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ORIGINAL PAPER

Assessing Knowledge, Physician Interactions and Patient-Reported Barriers to Colorectal Cancer Screening Among Arab Americans in Dearborn, Michigan

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Abstract

Colorectal cancer (CRC) is the second leading cause of cancer related deaths among men and women in the United States (Haggar and Boushey in Clin Colon Rectal Surg 22:191–197, 2009). Screening tests have shown to be successful at early detection of precancerous polyps. Between 2000 and 2010, there was a 72% growth in the population that identifies having an Arabic-speaking ancestry (Arab American Institute in https://www.aaiusa.org/demographics, 2011). Despite this, little research has been conducted to assess this unique community's knowledge regarding CRC. Given that low screening rates can be attributed to lack of knowledge, this study was designed to address CRC knowledge and screening barriers in an Arab American community. Between February 2016 and June 2017, an anonymous survey was conducted in English or Arabic among 131 patients from cancer programs at the Arab Community Center for Economic and Social Services (ACCESS) in Dearborn, MI. Program participants were expected to have greater insight and awareness about cancer risk than the general population. Knowledge deficiencies surrounding CRC and the screening process were identified. 70% of participants did not know what a colon polyp is and over 89% were not aware of their individual risk for CRC. 45.8% have never had a CRC screening and leading barriers included screening costs, lack of health insurance, and lack of advice by physicians. The goal of this study was to serve as a tool to healthcare providers by identifying evident gaps in medical knowledge surrounding CRC. In order to help better serve and educate patients, healthcare providers and community organizations are encouraged to fight the stigma and help to reduce misunderstandings.

Keywords Colorectal cancer · Knowledge · Screening · Barriers · Arab Americans

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Introduction

Colorectal cancer (CRC) is the second leading cause of death among cancers that affect both men and women in the United States with the overall lifetime risk of development being 1 in 22 and 1 in 24, respectively [1]. Most CRCs begin as a growth, called a polyp, on the inner lining of the colon or rectum [2]. For many decades, the death rate from CRC has generally been decreasing and early detection by screening tests and removal of polyps have been shown to reduce CRC rates [3]. The Centers for Disease Control and Prevention and the U.S. Preventive Services Task Force recommend individuals begin CRC screening at the age of 50 [4]. Unfortunately, about one third of adults age 50 or older, the age group at greatest risk of developing CRC, have not been screened as recommended [5]. Some patients potentially disregard some alarming symptoms of CRC, such as rectal bleeding or changes in stool frequency out of fear of wasting a doctor's time or being too busy to visit a doctor [6]. These notions may ultimately result in a worse cancer prognosis, possibly due to a delay in seeking medical attention.

Socioeconomic influences and lack of CRC education among other factors can serve as barriers to CRC screening [7]. Barriers can hence lead to lower CRC screening rates, which in many instances can present patients with serious health consequences. Some of the socioeconomic factors looked at in this study were the level of education, status of employment, and whether or not the participant had health insurance. Physician–patient communication and insufficient physician recommendation for screening can serve as additional factors that impact CRC screening [8, 9]. Colorectal cancer is a disease that can be prevented and treated successfully through early detection using proper screening tests, improved education and lifestyle changes [4].

The Census Bureau estimates that at least 1.9 million Americans are of Arab descent; while the Arab American Institute Foundation estimates that the number is closer to 3.7 million, which accounts for one percent of the US population [10]. Per the 2010 census, 40% of Dearborn population had been of Arab ancestry [11]. Differences in the social cultures of Arab Americans both raise challenges to healthcare access and delivery, and influence perspectives on healthcare and its providers [12]. With this growing population of Arab Americans in the country, little research has been conducted to assess this unique community's knowledge on CRC, physician interactions, and the screening barriers that prevent them from obtaining proper CRC screening.

