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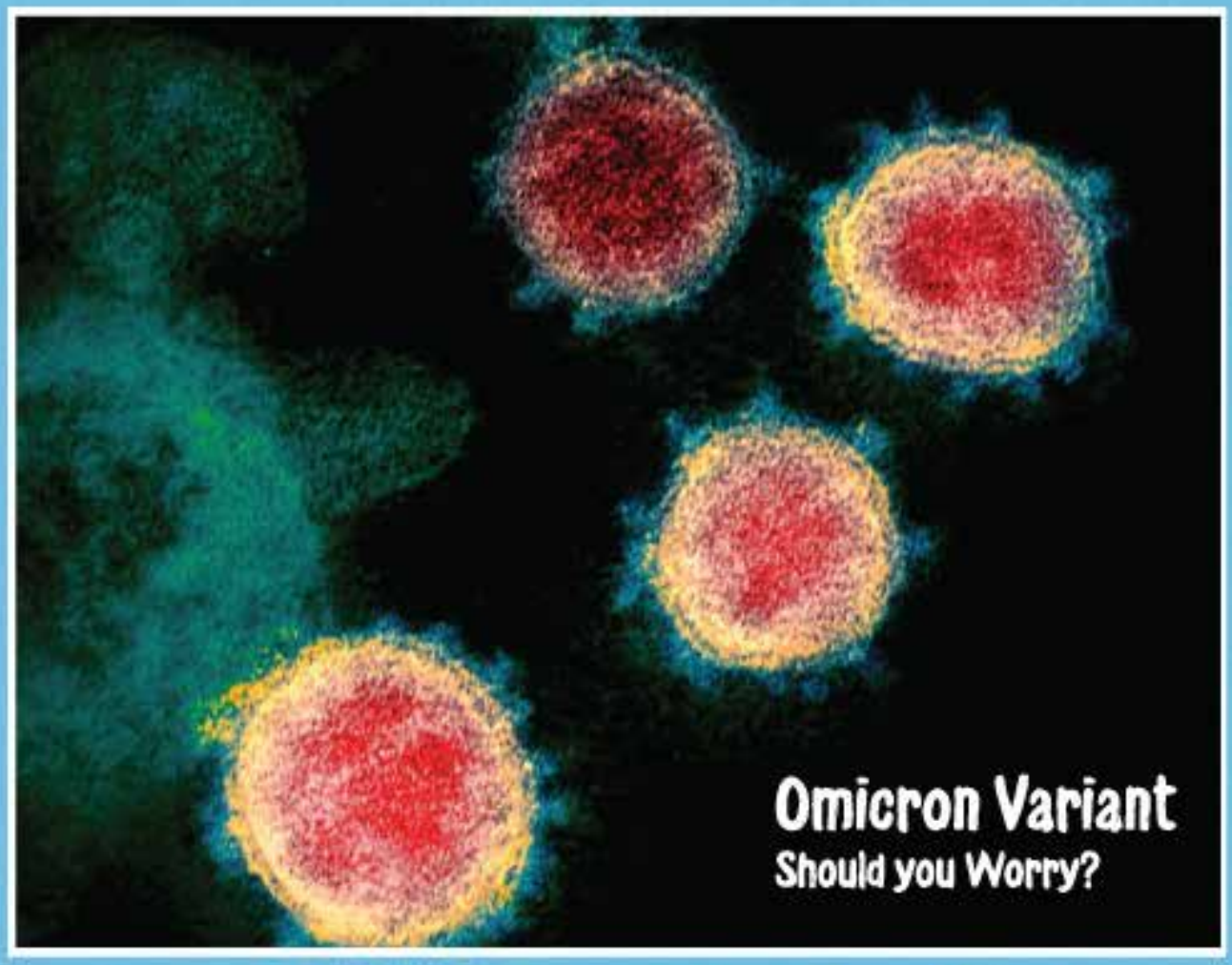

The Official Journal of the Gulf Federation For Cancer Control

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"CUIDARAS": A Nominal and Personalized Health Care Model. Effectiveness of a Massive Screening for Colorectal Cancer Detection at Community level

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Abstract

Health systems provides care only to those people who spontaneous demand for attention; excluding those who don't perceive illness or are not aware enough to consult. Alternative healthcare models based on the nominal–personalized care like "University Center for Integrated Care of Referred Health Care" (CUIDARAS) may have better results. In order to demonstrate benefits of this model, it was performed an experience based in colorectal cancer (CRC) detection and care that focused the entire population of the town.

