationships was aimed at discovering critical leverage points to be used in interventions on the health of people. The quantitative design used was the one that guaranteed objective measurement of constructs by the use of structured questionnaires and standardized statistical procedures. Moreover, the cross-sectional approach was economical and geographically achievable among a large and geographically spread population. Ethical approval was obtained before the data collection, and the participants were made aware of the voluntary nature of their involvement, ensuring that the original care of research ethics and already established data confidentiality principles were observed.

Study Population and Sampling

In the study, the target population was the Pakistani adults aged 18 years and older who reside in the four major provinces of the country, which are Punjab, Sindh, Khyber Pakhtunkhwa (KPK), and Balochistan. The use of the convenience sampling method ensured that all the regions were covered by sampling because of time and resource constraints. The ultimate sample that was obtained was about 450 respondents who represent both the urban and rural areas. The subjects had to know English, Urdu, or Sindhi, but those healthy workers with direct contact in the screening of colorectal cancer were excluded. The online questionnaire was used as a way of collecting data, and such ethical principles as informed consent, confidentiality, and voluntary participation were also adhered to. This strategy gave a general understanding of the knowledge and attitudes about CRC in Pakistan as a whole.

Data Collection
The instrument to collect data was a structured and self-administered questionnaire designed with the use of Google Forms to enable a large number of respondents and reduce the amount of physical interaction. The instrument was developed on the basis of existing validated tools of past studies related to knowledge and attitudes of CRC, tailored and modified according to the Pakistani cultural and linguistic specifics. The questionnaire contained four sub-sections: (1) Sociodemographic data (age, gender, education, income, occupation, marital status, province, and type of residence); (2) Knowledge of CRC (including the risk factors, symptoms, and screening methods); (3) Attitudes toward CRC and screening (5-points Likert scale with strongly disagree to strongly agree as one of the options); and (4) Screening practices (including the screening experience before, the recommendation of the physician, perceived barriers, and intentions). The questionnaire was done in English, Urdu, and Sindhi as well to make it inclusive and culturally appropriate. Before starting the actual data collection, a pilot test was done on 20 respondents to check the clarity, language, and content validity. Wording and better understanding were improved by having feedback. The last questionnaire link was sent via social media channels such as WhatsApp, Facebook, and community networks, and via academic-professional groups to be able to access a wide population. The data was collected over eight weeks, giving sufficient time to respondents in the various regions. All the participants agreed to take part in the survey by giving informed consent through electronic means. The study involved voluntary participation and was nonfinancial and free of any financial compensation, as anonymity was ensured. The internet strategy helped to overcome geographical obstacles as well as regional distinctiveness brought about by remoteness and rural location. This was done to guarantee balanced and representative data that could be analyzed using descriptive and inferential statistics.

Data Analysis
Post collection of data, all responses were exported from Google Forms into Microsoft Excel, then into the IBM SPSS Statistics version 26 to be analyzed and imported into Python. Data initially underwent cleaning to make sure that they were not incomplete or duplicated. Demographic variables, knowledge scores, attitude scores, and screening practices were

summarized using descriptive statistics (frequency and percentages, standard deviations, and means). These descriptive findings gave a picture of the general awareness among the people and the trend in behavior with respect to CRC screening. To perform inferential analysis, Chi-square tests were done to establish the relationship between the categorical variables, i.e., age, gender, education, and screening uptake. This also enabled the detection of statistically significant correlations between various sociodemographic groups. Moreover, the independent predictors of screening behavior were identified by the use of binary logistic regression analysis, in which the knowledge score, attitude score, education, and insurance coverage were regarded as important. The measure of associations was described as odds ratios (ORs) with 95% confidence intervals (CIs). The knowledge and attitude scores were calculated by adding the answers to the corresponding items, and the subjects were classified into the poor, moderate, and good levels of knowledge and negative attitudes, and neutral and positive attitudes on the pre-set cutoffs. All statistical tests were determined at a p-level of p = 0.05. Key findings were presented with the use of graphs and tables. The analytical method was useful in giving both descriptive and predictive results on the effect of factors on the awareness and participation in CRC screening, and consequently helped the research purpose of determining actionable factors in enhancing the uptake of screening in Pakistan.

Result and Discussion

Table 1 demonstrates the descriptive numbers of the age group of the respondents who took part in the study on colorectal cancer (CRC) screening uptake in Pakistan. The statistics demonstrate that the highest percentage of respondents (36.82%) fell in the 40 to 49 years bracket, meaning that the research was effective in representing a considerable number of the population age range of the screening target population. The second biggest age category included 1829 years, whose proportion was 29.69, which is then replaced by 3039 years with a proportion of 24.47, and a small percentage that included 50 and above years at 9.03. The given distribution shows that most of the participants were in the middle of their adult years, whereas only quite a few older adults, being more susceptible to colorectal cancer, were present. The fact that such a small proportion of the population aged 50 and older is involved implies possible impediments to their involvement or awareness regarding respective screening programs that target the age group most appropriate for such intervention. Such an age trend can also reflect the possibility that the awareness campaigns and preventive means are more successful in impacting the younger adult population, as opposed to the older. As colorectal cancer screening is prescribed mainly to those over the age of 50, the results indicate the necessity of providing specialized interventions that would target older adults in particular. All in all, the age profile gives a necessary background to interpret the changes in the patterns of knowledge, attitudes, and behaviors in relation to screening of CRC at various stages of life.

