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Colorectal cancer screening: assessment of physicians' knowledge, attitude and practice in tertiary healthcare centers of plateau state, Nigeria

Philip Ojile Akpa[1,2++], Barka Vandi Kwaghe[1], Innocent Emmanuel[1,2], Nyam Paul David[3], Bankole Kofi Adedeji[4], Christiana Nwanneka Ibeanu[1], Priscilla Ometere Onota[1], Ishaku Agahu Othman[1], James Eveshojaime Ben[1], Jacob Anzaku Emmanuel[1], Nanisi Zorto Bahaushe[1], Agabus, Nanfwang Manasseh[1,2], Ayuba Madachi Dauda[1,2], Olugbenga Akindele Silas[1,2] Barnabas Mafala Mandong[1,2], Dami Nantok[5]

[1]*Department of Anatomic Pathology and Forensic Medicine, Jos University Teaching Hospital, P.M.B 2076, Jos Plateau State, Nigeria.*
[2]*Department of Pathology, University of Jos, P.M.B 2084, Jos Plateau State Nigeria.*
[3]*Department of Internal Medicine, Jos University Teaching Hospital, P.M.B 2076, Jos Plateau State, Nigeria.*
[4]*Department of Histopathology, Federal University of health sciences Otukpo, P.M. B 145, Oturkpo Benue State, Nigeria*
[5]*Department of Community Medicine, University of Jos, P.M.B 2084, Jos Plateau State Nigeria*

Abstract

Background: Colorectal cancer is the second most common cause of cancer death and third most commonly diagnosed cancer worldwide. The incidence is projected to rise steeply in the nearest future with a high burden in low- and middle-income countries. Screening for colorectal cancer is not widely practiced in low- and middle-income countries despite its proven cost-effectiveness and benefit in reducing cancer related mortality. This study aimed at assessing the knowledge of colorectal cancer screening, attitudes towards screening and screening practices among physicians in tertiary health care centers in Plateau state.
Methodology: This study was a descriptive cross-sectional study. A total of 183 physicians from the Jos University Teaching Hospital and Plateau State Specialist Hospital returned appropriately filled self-administered questionnaires. A multistage sampling technique was used to recruit participants. Data obtained was analysed using Microsoft Excel and Statistical Product and Service Solutions.
Results: About 14(7.7%) and 16(8.7%) of responding physicians had good knowledge of colorectal cancer screening using fecal occult blood test and colonoscopy respectively. A significant proportion of responding physicians 138(75.4%) agreed that colonoscopy is very effective in reducing cancer mortality while 43(23.5%) felt the same about fecal occult blood test. Almost all responding physicians 180(98.4%) considered screening for colorectal cancer worthwhile, while 73(39.9%) routinely screen patients for colorectal cancer.
Conclusion: This research revealed a poor level of knowledge of colorectal cancer screening and a low level of screening recommendations among physicians despite a positive attitude towards screening.

Keywords: Attitude, Colorectal cancer, Practice, Physicians knowledge, Screening.

Corresponding Author:

Akpa Philip Ojile
Department of Pathology, University of Jos, Jos plateau state Nigeria. P.M.B 2084

akpaphilip@yahoo.com

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Introduction

Colorectal cancer is the second most common cause of cancer death and the third most commonly diagnosed malignancy worldwide, it is surpassed in incidence only by lung and breast cancer.[1,2] The incidence is increasing globally and it is projected that low- and middle-income countries (LMICs) will bear a disproportionately high burden of the projected

increase.[2-4] The increased burden in LMICs is driven by the adoption of a western lifestyle and lack of screening.[4-6]

A majority of cancers of the colon develop from adenomas with a long asymptomatic period in-between making screening an effective method of prevention and early detection.[7,8] Many developed countries that have implemented national guidelines on colorectal cancer screening have achieved significant levels of success ranging from stabilization to decreased incidence.[5] As a result of low screening coverage, most cases of colorectal carcinoma diagnosis in LMICs occurs as late stage disease with attendant poor prognosis.[9,10]

There are several methods that can be used for screening for colorectal carcinoma (CRC) such as fecal occult blood test (FOBT), fecal immunohistochemical test, colonoscopy, flexible sigmoidoscopy and barium enema.[11] The use of these methods in combination for colorectal cancer screening, has been shown to decrease mortality and is cost-effective in terms of quality-adjusted life-years (QALYs) gained in comparison to non-screening even in LMICs.[11-15]

There are several colorectal cancer screening guidelines proposed by organizations and professional bodies from around the world. The world gastroenterology organization recommends a screening regimen that suits the peculiarities of the population in which screening is planned.[16] The most widely recommended age of commencement of screening is 50 years.[17] The American cancer society recommends screening from the age of 45 for average risk individuals and screening starting earlier than 45 years with more frequent screening for high risk populations.[18] Screening intervals may vary depending on the test used and the individual's risk level. The United States Preventive Service Task Force (USPSTF) recommends annual screening using FOBT/FIT, sigmoidoscopy every 5 years and colonoscopy every 10 years.[19] The age of cessation of screening varies from guideline to guideline, stoppage of screening after 75 years is the most commonly selected upper limit because the benefit-risk ratio decreases thereafter. However, screening after this age should be individualized, based on considerations like patient fitness and potential benefits.[17] The average age at diagnosis of CRC is lower in Nigeria when compared to western societies, hence a recommendation for early screening was put forward by Alatise et al in 2019.[11]