Methods: It is an intervention study for early detection of CRC. A survey and a physical examination were performed in each adult from "CH" town. Two visits were made. Blood in stool test (BIST) was self–collected, analyzed and results delivered with appointment for a programmed video–colonoscopy (VCC) when test was positive.

Results: people enrolled (n546) had 59.9±6.4 yrs. Adherence was 93.8% of the target population; 99.2% performed BIST; while 95.3% a positive BIST had access to VCC and treatment. Overall cost of the experience (stool test, VCC, biopsy, local treatment) was 7685 USD, while costs associated to an advanced CRC classic treatment was USD 9577/patient (USD 26098 if treatment included bevacizumab).

Conclusion: The present study based on preventive actions like blood in stool test, applied as a screening to all inhabitants in town, had 93.8% of adherence and high level of CRC early detection. A health model based on personalized care (CUIDARAS), achieved more effective results in terms health care and disease prevention, with a favorable benefit/cost ratio compared with classical health care provide by current system.

Key words: Model of care; colorectal cancer, CUIDARAS, personalized care.

Introduction

Most people define "health" as the absence of disease; standing those individuals only perceive health when illness is absent (Gomez Lopez et al, 2000).

The World Health Organization (WHO) defined "health" more than 50 years ago as: "the complete state of physical, mental and social well–being and not just the absence of disease or disability" (Broadbent el al, 2006). It cannot be denied that in this proposition, the elements of the discourse that translate health are associate to the concept of well–being. However, from the way this definition is stated, it appears that "health" is comparable to a physically, mentally and socially pleasurable life, as if the pleasure emanating from the bodily senses would be the ultimate goal pursued by a healthy life. Besides, being in full permanent physical well–being is impossible for anyone, so this definition is associated with a medicalizing vision of health.

Floreal Ferrara, for its part, has defined health "as the ability to face and overcome conflicts and adversities that the environment presents us" (Ferrara, 1993). In reference to this last concept, we know that the inequalities in the opportunities generated by the different living conditions of an individual at birth, are reflected in unjust differences that deepen over time. Hence, the impact of the socioeconomic crisis turns unemployment and low income in a long–term phenomenon, which extend from material aspects to other social dimensions that ultimately translate into health problems (Ferrara, 1993).

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Public policies, advances in medicine and health technology seek to reduce the morbidity and mortality associated with the different diseases that afflict humanity. However, the systems are organized from the centrality of the health institutions that provide health care to those members of the Community who demand that care (Kornblit & Mendes, 2000).

Demanding health care is unfortunately linked to the concept of "repair / restitution" when the healthy status is lost. In other words, the demand for care is traduced in disease rather than health. There is a complex world of beliefs and values, norms, knowledge and behaviors explicitly linked to concepts of health / disease that permanently interact with formal medicine and that account not only for the modalities of health management, but also for the relationship that people have with their own body, with the food they eat, with their lifestyle, with their free time, and with all health services, among other aspects (Leventhal, 1997). The use of the health system is then the result of a process that begins with the perception of a health problem that is translated in a "need", and that further on, this need is transformed into a "demand" of care. When this demand becomes, the health system may satisfy it or not, depending of the capability of each system. If the demand is satisfied, only then we can consider that the people "use" the services provided by the health system.

Each society and each health system decide how it should take care of the health of its members and how to recover it when it has deteriorated (Llovet, 1984). Individuals are configuring different ways of thinking and acting, with a diversity of meanings that are attributed to the fact of being healthy or sick, where aspects such as age, sex and material living conditions, have a multiplicity of expressions.

The idea of "illness" that members of certain communities have, allows us to understand the reason for the behavior of people facing these situations, and when they consider that a situation is serious enough to warrant a medical consultation.

Unfortunately, all classic models of health care organization, need the will of individuals to demand of cared. However, this demand of care, requires a prior step, which is the perception of needs or of the loss of health status, which is highly unequal among communities and depends on many factors (MacKian, 2007).