Gaining a better understanding of the knowledge base Arab Americans have regarding basic principles and trends of barriers encountered can allow healthcare providers to better fill the gaps needed to improve screening rates. Hence, we here aim to assess the colorectal cancer knowledge of an Arab American population within the Dearborn community. Moreover, we attempt to better understand the main screening barriers faced by the community, which prevents them from undergoing CRC screenings. Ultimately, results from this study will allow us to target the barriers and focus community education on the gaps in CRC knowledge, with the hopes to increase CRC screening rates and ultimately improve the health status for the Arab American community.

Methods

Study Design

This study was determined to be exempt by the Institutional Review Board (IRB) review at the University of Michigan in accordance with federal regulations. Between February 2016 and June 2017, an anonymous survey was conducted at ACCESS, Arab Community Center for Economic and Social Services, in Dearborn, MI. The survey was administered in person or over the phone in English or Arabic by trained bilingual administrators through the cancer programs at ACCESS following a grant given to ACCESS by the Michigan Department of Health and Human Services, MDHHS. This grant allows more than 100 clients of low colorectal cancer risk to receive free fecal immunochemical test (FIT) and/or free colonoscopies.

Study Participants and Recruitment

Participants were clients and patients of ACCESS, particularly from the Breast and Cervical Cancer Control Program (BCCCP) the Chronic Diseases and Cancer Program, and the ACCESS clinic. Initially, the majority of participants were recruited through the BCCCP and hence were females. Later, clients were recruited through the clinic and the Chronic Diseases Program which helped increase the number of males participating in the study. The recruited participants were offered the survey prior to receiving FIT or colonoscopy screening. Survey information was obtained either in person or over the phone by trained bilingual survey administrators who communicated with participants in either English or Arabic languages. The scope of the study was explained to all participants and informed consent was obtained. No monetary compensation was offered for participation and subject IDs remained anonymous.

Survey Assessment

The survey addressed colorectal cancer knowledge and screening barriers within the Arab American community. The knowledge and screening barriers questions were modified based on existing surveys as well as results around both areas of assessment [7, 13]. The knowledge assessment targeted overall knowledge by addressing the following: general knowledge of CRC, knowledge of CRC risk factors and screening, and understanding of physician interactions. The screening barriers targeted areas such as lack of awareness, lack of a recommendation from the physician, fear, a preference that it is better to find out later, fatalism, time, lack of social support from family and close friends, competing demands, and concern that some screening modalities are outdated.

Inclusion and Exclusion Criteria

There were specific inclusion and exclusion criteria set by MDHHS for CRC screening eligibility which were reflected in our survey study. The criteria for inclusion was being 50 years or older while the criteria for exclusion was made for any history of positive FOBT/FIT, colonoscopy, sigmoidoscopy or barium enema. Additionally, exclusion was made for anyone with a history of Crohn's disease, familial adenomatous polyposis (FAP), Lynch syndrome, inflammatory bowel disease (IBD), ulcerative colitis or colorectal cancer. Lastly, exclusion was made for the presence of any symptoms such as recent rectal bleeding, blood in stool, long-term diarrhea, long-term constipation, unexplained weight loss or lower abdominal pain. From our standpoint, exclusion was made for all non-Arab Americans.

Statistical Analysis

Data analysis was performed using SAS 9.4 and Google forms analysis. All continuous variables were evaluated for normality using the Shapiro–Wilk statistic, histograms and Q–Q plots. Univariate analysis of data included means, standard deviation and percentages. Categorical data were described as absolute numbers and percentages and were compared using the Chi-squared test.

Results

Characteristics of Study Participants

Characteristics of study participants are highlighted in Table 1. There were a total of 131 participants age 50 or over with 75% under the age of 60 and 91% being females. Regarding Arab country of origin, 53% of participants were