Table 1: Descriptive Statistics for Age

Age	Frequency	Percent
40–49	155.0	36.82
18–29	125.0	29.69
30–39	103.0	24.47
50+	38.0	9.03

The distribution of the respondents as per the specific age groups is shown in Table 2, as the demographic spread in the study population reiterates. The results indicate that there is a high density of participants in the 40-49 age group

(36.82%), which is the highest percentage among the sample. The ages between 18 and 29 years closely follow at 29.69, with the age group of 30-39 years coming second at 24.47 years, and the 50 years plus with just 9.03. Such an age distribution implies the skew, which is an indicator of the younger and middle-aged adults, which can affect general screening knowledge and attitudes within the dataset. The young respondents may not find it necessary to map colorectal cancer screening to be relevant in their case, as they are not at risk as much as the older adults, and the latter are fewer; on the other hand, a greater number of them should be within the suggested age range of attending screening. The engagement rate among 50+ aged individuals is rather low, which highlights a disengagement gap among the most critical target audience of the CRC prevention programs. In addition, the balanced proportion between the 1849 range also enables a significant comparison of the various age blocks of adults with respect to awareness, their perceptions of risk, and their behavior. Finally, Table 2 will offer a demographic background for the further interpretation of this study's results, indicating that the representation of middle-aged adults is acceptable; however, the policy and health promotion efforts are still very important in terms of ensuring older adults are included in the screenings and related awareness.

Table 2: Age Group Distribution

Age Group	Frequency	Percent
40-49	155	36.82
18-29	125	29.69
30-39	103	24.47
50+	38	9.03

Table 3 serves to demonstrate the sex composition of respondents who were involved in research on the results of screening uptake on colorectal cancer (CRC) in Pakistan. There were 265 (62.95) male and 156 (37.05) female subjects out of 421 participants. This implies that there was a very high representation of men in the sample. The excess number of males may be a contribution of either cultural or societal aspects that contribute towards taking part in health-related surveys, whereby men might be more available or willing to respond than women are. Alternatively, it can also mean that there have been hidden differences in health knowledge or access to outreach across gender. Gender is known to have an effect on health-seeking behaviors and preventive screening uptake; hence, this imbalance is especially pertinent. Most of the past studies indicate that women tend to participate more in preventive healthcare, whereas in Pakistan, their involvement may be low due to cultural issues, low mobility, and low health literacy rates of women. As a result, the data dispersion indicates that gender-sensitive approaches to public health should be implemented to provide equal access to the screening services and the awareness of CRC. Moreover, because of the levels of male preeminence, it is possible that general results will be influenced in terms of knowledge, attitudes, and screening behaviors because men and women might have different perceptions of risk and preventive behavior. Therefore, as much as the demographic composition of the study offers a significant understanding of the general trends of people, it also suggests the possibility of gender-based differences that ought to be sensitized when it comes to health education and screening promotion programs in the entire country of Pakistan.

Table 3: Sex Distribution

Sex	Frequency	Percent
Male	265	62.95
Female	156	37.05

Table 4 indicates the sample distribution of respondents to four principal stable provinces of Pakistani origin, which presents the idea of the region as a whole regarding the sample composition. The statistics indicate a somewhat equal ratio of provincial representation, with Balochistan representing the highest (25.65%), followed by Sindh (25.42%), Punjab (24.47%), and Khyber Pakhtunkhwa (24.23%) in that order. This balanced representation improves the representativeness of the study to most of the ethnic and geographic parts of the country. The equal participation can also imply efficient recruitment plans in the provinces so that the knowledge, attitude, and screening behavior can be compared. Although there is also a possibility that the population density and the access to healthcare may vary significantly across provinces, and that it may have an impact on the awareness of the respondents and their adherence to screening. As an example, Punjab and Sindh are more urbanized, and therefore, they may have a better level of knowledge and access to screening services, whereas Khyber Pakhtunkhwa and Balochistan have a relatively small infrastructure in healthcare, which may affect the barriers of awareness and participation in screening. This very fact makes the respondents represent all the provinces, therefore, enabling the possibility of meaningful cross-regional analysis and offering a chance to see the localized gaps in the sphere of health communication and service provision. Altogether, Table 4 reiterates the role of equity of the region in cancer preventive measures and emphasizes how the sociodemographic diversity of the Pakistani population can determine the health of the population. Such data provide a platform to investigate the provincial difference in knowledge, perception of risk, and role of behavior on colorectal cancer screening.

Table 4: Province / Ethnicity Distribution

Province	Frequency	Percent
Balochistan	108	25.65
Sindh	107	25.42
Punjab	103	24.47
Khyber Pakhtunkhwa	102	24.23

Table 5 presents the results of the distribution of respondents based on their education level, which is one of the most crucial determinants of health literacy and awareness as regards screening for colorectal cancer (CRC). The findings show that there is a variety in the education level of the participants. The highest number was those with a Master's degree (24.47 percent), then there were those with a Bachelor's degree (22.8 percent), and lastly those with secondary education (20.9 percent). The medium or upper secondary graduates showed a figure of 13.78, and primary education had a figure of 9.5. A smaller percentage (7.36%) were not educated, and the number of those who got professional or PhD education was low (1.19%). This distribution shows that most respondents had a basic level of formal education, with a large percentage having received higher education. This fairly high proportion of university graduates could be attributed either to the availability of the survey to better-educated respondents or the larger possibility of participation by individuals with more literacy. In the sense that education is specifically associated with health awareness, persons who are better educated tend to have more knowledge regarding disease prevention and are more willing to participate in screening practices. On the other hand, the negligible proportion of uneducated or little educated respondents represents the possibility of inequalities in the effectiveness of outreach to those groups. All these implications imply that the design of the CRC awareness programs should take into consideration diversity in education, hence making sure that messages are comprehensible and culturally fitting to the less literate populations. Altogether, Table 5 states that even though the educated population can be more aware of the risks of CRC and its screening, the population at risk (with lower educational levels) should also be the focus of the preventive campaigns in order to be fair in helping the population.