Physicians' knowledge of colorectal cancer screening guidelines is likely to vary due to factors like access to updated resources, training opportunities, and the influence of their health care infrastructure. In LMICs of Africa including Nigeria, where colorectal cancer awareness is still in its early stages and evolving, physicians' education on screening guidelines may not be standardized compared to regions of the world where healthcare systems are more standardized. This is particularly true in Nigeria where a nationally accepted guideline is non-existent.[11] Studies conducted in Brazil and Thailand showed that physicians had very limited knowledge of colorectal cancer screening guidelines and their screening recommendation levels were also low.[20,21] The physicians in the study from Thailand had a better knowledge of screening for breast and cervical cancer than knowledge of colorectal cancer screening.[20] In Saudi Arabia physicians who practiced colorectal cancer screening had better knowledge scores than those who didn't screen revealing a direct correlation between knowledge of colorectal cancer screening and its practice.[22]

The attitude of physicians towards colorectal cancer screening in low income settings like Nigeria can vary due to their level of knowledge of screening guidelines, healthcare infrastructure constraints and cultural perceptions. A recognition of the importance of screening for early detection, skepticism about the feasibility of screening and cost-effectiveness of screening play an important role in shaping physicians' attitude towards screening.[23] A physician's belief in the effectiveness of colorectal cancer screening as a preventive measure against CRC is an important parameter in assessing a physician's attitude towards screening. Ninety-five percent (95%) of physicians surveyed in the United states believed colonoscopy is very effective in reducing cancer mortality while only 12% had the same view of FOBT screening.[24] In Ghana more physicians believed in the effectiveness of pap smear screening than they did for colonoscopic screening.[25] Most of the physicians surveyed in the USA by Brown et al considered CRC screening as a very important screening measure, agreeing that it is as or more important than breast and cervical cancer screening.[26] Eighty-seven percent (87.8%) of physicians surveyed in a Lagos study likewise agreed that colorectal cancer screening is worthwhile.[23]

The guidelines for colorectal cancer screening vary from country to country and even within the same

country different guidelines can be used.[17] While Nigeria does not have a nationally accepted colorectal cancer screening guideline its neighbor Ghana has one.[27] In Ghana the national cancer steering committee recommends the use of FOBT as initial screening tool for individuals 50-70 years with follow-up endoscopic evaluation for those with positive results because there was no evidence to warrant screening with nationwide endoscopic testing.[27] The commonest screening strategy used by physicians in Lagos in a report by Onyekwere et al was a combination of two methods (FOBT and sigmoidoscopy or double contrast barium enema (DCBE) followed by colonoscopy.[23] Only about a quarter of surveyed physicians in the Lagos study adhered to international screening guidelines for colorectal cancer in terms of frequency of screening.[23] A combination of tests as an initial screening strategy was also the most common screening strategy employed by physicians in a South African study as it was considered to have a higher yield and was cost effective.[28]

The objectives of this study were to assess physicians' knowledge of colorectal cancer screening, to assess their attitudes towards screening for colorectal cancer and to determine their current colorectal cancer screening practices.

Materials and methods

Study area

This study was carried out in Plateau state. Plateau state is situated in the North-Central geopolitical zone of Nigeria and has a projected population of 4.7 million inhabitants as at 2022.[29,30] The tertiary hospitals utilised for the study were the Jos University Teaching Hospital and Plateau State Specialist Hospital, both located in Jos, Plateau state, North-Central Nigeria.

Study design and study population

This research was a descriptive cross-sectional study carried out among physicians who offer clinical services at the Jos University Teaching Hospital and Plateau State Specialist Hospital. These hospitals offer specialized services in most of the fields of medical practice. The hospitals serve patients from within and outside the state in both in and out-patient basis. There are about 450 practicing physicians in JUTH and about 60 practicing in PSSH offering services in the various specialties. There are about 660 registered doctors practicing in Plateau state. Physicians who offer regular clinical services to adult patients that consented to participate in the study were included. Physicians who do not offer clinical services to adults such as pediatricians and those physicians who did not give consent to be part of the research were excluded.