Table 1 Characteristics of Participants

	Participants (n = 131)	P
Gender		
Male	12 (9.3)	< 0.0001
Female	117 (90.7)	
Arab Country of Origin		
Lebanon	68 (53.1)	< 0.0001
Iraq	28 (21.9)	
Yemen	17 (13.3)	
Other	15 (11.7)	
Age		
50–60	92 (75.4)	< 0.0001
61–70	21 (17.2)	
70 and above	9 (7.4)	
Marital status		
Married	89 (71.2)	< 0.0001
Never married	1 (0.8)	
Divorced/separated	15 (12.0)	
Widowed	20 (16.0)	
Education		
Less than high school	61 (50.0)	< 0.0001
High school graduate	38 (31.2)	
Some college	9 (7.4)	
College graduate	14 (11.5)	
Employment status		
Full-time	9 (7.8)	< 0.0001
Not employed	92 (79.3)	
Part time	9 (7.8)	
Retired	6 (5.2)	

Data is n (%)

Denominators may vary as a result of missing data

Lebanese, 22% were Iraqis, 13% were Yemenis and 11% were from other Arab countries. The majority of participants were married. From an education standpoint, 50% of participants had less than a high school education, 31% graduated high school and 19% had either some college education or a college degree. Employment-wise, 79% of participants were not employed.

Knowledge Assessment

Table 2 reflects results from the knowledge assessment. The first 2 questions address general knowledge of CRC. 50% of participants knew what CRC was and 30% knew what a cancer polyp was.

Question 3 to 7 cover knowledge of CRC risk factors. 10% of participants were comfortable sharing what their risk of CRC was based on prior knowledge. Over 65% of participants knew that a low fat diet, high fiber diet and physical activity decreases the risk for CRC, that the risk

Table 2 Knowledge assessment

	Yes/correct response Participants (n = 131)	P
Knowledge category		
Knowledge statements [correct answers]		
General knowledge of CRC		
Do you know what cancer of the colon and rectum (CRC) is?	65 (49.6)	0.9304
Do you know what a colon polyp is?	39 (30.0)	< 0.0001
Knowledge of CRC risk factors		
A low fat and high fiber diet helps decrease the risk for cancer of the colon and rectum.[True]	90 (68.7)	< 0.0001
Physical activity decreases the risk for cancer of the colon and rectum.[True]	92 (70.2)	< 0.0001
The risk of colon and rectum cancer increases after the age of 50.[True]	106 (80.9)	< 0.0001
A family history of cancer of the colon and rectum does not increase your risk.[False]	88 (67.2)	< 0.0001
Do you know what your risk for colorectal cancer is?	14 (10.9)	< 0.0001
Knowledge of CRC screening		
Finding cancer early will not increase the chances of surviving it.[False]	86 (65.7)	0.0003
You only need to have a colorectal cancer screening test if you are having symptoms.[False]	101 (77.7)	< 0.0001
Do you know the different types of screenings for cancer of the colon and rectum?	29 (22.1)	< 0.0001
Do you know what a fecal occult blood test (FOBT) is?	41 (31.5)	< 0.0001
Do you know what a colonoscopy is?	63 (48.5)	0.7257
Do you know what a sigmoidoscopy is?	9 (6.9)	< 0.0001
Do you know where you can receive these screening services?	66 (50.4)	0.9304
Physician interactions		
Have you ever talked to your physician about cancer of the colon and rectum?	32 (24.6)	< 0.0001
Has your physician ever recommended a FOBT, sigmoidoscopy, or colonoscopy?	38 (29.2)	< 0.0001

Data is n (%)

Denominators may vary as a result of missing data

of CRC increases after the age of 50, and that a family history of CRC increases one's risk for CRC.

Question 8 to 14 cover knowledge of screening for CRC. Over 65% of participants knew that finding cancer early will increase the chance of surviving it and that screening is not only limited to when a person has any specific symptoms. 22% of Arab American participants in this study knew what the different types of screenings for CRC are as compared to overall United States national statistic of 57.3% [14]. More specifically in this study, 32% of Arab Americans knew what the FOBT was, 49% knew what the colonoscopy was and 7% knew what the sigmoidoscopy was. In a study conducted in the United States with a national sample 73.7% of participants had heard of FOBT and 84.3% had heard of sigmoidoscopy or colonoscopy [14]. Regarding screening services in this study, 50% of Arab American participants reported comfortably knowing where to obtain them.

