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Logistics and results of a colorectal cancer screening program in a municipality in the Hinterland of Alagoas

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HIGHLIGHTS

- Colorectal cancer (CRC) has high mortality rates worldwide. In Brazil, it is the second most common cancer in both sexes.
- The aim of the study was to establish the main strategies and verify the feasibility of implementing a RCC screening program in the municipality of Piranhas/AL.
- A total of 2152 patients aged between 50 and 70 were screened.
- The study proved to be effective and feasible, since 44.6% of program participants who underwent screening with PSOF followed by colonoscopy in positive cases had some type of pre-neoplastic lesion.

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ABSTRACT – Background – Colorectal cancer (CRC) has high mortality rates worldwide. In Brazil, it is the second most common cancer in both sexes. Delay in detecting premalignant lesions contributes to increased morbidity and mortality. In this scenario, the Piranhas project was created to track CRC in a low-income population in the hinterland of Alagoas. **Objective** – The study aimed to establish the main strategies and verify the feasibility of implementing a CRC tracking program and demonstrate the results obtained in the CRC Prevention Campaign in Piranhas/AL. **Methods** – The program took place in Piranhas, Alagoas, Brazil, through public-private partnerships. Individuals aged between 50 and 70 years of age were included for screening with a fecal occult blood test (FOBT) and colonoscopy in positive cases. Patient data were collected on standard forms. **Results –** A total of 2152 patients, aged between 50 and 70 years, were screened, 130 of which underwent colonoscopy. Several preneoplastic lesions were detected in 58 patients. The adenoma detection rate (ADR) was 33.85%. **Conclusion –** The study proved to be effective and viable since 44.6% of the program participants, who underwent screening with FOBT, followed by colonoscopy in positive cases, had some type of preneoplastic lesion. In addition, the program generated a significant social impact on the population of Piranhas due to the opportunity to diagnose and treat CRC precursor lesions.

Keywords – Colorectal neoplasms; mass screening; colonoscopy.

INTRODUCTION

Colorectal cancer (CRC) is a frequent malignant neoplasm and a significant cause of death worldwide, ranking third in incidence and fourth in mortality. According to the American Cancer Society, it occurs mostly after 50 years of age, and symptoms tend to appear later, in a more advanced stage of the disease, generating high costs and an increase in morbidity[1,2].

According to the Instituto Nacional de Câncer (INCA), in Brazil, CRC is the second most common type of cancer in both sexes, excluding cases of non-melanoma skin tumors[3]. An increase in mortality rates from cancer is expected by the year 2025 due to the aging process of the population. This trend presents a greater tendency in less developed regions such as the Northeast, for socioeconomic reasons such as difficulty accessing health services, with delays in diagnosis and treatment[4,5].

About 95% of CRC cases originate from the adenoma-carcinoma sequence, with slow evolution, leading to a mostly asymptomatic premalignant stage. Thus, it enables early detection through screening and prevention from tumor resection before possible progression to invasive cancer[6-9].

Among the population screening proposals, recent worldwide guidelines recommend screening with fecal occult blood testing (FOBT), once or twice a year, and colonoscopy every 10 years, both from 45 or 50 years of age[10-12]. Studies show that programs carried out with patients aged 50 to 75 reduce CRC incidence by 47% to 72%[11]. In this regard, endoscopic polypectomy has a significant impact as it reduces mortality related to this neoplasm by more than 50%[13].

Colonoscopy is considered the best preventive exam, as it is diagnostic and therapeutic; however, due to its high cost for population screening, a different screening method is necessary. The FOBT, in turn, is a good screening test because of its low-cost, non-invasive character It is easy to apply, and the immunochemical type (IFOBT) has greater specificity and accuracy in detecting CRC, being the most used[7,9,14-16].