Sample size determination

The sample size was determined using Cochran's Formula and correcting for a finite population. Applying the Cochran's Formula ($n = z^2 p q/d^2$), a z-score of 1.96 corresponding to 95% confidence level was used, a proportion (expected prevalence rate of screening) of 40% from a previous Nigerian study was adopted[23] hence a complementary probability(q) of (1 – 0.4). With a degree of precision set at 5% (0.05) a sample size of approximately 369 physicians was calculated. Considering that the population of physicians in plateau state is less than 10,000, a finite population correction (FPC) was applied using the finite population correction formula ($nf = n \times N-n/N-1$). Whereby, nf = adjusted sample size with finite population correction, n = sample size calculated without finite population correction and N = total population size. A total of 163 (physicians) was arrived at. Furthermore, considering a non-response rate of 10%, a minimal sample size of 179 physicians was gotten.

Sampling technique

A multi-stage sampling technique was used for this study

Stage one (selection of institutions): Purposive sampling was used to select Jos University Teaching Hospital and Plateau State Specialist Hospital because they have a diverse and large number of physicians of the different areas of specialization.

Stage two (selection of departments/areas of specialization): Physicians in the fields which regularly see adult patients were selected using purposive sampling technique.

Stage three (selection of physicians): A complete enumeration sampling technique was used at this stage whereby questionnaires were administered to all physicians who were accessible in the selected specialties in order to attain to the calculated sample size.

Data collection

A semi-structured self-administered questionnaire was used to collect data. The questionnaire was an

adaptation from a validated nationally used US survey of colorectal cancer screening practices created by the United States of America National Cancer Institute.[31] The questionnaire was pre-tested on 6 physicians that offer specialist care in a private tertiary hospital in Jos to ensure clarity, reliability, and validity in our setting. The researchers along with trained assistants handed over all questionnaires to consenting participants during departmental meetings, at the clinics, personal offices and operating room waiting area. Participants were informed about the research and its aims, they were assured of information confidentiality and anonymity. They were also informed that participation is voluntary. Data collection took place between 9th January 2024 and 15th march 2024.

Data analysis

The questionnaires were sorted out for completeness, and manually entered into Microsoft excel (Microsoft corp. USA version 2019). Data was cleaned and exported to Statistical Product and Service Solutions (SPSS version 23) for analysis. Descriptive statistics such a frequencies percentages, mean and standard deviation were calculated for continuous variables, while the Chi-Square test was employed to analyze the associations between categorical variables at a significance of $p<0.05$.

Ethical considerations

Ethical clearance was obtained from the Jos University Teaching Hospital and Plateau State Specialist Hospital health research ethics committees with reference numbers NHREC/JUTH/05/10/22 and PSSH/ADM/ETH.CO/2015/C-NHREC/09/23/2010b respectively. Informed consent was obtained from participants prior to data collection. Information concerning study objectives, voluntary participation, and confidentiality was provided to participants. Confidentiality and anonymity of data collected was ensured.

Results

socio-demographic characteristics of respondents

A total of 183 out of 272 distributed questionnaires were returned and analysed for the study (response rate of 67.3%). Table 1 shows the socio-demographic and practice characteristics of the responding physicians. Family medicine was the field with the highest number of respondents (24%) followed by surgery (15.8%). A majority of the physicians (73.8%) were non-specialists (resident doctors and medical officers) and 70.5% of all respondents were males. Physicians who had practiced for between 11 to 15 years (31.7%) were the largest group in the category and a majority of responding doctors (71.6%) attend to between 25 to 50 patients per week.

Table 1: Socio-demographic and practice characteristics of Physicians

Physician demographic data	Frequency (n 183)	Percentage
Specialty		
Family medicine	44	24.0
Internal medicine	22	12.0
Lab medicine	21	11.5
Surgery	29	15.8
Others	67	36.6
Designation		
Consultant	48	26.2
Non-consultant	135	73.8
Gender		
Male	129	70.5
Female	54	29.5
Marital status		
Married	144	78.7
Single	39	21.3
Participants age		
<30	23	12.6
30-50	144	78.7
51-70	16	8.7
Number of years of practice		
≤ 5	29	15.8
6-10	57	31.1
11-15	58	31.7
16-20	16	8.7
>20	23	12.6
Average number of patients seen in a week		
≤25	52	28.4
26-50	89	48.6
51-100	28	15.3
>100	14	7.7
Percentage distribution of patients' ≥50 years seen per week		
<25	38	20.8
25-49	92	50.3
50-74	49	26.8
75-100	4	2.2

Physicians' knowledge of colorectal cancer screening

Table 2 shows physicians' knowledge of common cancer screening methods. Only about 7.7% and 8.7% of responding physicians had good knowledge of colorectal cancer screening using fecal occult blood test and colonoscopy respectively. The percentage of

Table 2: Knowledge of common cancer screening guidelines/methods among physicians

Screening test	Knowledge cancer screening guidelines n(%)		
	Good	Fair	Poor
Pap Smear	7(3.8)	17 (9.3)	159(86.9)
Mammography	18(9.8)	27(14.8)	138(75.4)
Prostate specific antigen	7(3.8)	27(14.8)	149(81.4)
Fecal occult blood test	14(7.7)	19(10.4)	150(82.0)
Flexible sigmoidoscopy	15(8.2)	23(12.6)	145(79.2)
Colonoscopy	16(8.7)	28(15.3)	139(76.0)
Double contrast barium enema	11(6.0)	20(10.9)	152(83.1)

responding physicians with a good knowledge of the other screening tests such as Pap smear (3.8%), Mammography (9.8%) and PSA (3.8%) were equally low.