Lastly, the final 2 question addressed the physician interactions with patients when it came to CRC. 25% of patients reported ever talking to their physicians about CRC and 29% of patients reported their physician ever recommending an FOBT, sigmoidoscopy or colonoscopy.

Demographic Comparison of Knowledge Assessment

Table 3 shows the knowledge assessment distribution when taking country of origin, education, and age into account. Knowledge categories were distributed into low, moderate and high knowledge depending on the total scores obtained for the general knowledge assessment [8]. Similar knowledge categories were approximated and created for knowledge of risk factors and knowledge of screening for CRC.

In terms of total general knowledge, 20% of participants had high knowledge, compared to 67% having moderate knowledge and 13% having low knowledge. There were no statistically significant results present with the CRC general knowledge distribution by country of origin, education level, or age. When it came to knowledge of risk factors, 39% of total participants had a high risk factor knowledge, compared to 56% for moderate knowledge and 15% for low knowledge. CRC risk factor knowledge distribution by country of origin, education level, or age showed no statistically significant results. Lastly, in terms of screening knowledge, 22% of all participants had a high screening knowledge level compared to 59% for moderate knowledge

Table 3 Knowledge Assessment Comparison for Various Demographic Parameters

	High knowledge per category					
	High total knowledge of CRC[a]		High knowledge of CRC risk factors[b]		High knowledge of CRC screening[c]	
	n (%)	P	n (%)	P	n (%)	P
Participants						
All (n = 131)	24 (19.5)	< 0.0001	50 (39.4)	< 0.0001	28 (21.9)	< 0.0001
Country of origin						
Lebanon	13 (21.0)	0.4939	25 (38.5)	0.2752	16 (24.2)	0.9069
Iraq	5 (17.9)		16 (57.1)		6 (21.4)	
Yemen	3 (18.8)		5 (29.4)		3 (18.8)	
Education						
Less than and equal to High school	19 (20.4)	0.3709	35 (36.5)	0.1852	21 (21.9)	0.3552
More than high school	4 (18.2)		12 (52.2)		6 (26.1)	
Age						
50–60	19 (21.8)	0.5778	41 (46.1)	0.1388	25 (27.5)	0.1502
61–70	3 (15.0)		5 (23.8)		1 (5.0)	
70 and above	1 (11.1)		2 (22.2)		1 (11.1)	

Data is n (%)

Denominators may vary as a result of missing data

[a]Total Knowledge is high if ≥ 10/14 total answers were correct

[b]Knowledge of CRC Risk Factors is high if ≥ 4/5 total answers were correct

[c]Knowledge of CRC Screening is high if ≥ 5/7 total answers were correct

and 19% for low knowledge levels. CRC screening knowledge distribution by country of origin, education level, or age showed no statistically significant results.

When looking at total general knowledge distribution among the top 3 countries of origin, high knowledge levels varied between 18 to 21% within each of the three listed countries of origin, with 56–75% of participants for each of the 3 countries falling in the moderate knowledge level category. High level of knowledge of CRC risk factors was highest in Iraqis at 57%, followed by Lebanese at 39% then by Yemenis at 29%. The distribution of high screening knowledge ranged between 19 and 24% for the 3 different listed countries compared to 59–69% for moderate screening knowledge.

In regards to education, 18–20% of participants with less than or equal to high school or more than high school had a high level of general knowledge. These numbers compared to 64–77% for moderate knowledge. In regards to high knowledge of CRC risk factors, 52% of those with more than a high school education had high knowledge levels compared to 37% in those with less than or equal to a high school education. 26% of those with more than a high school education had high screening knowledge levels compared to 22% in those with less than or equal to a high school degree. Additionally, 65% of those with more than a high school education had moderate screening

knowledge levels compared to 56% in those with less than or equal to a high school degree.