Table 5: Education Level Distribution

Education	Frequency	Percent
Master's	103	24.47
Bachelor's	96	22.8
Secondary	88	20.9
Intermediate/High School	58	13.78
Primary	40	9.5
No formal education	31	7.36
Professional/PhD	5	1.19

Table 6 provides the occupation of respondents, which can give an insight into the socioeconomic diversity and possible lifestyle variation altering the behavior of screening for colorectal cancer (CRC). Students constituted the biggest proportion of the occupational category (17.1%), then those in the government sector (13.78%), housewives (12.11%), and laborers (11.16%). Other conspicuous ones were self-employed and employees in the private sector (6.89% each), the unemployed (6.65%), and the farmers (5.70%). Retirees (4.99%), skilled workers (4.04%), and shopkeepers (3.56%) were reported in smaller percentages, and technicians (2.61%) and a daily wager (0.24%) were the most insignificant segments. This occupational picture indicates that the research represented a large cross-sectional group of working and non-working adults. The enormous population of students and governmental employees may represent a positive sign of an approach to educational and medical facilities, which can be converted into improved awareness of the CRC issue. On the other hand, such barriers might hinder access to preventive health services by those who are low-income earners, most of them laborers, farmers, and other daily wage earners who tend to be economically and informationally disadvantaged. The appearance of the housewives is also an indicator of gendered health processes, in which female health choices can be biased towards the interests of families and the social requirements. The occupational differences would be able to define the exposure to health information, time to complete screening, and financial capacity to get medical treatment. Hence, Table 6 provides an understanding of the need to establish specific interventions that consider occupational status to make sure that individuals of both the formal and informal sectors are provided with an equal opportunity to access the CRC education and screening opportunities throughout Pakistan.

Table 6: Occupational Distribution of Respondents

Occupation	Frequency (n)	Percent (%)
Student	72	17.1
Government Sector	58	13.78
Housewife	51	12.11
Laborer	47	11.16
Self-employed	29	6.89
Private Sector	29	6.89
Unemployed	28	6.65
Farmer	24	5.70
Retired	21	4.99
Other	18	4.28
Skilled Worker	17	4.04
Shopkeeper	15	3.56
Technician	11	2.61
Daily Wager	1	

The results presented in Table 7 reveal the proportion of marital statuses of the respondents and give an understanding of the social and familial background factors that might lead to the development of the behavioural screening responses to colorectal cancer (CRC). Out of 421 participants, most of them were married (63.42%), others were singles (28.5%), those who were divorced or separated (6.41%), and those who were widowed (1.66%). Most of the respondents are married, indicating dominance, which implies that most of them are members of family systems that may influence the health-related attitude and decision-making processes. Marriage also tends to have more social support that could influence the health-seeking behavior, such as following cancer screening programs, among married people. The willingness to undertake preventive health procedures could be increased through spousal encouragement, family awareness, and joint decision-making. On the other hand, single, divorced, or widowed people might lack such support networks, and this will reduce their screening uptake as a result of isolation or lack of motivation. The percentage of widowed and divorced respondents was relatively small, and this can be attributed to the age group the respondents belonged to, in that the majority were below 50 years of age. Marital status in Pakistan is also connected with cultural particularities like gender norms and social roles, and therefore, that may influence the way in which both men and women form their awareness of personal health priorities. Thus, the preponderance of married respondents provides a good background in giving a sense of pattern on CRC awareness and screening behavior. It underlines the need to incorporate family-based communication interventions in the face of public health interventions to promote regular screening and increase the practice of early detection and diagnosis among Pakistani families.

Table 7: Marital Status Distribution

Marital Status	Frequency	Percent
Married	267	63.42
Single	120	28.5
Divorced/Separated	27	6.41
Widowed	7	1.66

Table 8 presents the distribution of the respondents according to whether they have health insurance coverage, and this is a critical socioeconomic variable that determines healthcare access and uptake of preventive screening. The findings indicate that a large proportion of respondents (74.35%) had no type of health insurance, and only 25.65% indicated that they were insured. This sharp central tendency leads to restricted access to formal health coverage in Pakistan and the economic impediments that may constitute hindrances toward the practice of preventive initiatives like colorectal cancer (CRC) screening. A high number of the uninsured implies that the majority of the respondents make use of out-of-pocket payments to access healthcare services, which may deter preventive illnesses and prompt early diagnosis. Seeing that the process of CRC screening, including colonoscopy or fecal occult blood test, implies financial costs that cannot be afforded by individuals lacking financial resources, the absence of insurance can be taken as a massive structural obstacle. A minority of insured respondents probably have more access to health facilities and would be more willing to go through the screening process or consult medical advice on a proactive basis. This trend is compatible with world records that indicate that health insurance brings a lot of chances to adhere to cancer prevention and screening programmes. As a result, Table 8 underlines the criticality of urgent changes in the public health policy, which will improve insurance coverage, especially in low-income and informal sector workers. An increased protection of finances would result in better access to prevention and early detection services and would eventually lower morbidity and mortality of colorectal cancer in Pakistan.

Table 8: Health Insurance Coverage

Health Insurance	Frequency	Percent
No	313	74.35
Yes	108	25.65

Table 9 presents the proportions of the respondents based on their monthly spouse income, which can be helpful in providing details concerning the socioeconomic makeup of the population under study and its possible effects on colorectal cancer (CRC) screening patterns. The highest percentage population (37.77) of the participants earned between 25000 and 49000 households, followed by a group of less than 25000 earners (24.94). The category of respondents with an income of PKR 50,000- 74,999 constituted 20.43% and the PKR 75,000- 99999 constituted 11.16%. Only a very small percentage (5.7 percent) was earning PKR 100,000 or above per month. This distribution shows that most of the respondents were of low- and middle-income level, as it suits the general socioeconomic situation of the Pakistani population. Income level is a very important determinant of healthcare access because people in the lower income bracket are usually affected by financial factors that impede their access to preventive health care services like CRC screening. Furthermore, economic distress can also affect the level of awareness, in that people who are finding it difficult to make ends meet are likely to ignore preventive health practices. The low number of higher-income respondents implies that the research is largely an opinion of financially limited populations, who might be less exposed to health education and less exposed to private healthcare. This socioeconomic trend underlines the necessity to introduce interventions and screening programs funded by the public sector to guarantee that vulnerable populations are covered by the prevention activities against CRC. Table 9, hence, informs about the direct influence of financial capability on a health behavior and the role of economic inclusion in national cancer prevention strategies.

