Evaluation of the Algerian pilot program of colorectal cancer screening by immunological test

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Abstract— The results of various randomized clinical trials have led to the establishment of pilot or organized colorectal cancer screening programs in several countries. To date, there is no mass screening program or strategy for colorectal cancer in Algeria for the average risk population. Thus, our work problematic was composed: mainly on the feasibility of implementing a colorectal cancer screening program. The objective of our study is to carry out an organized mass screening strategy for colorectal cancers in the wilaya of Bejaia as a pilot project within the framework of the 2015-2019 cancer plan. The criterion of judgment of this program established is the Rate of participation (TP) of the target population which must be higher or equal to 40%. The program developed is evaluated by performance indicators. The participation rate was 30.02%. 17(6‰) people are screened for colorectal cancer. The mean age of his patients is 59.76 years +/- 8.2, a median of 57 years and a mode equal to 50 years. 24.24% people with advanced adenomas. At the end of our study in this pilot wilaya designated by the 2015-2019 cancer plan, it appears that the organized screening program is feasible subject to the following conditions: - Expand the pilot phase of a population-based screening in other sites in Algeria. - Institutionalize the colorectal cancer screening program at the local and national levels. - Provide a dedicated budget for this project. - Create a colorectal cancer mortality registry at the regional and national levels

I. INTRODUCTION

The International Agency for Research on Cancer IARC estimates the global cancer burden to be 18.1 million new cases and 9.6 million deaths in 2018. Colorectal cancer is common in industrialized countries, particularly in Western Europe and North America, and in Oceania. It is less common in South America, Africa and Asia. In the US, Colorectal Cancers (CRC) account for 9.7% of all cancers, with an estimated 179,771 new cases in 2018.[1] In Africa, colorectal cancer remains a disease that ranks first among cancers. The highest incidence is observed in South Africa with 6,937 new cases estimated in 2018 by the Globocan network; in Niger observes an incidence in the same year estimated at 6690 per 100,000 inhabitants;

in Egypt, the incidence is estimated at 5393; Morocco records 4118 new cases. Algeria is placed the 3rd country in terms of incidence in Africa and the first in North Africa with 5537 new cases in 2018, according to the same sources of estimation Globocan 2018. In Algeria, the incidence of colorectal cancer in 2016 is 13.7 in men and 14 in women per 100,000 inhabitants. Analysis of the progression of the disease shows an increasing trend with a CPA of +7 each year, and also increases with age, The highest incidence is observed in the wilaya of Bejaia or it is 16 in women and 23.5 in men per 100,000 inhabitants, followed by the wilaya of Constantine with an incidence of 14.6 in women and 17.4 in men per 100,000 inhabitants. The lowest incidence is observed in Ouargla and Skikda with respective incidences of 4.6 -7.4 in women and 9.5- 7.5 in men per 100,000 inhabitants, according to the Réseau Est et Sud Est, Algeria 2015. [2] In our country, colorectal cancer (ccr) fulfills the conditions that the WHO has established in the framework of detectable cancers: - It is a frequent cancer in Algeria (first position among cancers in men, and the second in women.) - Serious (the mortality rate increases by this cancer in Algeria) - Preceded in 60 to 80% of cases by an adenomatous polyp whose removal prevents malignant transformation. Our problem was built after the publication of new epidemiological data published by the network east and south east national in 2016 which concludes to an increase in the annual percentage of 7% of the incidence of colorectal cancer, in 2030 the data of incidences and mortality will be identical to those observed today in industrialized countries, the preparation of a strategy which aims to detect the disease at an early stage or then precancerous lesions, would be to our reflection necessary in order to check it on the Algerian ground the feasibility of a mass screening? The aim of this study is not only to identify the failure of the screening process before its extension soon, but also to determine the lack of diagnostic and therapeutic tools in terms of digestive endoscopy equipment and of the specialist physicians concerned by the pathology. From this general context, several problematic subchapters follow that we translate by the following questions: which feasible strategy to plan: the screening is addressed to which population? from which age the population is concerned by this screening? What are the necessary means for its execution? What is the diagnostic and therapeutic network envisaged? and how long will it take to treat the screened patients? Who are the partners involved in this project and what are their expectations? Evaluation: when to evaluate? Who and how to evaluate? By what to evaluate Duration of the pilot study and deadlines? The results of various randomized clinical trials have led to the establishment of pilot or