Table 3: Association between physician demographic data and knowledge of colorectal cancer screening with fecal occult blood test

Demographic data	Knowledge of guidelines of fecal occult blood test, n(%)			χ2	p-value
	Good	Fair	Poor		
Specialty					
Family medicine	3(6.8)	6(13.6)	35(79.5)	11.014	0.201
Internal medicine	5(22.7)	2(9.1)	15(68.2)		
Lab medicine	2(9.5)	2(9.5)	17(79.3)		
Surgery	2(6.9)	4(13.8)	23(79.3)		
Others	2(3.0)	5(7.5)	60(89.6)		
Designation					
Consultant	7(14.6)	5(10.4)	36(75.0)	4.474	0.107
Non-consultant	7(5.2)	14(10.4)	114(84.4)		
Number of years of practice					
< 5	0(0.0)	4(13.8)	25(86.2)	5.738	0.677
6-10	4(7.0)	5(8.8)	48(84.2)		
11-15	7(12.1)	7(12.1)	44(75.9)		
16-20	1(6.3)	2(12.5)	13(81.3)		
>20	2(8.7)	1(4.3)	20(87.0)		

Table 3 shows a test of association between physician demographic data and knowledge of colorectal cancer screening with fecal occult blood test. Internal medicine physicians (22.7%) had a relatively higher percentage of individuals with a good knowledge of colorectal cancer screening using FOBT than physicians in other fields such as surgery (6.9%), Specialists (consultants) also demonstrated a better knowledge (14.6%) compared to non-specialists (5.2%). The differences in the level of knowledge of the different groups was however not statistically significant ($p>0.05$).

Table 4 shows a test of association between physician demographic data and knowledge of colorectal cancer screening using Colonoscopy. Internal medicine physicians had the highest number of individuals with a good knowledge of colorectal cancer screening using colonoscopy at 27.3% compared to only 10.3% amongst surgeons. Specialists (16.3%) also had a higher percentage of individuals with a good knowledge of screening using colonoscopy than non-specialists (5.9%). The difference in the level knowledge of colonoscopy screening among the different areas of specialization and levels of qualification was statistically significant ($p<0.05$).

Table 4: Association between physician demographic data and knowledge of colorectal cancer screening with Colonoscopy

Demographic data	Knowledge of guidelines of Colonoscopy n(%)			χ2	p-value
	Good	Fair	Poor		
Specialty					
Family medicine	3(6.8)	7(15.9)	34(77.3)	22.769	0.004*
Internal medicine	6(27.3)	6(27.3)	10(45.5)		
Lab medicine	2(9.5)	6(28.6)	13(61.9)		
Surgery	3(10.3)	3(10.3)	23(79.3)		
Others	2(3.0)	6(9.0)	59(88.1)		
Designation					
Consultant	8(16.7)	10(20.8)	30(62.5)	7.525	0.023*
Non-consultant	8(5.9)	18(13.3)	109(80.7)		
Number of years of practice					
< 5	0(0.0)	3(10.3)	26(89.7)	11.115	0.195
6-10	4(7.0)	6(10.5)	47(82.5)		
11-15	8(13.8)	9(15.5)	41(70.7)		
16-20	1(6.3)	4(25.0)	11(68.8)		
>20	3(13.0)	6(26.1)	14(60.9)		

*= significant p value

Table 5: Knowledge of age at commencement and interval between screenings using FOBT and colonoscopy for CRC screening among physicians

	Screening method	Correct responses (n=183)	Percentage
Age of Commencement of screening	FOBT	77	42.1
	Colonoscopy	89	48.6
Interval between screenings	FOBT	48	26.2
	Colonoscopy	9	4.9

FOBT Fecal Occult Blood Test CRC Colorectal Cancer

Tables 5 shows the knowledge of age at commencement of screening and interval between screenings for colorectal cancer using FOBT and colonoscopy. Less than half of the responding physicians were aware of the age of commencement of screening for colorectal cancer using FOBT (42.1%) and colonoscopy (48.6%). The knowledge of the intervals between screening tests was very poor, only 26.4% and 4.9% of practicing physicians were aware of the correct screening intervals for FOBT and colonoscopy screenings respectively.