Table 9: Monthly Household Income Categories

Monthly Income Category (PKR)	Frequency (n)	Percent (%)
Less than 25,000	105	24.94
25,000 – 49,999	159	37.77
50,000 – 74,999	86	20.43
75,000 – 99,999	47	11.16
100,000 and above	24	5.7

The level of awareness of the respondents on relevant concepts regarding colorectal cancer (CRC) screening (early detection, reduction of mortality, and family risk factors) is indicated in Figure 1. The statistics reveal that although a significant percentage of the surveyed are aware that screening can help lower the mortality rates, when it is done in time, a significant number are unsure or unaware of the significance of screening. This is indicative of the level of partially enlightened thinking of the population, with people being aware of the overall usefulness of screening but unaware of the specific effects of screening on survival outcomes. The knowledge gap concerning hereditary predisposition to CRC is evident, as there seems to be little awareness of the presence of such risk factors in the family. The presence of such gaps is worrying since persons having a family history of CRC are at considerably increased risk and should be more proactive about screening. The moderate overall awareness tendency indicates that, despite the awareness that CRC is a health issue, misunderstandings and a lack of education remain. The lack of knowledge about familial risk supports the necessity to develop the programs of general health that would highlight genetic susceptibility and the significance of frequent screening of individuals at high risk. In other countries, such as Pakistan, where awareness programs on cancer are still in the maturity phase, such knowledge gaps result in late diagnoses and excessive loss of lives. Figure 1 consequently highlights the importance of specific awareness campaigns connecting early detection with better survival and communicating the role of a family history in preventing CRC, hence, improving evidence-based decision-making and prompting more people at risk to participate in screening.

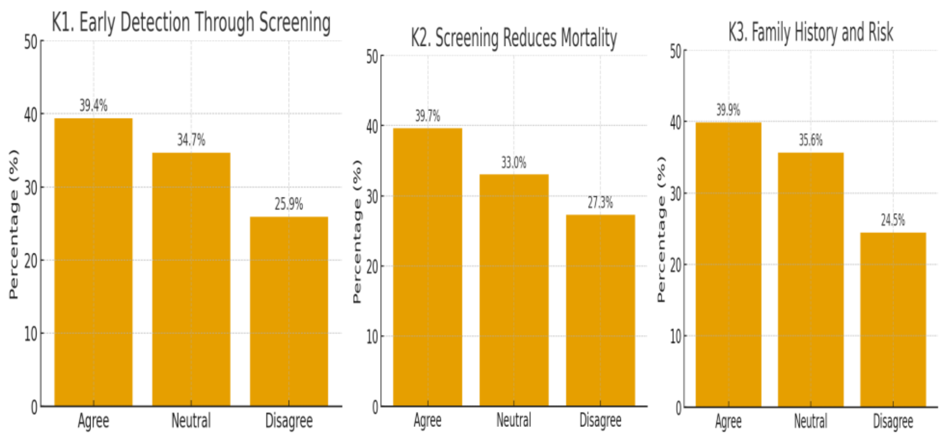

Figure 1: Awareness of Early Detection, Mortality Reduction, and Familial Risk Factors in Colorectal Cancer Screening

Figure 2 illustrates the level of awareness among the respondents concerning both the risk factors in the diets and the usefulness of the colonoscopy as an early colorectal cancer (CRC) screening method. According to the findings, there is a difference in the levels of awareness in these two areas. Some respondents acknowledge that there are dietary patterns that may cause the risk of developing CRC, i.e., high levels of red meat, low fiber, and insufficient intake of fruits and vegetables, but a significant number of respondents are not aware of or confused by these links. Such a narrow interpretation of lifestyle changes implies that dietary education is not adequately incorporated into society's health education. In relation to colonoscopy, it is reported that the knowledge of its efficacy in the identification of early-stage CRC is low. A lot of them look to be uninformed about the process or are too apprehensive to admit that the process is preventive, possibly because of fear, or even their culture, or a misunderstanding of the invasiveness of the procedure. This ignorance about the colonoscopy as a diagnostic and a preventive instrument can also be a major impediment to the rates of screening. Collectively, these results underscore the interaction between the awareness of a lifestyle and prevention among persons who understand diet as a risk factor, who are at least inclined to emphasize the importance of screening. Figure 2 highlights the imperative to improve respective government communication to bridge the gap between the consumption habits of cancer and the overall risk of cancer in the long term, and the need to suggest normalization of colonoscopy as a safe, workable, and life-saving method. The awareness gap could be closed by means of promoting culturally sensitive educational content and physician-led counseling so that individuals would alter their health behaviors and turn to periodic screening of CRC.