organized colorectal cancer screening programs in several countries. To date, there is no mass colorectal cancer screening program or strategy in Algeria for the average risk population. We propose a study on the feasibility of a mass screening program for colorectal cancer in a sample of population at average risk representative of the wilaya of Bejaia constituted of three pilot daïras. The criterion of judgment of this program established is the Rate of participation (TP) of the target population which must be higher or equal to 40% in our study. The objective of this work was to evaluate the effectiveness and feasibility of the pilot study of organized colorectal cancer screening in the wilaya of Bejaia, in view of a global strategy of mass screening.

II. MATERIALS AND METHODS

This is an epidemiological study of the screening type. Requiring the citizen's agreement and consent by signature or fingerprint. Definition of eligible subjects: Male or female persons aged between 50-74 years with an average risk of developing colorectal cancer and living in the following three Daïra: Souk El Ténine (SET), Adekar daïra, Amizour commune. Place and period of the study: the public health establishment of proximity (EPSP) of Souk el etenine, EPSP of Amizour, EPSP of Adekar, the University Hospital of Bejaïa. Duration of the study : from January 02, 2017 to February 28, 2019 or, 26 months. Number of subjects needed: In our mass screening study, the number of subjects must aim at a sufficiently large population, with homogeneous elements. The risk of error is minimized when the population is exhaustive. Nevertheless, other methods could be used such as random sampling and its variants, cluster sampling, systematic sampling, stratified sampling, and numerical sampling. Since the target population in the wilaya of Bejaia is estimated at 100,000 inhabitants, 10% of the population corresponds to 10,000 people. We are working on a representative sample of 10,000 citizensand we want to reach 40% of this population, which corresponds to 4,000 citizens in the three daïras. This study was carried out on a representative population of the general population, i.e. 10% of the target population, which represents 10,000 citizens residing in the following daïras -Daïra of Souk el etenine composed of two communes : Souk el etenine and Melbou installed at the outlet of Assif Augrioun on the coast with a target population of 4000 inhabitants. -The Daïra of Adekar: located in the northwest of the wilaya of Béjaïa and borders the wilaya of Tizi-Ouzou. Located in a mountainous region going up at an altitude of 859 m, the daïra includes the three communes of Adekar, Taourirt Ighil and Beni Ksila and the target population concerned is 2000 citizens. -The daïra of Amizour on its commune

Amizour with a target population of 4000 citizens. These three daïras were chosen for the following reasons: -Each daïra represents a different geographical model from the other: coastal, inland, mountainous. - The urban, suburban and rural characters; exist in each of the selected daïras. The target population in each daïra is exhaustive insofar as the daïra of Souk el Tenine is concerned by its 4,000 inhabitants, the daïra of Adekar is represented by its 2,000 inhabitants and the commune of Amizour groups together 4,000 inhabitants. These inhabitants are over 50 and under 74 years old. In sum, we obtain the figure of 10,000 citizens, which corresponds to the number necessary for the realization of our study. The questionnaire is one of the main instruments in our study, in particular to identify eligible and ineligible persons with a guidance of a course of action based mainly on the existence of symptoms or personal or family history of colorectal cancer. The colorectal cancer screening test used in our study is a rapid chromatography immunoassay that allows for the qualitative detection of blood in stool. In order to ensure that our colorectal cancer prevention and control program runs smoothly, we had to initiate a methodical organization. Before proceeding with the development and implementation of the program, it was necessary to ensure the political will in favor of this pilot operation, Our prevention strategy includes diagnostic and therapeutic steps, it was necessary to check first the functioning of the services practicing colonoscopy and biopsy (for the examination of presumed invasive lesions) as well as histopathology laboratories, but also the services for the management of patients with invasive cancer, including the carcinological surgery service, medical oncology service and radiotherapy (prescribed for cancer of the lower and middle rectum). A multidisciplinary consultation meeting was created on January 05, 2018 and is an integral part of all treatment services. The smooth running of the prevention program required qualified personnel, equipment and materials in working order. In addition, they must be closely linked to ensure that patients receive the appropriate care and continuity of care that the ethics of screening require. It was also necessary to designate other hospital structures even outside the wilaya to ensure replacement in case of equipment failure or to fill the lack of specialized medical staff, in order to guarantee the diagnostic and therapeutic aspect of the colorectal cancer screening process and its continuity,The general practitioner carries out a questionnaire among the voluntary citizens to eliminate the high and very high risks of developing colorectal cancer (IBD, PAF, Lynch syndrome etc. ....) or to eliminate the population that presents a digestive symptomatology that can orientate towards colorectal cancer (rectal bleeding, etc. ....) The