Physycians' attitude towards colorectal cancer screening

Table 6 shows physicians perceived beliefs about the effectiveness of common cancer screening strategies in reducing cancer mortality in average-risk individuals. A majority of responding physicians (82.5%) believed pap smear screening is very effective in reducing cancer mortality in average-risk

Table 6: Perceived effectiveness of cancer screening strategy in reducing cancer mortality in average-risk individuals among physicians

Screening test, n(%)	Very effective	Somewhat effective	Not effective	Don't know
Pap smear	151(82.5)	26(14.2)	4(2.2)	2(1.1)
Mammography	118(64.5)	59(32.2)	3(1.6)	3(1.6)
Prostate specific antigen (PSA)	102(55.7)	71(38.8)	9(4.9)	1(0.5)
Fecal occult blood test (FOBT)	43(23.5)	103(56.3)	24(13.1)	13(7.1)
Flexible sigmoidoscopy	102(55.7)	57(31.1)	6(3.3)	18(9.8)
Colonoscopy	138(75.4)	33(18.0)	6(3.3)	6(3.3)
Double contrast Barium enema (DCBE)	51(27.9)	84(45.9)	13(7.1)	35(19.1)

patients 50 years and above and seventy-five percent (75.4%) believed the same about colonoscopy. Only 23.5% of physicians believed that FOBT is very effective in reducing cancer mortality in average-risk patients 50 years and above.

Table 7: Association between physicians' area of specialization and their beliefs with regards to the effectiveness of cancer screening tests

variables	Specialty. n(%)					χ2	p-value
	FM	IM	LM	Surgery	Others		
Pap smear							
Very effective	33(75.0)	20(90.9)	18(85.7)	23(79.3)	57(85.1)	19.932	0.068
SWE	11(25.0)	2(0.0)	3(14.3)	3(10.3)	7(10.4)		
Not effective	0(0.0)	0(0.0)	0(0.0)	3(10.3)	1(1.5)		
Don't know	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(3.0)		
Mammography							
Very effective	26(59.1)	16(72.7)	12(57.1)	16(55.2)	48(71.6)	10.886	0.539
SWE	15(34.1)	6(27.3)	9(42.9)	12(41.4)	17(25.4)		
Not effective	2(4.5)	0(0.0)	0(0.0)	1(3.4)	0(0.0)		
Don't know	1(2.3)	0(0.0)	0(0.0)	0(0.0)	2(3.0)		
PSA							
Very effective	23(52.3)	15(68.2)	9(42.9)	15(51.7)	40(59.7)	21.668	0.041
SWE	14(31.8)	7(31.8)	12(57.1)	14(48.3)	24(35.8)		
Not effective	7(15.9)	0(0.0)	0(0.0)	0(0.0)	2(3.0)		
Don't know	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(1.5)		
FOBT							
Very effective	7(15.9)	9(40.9)	4(19.0)	4(13.8)	19(28.4)	16.790	0.158
SWE	28(63.6)	10(45.5)	14(66.7)	20(69.0)	31(46.3)		
Not effective	8(18.2)	2(9.1)	2(9.5)	4(13.8)	8(11.9)		
Don't know	1(2.3)	1(4.5)	1(4.8)	1(3.4)	9(13.4)		
Flexible sigmoidoscopy							
Very effective	22(50.0)	10(45.5)	15(71.4)	20(69.0)	35(52.2)	18.147	0.111
SWE	13(29.5)	12(54.5)	2(9.5)	8(27.6)	22(32.8)		
Not effective	3(6.8)	0(0.0)	1(4.8)	0(0.0)	2(3.0)		
Don't know	6(13.6)	0(0.0)	3(14.3)	1(3.4)	8(11.9)		
Colonoscopy							
Very effective	30(68.2)	21(95.5)	17(81.0)	26(89.7)	44(65.7)	21.736	0.041
SWE	9(20.5)	1(4.5)	3(14.3)	3(10.3)	17(25.4)		
Not effective	4 (9.1)	0(0.0)	1(4.8)	0(0.0)	1(1.5)		
Don't know	1 (2.3)	0(0.0)	0(0.0)	0(0.0)	5(7.5)		
DCBE							
Very effective	10(22.7)	6(27.3)	7(33.3)	4(13.8)	24(35.8)	22.608	0.031
SWE	16(36.4)	11(50.0)	10(47.6)	20(69.0)	27(40.3)		
Not effective	7(15.9)	2(9.1)	0(0.0)	3(10.3)	1(1.5)		
Don't know	11(25.0)	3(13.6)	4(19.0)	2(6.9)	15(22.4)		

FM-Family medicine IM-Internal medicine LM-ab. Medicine SWE-Somewhat effective

Table 7 Shows the association between physicians' area of specialization and their beliefs with regards to the effectiveness of cancer screening tests. Almost all physicians in the field of internal medicine (95.5%) believed that colonoscopy is a very effective screening test while only 68.2% of family medicine physicians felt the same. The differences in the perception of the different specialties as regards the effectiveness of colonoscopy as a screening test was statistically significant ($p<0.05$).

Figure 1 shows physicians perceived difficulty in arranging colorectal cancer screening. The bar chart shows that 34.2% of physicians considered arranging a colorectal cancer screening to be not at all difficult or of low difficulty, about 53.4% agreed that arranging a screening test is of moderate difficulty.

