

Chronic care model and cost reduction in initial health: a new approach for satisfaction and improvement of chronicity

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Abstract

Nowadays, the number of elderly is growing, with consequent increase of chronic diseases. An effective approach to reduce the costs incurred is required. The Chronic Care Model has proven to be a good starting point for a better management of economic and human resources.

Introduction

According to the World Health Organization (WHO) in 2014, some diseases such as cancer, diabetes, cardiovascular or respiratory diseases caused 38 million victims, 68% of all deaths in the world in the same year. Among them, 16 million people were under 70 years old and about 80% came from poorest countries.¹ These diffused chronic diseases in the WHO European Region, are responsible for premature deaths (86%) in recent years. The available data indicate a negative impact on the economic development and well-being of most of the adult population.² The epidemiological transition in the world, particularly in middle and low-income countries, is very different for some reasons. The growth of chronic diseases in many countries is related to infectious diseases and consequent epidemic. This is particularly evident in sub-Saharan Africa and India.³ In the latter, for example, Type 2 diabetes increased by 2% in the 1970s to 12% at the beginning of 2000.⁴ Non-com-

municable diseases' mortality in middle and low-income countries is affecting younger population groups; in the poorest countries, premature mortality for chronic illnesses is 3-4 times higher than that of higher income countries.⁵ In middle and low-income countries, health protection networks are generally very weak or almost inexistent. Living with a chronic illness almost always lead to high costs to sustain care, with consequent renunciation of this.

Nowadays, chronic diseases become the main cause of morbidity, disability and mortality, and most medical care and costs focus in elderly people. In Europe, on average women's live eight years more than men's, and most of these years they live in disadvantaged health status. So, social and economic costs increase.⁶ There is scientific evidence that unhealthy lifestyles, incorrect nutrition, smoking, alcohol abuse, inadequate physical activity cause risk factors for many chronic diseases in about 50% of the men and almost 25% of women in the most developed European countries.⁷ The prevention of chronic conditions, disability and premature death is very important. A new care model is established to allow an individual and systemic professional engagement, to reflect public health access in terms of equity and development of healthcare approach. This is Chronic Care Model (CCM), a new cultural pro-active approach, which propose preventing care strategies, by means of multidisciplinary integration of health-care professionals and multidimensional assessment of needs.⁸

Chronic illnesses require particular attention to social determinants of health. The attributes of effective care for chronic conditions are showed in Table 1.⁹ It is important to identify an effective management of chronic diseases, including the assessment of community needs and attention to health determinants, the prevention of interventions, the use of information systems and the database building, the programmed activities and pro-active interventions, users involvement and motivation.¹⁰ So, it is crucial to reorganize models, aiming to define integrated multidisciplinary care.¹¹

Chronic Care Model: starting point of the multidisciplinary program for chronic disease

Managing chronicity is one of the most important health and social problems. As indicated, the spread and the presence of chronic diseases are constantly increasing.

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A predictive study estimate that in 2020 approximately 60% of the population will be affected by chronic illnesses. Initiative health care, as a care model for the taking care of patients, in chronic illness is a new organizational approach that entrusts the primary care to the ambitious task of planning and coordinating interventions for chronic patients.¹²

CCM was developed by Wagner and researchers at MacColl Institute for Healthcare Innovation (USA). The model was applied in various care settings and then was developed through a national program *Improving Chronic Illness Care*. Indeed, the CCM's framework, include the role of organized and prepared healthcare teams and the community. To ensure effective chronic patients support, this model must be based on six key elements:^{13,14} i) the resources of the community; ii) health organizations; iii) support for self-care; iv) the organization of the team; v) supporting decisions; vi) information systems.

The crucial element of the CCM is the focus on patients, caregiver and multidisciplinary team. Nurses have a key role, such as educate patients, establish relationships with them and their caregivers, ensure continuity of care, use technology to advance assistance.^{15,16}

This type of multidisciplinary and interdisciplinary approach is important to ensure that all patients with chronic illness have available full-time care and access to specialist care when needed.¹⁷

As a final goal, CCM turn to an informed patient that interacts with team, with the scope to obtain high quality primary care and satisfied users. The CCM was adopted by the WHO and widely introduced in healthcare intervention strategies in different countries.¹⁸

Aim

To analyze the scientific literature about the CCM and its use as a possible organizational strategy for reducing healthcare costs in aging.

Materials and Methods

The PUBMED search engine was used for the bibliographic review. The search string launched was [*'Chronic Care Model' AND 'cost'*] for a total of 108 articles found. Subsequently, the following limits were imposed: i) text availability: *free full text*; ii) publication dates: *5 years*; and iii) species: *human*, with the exclusion of 94 studies, for a total of 14 studies useful for the revision (Table 2).¹⁹⁻³³

Results

According to Alliota,³⁴ the chronic disease management care program (CDMCP) results in a 60% reduction in hospital service demand, a 50% reduction in hospitaliza-

tion and greater user satisfaction. In this context, as appointed by some authors,³⁵ 5% of chronic patients consumed 30% of hospital costs in Portugal. With quality management, it is possible to obtain significant values such as 40% reduction in hospital admissions due to chronic respiratory

Table 1. Attributes of effective care for chronic conditions.

Outdated care	Effective care
Disease-centered	Patient-centered
Specialty care/hospital-based	Primary care-based
Focus on individuals	Focus on population needs
Reactive, symptom-driven	Proactive, planned
Treatment-focused	Prevention-focused

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Table 2. Description of the included studies.