Lastly, in regards to age distribution, our results showed statistically insignificant decrease in high knowledge levels with increasing age, where the 50–60 age category had 22% high general knowledge level compared to 11% in the over 70 age group. Note once more that the majority of participants here had moderate general knowledge levels which ranged between 65 and 80% among the different age groups. In regards to risk factor knowledge distribution among the different age groups, 46% of those in the 50–60 age group had high risk factor knowledge compared to 23–23% in the older age groups. Lastly, 28% of those within the 50–60 age group had high level of CRC screening knowledge with 55–70 of the 3 age groups having moderate screening knowledge levels.

Health and Diet History

Table 4 covers the health and diet history for participants. From a health history standpoint, 67% of participants were smokers, 18% had diabetes and 6% reported a history of heart disease. Between 61 and 63% reported average overall health rating and average overall physical activity rating. 48% of participants were obese, 35% were overweight, 17% were normal weight and none of them were underweight.

Table 4 Health and diet history

	Participants (n = 131)	P
Smoking history		
Positive	88 (67.2)	< 0.0001
Negative	43 (32.8)	
Medical history		
Diabetes positive	23 (17.6)	< 0.0001
Heart disease positive	8 (6.1)	
Fruits and vegetables consumptions		
Less than or equal 3 days/week	21 (16.5)	< 0.0001
More than 3 days/week	106 (83.5)	
Red meat consumption		
Less than or equal 3 days/week	103 (81.8)	< 0.0001
More than 3 days/week	23 (18.3)	
Saturated fat intake		
Below average	35 (27.1)	< 0.0001
Average	82 (63.6)	
Above average	12 (9.3)	
Fiber intake level		
Below average	24 (18.6)	< 0.0001
Average	83 (64.3)	
Above average	22 (17.1)	
Overall health rating		
Below average	15 (11.6)	< 0.0001
Average	81 (62.8)	
Above average	33 (25.6)	
Overall physical activity rating		
Below average	22 (17.3)	< 0.0001
Average	78 (61.4)	
Above average	27 (21.3)	
Body mass index		
Underweight	0 (0.0)	0.0002
Normal weight	20 (17.1)	
Overweight	41 (35.0)	
Obese	56 (47.9)	

Data is n (%)

Denominators may vary as a result of missing data

From a diet history standpoint, 84% of participants reported consuming fruits and vegetables 3 or more days per week and 18% reported consuming red meat more than 3 days per week. 64% of participants reported average saturated fat intake and fiber intake levels.

Screening History

Table 5 addresses participants' screening history. 58% reported having no insurance as opposed to 35% having Medicaid or Medicare and 7% having private insurance. 57% of participants reported having visited a physician in the past 1–6 months. From a CRC screening standpoint, 46%

Table 5 Screening history

	Participants (n = 131)	P
Health insurance		
No insurance	74 (57.8)	< 0.0001
Medicaid/medicare	45 (35.2)	
Private	9 (7.0)	
Last time visited physician		
1 to 6 months ago	74 (57.4)	< 0.0001
6 months to a year ago	14 (10.9)	
Between 1 and 2 years	9 (7.0)	
More than 2 years ago	19 (14.7)	
Never visited one	13 (10.1)	
Time of last CRC screening		
Less than a year ago	33 (25.2)	< 0.0001
Between 1 and 5 years	29 (22.1)	
Between 6 and 10 years	3 (2.3)	
More than 10 years ago	6 (4.6)	
Never	59 (45.8)	
Age at first CRC screening		
Mean (± standard deviation)	53.2 (± 8.2)	

Data is n (%) unless otherwise specified

Denominators may vary as a result of missing data

reported never having CRC screening in the past, with 54% reporting having done so within the past year, 1–5 years ago or more than 6 years ago. More specifically, 35% reported having CRC screening in the past year, 22% reported having CRC screening 1–5 years ago and 6% had screening more than 6 years ago. Compared to CRC screening rates provided by the Michigan Cancer Consortium, screening rates for Colorectal Cancer vary by demographic categories. In Michigan, there is a 65.5% screening rate among black Americans and a 73% screening rate among white Americans [15]. In this study, it was found that 54% of Arab Americans had a CRC screening and this rate is also lower than the national screening for colorectal cancer, which is 67.3% [16].