evaluation criterion for this program is the Participation Rate (PR) of the target population, which must be greater than or equal to 40%. Statistical analyses were performed using SPSS 20.0 statistical software. Continuous quantitative variables were expressed as mean ± standard deviation. For the comparison of groups, we used a Pearson Chi-2 test for categorical variables and a t-test for continuous quantitative variables. For the study of risk factors, univariate analysis with a $p \leq 0.20$ was retained for multivariate analysis. The multivariate analysis allowed the calculation of Odds Ratios with 95% confidence intervals (IC95%). For the entire statistical analysis, the threshold of significance retained was $p < 0.05$.

III. RESULT

The mean age of the participating population is 59, 72 years (+/- 6.63). 50% of this population is under 60 years of age; the median is 60 years of age, and the most frequently found age in the series is 50 years (Table1). 41% of the participating population resides in rural areas, while 59% of the population resides in urban and suburban areas. 13.7% are employed, 41% are retired and 45.3% are not employed, 92% of the population have social security. The most frequent type of social security found in the participating population is the CNAS in (2598)86.54%.

I Evaluation of the participation rate: We collected, on the basis of 10,000 guests, 3002 files from citizens aged between 50 and 74 years. That is to say a total participation rate of : 30.02%. Fig1 illustrates the participation rate of the target population in relation to the general target population and in relation to the target population in each daïra. 1735 people, i.e. a rate of 43.38% of the target population of the daïra of Souk el Tenine, participated in the Screening, which corresponds to a rate of 57.8% of the total number of participants (3002). The lowest rate is observed in the daïra of Adekar with a rate of 18.75% and a rate of 12.5% of the total number of the participating population (3002). The age range of the highest participating population is between [50-54] years, then the age range between [60-64] years, the participation rate is decreasing with increasing age of the population of [65-74] years, (Figure1), The participation rate is decreasing with increasing age in the commune of Amizour versus increasing with age in the daïra of Souk el Tenine, in the daïra of Adekar the participation rate is stable in all age groups of the participating population. The chi-square test did not reveal any significant difference between the two sexes in the participating population. The sex ratio is 0.81. The analysis of the participation rate by gender in each daïra does not show a significant difference (p= 0.25). The sex