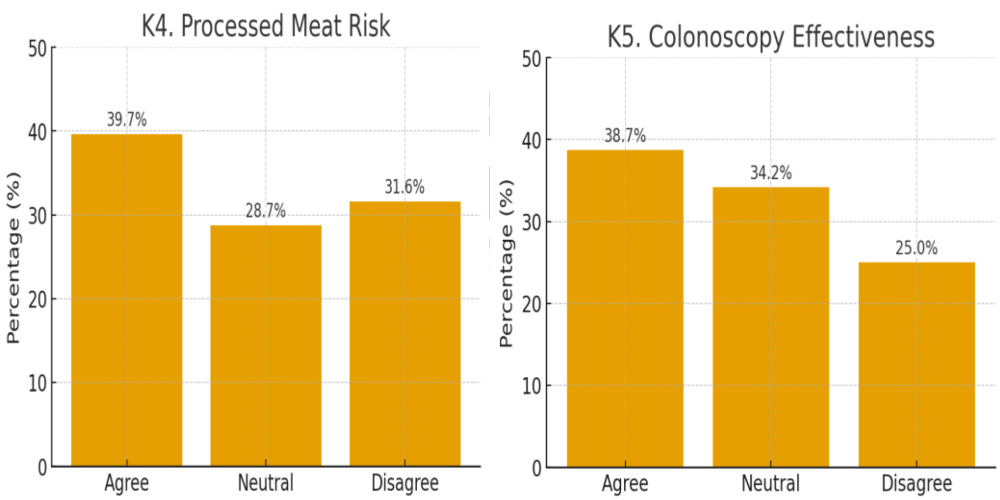

Figure 2: Awareness of Dietary Risk, Colonoscopy Effectiveness, in Early Colorectal Cancer

Figure 3 indicates how the respondents are aware of the screening of persons above the age of 50 and how much they understand the connection between the symptoms and the necessity of screening against colorectal cancer (CRC). The findings indicate that the awareness of the required age threshold of screening is not high, and most of the participants are not aware of the fact that regular screening is recommended starting at 50 years, even without any symptoms. This is indicative of a common myth that screening is only essential when symptoms like rectal bleeding, pain, and alteration in bowel movements manifest. The beliefs do not allow early identification of the disease and leave it at an advanced stage before they seek medical intervention. The results show that there is a reactive but not a proactive attitude towards health in the respondents. Moreover, the individuals who accepted the recommendation of 50+ were also more inclined to accept the relevance of symptom awareness, which caused the speculation that a subgroup of the population has a more inclusive knowledge about the risk of

CRA. The insufficient awareness of age refers to the failure in the national strategies of communication and raises a significant gap in prevention education. Throughout Figure 3, it is stressed that such practices as proactive screening behavior should be encouraged, especially among older adults who belong to the category of high risk. Through clearer communication by the means of healthcare providers, seminars in the communities, and mass media, the perception of the people towards screening based on symptoms to preventive screening must be changed, which in turn will result in the enhancement of the rates of early detection of CRC, as well as a decreased rate of death in Pakistan due to cancer of the colon.

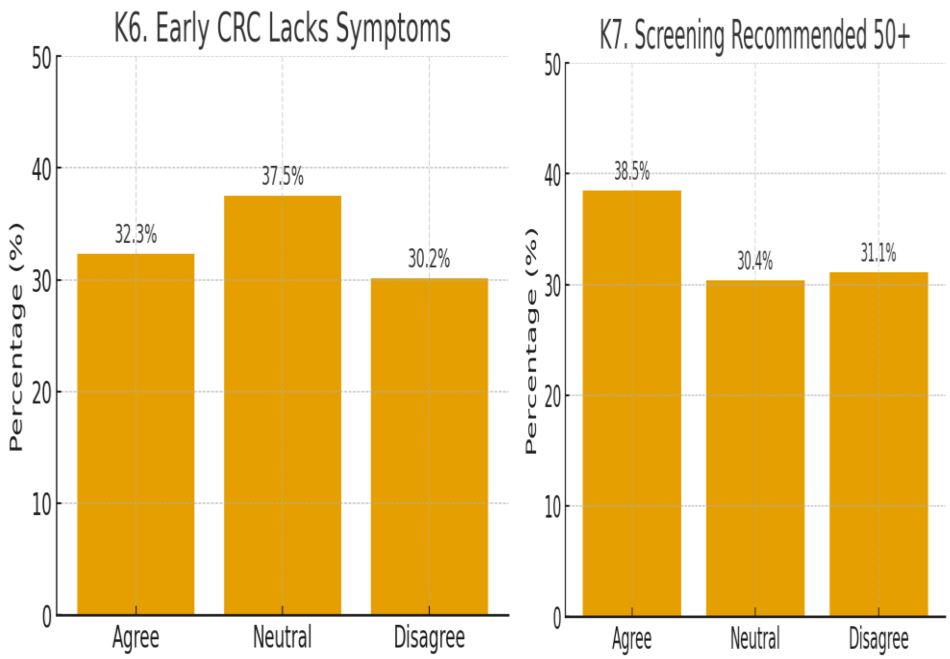

Figure 3. K7. Screening Recommended 50+and Symptom Presentation

Figure 4 indicates the awareness of the participants on the significant risk factors, frequent symptoms, and reliable screening procedures of colorectal cancer (CRC). The figure shows that although there are a few important risk factors like poor diet, sedentary lifestyle, and family history, among others, known by some respondents, there is a poor comprehensive knowledge of them. In the same manner, the symptoms of CRC, such as rectal blood, changed bowel movements, and unexplained weight loss, have low awareness among the majority of individuals. This ignorance gap may postpone treatment and diagnosis since conclusions may be overlooked or misunderstood as people overlook early warning. Raising their awareness about valid screening tests such as fecal occult blood tests, sigmoidoscopy, and colonoscopy is also poor and indicative of the deficiency during the process of publishing health information to the population and outreach on the healthcare system. The low familiarity of the respondents with these modes of diagnosis means that most of the respondents trust in informal health beliefs as opposed to evidence-based information. Through low awareness of their symptoms and the little they know about screening methods, the situation is worsened by the fact that in Pakistan, there is a late detection of the disease and worse prognoses. The number indicates the necessity to implement multipronged education interventions, both incorporating information on risk factors, symptoms, and screening tools to raise the general awareness about the prevention of CRC. Providing people with such knowledge is likely to produce earlier medical attendance and an increased intake of screening. On the whole, Figure 4 highlights an institutional requirement of all-inclusive, accessible, and culturally sensitive cancer awareness campaigns that would help address the existing gaps in knowledge and facilitate proactive health practices throughout the communities.