Title and study design	Year and setting
1. Randomized controlled trial of a coordinated care intervention to improve risk factor control after stroke or transient ischemic attack in the safety net: Secondary stroke prevention by Uniting Community and Chronic care model teams Early to End Disparities ¹⁹ <i>Randomized Controlled Trial</i>	2017, USA
2. Innovative care models for high-cost Medicare beneficiaries: delivery system and payment reform to accelerate adoption ²⁰ <i>Research Support, Non-U.S. Gov't</i>	2015, Baltimore (USA)
3. Reducing CKD risks among vulnerable populations in primary care. ²¹ <i>Review</i>	2015, Baltimore (USA)
4. Cross-site evaluation of the Alliance to Reduce Disparities in Diabetes: clinical and patient-reported outcomes ²² <i>Evaluation Studies</i>	2014, USA
5. Study protocol of EMPOWER participatory action research (EMPOWER-PAR): a pragmatic cluster randomised controlled trial of multifaceted chronic disease management strategies to improve diabetes and hypertension outcomes in primary care ²³ <i>Randomized Controlled Trial</i>	2014, Malaysia
6. Implementing community-based diabetes programs: the scripps whittier diabetes institute experience ²⁴ <i>Research Support, N.I.H., Extramural</i>	2014, California (USA)
7. Being uninsured is bad for your health: can medical homes play a role in treating the uninsurance ailment? ²⁵ <i>Research Support, N.I.H., Extramural</i>	2013, Oregon (USA)
8. Embrace, a model for integrated elderly care: study protocol of a randomized controlled trial on the effectiveness regarding patient outcomes, service use, costs, and quality of care ²⁶ <i>Multicenter Randomized Controlled Trial</i>	2013, The Netherlands
9. Overcoming roadblocks: current and emerging reimbursement strategies for integrated mental health services in primary care ²⁷ <i>Review</i>	2013, USA
10. Treatment for substance use disorder: opportunities and challenges under the affordable care act ²⁸ <i>Clinical Trial</i>	2013, Maryland (USA)
11. Expansion of electronic health record-based screening, prevention, and management of diabetes in New York City ²⁹ <i>Research Support, N.I.H., Extramural</i>	2013, New York (USA)
12. The ClaudicatioNet concept: design of a national integrated care network providing active and healthy aging for patients with intermittent claudication ³⁰ <i>Research Support, Non-U.S. Gov't</i>	2012, Eindhoven (The Netherlands)
13. Are characteristics of the medical home associated with diabetes care costs? ³¹ <i>Research Support, Non-U.S. Gov't</i>	2012, Minneapolis (USA)
14. Impact of the Chronic Care Model on medication adherence when patients perceive cost as a barrier ³² <i>Randomized Controlled Trial</i>	2012, Texas (USA)
15. Chronic case management: clinical governance with cost reductions ³³ <i>Clinical Trial</i>	2016, Paraná (Brazil)

diseases, 25% reduction in admissions due to diabetes; reduction of 38% of emergency calls to patients with asthma and 50% reduction of occurrence of absenteeism due to arthritis.^{36,37}

A cohort transverse epidemiological prospective study, conducted by a team of cardiologists and oncologists Executive Master in Business Administration at the University of Parana,³⁸ compared a group of patients monitored by a CDMCP with subjects without CDMCP assistance since 2010 to 2012. Patients monitored in this program were recruited because they had chronic-degenerative non-transmissible diseases (CDNCD) with frequent hospitalizations and/or urgent care in the year preceding the selection of the study. Additionally, patients could be referred to the program by their doctors and / or other programs such as HomeCare or family medicine. All costs related to the program were included and compared with the cost of users with the same epidemiological profile who opted for not participating in the CDMCP.

The practitioner verified the correlation between the International Classification of Diseases (ICD-10) and the pathologies that the users presented and sought the most appropriate strategy for each case, advising health education and self-management of the disease by the patient. They encouraged to increase adherence to the treatment, and suggesting possible non-pharmacological behavioral changes, such as a healthy life style, weight control, and regular physical activity. Patients were monitored through interviews (weekly or monthly) and/or through telephone calls during the monitoring period. It is important to emphasize that patients were assisted by caregivers, who have taken definitive decisions on clinical and therapeutic management. Physician was responsible for defining the frequency of user evaluation, based on the morbidity and risk of existing CDNCD complications. There was no interference in the frequency of consultations defined by the treating physician. Therefore, the CDMCP studied was limited to informational and educational actions. The cases studied showed a 79% reduction in the number of days of hospitalization compared to non-monitored CDMCP cases: the sum of the total number of days of hospitalization in the CDMCP group was 230 days compared to 1097 days in the non-CDMCP group (SD±613.62). The average reduction in total costs was 31.94%, with an average reduction of 8.36% in monthly costs.

The total health care costs of the selected users were analyzed by sex, age group and ICD-10. In the CDMCP group, women represented 48%, while male users account-

ed for 52% of the total cost of the program. No significant statistical difference in the cost of healthcare between females and males was observed. The highest concentration of healthcare costs in the CDMCP group (51%) was observed in the age group 50-70 years old. Cardiovascular disease and cancers represented the highest cost of health in the CDMCP group (64%).

Discussion

It was observed a relevant reduction of 31.94% of the total costs and a reduction in the monthly cost of 8.63%. It's important to consider that the program evaluated in this study offered only verbal indications to users, self-management of the pathologies by patients without interfering with the treatment plan established by the treating physician, according to the core elements of the program based on the CCM.^{39,40} The analyzed CDMCP evidenced an emphasis on the individual in promoting health.⁴¹ Healthcare provided, including information for self-management of chronic conditions, respects the criteria of clinical governance in equity of care and respect of patients.

Conclusions

The multidisciplinary program for the treatment of chronic disease based on the principles of the CCM has highlighted a considerable cost reduction and increased satisfaction by patients and their caregiver. The commitment of the whole community helped to improve the patient's self-care with educational and pro-active purposes and also of their caregiver.

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