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CHRONIC DISEASE MANAGEMENT PROGRAM IN A HEALTH PLAN, SÃO PAULO, BRAZIL[1]

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ABSTRACT

Currently, non-transmissible chronic diseases are leading causes of death worldwide. Considered as multifactorial diseases, they have common modifiable risk factors such as physical inactivity, high cholesterol, overweight, smoking, excessive alcohol consumption, and unhealthy diets. Aiming at verifying the impact of theChronic Disease Management program, this study arose after two years of follow-up. This is a program developed with a group of customers in a self-management platform in the state of São Paulo. This was a cross-sectional study carried out during 2014 and 2015 with electronic medical record data through the comparison ofthe clinical and lifestyle parameters of 1,509 individuals participating in a disease management program in two moments: at the program'sentry and two years after participation. Satisfactory results in the improvement of clinical parameters related to blood pressure and blood glucose levels in fasting were observed as well as decreased physical inactivity in individuals under 60 years of age.

Palavras-chave: Chronic diseases. Health promotion.Plans and health programs.Health pre-payment plans.

INTRODUCTION

Currently, chronic diseases stand out as the main causes of morbidity and mortality in populations, leading to multiple impacts on quality of life, functionality, and productivity. These diseases are characterized by a high social burden, increasing costs inthe health sector jeopardizing its sustainability, and causing slow deaths after long periods of dysfunction(1).

Non-transmissible chronic diseases (NTCDs) are multifactorial diseases related to certain modifiable risk factors that have a common approach to prevention. Among these, smoking, excessive alcohol consumption, obesity, dyslipidemia, unhealthy diet, and physical inactivity stand out(2,3). Small changes in these factors can have a huge impact on reducing death and disability. A study(4) shows that reducing salt intake to 3 g/day attenuates the systolic blood pressure in2.5 mm Hg on average, and 2% decrease in mortality rates by cardiovascular diseases.

In Brazil, it is estimated that approximately one-third of the population suffers fromat least one NTCD. These, together with the risk factors mentioned above, are affecting the scope of the country's millennium development goals in addition to having a strong impact on the economy. Considering the loss of productivity at work and falling household income, the NTCDs led to an estimated loss of US$ 4.18 billion between 2006 and 2011(1).

Despite the rapid growth of NTCDs, their impact can be reversed through cost-effective interventions promoting health and seeking to modify or reduce the presence of risk factors, combined with improved health care, early detection, and timely treatment(5).

The Brazilian private health sector has been encouraged since 2005 by the National Health Agency (ANS) to implement health-promoting programs and disease prevention with a focus on NTCDs.

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For this agency, a health promoting program is one that has a series of ordered and systematic activities, both for the control of diseases and disorders, and their prevention, directed to a population with a known epidemiological risk profile and under inter-professionalaction and coordination. In addition, the program should ensure the specific monitoring of participants, evaluation, and actions taken through health indicators. Most health insurance providers currently execute programs based on the methodology known as Disease Management (DM) or Chronic Disease Management (CDM)[6].

There is a lot of debate about the effectiveness of health promoting programs and disease prevention in the private health insurance sector. There is aregulatory stimulus for its implementation. However, very few studies on the subject are available, and hence, its analysis is difficult. The existing studies focus on cost, or do not provide clearly described variables and performed statistical analysis[6].

The objectives of a CDM program are to interfere favorably in the natural history of the disease, prevent exacerbations and complications of chronic diseases, increase patient involvement in self-care, and build a database on chronic patients[7]. Disease management comprises a set of health actions and practices, combined with management tools, population risk estimates, measurements of interventions, and economic models of decision-making[8].

In São Paulo, one health insurance provider that used a self-management model has been conducting programmatic actions to promote health with their clients who are NTCDs patients since 2007. It is a closed entity, with approximately 120,000 customers in which active employees of the sponsoring companies, former employees who remain contributing, retirees, and pensionersare considered participants in health plans. The sponsoring companies belong to the energy sector in the state of São Paulo.

The actual implementation of the program is performed by a contractor that is specialized in offering CDM programs, focusing on stimulating self-care, emphasizing health education, with the main purpose of preventing both the rise of NTCDs and the onset of their complications.

The entrance and adherence to thisprogram are spontaneous, with a time limited at two yearsto remain in the program. All participants showedat least one NTCD as inclusion criteria. The NTCDs that originated the entry of these individuals in the program are mainly Arterial Hypertension followed by Diabetes Mellitus.

The scope of the CDM program was executed by telephone monitoring through monthly calls and home visits, both performed by nurses and supported by a multidisciplinary team, which was involved depending on the complexity of each case. During the home visits, the health status of participants is evaluated in person by nurses, and this information became part of an electronic medical record enabling further monitoring. The objective of this research is to verify the impact of a CDM program in people with chronic diseases after two years of follow-up.