Due to its high prevalence, its long asymptomatic period, and its preneoplastic lesions that can be treated, routine population screening is necessary as a tool to reduce CRC incidence and mortality rates. In Brazil, the Ministry of Health recommends screening for the population between 50 and 75 years of age, but there is still no organized and effective CRC screening program[17-19].

Due to the importance of the theme, a social program for the prevention of CRC took place in Piranhas, a municipality located in the hinterland of Alagoas. This was an initiative of the *Sociedade Brasileira de Endoscopia Digestiva* (SOBED), whith the support of the *Universidade Federal de Alagoas* (UFAL), *Universidade de São Paulo* (USP), and the municipal government, which provided human resources and facilities for population mobilization. It aimed to explain and raise awareness about this type of cancer and serve as a study model for implementing a cancer screening program in the country. A multidisciplinary health team participated in the program, including medical students.

Thus, the objective of this study was to establish the main strategies and verify the feasibility of implementing a CRC tracking program, as well as demonstrate the results obtained in the CRC prevention campaign in the city of Piranhas/AL.

METHODS

The study was descriptive, analytical, and interventionist, approved by the ethics committee (CAAE: 60945316.7.0000.5013), submitted on 26/11/2018. The project was carried out in the city of Piranhas/AL, at the *Unidade Básica de Saúde* (UBS) Josiclei Dias Nobre, located in the village of Piau.

The sample included individuals aged between 50 and 70, registered by community health agents (CHA), who signed an informed consent form to perform the IFOBT and subsequent colonoscopy in patients with a positive test result.

Data were collected using standard forms completed by medical students, CHAs, and physicians during the program. These consisted of general patient information, personal history, and IFOBT and colonoscopy test results.

Public-private partnerships were signed to provide equipment, medication, medical supplies, and the necessary physical structure to enable the project and its financing.

Procedures

- **The project took place in the following phases:**

■ 1st phase - mobilization, information, and team training strategy.

The project was publicized through radio, pamphlets, and newspapers to inform the population and CHAs about the importance of CRC tracking. It enabled the population to adhere to the program. There was also training for health professionals in the region who were part of the work team during the program.

■ 2nd phase – testing for fecal occult blood

CHAs, previously instructed to carry out this step, distributed quantitative fecal occult blood tests manufactured by Eiken Chemical CO., LTD, and provided by the city of Piranhas to individuals aged 50 to 70 living in the town. The collected samples were sent to laboratory analysis. The cut-off value for test positivity was 50 ug/mL. Twenty-five patients with an IFOBT value below 50 ug/mL were selected to determine a random sample.

■ 3rd phase – referral, preparation, and patient data collection

Patients with positive IFOBT were selected to undergo the colonoscopy exam. They received guidance to prepare for it, which was based on a liquid diet without residues, two tablets of Bisacodyl a day before the exam, and 500 mL of a 20% mannitol solution 6 hours before the exam. On the day of the exam, medical students were responsible for collecting patient data for research, during the pre-examination.

■ 4th phase – colonoscopy exams

This phase lasted 5 days and was attended by eight experienced colonoscopists from different states, six medical students, one anesthesiologist, nurses, and nursing technicians from the region. Two examination rooms were set up at the Basic Health Unit (UBS), premises, Fujifilm EC-760R, EC-760ZP, EC-720R video colonoscopes with Fujifilm's EP-6000 Eluxeo Lite processor were used.

Colonoscopy exams were performed with metric criteria of quality and endoscopic resection when indicated. Biopsies were also performed, and the material obtained during the exams was sent to the pathological anatomy laboratory. In addition to the examination rooms, there were anesthetic preparation and recovery rooms.

■ 5th phase – patient follow-up

Patients who received the test results and those treated by endoscopy were instructed to perform endoscopic follow-up according to guidelines established by the best scientific evidence, while patients without polyps or tumors were returned to the occult blood screening program. In cases with a diagnosis of cancer requiring surgical follow-up, the patient would be referred to the oncology and coloproctology services of the University Hospital Prof. Alberto Antunes, UFAL (HUPAA-UFAL).