ratio = 0.81. The participation rate curve is decreasing (Figure 2), along with the curve for the number of outreach activities. We studied the correlation between these two curves by applying a Pearson correlation coefficient R2= 0.99. Its positivity shows us that there is a true correlation between the number of outreach actions and the number of participants calculated per month during the year 2017. The correlation index is also calculated for the months of May, June and July of the year 2017 and shows a correlation R2= 1 The correlation index calculated regarding the month of January, February and March of the year 2018 and shows a correlation R2= 1 The correlation coefficient calculated for the year 2017/2018 by quarter finds a R2= 0.86 The number of participants correlates with the number of awareness action. The total participation rate of general practitioners is 42% in the two health sectors of the daïras concerned by the mass screening of colorectal cancer, 85% of people came for colorectal cancer screening, and 15% came for another reason for medical consultation and agreed to be screened when proposed by the physician. Results of the immunological test in the eligible population 217 persons, i.e. a rate of 7.2 % have a positive test, while 10.6% (317) of individuals are excluded from the study due to the presence of symptomatology suggestive of colorectal cancer or a personal or first-degree family history of colorectal cancer. 2468 people had a negative immunological test result, which represents a rate of 82.2% of participants (Figure 3). It is noted that the highest rate of positive tests in the study population is in the [60-69] age group, followed by the [50-54] age group, and the lowest rate is in the [70-74] age group. There were 17 cancers detected out of the eligible population (2685) for mass screening, or a rate of 6‰ of colorectal cancer. The mean age of those screened for colorectal cancer was 59.76 +/- 8.2 years, a median of 57 years, and a mode equal to 50 years. The sex ratio =0.89. The peak age of detected colorectal cancers is in the [50-54] age range, followed by the [65- 69] age range, with the lowest rates observed in the [55- 64] age range (Figure 4). Polyps and Adenomas Detected: The number of people with polyps 89(3.5%) of the eligible colorectal mass screening population (2686) is carrying at least one colorectal polyp. 37% of the population with polyps have at least one adenoma and 15% of the population with test+ have at least one adenoma, while 1.3% of the participating population have at least one adenoma. 30% of the adenomas with test+ have villeous type adenomas, 20% of the adenomas are tubulo-cultivated, and 50% have tubular adenomas. The statistical analysis of the resected adenomatous polyps according to histological type and

colorectal topography (Figure 5) shows us that the villous histological type is preferentially located in the sigmoid part with a rate of 27.3%, then it is located in the right colon with a rate of 9%, then also in the left colon and rectum with a rate of 3%. The tubular histological type is located in the sigmoid with a rate of 9%, then in the rectal with a rate of 6%, and also in the right and left colon with a rate of 3%, the tubullo-cultivated histological type is located in the sigmoid with a rate of 15%, then in the right colon with a rate of 9%, and also in the rectal and left colon with a rate of 6% of the screened population. Statistical analysis of resected adenomatous polyps according to histological type and according to the Paris classification shows us that the majority of villeous types are pedunculated (41.4%) then sessile (8.6%). Tubular types are pedunculated in 13.8% of cases and 10.3% of cases are sessile, tubullo-city types are pedunculated in 17.4% of cases and 8.6% of cases are sessile. According to the statistical analysis of the histological types of adenomas according to their size, we note that the most voluminous histological types (> 20 mm) encountered are the villeous and tubular adenomas in 12% of the cases, while the tubullo-cultivated ones are in this size range in 3% of the total adenomas. Among the villeous adenomas, 53.85% have a size between [10-19.9] mm and in 31% are >20mm versus 15% are < 9.9 mm Among the tubular adenomas, 50% have a size between [10-19.9] mm, and 40% have a size>20mm, versus 10% have a size 20 mm. Table 2 analyzes the adenomas according to the following variables: size, degrees of dysplasia, and histologic type. The Test: The rate of tests reported as unanalyzable is 8.5% (229) of the immunoassays were failing, the predictive values of the cancer screening test = 7.8% The PPV for detecting advanced adenomas for the test used is 3.23%, the PPV for detecting adenomas for the test used is 15.20%, the PPV for detecting polyps for the test used is 90.32% The number of colonoscopies performed was 189 (87%) of the indicated colonoscopies for mass screening (i.e., 217). The number of indicated colonoscopies not performed was 28 (13%). The reason for not performing the indicated colonoscopy of positive tests was mainly the refusal of the persons to perform the procedure with a rate of 6.4% (14). A rate of 2.76% of the population have formal contraindications to the performance of colonoscopy (people under anticoagulant therapy, major heart disease) while 3.7% of people are lost to follow-up.