Figure 2 shows physicians' consideration of colorectal cancer screening as being worthwhile or not. The Pie-chart shows that ninety-eight percent (98.4%) of responding physicians considered colorectal cancer screening to be worthwhile.

Table 8 shows the reasons why physicians consider colorectal cancer screening as being worthwhile. The bar chart shows that 129(70.5%) out of 183 respondents noted the importance of early detection as a benefit of screening.

Physicians' colorectal cancer screening practices

Table 9 shows the screening tests routinely ordered or performed by physicians. Over half of the responding physicians routinely perform or recommend screening using pap smear (57.9%) and PSA (55.7%), however

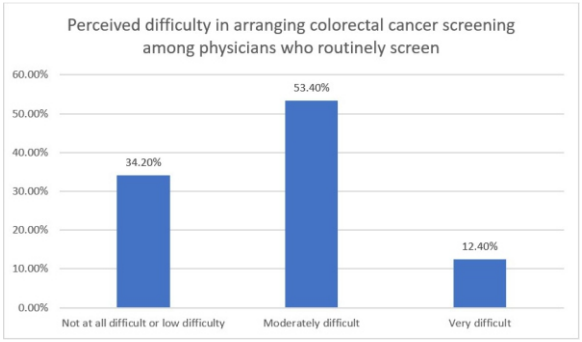

Figure 1: Perceived difficulty in arranging colorectal cancer screening among physicians

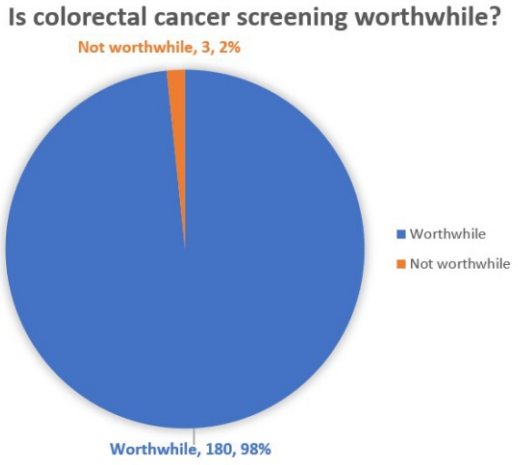

Figure 2: Physicians consideration of colorectal cancer screening as being worthwhile

only about a quarter routinely perform or recommend screening with FOBT (24%) and Colonoscopy (26.8%).

Table 10 shows the test or test combination often recommended as an initial colorectal cancer screening strategy by responding physicians. Almost forty percent (39.9%) of responding physicians routinely screen patients for colorectal cancer while 60.1% don't screen. About half of the responding physicians (50.6%) who routinely screened for CRC utilised a combination of FOBT and colonoscopy as the initial screening tests.

Table 8: Reasons why physicians consider colorectal cancer screening as being worthwhile

Response	Frequency	Percentage
Because of increasing incidence		
Yes	115	62.8
No	68	37.2
Because of the importance of early detection		
Yes	129	70.5
No	54	29.5
Because screening will lead to a reduction in overall mortality		
Yes	116	63.4
No	67	36.6

Table 9: Screening tests routinely ordered or performed by physicians

Cancer screening procedures, n(%)	Frequency	Percentage
Pap smear		
Yes	106	57.9
No	77	42.1
Mammography		
Yes	78	42.6
No	105	57.4
Prostate specific antigen (PSA)		
Yes	102	55.7
No	81	44.3
Fecal occult blood test (FOBT)		
Yes	44	24.0
No	139	76.0
Flexible sigmoidoscopy		
Yes	20	10.9
No	163	89.1
Colonoscopy		
Yes	49	26.8
No	134	73.2
Double contrast Barium enema (DCBE)		
Yes	18	9.8
No	165	90.2

Figure 3 is a bar chart that shows the follow-up step after an initial positive FOBT. After a positive FOBT, 80% of the responding physicians recommend colonoscopy as follow up and 8.5% recommend a repeat FOBT.

Table 10: Current test or test combination often recommended as an initial colorectal cancer screening strategy by physicians

Response	Frequency	Percentage
Because of increasing incidence		
Yes	115	62.8
No	68	37.2
Because of the importance of early detection		
Yes	129	70.5
No	54	29.5
Because screening will lead to a reduction in overall mortality		
Yes	116	63.4
No	67	36.6