Statistical analysis

The data obtained in the study were evaluated through the statistical application of the Pearson's chi-square method. Later, they were tabulated in Microsoft Excel and graphs were created that allowed the presentation of the results and their better discussion.

RESULTS

A total of 2500 Fecal Immunochemical Tests (FIT) were distributed at the UBS with 2152 being carried out, 86% of the target population joined the program. To be part of the sample, 141 (6.5%) patients were selected, 115 who had a positive IFOBT and 26 with a negative result, 130 underwent colonoscopy, and 11 did not undergo the examination for not showing up on the scheduled date, for inadequate bowel preparation or health issues.

Analyzing the relationship between age and IFOBT, out of 130 patients undergoing colonoscopy, 105 patients had IFOBT >50 ug/mL, of which 36.1% (n=38) were between 50 and 55 years old, 27.6% (n=29) between 56 and 60, 19.4% (n=20) between 61 to 65, and 17.1% (n=18) between 66 to 70. The remaining patients (n=25) had an IFOBT <50 ug/mL. No statistical significance was found between the variables (P=0.96).

When relating age to polyp findings, polyps were detected in 37% of patients aged between 50 and 55,

43% between 56 and 60, 48% between 61 and 65, and 59% between 66 and 70. No statistical significance could be observed between the variables (*P*=0.38). This data is represented in FIGURE 1 below.

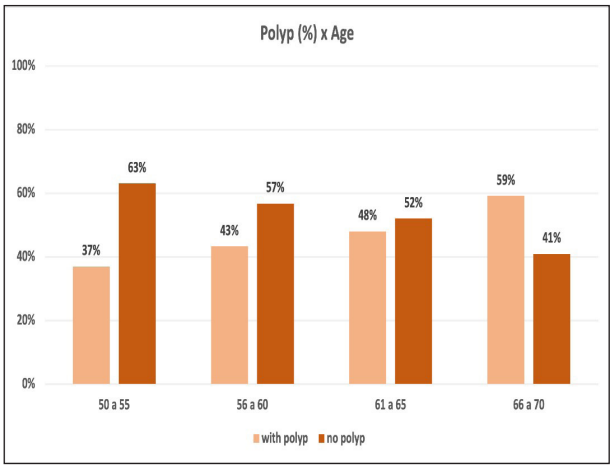

FIGURE 1. Age and polyps percent.

In the study, colorectal polyps were diagnosed in 44.6% (n=58) of the patients, 77.5% (n=45) with an IFOBT result >50 ug/mL, and 22.5% (n=13) <50 ug/mL, with no statistical significance between these variables (*P*=0.63). The predominant location was in the sigmoid colon (n=28), followed by the transverse colon (n=24), ascending colon (n=20), descending colon (n=15), rectum (n=9), and cecum (n=5), as shown in FIGURES 2, 3 and 4 below.

From 1 to 5 polyps were detected per patient, totaling 101, of which 76 were adenomatous, present in 44 patients. The ADR was 33.85%. Among these findings, tubular adenoma with low-grade dysplasia with 51.5% (n=51) of the total and high-grade

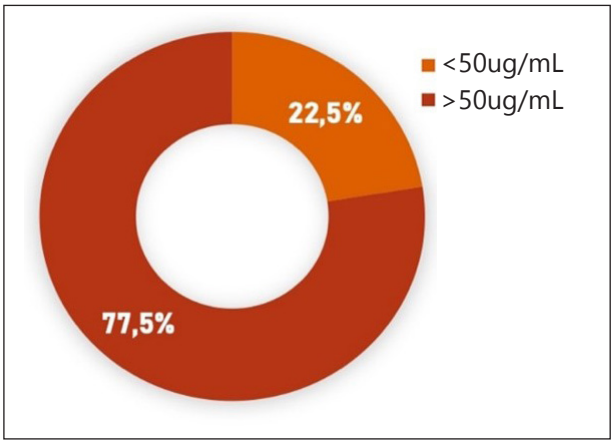

FIGURE 2. Finding polyps according to IFOBT results.