METHODOLOGY

This was a cross-sectional study, conducted between September of 2014 andMarch 2015, with an analysis of data contained in electronic medical records and comparison of the clinical parameters and life habits of 1,509 individuals participating in the CDM program in two moments: at program entry and two years after participation.

The participants were only individualswho remained active in the program without interruption for two consecutive years and whose inclusion in the program took place during the months between January and June of 2011. Out of the 1,612 active individuals in the program, 1,509 (93%) agreedto participate, thus composing the group described herein.

The medical records of active employees, retirees, and pensionerswere evaluated. Data were consolidated into *Excel* spreadsheets and treated statistically using the SPSS software version 22.0. The Student t test was used for paired samplesto compare data from thetwo studied moments; all same patients were evaluated in these two periods. The nonparametric *Wilcoxon* testwas used for the analysis of binary variables, physical activity, and smoking. A significance level of 5% was considered, and therefore, a statistically significant difference between groups was considered when $p<0.05$.

The following clinical parameters were compared: blood pressure, serum cholesterol

dosage (COL-T) and HDL cholesterol (HDL-COL), glycated hemoglobin (HbA1c), and fasting glucose; normal values were based on reference values advocated by medical societies and their guidelines[9-11]. Thus, blood pressure above 140X90 mmHg[9], fasting glucose above 126 mg/dl (10), HbA1C above 6.5%[10], COL-T above 200 mg/dl[11] and HDL-COL below 40 mg/dl were considered as altered values[11].

Nutritional status was evaluated based on the Body Mass Index (BMI), calculated usingheight and weight data. Despite that the classification of nutritional status based onthis index is not the best choice because it does not reflect regional fat distribution, the easiness in obtaining data such as weight and height, as well as their correlation with mortality, justifies using itin epidemiological studies and clinical practice as long as specific cut-off points for age are used, as it was used in this study. Thus, the following differentiated BMI cut-off points were considered for elderlies over 60 years old: BMI <22kg/m², normal weight BMI between 22 and 27kg/m², and excess weight BMI> 27kg/m²[12].

Regular physical activity was defined in the performance of physical exercise asof moderate intensity when executed at least during 150 minutes per week according to the recommendations of the World Health Organization (WHO)[13]. Smoking was considered regardless of the number of cigarettes smoked per day.

The study was approved by the Ethics and Research Committee of the Pontifical Catholic University of São Paulo-SP, Research Protocol number 219/2011. All participants were informed about the research and signed a Voluntary Informed Consent Term before the study start.

RESULTS AND DISCUSSION

The total number of participants inthis study was 1,509; 905 (60%) women and 604 (40%) men, all residents of the state of São Paulo, which was the geographical area covered by the program. Considering the place of residence, 946 (63%) were residents of the city of São Paulo, 252 (17%) in the littoral, 211 (14%) in municipalities that make up the Greater São Paulo, except for the capital, and 100 (7%) in the countryside.

The average age of the study participants was 75 years, with the oldestat 101 and the youngest at 45 years old. The total number of elderlies was 927 (61%). These results are shown in Table 1.

Table 1. -Distribution of the studied group according to gender, age, and NTCD in thestate of São Paulo, 2011-2013.

	n	%
Gender		
Females	905	60
Males	604	40
Total	1509	100
Age		
45-50	190	13
51-60	392	26
61-70	351	23
70 andolder	576	38
Total	1509	100
NTCD*		
Arterial Hypertension	1101	73
Type2 Diabetes	683	45
Total	1784*	

* Individuals with more than one NTCD

It is noteworthy that the number of comorbidities found was between 2 and3 diseases in the age group of 45-55 years, 3 to 4 diseases among people aged 55 to 65, and5 to 6 diseases among those over 70 years old. The most frequently found association was Arterial Hypertension with Type 2 Diabetes.

As shown in Table 1, out of the 1,509 participants, 1,101 (73%) had a diagnosis of Arterial Hypertension. Out of these, 848 (77%) were elderly, and 660 (60%) were females. After remaining two years in the program, this number increased to 891 (81%) with p <0.001.

Arterial Hypertension is considered one of the major modifiable risk factors and one of the most currently important public health problems related toin creased mortality caused by cardiovascular disease, directly proportional to the increase in blood pressure levels. Studies demonstrate a direct and linear relationship between increased blood pressure andage, with a hypertension prevalence of more than 60% in the age range over 65 years[10].

Individuals with a Type 2 Diabetes diagnostic totaled 683 (45%). In this group, females

prevailed and corresponded to 375 (55%) individuals; the female predominance increases as age rises. As for fasting glucose levels on program entry, only 143 (21%) of those individuals with Type 2 Diabetes had fasting glucose levels considered normal; this number increased to 206 (30%) after two years in the program (p <0.001). There was no significant change inHbA1C levels from the statistical point of view, despite the decrease from 225 (33%) to 205 (30%) in the number of patients with Type 2 Diabetes individuals with HbA1C values above 6.5% at the program entry.