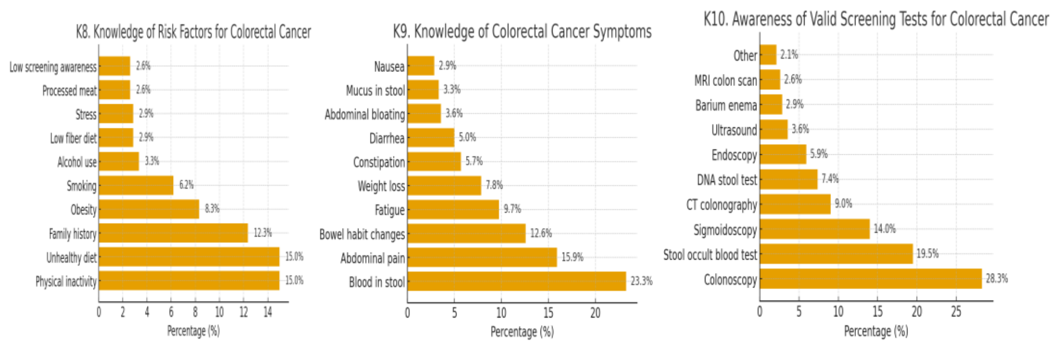

Figure 4: Awareness of Major Risk Factors, Common Symptoms, and Valid Screening Tests for Colorectal Cancer

Table 10 presents the descriptive statistics of the score on knowledge of the respondents on colorectal cancer (CRC) and its methods of screening. These have been analyzed on a population of 421 respondents, the average knowledge of which stood at 35.75, and the standard deviation was 11.73. A lowest score of 12 and a highest score of 67 was registered, signifying a high degree of variation in the level of awareness among the respondents. This difference indicates that some of the respondents had gained a great amount of knowledge regarding the risks of cancer, its symptoms, and the screening process, whereas others had substantial knowledge gaps. The average score of moderate is a symptomatic indication of a deficiency in the general level of awareness, probably affected by some variables like the level of education, the level of socioeconomic status, and the availability of health care. The large standard deviation also suggests that the sample might be heterogeneous in the distribution of the knowledge source, which might indicate the differences between urban and rural areas and between the provinces. The lack of knowledge regarding CRC is a key obstacle to screening, as people who lack the information concerning risk factors and methods of prevention will be less inclined to engage in the process of early disease detection. The results highlight the pressing necessity of community-based education campaigns and the dissemination of information in cultural contexts to increase the knowledge of the population about CRC. Table 10, therefore, is an important measure of the baseline knowledge of the population, which can be used to test the effectiveness of awareness and intervention programs targeting the promotion of the timely screening and burden reduction of the disease in Pakistan.

Table 10: Knowledge Score Descriptives

Statistic	K_S
N	421.0
Mean	35.75
SD	11.73
Min	12.0
Max	67.0

The data in Table 11 shows the organization of the knowledge level of the respondents on the topic of colorectal cancer (CRC) screening, which will allow for a clear picture of the awareness distribution among the study population. The findings show that 36.1 per cent of the study participants showed poor knowledge, 31.83 percent of the respondents had moderate knowledge, and 32.07 percent only displayed good knowledge. This offering implies that quite a number of respondents have little knowledge about CRC risk factors, symptoms, and screening procedures, which might be very limiting in engaging in preventative health practices. The almost equal balance between bad and good knowledge stories reflects a polarized society with a minor enhancement of sensibility programs, which might likely bring a good number of people into the uninformed and informed groups. The lack of good knowledge is in line with the other poor and middle-income countries, where there is no good health education and proper screening facilities, leading to poor awareness levels. This trend could be supported by factors including low education levels, the absence of exposure to information about public health, and low involvement in healthcare institutions etc. Also, cultural taboos of the gastrointestinal system in discussion may hinder open learning of CRC. The moderate level of good knowledge of the respondents underlines both the effect of higher education and urbanization as positive, yet also suggests that knowledge itself might not be a sufficient condition for screening uptake unless the respondents also have positive attitudes and available services. On the whole, Table 11 highlights one of the major public health issues associated with increasing the general awareness level of the citizens to bridge the information gap that currently constrains the ability to detect and intervene on the issue of colorectal cancer in Pakistan on time.

Table 11: Knowledge Level Categories

Knowledge Level	Frequency	Percent
Poor	152	36.1
Good	135	32.07
Moderate	134	31.83

Table 12 presents the descriptive statistics of the attitude scores of respondents to colorectal cancer (CRC) screening to reflect the general attitude and inclination to the behavioral pattern of the respondent to the preventive health measures. According to the data obtained on 421 respondents, the mean score of attitude was 45.47 and a standard deviation of 7.13, with minimum and maximum scores being 13 and 65, respectively. The high median level of respondents indicates that although there are those who show positive responses towards the screening of breast cancer, others show neutrality or rejection of the measure, as they have different levels of motivation and perception of the importance of the screening. A relatively large range of scores also shows many views among the population, which can be explained by the various knowledge, cultural beliefs, socioeconomic background, and past experiences with healthcare. The results suggest that, even with proper awareness, those who have sufficient understanding are subject to practical obstacles or psychological reluctance to screen, like intimidation by diagnosis, humiliation, fear of hospitalization, or distrust of medical interventions. Attitudes are vital in the transfer of the knowledge into behavior; hence, these patterns are vital in the planning of behavioral interventions. The middle standard deviation is also an indication that although the attitudes are somewhat cohesive, there is still a wide scope for influencing the perceptions through specific awareness programs. On the whole, Table 12 indicates that despite the average rates of acceptance of cancer screening, there still should be concerted efforts to enhance and support the positive attitudes of the respondents with the help of culturally sensitive education, assurance of the benefits of screening, and the normalization of preventive health behavior both in the community and in the clinical setting.