It is well known that the current models of health care act mostly "in reaction" to the spontaneous demand of the population (Menéndez, 2004; Marin et al, 2006; Marin et al, 2008); for this reason, it is necessary to develop other models that could be more inclusive even with those people who need care but do not demand for attention (Marin el al, 2015, Marin el al, 2019). The objective of this study focuses on the implementation of an alternative model of health care at the community level, in a project that arises from the university environment, carried out in conjunction with the local health system at the county, provincial and national levels. The program called "University Center for Integrated Care of Referred Health Care" (CUIDARAS) intended to establish the benefits of a nominal and georeferenced health care in homes, exemplified in an experience of early detection and timely treatment of colorectal cancer among population over 50 years of age in a town enrolled in the program.

Methodology:

Type of Study

It is an intervention study where an alternative model of health care is tested though an experience of early detection of colorectal cancer.

Area selected

Within the state of Buenos Aires, is exist a town "CH" defined as a strategic place by local health authorities in Olavarria, Argentina.

Community and Local Health System Assessment

CH is a rural town of 1,100 inhabitants, all descendants of German came from the Volga region, which were settled in Argentina in 1878. The colony is isolated from the neighboring towns and is only accessible by inter–district roads. In the town there is only 1 Local Primary Care Health Center, without any option to have access to private medical institutions. The area was evaluated initially through observation, structured interviews, and surveys. A data base was developed with the information emerged regarding the area (surrounding institutions, community problems, public service network, etc.), health risk factors, health perception, existing prevalent diseases, and the degree of compliance with medical controls.

Training and use of the program for the team of the Health centers.

The health center staff and students were trained in risk factors and prevalent diseases detection, as well as procedures for data georeferencing, in order to planning health care activities.

Tools for data collection:

A survey was carried out in the following stages: A socio–economic survey component was performed in

each household, considering the official cadastral maps at each exit to the field, considering last census fraction, radius, block (area of 1 km^2) and housing (MEN, 2020). A health's component was also performed, stage completed with a basic physical examination of each member of the house surveyed. The interviewers were university students of the Medicine and Nursing Career, specially trained for this purpose, coordinated by their professors. The processing and subsequent analysis of the surveys were carried out using "R" version 4.0 Software.

Procedure of georeferencing dwellings on the digital map

The digital database was built with survey's information of each dwelling. This data was then linked to a map using the Arc–GIS software (GIS by ESRI 2016). This tool allowed to locate each home on a map and at the same time observed all data belonging to each member of the family. A program installed in the Olavarria, allow the coordination to program specific actions according to population needs (vaccination, health controls, contraception guidelines, detection of chronic diseases such as hypertension or diabetes, detection of zoonotic diseases, or preventive actions described in the present work: "early detection of colorectal cancer and its timely treatment").

Pilot Experience: Early detection of colorectal cancer and timely treatment procedures

From the survey and georeferenced data, it was already known which homes had adult's members aged between 50 and 75 years old. Hence, attention was focused on those homes in the locality that had age. Each research team (2 students and their teacher) were assigned to a home (called home "under responsibility"). This team was the vector of all actions and activities related to the project. In the case of colorectal cancer (CRC) early detection, each household was initially visited to sensitize their elderly members about the need to know their health status and to carry out a voluntary CRC test. In a second visit, the home was provided with a immunological blood in stool test (BIST) and after demonstrating how to use it, it was left one kit for each member how agreed to be tested, after signing an informed consent. Once the test was self–collected, samples may be received at the Health Center or either collected at each home by the University team during their regular weekly control visit within the 24 h from sample collection. The reading of all the tests was carried out by a single person (biochemical professional) in the Municipal referral hospital (Dr. Hector Cura). The negative results were delivered by the students assigned to each home, and the positive results were delivered personally in an agreed interview by either the professor or the local health staff with the home member. An appointment for a programmed video–colonoscopy was provided in that interview. The coordinator of the project located at the University center was in charge of monitoring and assure that each person with a positive test perform the colonoscopy, and to follow the case according to the pathology results.

Test Kit

A testing blood in stool (BIST) (immunological method) Kit (brand SD) provided by the National Cancer Institute and the Buenos Aires Program was used free of charge for the project.