Screening Barriers for Participants

Finally, Table 6 addresses the barriers to CRC screening selected by participants that did not have CRC screening at the age of 50. The top listed barrier was lack of health insurance that was selected by 78% of participants. 47% of participants reported lack of problem with stool as the second leading barrier to screening followed by 34% of participants who reported that screening was expensive and 31% who identified having no family history as a barrier. 25% of Arab American participants mentioned lack of advice from physician for screening as a screening barrier while in a study conducted in the US not focused on Arab Americans, 10.9% reported not being recommended to do so by a provider as a

Table 6 Screening barriers for participants who didn't have CRC screening at the age of 50

Barrier	Participants (n = 98)
Lack of health insurance	87 (88.8)
No problem with stool	47 (48.0)
Screening is expensive	35 (35.7)
No incidence of CRC within family	31 (31.6)
Lack of advice from physician for screening	27 (27.6)
Lack of awareness for CRC prevalence	16 (16.3)
Fear of medical procedures in general	16 (16.3)
Poor emphasis from physician regarding the importance of screening	15 (15.3)
Poor awareness about the benefits or harms of screening	13 (13.3)
Lack of time to arrange for the test	13 (13.3)
Lack of available means for transportation	12 (12.2)
Fear of sedation by anesthesia	11 (11.2)
Embarrassment from the screening procedure	11 (11.2)
Poor understanding for the logistics of the prep	10 (10.2)
Poor explanation from providers regarding the screening options	9 (9.2)
Preference to find out later for the sake of family's concern	9 (9.2)
Fear of learning of an abnormal test rest	8 (8.2)
Lack of time to undergo the procedure	8 (8.2)

Data is n (%), multiple selections allowed

Sorted by percentage reported for each selection

barrier to screening [17]. Additional reasons included lack of awareness for CRC prevalence, fear of medical procedures, lack of means for transportation, lack of time, embarrassment from the screening procedure, fear of learning of abnormal test results and others.

Discussion

Knowledge Implications

Our results identified deficiencies in Arab American women in their understanding of colorectal cancer. About half of the participants reported knowing what defines colon and rectal cancer while only 30% of participants knew how to define a colon polyp. It is important for the community to increase its knowledge surrounding what colorectal cancer and colorectal polyps mean, particularly as the number and types of polyps can influence screening guidelines on an individual basis. Better understanding that polyps serve as precursors for CRC can help with preventing CRC through earlier detection and removal of adenomatous polyps [18, 19]. While 90% of participants reported not knowing what CRC risk factors are, over 60% of participants responded correctly for questions related to CRC risk factors, such as the correlation between low fat and high fiber diet, physical activity, age and family history, and colorectal cancer. When asked to personally assess their diet and health, around 60% of participants reported average saturated fat intake, fiber intake,

overall health and physical activity. From a less subjective measure, 35% of participants were found to be overweight and 48% were obese. This may suggest that a comprehension about dietary CRC risk factors may not directly translate into actual lifestyle choices for the participants. Additionally, 67% reported smoking either cigarettes or hookah, all which further support the suggestion that subjective ratings might not be ideal nor reflective of participants' health status. In 2013, it was estimated that 28% of Arab adults were classified as obese, with an additional 36% of Michigan Arab adults being classified as overweight [20]. The prevalence of obesity among Arab adults did not significantly differ from that of any of the other racial/ethnic groups in Michigan at the time [20]. This is important to highlight as it is not only reflective of the diet and lifestyle pattern of Arab Americans, but it also strongly correlates as a risk factor for many diseases and health conditions, with colorectal cancer being one of them [21].