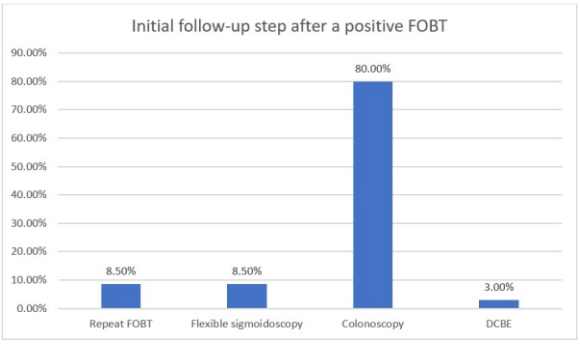

Figure 3: Initial follow-up step recommended by physicians after a positive FOBT

Discussion

This study assesses the knowledge, attitudes and practice of colorectal cancer screening among physicians practicing in tertiary hospitals in Jos, Plateau State in North-Central, Nigeria. The study revealed an overall poor level of knowledge of cancer screening. Only 7.7% and 8.7% of responding physicians were assessed to have an overall good knowledge of colorectal cancer screening using fecal occult blood test and colonoscopy respectively. Those who had an overall good knowledge of the other routine cancer screening tests such as pap smear, mammography and PSA screening were also a minority at 3.8%, 9.8% and 3.8% respectively. Physicians in the field of internal medicine demonstrated a better knowledge of the screening guidelines for colorectal cancer using both FOBT and colonoscopy with the difference in level of knowledge for colonoscopy screening being statistically significant. The higher percentage of internal medicine physicians demonstrating a good knowledge of screening may be coincidental or could be as a result of peculiarities of the training and practice in the specialty. There was poor knowledge

on the age of commencement of screening and interval of screening among responding doctors when these parameters were considered independently for FOBT and colonoscopy which are the most widely used CRC screening tests. Figures higher than ours were reported by Thanapirom et al in Bangkok Thailand, whereby 65% of physicians were aware of the correct interval of screening using FOBT while 25.3% were aware of the interval of screening using colonoscopy.[20] The percentages of physicians who were aware of the correct screening interval for FOBT (87%) and colonoscopy (54%) in a nationwide United States study were also very much higher than the figures in this study.[24] Efforts to improve physician knowledge of colorectal cancer screening in our setting is of dire importance as evidence shows a direct relationship between knowledge of colorectal cancer screening and screening rates.[22]

Assessment of physicians' attitude towards colorectal cancer screening was carried out by asking physicians to select their level of belief in the effectiveness of the various screening modalities, to state whether screening was beneficial/worthwhile and to grade their perceived level of difficulty in getting a patient screened. Pap smear screening had the highest proportion of physicians (82.5%) who considered it to be a very effective screening test, a finding similar to the report by Lussiez et al (82.6%) from Ghana.[25] Seventy-five percent (75.4%) of doctors surveyed in this study believed colonoscopy is very effective in reducing CRC mortality while less than one quarter (23.5%) considered FOBT as very effective. The proportion of physicians in the study by Lussiez et al who felt colonoscopy (66.7%) and FOBT (25%) are very effective screening tests is similar to the findings of this study.[25] Internal medicine physicians were significantly more likely to consider colonoscopy as an effective screening test, a finding that aligns with their better knowledge of the screening method. In a study by Klabunde et al among physicians surveyed across the United States, 95% believed colonoscopy was very effective in reducing CRC mortality and only 12% of respondents believed FOBT was very effective.[24] Studies from Saudi Arabia, Brazil and Thailand all indicate that physicians have a bias towards colonoscopy.[20,21,32] The perceived greater effectiveness of colonoscopy compared to FOBT appears to be held by most physicians and hence influences their choice of screening tests. The main limitation of FOBT are its low sensitivity and tendency of poor adherence to screening instructions by patients.[33] Physician education aimed at improving their attitude towards FOBT usage is necessary as available data indicates an over-reliance on colonoscopy.[26]

Slightly more than half (53.4%) of physicians in this study who routinely screened for colorectal cancer indicated that getting a patient screened is of moderate difficulty while 34.2% indicated that it was not at all or of low difficulty. The perceived lack of difficulty in arranging screening is an encouraging finding considering the limitations of practice in our setting. The vast majority of the surveyed physicians (98.4%) considered colorectal cancer screening to be worthwhile, about 70.5% of them stating the need for early cancer detection as reason for screening. In a Lagos study 87.8% of physicians considered CRC screening worthwhile, a figure similar to the observations of this study.[23] Majority of clinicians surveyed by Brown et al in community health centres of the community health applied research network of America agreed that CRC screening was as or more important than screening for breast and cervical cancer.[26] The positive attitude towards colorectal cancer screening amongst physicians in this study is an interesting and encouraging observation which can be harnessed to increase colorectal cancer screening rates in our setting.

Physicians screening practice was assessed by determining their general cancer screening practices, the test or test combination used as initial screening strategy and the follow up test used after a positive fecal occult blood test. Physicians surveyed in this study are less likely to screen for colorectal cancer than the other commonly available screening strategies. Over half of responding physicians routinely recommend screening using pap smear (57.9%) and PSA (55.7%), while only about 39.9% screen for colorectal cancer. Similar observations were made by Onyekwere et al in Lagos whereby only 40% of surveyed physicians recommended colorectal cancer screening and it was the least practiced form of cancer screening.[23] Physicians screening rates for breast cancer (90%), cervical cancer (80%) and prostate cancer (70%) were however significantly higher in the Lagos study than in this study.[23] A report by Souza et al in Brazil documented similar findings to this study whereby only 42.2% of surveyed physicians offered any form of colorectal screening to their patients.[21] These figures are abysmally low compared to the 99% physician recommendation of colorectal cancer screening reported by Klabunde et

al in the United states of America. The reasons for a lower percentage of physicians who screen for colorectal cancer in comparison to other cancer screening methods could be a perceived lower incidence of CRC when compared to other cancers, the high costs involved in screening for CRC or lack of awareness of colorectal cancer screening. The low level of screening in our environment is an important factor responsible for late presentation and disproportionate mortality in Nigeria.[5,6] Increased screening coverage has the potential to decrease or at least stabilize the incidence as evidenced by the trends in high income countries (HICs) that have high screening coverage.[5]