Variables evaluated

The variables for the present study were: sex; age; person visited; person enrolled in the study; person tested; individuals with a positive test; individuals with video–conoloscopy performed; individuals with positive colonoscopy + biopsy; BIST kit costs; video colonoscopy costs; histopathology biopsy specimen processing costs; standard costs of advanced CRC treatment.

Statistical analysis

The data were presented as mean values ± standard deviation, ranges and / or percentages as they correspond to the type of variable (continuous or categorical). For statistical analysis of the data arising from the survey, the SAS / STAT version 7 program (SAS Inc) and the "R" version 4.0 Software were used.

Ethical statement

The study was approved by the CIC–Ethical Committee (ID–0124–2018).

Results

The CUIDARÁS Program carried out activities on a geographic–population space defined in methodology: CH is a rural population that allowed, together with active members of the community, to build practices related to improving people's health status and prevention action primary as was the present Colorectal Colon Cancer prevention project.

The research team carried out visits to each of the homes in the town of CH, in order to perform a survey of members per household and also a basic physical examination. Data from the survey on sex, age, and composition of each household, health risk or illness. All data was geo–referenced in order to take focused health actions according to the age group of the household members (fig 1).

Figure 1: Image of the central area of the town "CH" with households with individuals > 50 yrs

Students and professors university teams were trained in the operational definitions, and in the activities related to all stages of the project. The training was coordinated by the Ministry of Health of Buenos Aires (Cancer Prevention Program) with the help of the National Cancer Institute.

The Provincial Cancer Prevention Program provided the testing blood in stool Diagnostic Kits for the detection of hemoglobin in feces (immunological method) (BIST).

Members older than 50 years old (n 582) were invited to participate in the Colorectal Cancer early prevention included in CUIDARAS program, reaching an initial acceptance level of 63.6% (n 370) for the proposal to be enrolled in the research.

A second house–to–house sensitization was carried out in CH, inviting everyone over 50 years old to perform the test, achieving a new level of adherence (n 546) of 93.8% of the target population.

A week later, homes were visited for the third time to deliver the test BIST kits and validate that the beneficiaries of the program had correctly understood how to use them. Because this test was self–executing, each individual was able to collect the sample in privacy. 24 hours after the kits were delivered, the research team went to each home to collect them, or either the beneficiaries of the program may deliver the sample in the CH Local Health Center (in 4 of the 546 cases, kits were not returned).

The average age of the individuals enrolled was 59.9 ± 6.4, being 57.9% female and 42.1% male.

The tests were processed within 24 hours of being collected in the Laboratory of the District| Hospital "Dr. Hector Cura", and performed by research biochemist of the project as programmed.

The results of the test were delivered home by home by either students or professors/health Staff with a maximum delay of 1 week after the completion of the test, (always in each case, with an explanation of test results).

In the cases in which the test was positive (n 67), each patient was provided with an appointment for video–colonoscopy (VCC) at the Dr. Hector Cura Hospital, at the same visit to inform BIST results. If the patient had private social security coverage, he/she was asked to carry out the VCC in the private institution that corresponds to their coverage. In all cases, a personalized follow–up of patients was carried out, until the endoscopy was completed. Of these 67 cases, 64 agreed to carry out VCC (3 refused to carry out the practice). In these cases that merited and accessed video–colonoscopy, 42 cases a biopsy was performed buy only in 13 patients of them a polyp was found, situation that required resolution by endoscopic biopsy and resection at that moment. None of the cases required a systemic treatment (table 1).

After 24 months of follow–up, no manifestations of CRC were detected in those individuals with negative tests.

In other words, blood in stool test carried out had a sensitivity of 100%. Regarding the relationship between a positive test and the probability of having a colonic lesion it was 4.2% (table 1).

It was possible to treat in a timely manner all of those patients in whom an abnormal pathology polyp was detected (tubular adenomas> 10 mmm, villous or cancer in situ) on video–colonoscopy.

The costs associated with testing blood in stool performed to the entire population over 50 in the town of CH was USD 1856, while the overall costs associated with all colonoscopies (64) was USD 4989 and the costs of all 42 histopathology analysis performed were USD 840. Hence, to performed the screening and solve the positive cases in the town where 542 adults were included, the overall cost was 7685 USD.