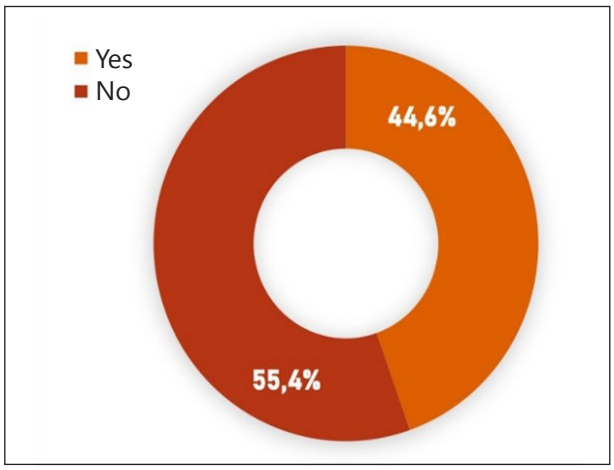

FIGURE 3. Patients with polyps on colonoscopy.

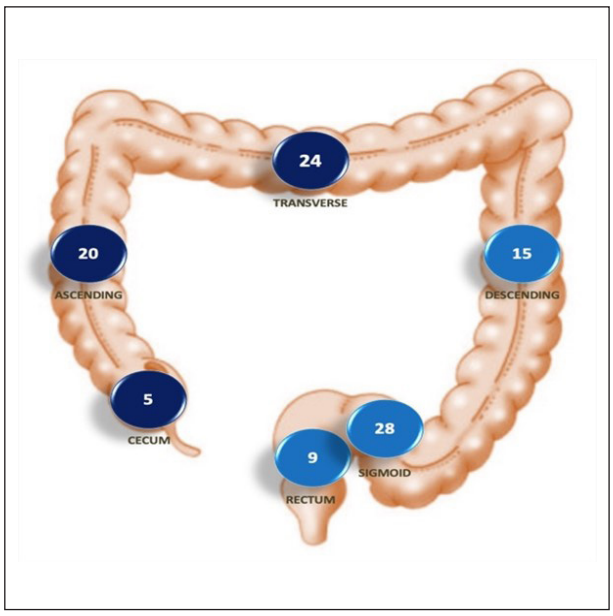

FIGURE 4. Location of polyps in the intestine.

with 14.1% (n=14) were the most frequent histological types. Tubulovillous adenoma with high-grade dysplasia, sessile serrated adenoma with low- and high-grade dysplasia, and traditional serrated adenoma with high-grade dysplasia were found in smaller proportions. In addition to adenomas, hyperplastic polyps, lymphoid polyps, colonic hamartomas, and juvenile-type inflammatory polyps were also diagnosed. Data were not available for four polyps, due to insufficient material for analysis. It was observed that 12 adenomatous polyps occurred in patients whose IFOBT result was less than 50 ug/mL. The histological type of diagnosed polyps and their locations are described in TABLE 1 below.

TABLE 1. Histological type and polyps location.