Table 12: Attitude Score Descriptives

Statistic	A_S
N	421.0
Mean	45.47
SD	7.13
Min	13.0
Max	65.0

Table 13 presents the classification of respondents regarding their attitudes towards colorectal cancer (CRC) screening, in which the picture of the current attitude of the psychological orientation and readiness towards preventative health measures is revealed. Out of the 421 participants, 34.68% of the respondents recorded a neutral attitude, 33.97% recorded a negative attitude, and 31.35% percentage recorded a positive attitude towards CRC screening. The fact that the three groups are almost equal implies that although there is a section of the population that appreciates the significance of screening, there is another part that does not care or is not receptive to it. Neutral and negative attitudes prevail, which can be caused by the lack of awareness or misinterpreted by such cultural beliefs or fear of diagnosis and screening mechanisms in cancer. There are also negative attitudes that can be associated with the perception of screening as something that is not necessary when the person has no symptoms, a myth in most developing nations. The equal representation of the positive attitudes, however, suggests the emergent awareness and readiness to undergo screening, especially with more educated or urban respondents. The results indicate that there should be public health efforts to translate neutral information to those who are positive, using evidence-based awareness campaigns, and through the community. In addition to that, the promotion of the reduction of fear, stigma, and misinformation can contribute to the transformation of reluctant or resistant groups into active subjects of screening programs. All in all, it is important to note that Table 13 reveals a significant behavioral fact that the development of an attitude is as crucial as knowledge dissemination in promoting rising CR screening uptake. It highlights the importance of the combined approach to education and motivation in order to develop a healthy and positive attitude towards the Pakistani people.

Table 13: Attitude Level Categories

Attitude Level	Frequency	Percent
Neutral	146	34.68
Negative	143	33.97
Positive	132	31.35

Table 14 demonstrates the knowledge and perception of the respondents with regard to early detection of colorectal cancer (CRC) by screening, with a specific concern on whether the respondents agree or disagree with the statement that screening could help identify the disease at an early stage. Out of the 421 respondents, 39.43% had concurred with the statement, 34.68% were neutral, whereas 25.89% did not agree. These findings indicate that even though a significant number of the people surveyed are familiar with the importance of early detection, over fifty percent of the respondents are not convinced or are unsure of its significance. This is because the percentage of neutral answers is high, which prompts one to think that there could be a lack of strong beliefs or knowledge regarding the effectiveness of screening, which could be because of limited exposure to public health information or a lack of communication in the minds of medical professionals. The fact that the people who only disagreed amount to a quarter of the respondents goes to show that the practice of medical screening is still subject to misinformation or distrust. Such attitudes may play an important role in preventing early diagnosis and early treatment, resulting in a worse health outcome. The results highlight the significance of educational interventions in stressing the importance of CRC screening, which is not only diagnostic but also preventive, making it possible to eliminate precancerous lesions. In addition to this, community outreach services that incorporate the use of reliable healthcare providers and media campaigns can be utilized to fill this divide by strengthening positive beliefs regarding early detection. All in all, Table 14 emphasizes the fact that most of the participants are aware of early detection, but it needs concerted efforts to make the participants act and practice what they know in order to overcome the uncertainty and misconceptions that stand in the way of screening uptake in Pakistan.

Table 14: Screening Uptake; Knowledge about Early Detection of Colorectal Cancer through Screening (K1)

Response Category	Frequency (n)	Percent (%)
Agree (1)	166	39.43
Neutral (2)	146	34.68
Disagree (3)	109	25.89
Total	421	100.00

The cross-tabulation of the factors (K1) and five major factors (age, gender, education, overall knowledge level, and attitude level) is presented in Table 15, indicating the combined cross-tabulation of the respondents' knowledge about the importance of screening as an early diagnosis method of colorectal cancer (CRC). In general, 39.4 per cent of the 421 respondents concurred that clever screening can identify CRC at an early stage, but this was found to differ significantly among groups. The highest agreement was found in younger adults (18 29 years) with 62.4 hours, and then that decreased sharply in the 40-49 and 50 and above age groups with 22.6 and 18.4 hours, respectively. This downward trend indicates a decline in awareness with age, which may be because older adults are less exposed to health information, or they are not encouraged to undergo screening. Gender analysis reveals that females (42.9 -37.4) were a little more inclined to agree than males due to minor gender variations in preventive attitudes towards health. Education demonstrated a positive gradient of strong nature- only 15% of those having primary education agreed; however, 60 percent of the respondents having qualifications in professionalism or PhD agreed to the fact that education significantly creates awareness of screening. Interestingly, similar respondents with low knowledge (49.3) accepted more when compared to their counterparts with good knowledge (28.9) as a factor leading to the perception of early detection, which suggests that basic awareness, as opposed to more detailed understanding, may be driving the perception of early detection. Lastly, agreement had a strong relationship with attitude level: 54.5 per cent of people, who had positive attitudes, agreed on early detection, and 34.9 and 30.1 per cent, who held a neutral and negative opinion respectively. On the whole, Table 15 shows that the age, education, and attitude of individuals are interconnected to create a complicated effect on the level of CRC screening awareness, and it is urgent to consider developing age-specific, education-related, and age-related awareness programs in Pakistan.