The persistently high levels of serum glucose and HbA1c above 6.5% increment the risk of retinopathy, nephropathy, neuropathy, and microalbuminuria that are consequent of diabetes[9]. The maintenance of appropriate blood pressure and glucose levels can reduce the appearance of serious complications that result from the evolution of hypertension and diabetes, respectively. The utmost avoidance of these events reduces the disease burden to society as a whole and prevents premature death and disability[9].

Meta-analyses demonstrate that CDM programs can have beneficial effects on the clinical outcomes of patients with NTCDs and that the results are very consistent in a variety of studies. The best results are found in reducing blood glucose, HbA1C, and adecrease of COL-Tin Type 2 Diabetes patients, which causes a 10% decrease in this group's mortality[14,15]. Individuals who need to use insulin to control the disease are those who benefit the most from this type of program[15].

As for Arterial Hypertension and dyslipidemia, a systematic review of interventions in lifestyle among adults concluded that these interventions provide short-term marginal benefits over blood pressure control and, to a lesser extent, on lipids. The study points out that the effects of lifestyle interventions on lipids appear to be stronger for LDL-cholesterol and triglycerides and weaker, or with no benefits, when it comes to COL-T reduction or HDL-COL increase. It also highlights that the duration of physical exercise over time may be the most important predictor of change in HDL-COL[16].

According to the data presented in Table 2, a statistically significant difference was observed in the performance ofphysical activity in adults; an increasein the number of adults was observed (p <0.039), however,this increase was not significant among the elderly with an increase in the proportion of those who were sedentary.

The increase in inactivity among the elderlies in this group should be analyzed with caution. The high age range of participants correlated with the increase in the number of co-morbidities related to age, such as those found in this group, and may indicate progressive functional disability in these individuals.

The practice of physical activity contributes not only to reduce and maintain body weight but to improve body functioning, and strengthening the circulatory, muscle, lung, bones, and joints function[5,10]. In individuals with Diabetes, glucose is favoredas fuel for muscle activity contributing to the control of glycemia[10].

In no other analyzed parameter, a statistically significant difference was observed despite the numerical improvement inclinical parameters such as a reductionin the number of individuals with hypercholesterolemia and aHDL-COL increase in those over 40 years of age (Table 2). There was no change inthe habit of smoking. However,a numerical increase was noted in overweight individuals among the elderly and obesity among adults.

Elevated serum COL-T is related to the development of coronary artery disease, peripheral arterial disease, and cerebrovascular disease, hence the importance of reducing their levels. This research draws attention to lever aging the presence of this risk factor associated with Arterial Hypertension while representing the presence of risk for cardiovascular disease. Changes in lifestyle, giving priority to reducing the consumption of saturated fatsis very important to maintain desirable cholesterol levels[11,17].

There was no interference in the habit of smokingin the studied program. Smoking cessation is essential and a priority measure in the primary and secondary prevention of cardiovascular diseases and other diseases. Smoking favors the elevation of blood pressure levels and heart rate, in addition to providing internal injury in vessel walls and deposition of fat and cholesterol in blood vessels[11].

Table 2. Distribution of participants according to the following variables: COL-T, HDL-COL, nutritional status, smoking status, and physical activities at the CDMprogram entry and two years after entry, in a self-management platform, state São Paulo, 2011-2013.

		Programentry		Twoyearsafterentry		p-Value
		n	%	n	%	
COL-T	Over 200 mg/dl	755	50	694	46	0,118
	Under 200 mg/dl	754	50	815	54	
	Total	1509	100	1509	100	
HDL-COL	Over40 mg/dl	287	19	271	18	0,682
	Under40 mg/dl	1222	81	1238	82	
	Total	1509	100	1509	100	
Nutritional status among the elderlies (Over60 years old)	Low weight	82	8,9	83	9,0	0,956
	Adequateweight	342	36,9	336	36,3	
	Overweight	503	54,2	508	54,7	
	Total	927	100	927	100	
Nutritional status amongadults(Between 45 and 60 years old)	Low weight	2	0,3	2	0,3	0.906
	Adequateweight	102	17,6	93	16,1	
	Overweight	215	37,0	208	35,8	
	Obesity	263	45,2	279	47,9	
	Total	582	100	582	100	
Smoking	Yes	106	7	106	7	-
	No	1403	93	1403	93	
	Total	1509	100	1509	100	
Physical activity among the elderlies (over 60 years old)	Yes	417	45	380	41	0.053
	No	510	55	547	59	
	Total	927	100	927	100	
Physical activity among adults (between 45 and 60 years old)	Yes	232	40	279	48	0.039
	No	350	60	303	52	
	Total	582	100	582	100	

A weight increase was observed in the studied subjects, although not significant. However, this result does not differ from that found in the literature. It is known that the modification of nutritional habits stumblesin cultural issues that do not always allow for effective interventions. However, it is emphasized that the relationship between weight gain and blood pressure is almost linear; weight loss and abdominal circumference reduction correlate with pressure reduction and improvement in associated metabolic disorders[18].