IV.   DISCUSSION

We propose in this study a pilot strategy of mass screening for colorectal cancer whose aim is, firstly, to answer questions of feasibility and acceptability on the Algerian

ground, and secondly to determine the specific performance indicators established by the international scientific communities. Our strategy is defined by inviting an asymptomatic population aged 50 to 74 years without any personal or family history of first-degree colorectal cancer every 2 years to perform a qualitative immunological test at the level of proximity health structures of the three designated pilot daïras. The persons having obtained a positive test are invited to carry out a total colonoscopy at the level of the CHU Khellil Amrane by trained endoscopists. This study was conducted between January 2017 and February 2019. The European Commission, in a directive of December 2003, recommends a 2-stage screening strategy based on performing a fecal test every 1 to 2 years in the 50-74 age group [3]. More nuanced recommendations, considering recent work, were published by experts at the European Commission in 2010. The rate should not exceed 2 years and the "minimum" target is the population between 60 and 64 years old, each member state being free to extend it to younger or older age groups depending on its resources. Only England, Scotland, Finland, and the Czech Republic had an organized program covering the whole country [4]. In the other European countries, the implementation of screening has been very gradual. Initially, the FOBT was used in France, Finland, the United Kingdom, Belgium, and Italy, and gradually the immunological test replaced the gFOB. Luxembourg and Poland favored colonoscopy but introduced a strategy based on the immunological test. Some countries such as Denmark, Norway, Hungary, Spain and Portugal do not have a clearly defined strategy for CRC screening but have started pilot studies or clinical trials that are being validated. In the United States, there is no mass screening campaign, the American cancer society recommends either immunological tests every year, or a choice of colonoscopy every ten years or flexible sigmoid endoscopy every three to five years in those over 50 years of age. No pilot studies have been published or national recommendations have been found in the literature for countries in North Africa or the Middle East where the epidemiological parameters of mortality are poorly known. Table 3 illustrates some examples of the status of colorectal cancer screening in some countries in comparison with Algeria. 10.6% (317) of the target population were excluded from the study because of the presence of symptomatology suggestive of colorectal cancer or a personal or first-degree family history of colorectal cancer. According to the information collected by the pilot management structures in a study conducted in 2012 at the Institut de veille in France concerning a total population of 9.1 million women and men aged over 50 and under 74 years. The rate of medical exclusions from

the organized screening program was 10.7% over this period, or just over 1,825,000 people. Other pilot studies have found the same figures for the population not eligible for mass screening and who undergo total colonoscopy without screening. This category of population deserves more attention in our country by conducting a specialized study to know its epidemiological profile and by organizing a systematic review on the planning of a targeted screening of high and very high-risk families [5]. The screening is aimed at people aged 50 to 74 years. This is consistent with the requirements of the Guidelines and with international practice. At the international level [6] , the question of age is a major concern. Different situations can be observed: - In France, the program includes the population aged 50 to 74 years. The French High Authority for Health notes that better identification is needed for men and women aged 70 to 74. - The Canadian Task Force on Preventive Health Care recommends the reference ages of 60 to 74 years (primary recommendation) and 50 to 59 years as a secondary recommendation (no screening beyond age 75). - In Germany, a program modulates the choice of method according to age: from 50 to 55 years, immunological test; from 55 years, colonoscopy. - In the Netherlands, the Heath Concil of the Netherlands (2009) recommends that the age range be 55 to 75 years. - In the United States, the updated recommendations (update 2018, American Cancer Society) recommend screening from age 45 to 75. - In Switzerland, health insurance legislation recognizes the 50-69 age range for ccr screening. Discussions are underway to extend screening to 74 or 75 years [7]. In our study, the results of the frequency of colorectal cancers show that the average age is located 59.76 years +/- 8.2 and the most frequently found age is (mode) in the series is 50 years. The age limit for access to screening is 50 years, and it is consistent with practice. Several countries refer to it. However, the scientific literature shows the existence of analyses and discussions concluding that it would be beneficial to lower the age of entry to 45 or even 40 years [8]. There are no precise rules in this respect. It is up to the health authority to determine the age of entry according to the constraints of program implementation (care capacity, available resources). It is proposed that the age of entry into mass colorectal cancer screening be lowered to 45 years, which is 5 years earlier than the age of entry (50 years) found in our study. The literature points out that various obstacles to participation must be carefully considered, as participation depends on many factors: political (will and means), cultural, organizational, financial, standard of living, population expectations, and the quality of the information and invitation process. Various studies have highlighted, through the choice of