Physicians may recommend a single test or combination depending on the perceived reliability, availability and cost. About half (50.6%) of the doctors who routinely screened patients in this study chose a combination of FOBT and colonoscopy as their preferred initial screening strategy. A further 24.6% recommended colonoscopy alone and only 12.3% recommended FOBT alone as an initial screening test. The initial screening practice of Ghanaian physicians differs slightly, 40% of physicians in a Ghana study would initially recommend colonoscopy alone, 26.7% FOBT and flexible sigmoidoscopy and 2.5% FOBT alone.[25] Colonoscopy even though expensive and not readily available in LMICs like Nigeria and Ghana appear to feature prominently because of its perceived superiority to other colorectal cancer screening modalities.[25]

After a positive FOBT, 80.0% of the responding physicians in this study would recommend colonoscopy as follow up, 8.5% would recommend flexible sigmoidoscopy, 3% would recommend DCBE and 8.5% would repeat FOBT. In the Ghanaian study by Lussiez et al 66.7% would recommend colonoscopy as follow up of positive FOBT and 33.3% flexible sigmoidoscopy.[25] The practice of following up a positive FOBT with colonoscopy is the most appropriate step and universally accepted.[11,26]

Colonoscopy was the most commonly recommended CRC screening test in this study, 67.1% of the responding physicians who routinely screen for CRC recommend colonoscopy while FOBT was second with 60.3% of doctors who screen recommending it. Only 27.3% and 24.6% of doctors who routinely screen patients for colorectal cancer have recommended flexible sigmoidoscopy and double contrast barium enema respectively at some point. The percentage of doctors that utilised colonoscopy for screening in a large study in the USA was 95% and FOBT utilization was slightly lower at 80%.[24] In another study in the United States 74% of physicians stated that they never recommend flexible sigmoidoscopy and double contrast barium enema as screening tests.[34] Brown et al also out of the United states reported that 37% of clinicians who served under-privileged populations didn't even discuss other modalities of screening asides colonoscopy with their patients without considering cost.[26] The commonest screening test used by physicians surveyed in Bangkok Thailand was colonoscopy at 47.5% followed by FOBT at 40.6%, with only 5.7% and 4.4% using flexible sigmoidoscopy and double contrast barium enema respectively.[20] A report by Souza et al in Brazil also showed a preference for colonoscopy among physicians who offer screening, 83% of the physicians routinely offer screening using colonoscopy while 73% routinely use FOBT.[21] The preferential use of colonoscopy as a screening test reflects the belief and attitudes regarding the effectiveness of colonoscopy as compared to FOBT despite the high financial burden of carrying out colonoscopy. This has implications for LMICs which do not have the financial might to offer colonoscopy to everyone who needs it. Although most physicians believe colonoscopy is the most effective screening test and FOBT is less effective, evidence suggests that FOBT is also effective in reducing colorectal cancer mortality.[35] The physician's attitude towards FOBT effectiveness may create an implicit bias that reduces the use of FOBT and hence become a barrier to screening patients who would have benefitted from screening using FOBT.[34] Fecal occult blood test use should therefore be encouraged in our environment because of its low cost, availability and proven effectiveness. Strict adherence to annual FOBT screening and judicious follow-up endoscopy for positive cases can help improve the effectiveness of FOBT where colonoscopy is not readily available or patients prefer the former.[26]

Limitations of study

Possible response bias could have occurred if physicians provided desirable answers rather than their true opinions or practices. Recall bias could also have occurred because physicians may not have accurately remembered their practices over the duration asked. Self-selection bias could also be a limitation as those who participated may have

different attitudes and practices from those who did not fill the questionnaire. Non-response bias is also a potential limitation as a high percentage of those who were given questionnaires did not return them.

Conclusion and recommendations

This study showed a low level of knowledge of colorectal cancer screening among physicians in tertiary hospitals in Jos, Plateau State, Nigeria. The physicians' colorectal cancer screening recommendations was also low despite a positive attitude towards screening. Effort to increase physicians' knowledge of colorectal cancer screening and education on the benefits of screening at the hospital and state level is therefore recommended. Increased screening rates will be necessary to mitigate projected increase in colorectal cancer related mortality predicted for low- and middle-income settings like ours.

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