It is emphasized that the best clinical results obtained in programs of the studied program type are assigned to self-careeducation for the NTCD patient. Any health action that leads information to the patient helping in assimilation and disease understanding and allowing the patient to make decisions about his health reaches excellent results[19-20].

FINAL CONSIDERATIONS

In the studied program, an improvement in some clinical parameters in patients with Arterial Hypertension and Type 2 Diabetes was observed. Among the former group, there was an increase in

the number of individuals with blood pressure levels considered normal and, among the latter, there was an increase in the number of individuals with normal fasting glucose. Furthermore, a significant increase was observed in the number of adults who started performing physical activities. These are important parameters for the prevention of complications caused by NTCDs; these data reproduce what is reported in the literature for this type of program.

However, no significant difference in reducing the COL-T and HbA1C levels was observed, despite the increase in individuals with improved values of these parameters. The observed weight increase and absence of any impact from smoking can be considered serious faults. In a program that aims to prevent both the emergence of NTCDs and the onset of complications, such as these negative results, are alerts for the program's review and proposal of improvements.

The limitations found in this study relate to the specificity of the studied group, which does not allow generalizations about CDM programs and their results. The studied group differs not only in the advanced age of participants compared to other groups studied in the literature but also on the number of comorbidities found. One of the observations that stand out regarding the influence of age comes from the very process of aging, which brings with it a range of biopsychosocial alterations that must be considered when designing a program. The neglect of aging characteristics may leadthe program to lose its effectiveness.

PROGRAMA DE GERENCIAMENTO DE DOENÇAS CRÔNICAS EM UM PLANO DE SAÚDE, SÃO PAULO, BRASIL

RESUMO

Atualmente as doenças crônicas não transmissíveis são as principais causas de morte no mundo. Consideradas doenças multifatoriais, têm em comum fatores de riscos modificáveis tais como inatividade física, colesterol elevado, excesso de peso, tabagismo, consumo excessivo de bebidas alcoólicas e alimentação não saudável. Com o objetivo de verificar o impacto por um programa de Gerenciamento de Doenças Crônicas,após dois anos de acompanhamento, surgiu esta pesquisa. Trata-se de programa desenvolvido com um grupo de clientes de uma autogestão localizada no estado de São Paulo. É um estudo transversal realizado durante os anos de 2014-2015 com dados de prontuário eletrônico que foram comparados parâmetros clínicos e hábitos de vida de 1.509 indivíduos participantes de um programa de gerenciamento de doenças em dois momentos: na entrada ao programa e após dois anos de participação. Observaram-se resultados satisfatórios na melhora de parâmetros clínicos relacionados aos níveis pressóricos e à dosagem de glicemia em jejum, assim como diminuição do sedentarismo em indivíduos abaixo dos 60 anos.

Palavras-chave: Doenças crônicas. Promoção da saúde. Planos e programas de saúde. Planos de pré-pagamento em saúde.

PROGRAMA DE GESTIÓN DE ENFERMEDADES CRÓNICAS EN UN SEGURO SALUD EN EL ESTADO DE SÃO PAULO, BRASIL

RESUMEN

Actualmente las enfermedades crónicas no transmisibles son las principales causas de muerte en todo el mundo. Consideradas enfermedades multifactoriales, tienen en común factores de riesgo modificables, tales como inactividad física, colesterol alto, sobrepeso, tabaco, exceso de alcohol y alimentación poco sana. Con el objetivo de averiguar el impacto por un programa de Gestión de Enfermedades Crónicas, tras dos años de acompañamiento, se hizo esta investigación. Se trata de un programa desarrollado con un grupo de clientes de una autogestión ubicada en el estado de São Paulo, Brasil. Es un estudio transversal realizado durante los años de 2014-2015 con datos de registros médicos electrónicos, comparándose los parámetros clínicos y hábitos de vida de 1.509 personas que participan en un programa de gestión de enfermedades en dos ocasiones: cuando entran en el programa y después de dos años de participación. Se observaron resultados satisfactorios en la mejora de los parámetros clínicos relacionados con los niveles de presión arterial y a la dosificación de glucemia en ayunas, así como la disminución de la inactividad física en personas con edad abajo de 60 años.

Palabras clave: Enfermedades crónicas. Promoción a la salud. Planes y programas de salud. Seguro de salud prepagado.

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