organization or method (as for other prevention programs), factors that facilitate or restrict the participation of the population. As the effectiveness (and efficiency) of a program depends on the participation rate, these issues require special attention [9]. The barriers identified at our level are: - Culture and perception of health prevention influence the effectiveness of a Program, - cancer is a taboo disease that means death; the concept of cure is not possible due to the lack of knowledge of colorectal cancer and its carcinogenesis process by the citizen. - The fact of not feeling concerned because of one's state of health (absence of symptoms) is not to be underestimated. - Family, social and economic situation. - Gender: in our study we did not find a significant difference in participation between the two sexes. However, in Europe or in the USA, men are less concerned about screening than women. Women can play a key role in informing and encouraging participation, particularly because of their experience with breast cancer screening as a successful program. - Age: the oldest members of the target population (65-74 years old) are more reluctant. – Precariousness This category of the population generally has an average general state of health and is often less informed and aware. - The program's information and organizational arrangements are insufficient for continuity and stability of participation, as shown in the graphs - Fear related to the screening result. A total of 217 people tested positive, for an overall positive test rate of 7.2% (among those who tested analytically). For men, the positive test rate is 7.7%. For women, it is 8.4%, there is no significant difference in the results of the immunological test between men and women (p=0.0.52). The rate of positive tests did not increase with age. For each age and sex category, it is highest in the 60-64 age group, then in the 50-54 age group, and lowest in the 70-74 age group. In Europe and in an evaluation of a pilot study conducted in 2013 at the Institut de Veille Sanitaire in France [10], the rate of positive tests increases with age. For each age and sex category, the comparison between the age ranges of positive tests in our study did not find statistical significance (p=0.197), The results of the immunological test were compared between medical facilities, by applying the chi-square test, the test results were significantly different between facilities. The sensitivity and specificity of the screening test used remains low and deserves consideration in the future: First-generation qualitative immunoassays have a positivity threshold set by the producers. In our study, it is 50 ng/ml, these tests can be used in the first pilot studies in order to determine the difficulties and obstacles that can be encountered in the field before generalizing these strategies in countries with a high incidence and mortality of colorectal cancer and a high cost of therapeutic management. The accessibility, the feasibility and verification of the diagnostic and therapeutic network are factors in the success of mass colorectal cancer screening. Pilot studies in general aim to verify its parameters influencing participation. The detection rate of colorectal cancer is equal to an average of 6 ‰. It is more frequent in women 53% than in men 47%, but statistically no difference is observed between the two sexes. This rate is high compared to what is reported in the literature; in France the rate of detected cancers is 1.7‰, in Germany in a pilot study is 2‰ [11]. The Sex ratio is 0.89. The average age observed in our study is 59.76 +/- 8.2 years. The most common age observed is 50 years. No statistical variability was observed between the cancers detected according to the institution or the area of residence. The topography of the cancers detected in our study did not differ from the results observed in other studies worldwide: sigmoid 47% and rectum 24%, right colon 17% and left colon 12% . It can be noted that for the age group most affected is 50-54 years, then the one from 60- 74 years. In a pilot study carried out in England in 2010, the same age groups were observed [12]. Although time to colonoscopy after a positive screening test is an evaluation criterion for the screening program, few studies have analyzed the time to colonoscopy after a positive test. It is important to identify the factors that may delay colonoscopy and the potential impact of longer wait times on the detection rate of colorectal tumors. According to the European guidelines for quality assurance in colorectal cancer screening and diagnosis, at least 90% (ideally 95%) of individuals with a positive test in an organized screening program should have access to colonoscopy within 31 days (evidence and recommendation level: VI-B) [13].According to the Canadian National Colorectal Cancer Screening Network, at least 90% of individuals with a positive test result should receive colonoscopy within 60 days [14,15]. In the Bejaïa experience, the average waiting time for colonoscopy was 28.16 days, which is in line with international recommendations on waiting times for screening colonoscopy; 75% of the population who required a colonoscopy after a positive test had their colonoscopies after 33 days of waiting, the minimum waiting time was 6 days and the maximum 386 days with a median of 25 days A Californian study evaluated the impact of the delay between the date of the fecal immunoassay (FIT) and the performance of the colonoscopy on 70124 FIT- positive patients, 2191 of whom had colorectal cancer, including 601 at an advanced stage (Stage III or IV). Cancer rates were similar (3 to 3.4%) in the 1-month, 2-month, 3-month, 4-6-month, and 7-9-month periods. However, the rates were