In regards to knowledge of CRC screening, although the majority of participants were aware that early cancer detection would increase the chances of surviving it and that screening is performed regardless of symptoms, most of the participants were not familiar with the different screening modalities including FIT, sigmoidoscopy and colonoscopy. Colonoscopy, however, was the modality that the community was most familiar with. Between 25 and 29% of participants reported ever talking to their physicians about CRC or being recommended by their physicians to perform FOBT, colonoscopy or sigmoidoscopy. Studies from 2013 have shown

that 67% of Arab adults reported having a routine medical checkup within that past year, similar to 70% of all Michigan adults [20]. Physician visits among Arab Americans in Dearborn are hence comparative to those within the Michigan community and so it becomes critical that these visits include positive communication between the patient and provider regarding health screenings in general and CRC in specific. Patients who have higher rates of visits to primary care physicians would generally have higher rates of CRC screenings [4, 6]. Ensuring that the physician provides the appropriate prevention and screening discussions can significantly impact a patient's overall health. In regards to CRC, training physicians and providing the appropriate material to the patients can positively influence screening rates for CRC in the future [22]. A physician should be conscious that the information is not only given to patients, but that it is also understood by them. The amount of CRC knowledge that one has can also influence the protocol of care a patient encounters and ultimately screening timeline, detection, and health outcomes [23]. Increasing community education around CRC screening knowledge can be an excellent step towards bettering the community's overall health. It is worthy to note that when knowledge was categorized into low (approximately lower than 20% correct), moderate (approximately between 20 and 70% correct) and high (approximately over 70% correct), there were no differences in knowledge levels among the three top countries of origin for participants (Lebanon, Iraq and Yemen). Additionally, there were no differences among the various education backgrounds or age categories. The majority of participants fell within the moderate knowledge levels categories particularly when it came to general CRC knowledge and screening knowledge, while around 20% of participants had high knowledge levels within these categories compared to 40% of participants within the risk factor knowledge category. This once more reassures the need for education within the general Arab American community regardless of education, country of origin, or age.

Screening Rates Implications

From a screening history standpoint, our findings showed that 58% of our participants had no insurance and that 46% of participants, all which are over the age of 50, have never had CRC screening in the past. Although 25% reported having CRC less than 1 year ago, many of those participants were actually recruited through the program and received their first screening this year. While our data showed that around 47% of participants had CRC screening within the past 5 years, past data from 2013 showed an even lower prevalence for screening among Arab American adults at 35% [20]. At the time, this prevalence was significantly lower than all of the other racial/ethnic groups: White,

non-Hispanic at 56.3%, Black, non-Hispanic at 58.9% and Hispanic at 62.1% in Michigan [20]. Hence the current study shows potential improvement in the screening rates, while certainly remaining low when compared to other ethnic groups. We can also note that 75% of the participants have seen a physician within the past 1–2 years suggesting once more adequate follow-up within the community.

Screening Barriers Implications

When it came to barriers to receiving screening at the age of 50, the leading barriers were: lack of health insurance, lack of problems with stool, screening cost, lack of family history and lack of advice from a physician. Other listed barriers included: insufficient understanding for screening modalities, time constraints, fear, lack of awareness and transportation. While the knowledge assessment showed good participant knowledge about family history and cancer risk, or the need to receive screening regardless of symptoms, some of the top identified barriers were lack of problems with stool and lack of family history. Both of these are personal barriers due to poor knowledge about CRC risk, hence suggesting that patients may fail to understand the significance of certain symptoms on their health and well-being. For instance, certain symptoms of CRC, such as constipation, may be interpreted as insignificant by a patient which can cause a delay in seeking medical care [23]. This once more suggests an inadequate community understanding for CRC and the need to properly provide the educational resources and tools to further advance this understanding. Providing appropriate resources such as translation, financial help, or guidance on how to receive help, and physician cultural consciousness should be implemented in efforts to further increase screening rates of CRC so that overall care and preventative measures can parallel patient health [18]. It is worthy to mention that a majority of participants responded to this survey in Arabic, suggesting that bilingual education is critical within this particular Arab American community. None of the top listed barriers are gender and culturally specific such as modesty or embarrassment. Thus while taking the culture into consideration is important, many of the top listed barriers are common among a range of other groups such as costs, absence of risk factors or family history, fear and others. With the growing Arab immigrant and refugee population in the State of Michigan, language and financial barriers should be kept in mind while providing care for this population.