Table 15: Cross-tabulations of Screening Knowledge (K1) with Key Variables

Variable	Category	Agree (n)	Neutral (n)	Disagree (n)	Total (n)	% Agree
Age Group (years)	18–29	78	20	27	125	62.4%
	30–39	46	36	21	103	44.7%
	40–49	35	74	46	155	22.6%
	50 and above	7	16	15	38	18.4%
Gender	Female	67	47	42	156	42.9%
	Male	99	99	67	265	37.4%
Education Level	No formal education	12	12	7	31	38.7%
	Primary	6	22	12	40	15.0%
	Secondary	17	49	22	88	19.3%
	Intermediate/High School	21	17	20	58	36.2%
	Bachelor's	50	20	26	96	52.1%
	Master's	57	24	22	103	55.3%
	Professional/PhD	3	2	0	5	60.0%
Overall Knowledge Level	Poor	75	46	31	152	49.3%
	Moderate	52	44	38	134	38.8%
	Good	39	56	40	135	28.9%
Attitude Level	Negative	43	59	41	143	30.1%
	Neutral	51	53	42	146	34.9%
	Positive	72	34	26	132	54.5%
Total (All Respondents)	–	166	146	109	421	39.4%

The logistic regression analysis of predictors of colorectal cancer (CRC) screening knowledge and behavior is displayed in Table 16. The findings indicate that the explanatory variables included in the results are age, knowledge score, and attitude score, in addition to gender and education. The model constant (-2.09, p=0.0299) represents a very low propensity of positive screen in the occurrence of positive screening behavior at the time the predictors are at zero. Of the age groups, the 50+ group was the only statistically significantly positively associated one (χ^2 = 0.9568, p = 0.0298), which implies that older adults, although few in number, were more likely to realize the significance of screenings for CRC. Knowledge score (0.0285, 0.004) proved to be a significant predictor, which suggests that with a one-unit increase in the amount of knowledge, a higher probability of awareness or engagement during screening was attained. This observation highlights the fact that educated persons are more aggressive in preventive health activities. By contrast, attitude score (-0.0121, p = 0.4733) did not reveal a significant relationship, which means that without adequate knowledge, attitudes alone might not lead to behaviour change. Neither gender nor education achieved a significant value, also suggesting that in this sample, the informational and the experiential had a bigger impact on the results as compared to the differences in demographics. The general results of the model confirm the hypothesis that cognitive comprehension, instead of the demographic factors or simple positivity, is the most determining factor in encouraging the CR screening behavior. Table 16, therefore, supports the fact that there is a need to increase efforts on increasing public health education and community awareness to enhance screening attendance and early detection in Pakistan.

Table 16: Logistic regression results

Variable	Coef.	Std. Err.	z	P>|z|	[0.025	0.975]
Const	-2.090	0.963	-2.1707	0.02994	-3.977	-0.203
Age_30-39	-0.162	0.3381	-0.4811	0.630	-0.825	0.5000
Age_40-49	0.411	0.33	1.24	0.2132	-0.23	1.059
Age_50+	0.9	0.44	2.17	0.0298	0.093	1.82
Gender_Female	0.3	0.24	1.327	0.184	-0.15	0.79
Education_ord	0.07	0.083	0.58	0.557	-0.115	0.26
KnowledgeScore	0.02	0.010	2.83	0.004	0.008	0.048
AttitudeScore	-0.01	0.0169	-0.71	0.4733	-0.04	0.021

Conclusion

The research is important as it presents the essential understanding of the latest situation regarding knowledge, attitudes, and determinants affecting the colorectal cancer (CRC) screening prevalence among Pakistani adults. The analysis has indicated that despite the awareness of the topic of CRC and its risk factors, it is still divided and not well enough to prompt preventive action. The level of knowledge exhibited by the majority of respondents was moderate, and the level of neutral attitudes is also moderate; actual screening participation is low. The sample was represented by middle-aged adults, but undersampled those over 50 since it was the sample most at risk and less aware of screening recommendations. Education became the most powerful factor of awareness, as respondents with higher educational levels expressed much more knowledge of CRC prevention and early detection. There were a few gender differences, but the females reported more positive attitudes. Screening was further limited by economic and structural impediments, especially the lack of health-insurance cover and the high cost of diagnostic tests. Regression analysis emphasized the ability to predict screening awareness as commanded by knowledge being the strongest independent predictor, with attitudes playing a minor but supportive role. Taken together, the results reveal the severe knowledge-practice gap and emphasis on risk-taking national action. Enhanced participation rates could be achieved through improving public awareness via community-sensitive awareness initiatives, improving communication between physicians and patients, and providing subsidized or insured screening services. Besides, CRCS screening education incorporated into primary care and media platforms would make preventive behavior a norm and decrease the stigma.

The bottom line is that there is a need to neutralize informational and structural disparities to convert the awareness into the experience of a sustained screening practice. To prevent the increase in the number of cases, accessibility is to be affordable, and organized CRC screening programs should be institutionalized to reduce the prevalence of the disease, as well as to facilitate early detection and avoidable death of the population in Pakistan.

Future Research Recommendations

The studies need to be done at a large scale with population-based studies, which will substantiate the results of this research in different parts of Pakistan, such as rural and underserved areas. To determine the long-term effects of awareness campaigns, physician recommendations, and subsidized screening programs on the uptake of screening amongst colorectal cancer (CRC), longitudinal and interventional studies are required. Additional information on the determinants of behavioral factors affecting screening choices in qualitative studies of cultural beliefs, social stigmas, and gender-related barriers would offer a better understanding of the issue at hand. Also, future researchers ought to consider the economy and viability of adopting the national-based screening strategies of CRC on the basis of stool and colonoscopy tests. Healthcare policies, government agencies, and non-governmental organizations may also collaborate to enhance the quality of data and relevance of the policy. This long-term follow-up and continuous production of evidence will be necessary to make informed, sustainable, evidence-based strategies that would enhance the early detection and decrease the morbidity and mortality rates of CRC in Pakistan.

Declaration

The study under discussion, called Knowledge, Attitudes, and Determinants of Colorectal Cancer Screening Uptake in Pakistan, is research that is being conducted on academic grounds. It has never been turned in before to any institution or organization to receive any degree or award. All information and references utilized in the research have been appropriately recognized, and the research was also carried out in respect to ethical research practice.

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