significantly higher beyond 10 months (4.9%) and 12 months (7.6%). Similar results were observed for advanced adenomas. For stage III and IV cancers, the rates up to 7 months ranged from 0.7 to 1.3% but increased significantly to 1.9 and 3.1% after 10 and 12 months respectively [16]. The waiting time for curative surgery was the prerogative of our study, with waiting times that could exceed 400 days, with an average waiting time for surgery of 115 days+/- [17] 163,265. A rate of 25% of patients were operated on within a minimum of 18 days, while 75% were operated on within an average of 97 days Weaknesses of the study: - No budget was reserved for this project, which generated delays in its execution. - The study was carried out as a monocentric study; no comparison is possible in Algeria. - The information system is insufficient. - Training did not reach all the actors involved in the project, anatomopathologists and surgeons were not evaluated. - Lack of data in the anatomopathology reports and the reports of carcinological surgery and colonoscopy due to the absence of standardized protocols in each specialty. - Lack of risk analysis prior to program development for each step of the colorectal cancer screening process. Strengths of the study: -A major strength is that the study reflects the reality of the health field in the wilaya of Bejaia using routine health care, which allows an assessment of the feasibility of colorectal screening in a country where the health sector is experiencing significant deficiencies. - The pilot phase of the proposed colorectal cancer screening program can be considered positive and successful. Although imperfect, the program is unanimously considered important for the Algerian public health system and the population. Beyond the imperfections, errors and shortcomings that remain to be corrected, the pilot study also allowed for the testing of screening methods and procedures, and organizational modalities. This first national study, and one in North Africa, could serve as a point of comparison in future scientific studies of mass screening for colorectal cancer.

V. FIGURES AND TABLES

Table.1: Age *Description* of Participant Population

Average	59.72 ans +/- 6,63
Médian	60 ans
Fashion	**50 ans**
Minimum	50 ans
Maximum	74 ans
Percentiles 25 %	54 ans
50 %	60 ans

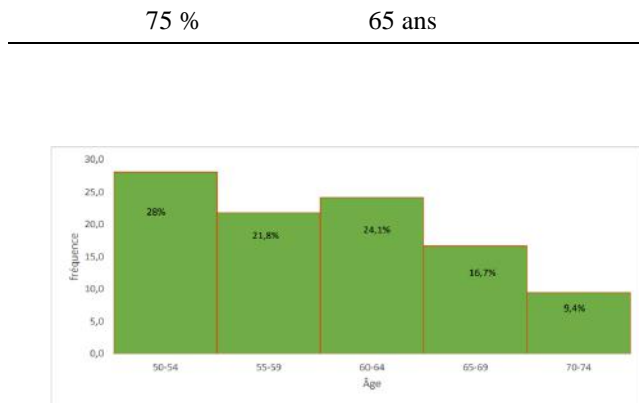75 %   65 ans

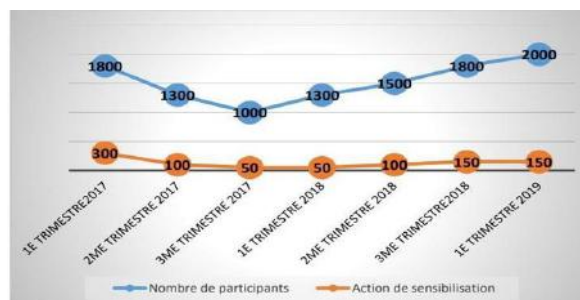
Fig.1: Overall participation rate by age

Fig.2: Number of outreach events and number of participants 2017/2018.
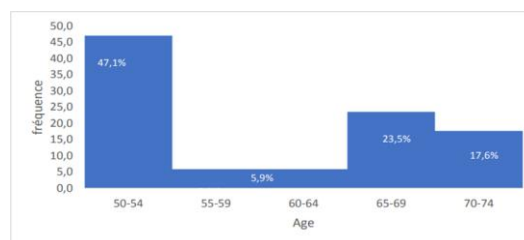