Histopathological finding	Rectum		Sigmoid		Descending colon		Transverse colon		Ascending colon		Cecum		Total polyps	
	nº	%	nº	%	nº	%	nº	%	nº	%	nº	%	nº	%
Sessile serrated adenoma with high-grade dysplasia	-	-	1	3.6%	-	-	-	-	-	-	-	-	1	1.0%
Sessile serrated adenoma with low-grade dysplasia	-	-	1	3.6%	-	-	3	12.5%	-	-	-	-	4	4.0%
Sessile serrated adenoma without dysplasia	-	-	-	-	-	-	-	-	-	-	1	20.0%	1	10%
Traditional serrated adenoma with high-grade dysplasia	1	11.1%	-	-	-	-	-	-	-	-	-	-	1	1.0%
Tubular adenoma with high-grade dysplasia	-	-	5	17.9%	4	26.7%	-	-	5	25.0%	-	-	14	13.9%
Tubular adenoma with low-grade dysplasia	2	22.2%	15	53.6%	6	40.0%	16	66.7%	10	50.0%	2	40.0%	51	50.5%
Tubulovillous adenoma with high-grade dysplasia	2	22.2%	1	3.6%	-	-	1	4.2%	-	-	-	-	4	4.0%
Colonic Hamartoma	-	-	-	-	-	-	1	4.2%	-	-	-	-	1	1.0%
hyperplastic polyp	3	33.3%	4	14.3%	3	20.0%	2	8.3%	2	10.0%	-	-	14	13.9%
Lymphoid polyp	1	11.1%	-	-	-	-	-	-	-	-	1	20.0%	2	2.0%
Juvenile-type inflammatory polyp	-	-	-	-	-	-	-	-	1	5.0%	-	-	1	1.0%
Post inflammatory polyp	-	-	-	-	-	-	-	-	-	-	1	20.0%	1	1.0%
Data unavailable	-	-	1	3.6%	2	13.3%	1	4.2%	2	10.0%	-	-	6	5.9%

DISCUSSION

Carrying out a CRC screening social program for a population in the hinterland of Alagoas known to be underserved and have poor access to health services was unprecedented and a great challenge. Its results are of great relevance. In carrying out the project, we identified difficulties such as the qualification of professionals in the region who were not familiar with the colonoscopy exam, as well as with population screening programs, incomplete filling in of data by the CHAs, problems with the supply of sedative drugs and delay in preparation of the intestine.

We present the program's results, where 86% of the target population adhered, considered high thanks to the joint work of health professionals and the municipal health department responsible for publicizing the action, registering patients, and making them aware of the importance of CRC prevention. In Brazil, a study carried out in Santa Cruz das Palmeiras had an adherence rate of 79.7% and in Belterra over 95%[14,20]. Other studies from different countries have shown lower adherence rates, ranging from less than 25% in Croatia, 49.2% in Spain, and 77% in Chile[21], while the Kaiser Permanente study showed an adherence rate of 80%[22,23].

Regarding lesion diagnosis, polyps were evidenced in 44.6% (n=58) of patients during colonoscopy, with resection performed when appropriate. A similar study carried out in Santa Catarina found that among 40 patients with positive fecal occult blood tests, 52.5% had polyps[24]. Of the polyps detected in Piranhas, 76 were adenomatous, observed in 44 patients. The ADR was 33.85%, a value above the performance target proposed by the American Society for Gastrointestinal Endoscopy (ASGE) of 30% for men and 20% for women, which optimizes CRC prevention[25]. The ADR value obtained in the study may be attributed to the performance of exams by experienced endoscopists and the use of a high-resolution device.

Among the diagnosed adenomas, most were tu-

bular adenomas with low-grade dysplasia with 51.5% (n=51) of the total, followed by tubular adenoma with high-grade dysplasia, 14.1% (n=14). Similar research carried out in the municipality of Santa Cruz das Palmeiras (SP), in 2007, showed that of the 101 polyps found, 75.2% (n=76) were of the tubular adenoma type with low-grade dysplasia, and 4% (n=4) adenoma type with high-grade dysplasia (14). In 2020, a Chinese study found that of 134 polyps found, 70.9% (n=80) were tubular adenomas without distinction as to the degree of dysplasia[26].

Regarding location, the incidence was slightly higher in the left colon (n=52) than in the right colon (n=49), with a predominance of polyps in the sigmoid (n=28), transverse (n=24), and ascending (n=20); there is still a moderate incidence of findings in the cecum with (n=5). A review carried out at the *Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo*, published in 2019, showed that of 370 patients with CRC, 187 were in the right colon and 171 in the left colon. Patients with CRC on the right had a more advanced stage (III or IV) and a 3.23 times higher risk of death[27]. These data demonstrate the importance of early screening and performing colonoscopy up to the cecum as performed in our study.