Strengths

The strengths of this study include adapting our knowledge assessment and screening barrier survey from other literature studies. This allowed us to better appreciate our

findings based on past validated research instruments. We additionally had bilingual study coordinators administer the study which allowed for providing accurate translation and explanation for survey questions. From weaknesses standpoint, the significance of the screening results may not be generalized to the community. For instance, while some participants may have just turned 50 within the past year, never having had a colonoscopy in the past is not as significant when compared to someone who is 70 years old for instance. The same concept applies to the screening barriers section as it includes barriers listed by all participants who turned 50 at any point and have not had a CRC screening at the time. Given however, that CRC screening guidelines are for those 50 and above, this can be a strength at times since understanding why someone at the age of 51 did not receive screening at 50 could be as valuable as learning why someone at the age of 70 did not receive screening at age 50.

Limitations

There are several limitations for this study. First, the majority of participants were female and the majority were also in the 50–60 age category. This should be taken into consideration as we address the impact of the knowledge assessment or screening barriers on the Arab American community hence keeping in mind the dominant gender and age group that our study targeted. Additionally, given that our study participant was a subset of that which the MDHHS was targeting with screening, we were limited by the absence of risk factors as criteria for enrollment eligibility such as absence of family history of CRC and absence of signs of CRC. It would have been interesting to correlate risk factors such as family history of CRC and signs of CRC with knowledge and/or screening history and barriers. A future direction could be including a less restricted group of Arab Americans from the clinic at ACCESS or other clinics in the Dearborn community and making such correlations. Another limitation relates to the participant pool. Since most participants were recruited through the BCCCP program at ACCESS hence seen for breast/cervical cancer prevention or treatment, one would expect them to have increased knowledge regarding cancer generally than the general population. Additionally, a limitation is the survey tool utilized. While participants were asked to self-report their knowledge of CRC, polyps, and their personal CRC risk, we had a relatively smaller number of follow-up questions or verification of knowledge to understand true knowledge of participants. For instance, although they may have responded yes or no to certain questions such as 'do you know what a colon polyp is?', we couldn't really assess whether they truly had that piece of information as opposed to truly confirming or denying it. While we trusted the validity of the knowledge assessment as referenced in the literature, this makes it more difficult to make actionable conclusions regarding further cancer education and warrants a more thorough objective knowledge assessment to better capture the current community's CRC knowledge. Along the same line, a final limitation is the subjectivity of the study in terms of the health and diet history. While we showed how participants identified good diet and average overall health, the majority were overweight and obese indicating inaccuracy and misrepresentation with self-rating.

Conclusion

The current study presents additional support regarding the knowledge gaps about colorectal cancer within the Arab American community. Our study highlights failures in effective patient-physician communication and necessitates that physicians become better aware of the presence of knowledge gaps in order to properly educate patients. Physicians should not only share such knowledge but also ensure proper patient understanding. A future direction here would be obtaining physicians' perspectives on the amount of screening and general CRC knowledge that they deliver to patients. One could also delve deeper into the quality and accuracy of the CRC knowledge shared by physicians by assessing physician's knowledge on colorectal cancer screening guidelines. Reflecting on the Arab American community as a whole, it is important to address the resources used by community members as they obtain CRC knowledge and understanding. Additionally, the current study provides further evidence supporting the low CRC screening rates among Arab Americans. While language and culture could represent barriers to screening, many of the top identified screening barriers dealt with costs, inaccurate understanding for risk factors and signs, and lack of physician communication and recommendations for screening. Hence, this study further highlights some of the most significant barriers to screening for CRC in Arab Americans and encourages addressing these specific barriers properly to further increase screening rates and ultimately improve the health status for Arab Americans.

Compliance with Ethical Standards

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