Fig.3: Immunoassay results

Fig.4: Distribution of colorectal cancers by age group

Tableau 2 : Histological type of adenomas according to their sizes and degrees of dysplasia in people with at least one adenoma

Sign of dysplasia	Type of adenoma	class by size			Total
		<=0,99cm	1-1,99 cm	>=2 cm	
No	TUBULAR	0	0	1	1
	TUBULAR VILLOUS	1	0	0	1
	Total	1	0	1	2
High	VILLOUS	2	4	4	10
	TUBULAR	0	4	2	6
	TUBULAR VILLOUS	1	4	1	6
	Total	3	12	7	22
Down	VILLOUS	0	3	0	3
	TUBULOUS	1	1	1	3
	TUBULAR VILLOUS	3	0	0	3
	Total	4	4	1	9
Total	VILLOUS	2	7	4	13
	TUBULAR	1	5	4	10
	TUBULAR VILLOUS	5	4	1	10

Table 3 : Status of organized colorectal cancer screening (2017).

| Country	PODCCR status*
Algeria	Pilot study of feasibility and acceptability by iFOB, FIT in 03 Wilayas (2017), No recommendation by the 2015-2019 Cancer Plan
Australia	Implementation of a national colorectal cancer screening program based on population 2004
Belgium	Feasibility study on screening using FOB since 1990. No national population-based screening program
Canada	No population-based pilot study has been conducted, mass screening recommended
France	Pilot studies in 23 departments (1999), mass screening recommended >50 years -74 years 2009 by FOB then replaced by FIT (2015)
Germany	No mass screening is recommended, centralized data, opportunistic screening >55 years old by an immunological test or colonoscopy /5 years Pilot study not
Japan	carried out, mass screening recommended since 1990, low participation rate <25%
Italy	Pilot feasibility study in 21 departments Mass screening recommended by an immunological test.
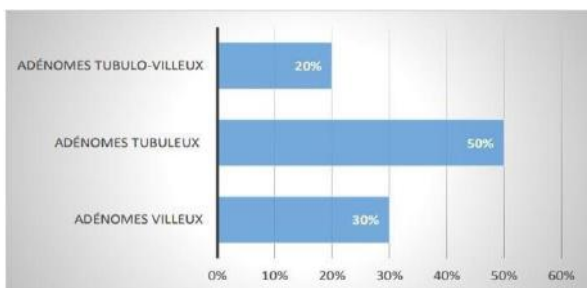
Fig.5: Distribution of adenomas according to their histological appearance

VI.   CONCLUSION

The evaluation of the pilot phase of the organized colorectal cancer screening program in the wilaya of Bejaia, from 2017 to 2019, addresses the following issues: 1. Evaluate the organization and functioning of the 2017-2019 pilot program. 2. Evaluate the screening modalities selected and their effects. 3. Analyze the positioning of the actors involved,

4. Reorganization of the national committee into groups of experts: endoscopists, oncologists, anatomopathologists, and definition of the tasks assigned to them 5. Analysis of the effects in terms of prevention and health promotion 6. To propose possible adjustments for the sustainability of the program. 7. Substitution of the qualitative immunological test by an automated test (We have started the substitution of the qualitative test by the quantitative test of colorectal cancer screening, and we have made a first evaluation of the 80 volunteers exposed in appendix 14. 8. Improvement of the quality and the means for the transmission of the message to the target population. 9. Elaboration and distribution of the self-evaluation questionnaires for the periodic general practitioners. 10. Elaboration and distribution of self-assessment questionnaires for citizens on a website. 11.Elaboration of documents containing standardized information on the endoscopy and histology reports of the polyps detected in the appendix 16 a proposed report 12. Extension of the pilot project by 2 years We therefore propose that, by regulation, an extension of the project be accompanied and financed to achieve its generalization, 13. Implement other national pilot studies based on the results of the study in the wilaya of Bejaia 14. Financing and fund dedicated to colorectal cancer screening 15. Implement screening strategies for the population at high risk of developing colorectal cancer.

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