The campaign cost evaluation is imprecise due to partnerships with the private sector through donations of materials and equipment to the project. However, it is known that the cost of treating CRC at an advanced stage is high, costing the *Sistema Único de Saúde* (SUS) an average of 80,000 reais per patient. It also generates other expenses for the state, such as sick pay, tax exemption, or in some cases disability retirement[28,29]. On the other hand, prevention allows for a reduction in CRC incidence through the removal of polyps, reducing future expenses, and early diagnosis allows for endoscopic treatments, fewer hospitalizations and other therapies, and returning to activities in a shorter time.

CONCLUSION

This study was a tool to clarify and raise awareness of the importance of CRC and its prevention. It generated a great social impact on the life of the local population due to the opportunity to access health care, which is scarce in the region. More importantly, it allowed early detection and resection of CRC precursor lesions, which otherwise would be diagnosed only at a late stage, with little chance of cure and greater morbidity and mortality.

Linked to this, the study proved to be effective and viable, highlighting the importance of implementing an organized CCR screening program in Brazil, since our results showed a high rate of adherence and that 44.6% of the project participants performed the screening with IFOBT followed by colonoscopy in positive cases had some type of colonic lesion. As for the most appropriate cut-off value for the IFOBT, further studies are needed to determine the value since, in the present study, preneoplastic lesions were detected in patients with a test result considered negative.

Authors' contribution

Toledo GM and Monteiro DGA: development of the pre-project, participeted in the project and all of the research stages (review of the literature, data collection, data analysis, and composition). Silva HJT and Averbach M: development of the pre-project, execution and coordination of the project, composition, supervision, and guidance. Melo TT: contributed for composition, supervision, and guidance. All authors approved the final version as submitted.

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Toledo GM, Monteiro DGA, Melo TT, Silva HJT, Averbach M. Logistíca e resultados de um programa de prevenção do câncer colorretal em um município do Sertão de Alagoas. Arq gastroenterol. 2023;60(4):463-9.

RESUMO – Contexto – O câncer colorretal (CCR) possui altas taxas de mortalidade em todo mundo. No Brasil é o segundo câncer mais comum em ambos os sexos. O atraso na detecção de lesões pré-malignas contribui com o aumento da morbimortalidade. Neste cenário, o projeto Piranhas foi criado para rastrear o CCR em uma população carente do sertão alagoano. **Objetivo –** O estudo teve como meta estabelecer as principais estratégias e verificar a viabilidade da implementação de um programa de rastreamento do CCR, assim como demonstrar os resultados obtidos na Campanha de prevenção de CCR no município de Piranhas/AL. **Métodos –** O programa aconteceu em Piranhas, Alagoas, Brasil, através de parcerias público-privadas. Foram incluídos indivíduos entre 50 e 70 anos para triagem com pesquisa de sangue oculto nas fezes (PSOF) e colonoscopia dos casos positivos. Os dados dos pacientes foram coletados em formulários padrão. **Resultados** – Foram rastreados um total de 2152 pacientes com idade entre 50 e 70 anos, sendo destes, 130 submetidos à colonoscopia. Várias lesões pré-neoplásicas foram detectadas em 58 pacientes. A taxa de detecção de adenoma foi de 33,85%. **Conclusão** – O estudo demonstrou-se eficaz e viável, uma vez que 44,6% dos participantes do programa que realizaram a triagem com PSOF seguido de colonoscopia nos casos positivos apresentava algum tipo de lesão pré-neoplásica. Além disso, o programa gerou grande impacto social na população de Piranhas, pela oportunidade de diagnóstico e tratamento de lesões precursoras do CCR.

Palavras-chave – Câncer colorretal; programa de rastreamento; colonoscopia.

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