On the other hand, the standard costs of a first–line treatment of only one patient affected by colorectal cancer was USD 2104 (basic colostomy surgery); USD 2457 (laparoscopy colostomy); FOLFOX chemotherapy scheme (*Oxaliplatin 85 mg/m2 /day + 5–fluorouracile 400+600 mg/m2/day –days 1 & 2; Folinic Acid 200 mg/*

Population Targeted		Population enrolled in the Program		Population that received the test kit		Population tested with BIST		Population with positive BIST test		Population that accessed VCC		Population with abnormal VCC		Screening Sensitivity with BIST	Probability of BIST to lesion correlation
n	%	n	%	n	%	n	%	N	%	n	%	n	%	%	%
582	100	546	93.8	546	100	542	99.2	67	12.3	64	95.3	13	20.3	100	2.4

BIST: immunologic blood in stool test. CC: Colonoscopy; n: number; % percentage.

Table 1: General Data

m2 /day –days 1 & 2; Ondansetron 8 mg/day x2 days) for 12 cycles was USD 9577; however, if the treatment includes bevacizumab in the scheme (5mg/kg/day x 12 cycles), it must be added the amount of USD 26098.

Discussion

The concept of health depends on the conjunction of the well–being concept and the effects of physiological conditions, functional capacities and social circumstances.

Different social groups pay different attention to morbid processes according to their own connection with their bodies. Some oligo–symptomatic chronic illness such as high blood pressure, diabetes or colorectal, breast or prostate cancer, have a low level of timely consultations, hence patients usually arrive to doctor's consultation when the disease is advanced.

This situation should make us reflect on how health care models are based on the spontaneous demand of individuals who not only perceived the disease, but were also willing to consult. New Health systems are needed, based on ensuring people's health status, in preventing diseases and in being alert to the early detection of diseases even in those people who do not spontaneously demand for attention (Marin et al, 2015).

The CUIDARAS program aims to propose an active model that provides personalized health care and is capable of preventing diseases or avoiding complications associated with them.

In order to demonstrate the potential benefits of the CUIDARAS care model, different actions were carried out, including the early detection of colorectal cancer, since it is a high epidemiological prevalent disease with significant morbidity and mortality with a negative impact in socioeconomic and economic terms. CRC incidence rates show that worldwide there is an upward trend in recent years, becoming one of the leading–cause of incidence for both sexes (Ferlay et al, 2021).

In Argentina, CRC is the second most frequent cancer, representing 11.8% of all cases in both sexes, behind breast cancer (16.8%) and before prostate cancer (9.7%). By sex, CRC is the third most prevalent cancer in both men (after prostate and lung cancer) and women (behind breast and cervical cancer). Each year more than 13,000 new cases of CRC are diagnosed and more than 7,000 of these people die (NCI, 2020).

The evidence is overwhelming in demonstrating that through the implementation of CRC screening organized in population–detection based programs (average risk population), it was possible to reduce its incidence and mortality (NCI, 2020). Although there are different implementation strategies based on the different methods for detecting pre–neoplastic and neoplastic lesions, testing blood in stool (immunological or non–immunological) are valid test to define whether if VCC is needed.

Even when the direct visualization tests are confirmatory, there is low adherence to their performance on a scheduled and regular program. For this reason, the practicality, sensitivity and adherence of the population to blood in stool tests guarantee the efficacy of a community screening capable of an early CRC detection.

Our work is confirmatory of this assertion since, thanks to a direct and personalized contact of the University and Local Health Staff teams with each one of the individuals enrolled to the program, almost the entire target population over 50 years old agreed to take the screening test.

On the other hand, the personalized follow–up of the population guaranteed not only a high level of adherence to BIST screening but also that 95% of the people with a positive blood in stool test, agreed to be submit to VCC and to treat the lesions found by the endoscopy.

The economical evaluation of performing a massive screening for all adult's members of town's population was 4.6 times less expensive than the treatment of an only one patient with an advanced disease.

Conclusions

The present study based on preventive actions like blood in stool test as a CRC early detection screening performed to all adults from a Rural Town in Argentina town, demonstrated that a model of personalized care call CUIDARAS Program, was able to enrolled 93.8% of the target population, with a highly favorable benefit /

cost ratio for the health system. A health model based on nominal and personalized care like the one developed in achieved more effective results in terms of population health care and disease prevention.

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