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Economic Impact of Integrated Care Models for Patients with Chronic Diseases: A Systematic Review

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ABSTRACT

Objectives: To assess the costs and potential financial benefits of integrated care models for patients with chronic diseases, that is, type 2 diabetes mellitus, schizophrenia, and multiple sclerosis, respectively. **Methods:** A systematic search of the literature was performed using EMBASE, MEDLINE, and Web of Science. Studies that conducted a cost analysis, considered at least two components of the chronic care model, and compared integrated care with standard care were included. **Results:** Out of 575 articles, 26 were included. Most studies examined integrated care models for type 2 diabetes mellitus (n = 18) and to a lesser extent for schizophrenia (n = 6) and multiple sclerosis (n = 2). Across the three disease groups, the incremental cost per patient per year ranged from − €3860 to + €613.91 ($\bar{x}$ = − €533.61 ± €902.96). The incremental cost for type 2 diabetes mellitus ranged from − €1507.49 to + €299.20 ($\bar{x}$ = − €518.22 ± + €604.75), for schizophrenia from − €3860 to + €613.91 ($\bar{x}$ = − €677.21 ± + €1624.35), and for multiple sclerosis from − €822 to + €339.43 ($\bar{x}$ = − €241.29 ± + €821.26). Most of the studies (22 of 26 [84.6%]) reported a positive economic impact of integrated care models: for type 2 diabetes mellitus (16 of 18 [88.9%]), schizophrenia (4 of 6 [66.7%]), and multiple sclerosis (1 of 2 [50%]). **Conclusions:** In this systematic literature review, predominantly positive economic impacts of integrated care models for patients with chronic diseases were found.

Keywords: chronic disease, cost analysis, integrated care, multiple sclerosis, schizophrenia, type 2 diabetes mellitus.

Introduction

The fast-growing scientific knowledge, the rapid technological innovations, the fragmentation of care, the rapidly aging population, and the increasing number of patients with (multiple) chronic diseases represent major challenges for health care systems worldwide [1]. Nevertheless, one must guard the primary goal of health care, that is, to provide high quality of care. The American Institute of Medicine (IOM) defines quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" [2]. The second IOM report "Crossing the Quality Chasm" recommended that the delivery of health care must be based on six dimensions: safety, timeliness, equitability, patient centeredness, effectiveness, and efficiency [3]. Nevertheless, the significant rise in the number of people with chronic diseases jeopardizes the financial sustainability of health care systems and, therefore, the efficiency of health care. Total health care costs for chronic diseases in Europe are estimated at €700 billion annually [4]. The annual health care costs for type 2 diabetes mellitus, schizophrenia, and multiple sclerosis in Europe are estimated at €90 billion [5], €94 billion [6], and €15 billion [6], respectively.

Health care systems are mostly historically organized to respond to acute diseases [7]. Patients with chronic diseases, however, are in great need of long-term care, which brings together a broad range of professionals, who integrate and coordinate services along the continuum of care. So, health care systems are facing the challenge of efficiently meeting the complex care needs of the chronically ill. At present, integrated

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care receives increasing attention because it is considered appropriate in reducing the fragmentation of care, improving the quality of patient care, and controlling costs [8]. Moreover, it is considered to be a new innovative strategy to overlap the existing gaps and to help in changing health care systems into more "demand-driven, client-centred and cost-conscious systems" [7]. The World Health Organization [9] defined integrated care as "the management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system."

Integrated care is driven by the so-called triple aim approach, which has a simultaneous focus on 1) cost savings, 2) better patient care experience, and 3) improved health outcomes [1]. Furthermore, different terms are used for labeling particular models of integrated care such as "disease management" [10], "case management" [11], "continuous care" [12], "care pathways" [13], and "integrated delivery networks" [14]. Integrated care is, therefore, an umbrella term of various alternative forms rather than an exact definition.

Although there is a widespread belief that integrated care can control or even reduce health care costs, relatively few studies have evaluated the economic impact of integrated care models so far. The present body of literature is inconclusive about the potential economic impact of integrated care [1]. Ofman et al. [15] reported that 1 article out of 7 (14%) showed a positive economic impact. Ouwens et al. [16] found that 4 out of 7 articles (57%) showed a financial benefit of integrated care. In a recent review conducted by de Bruin et al. [17], 13 articles out of 21 (62%) reported cost savings [17]. Specifically for type 2 diabetes mellitus [17] and schizophrenia [18], the results are also inconclusive. To the authors' knowledge, no similar review has been undertaken for multiple sclerosis. Therefore, there is a great need for economic evaluations of integrated care.

There are several guidelines for economic evaluations. First, economic evaluations of integrated care models require a comparison of their costs and health consequences with care provided in the usual setting (i.e., routine or standard care). Generally, there are five types of economic analyses [19]: 1) cost minimization (the simplest form of analysis that considers only the costs and savings, leading to a calculation of net costs), 2) cost consequence (an analysis that relates the costs to an array of output measures), 3) cost benefit (an analysis that expresses the outputs in monetary terms), 4) cost effectiveness (an analysis that relates the costs to a single, common effect), and 5) cost utility (an analysis that adjusts the life-years gained by a series of utility weights). Second, each economic evaluation must also consider the relevant type of costs [1]: 1) direct costs (costs of health care services, i.e., hospitalization, consultation, medication, etc.), 2) indirect costs (productivity losses due to disability and premature mortality), and 3) intangible costs (psychological burden on patients and family members). Finally, guidelines also recommend to state the viewpoint for the analysis [19]: 1) patient and/or family members, 2) employer, 3) professional organization, and 4) society or third-party payer.

Because integrated care models receive a more prominent role in health care, the present study aimed to assess the economic impact of integrated care models for patients with chronic diseases. The present study is a part of CORTEXS (Care Organization: a Re-Thinking EXpedition in search for Sustainability), an extensive multidisciplinary research project in Flanders (Belgium), which studies integrated care from the microlevel of care recipients and their caregivers, over the mesolevel of intraorganizational and interorganizational processes, to the macrolevel of legal and financial frameworks [7].

Methods

Eligibility Criteria

The eligibility criteria for this review were decided a priori. First, and in line with the two basic approaches to economic evaluations [19], potential designs for inclusion were randomized controlled trials, nonrandomized controlled trials, before-after studies (i.e., trial-based studies), or observational studies and modeling studies, on the basis of existing clinical trials. Consequently, editorials, opinion articles, and descriptive articles were excluded. Second, this systematic review included studies that conducted a cost analysis because the review was interested only in the costs and potential financial benefits of integrated care. Third, articles were included if they specifically dealt with type 2 diabetes mellitus (one of the most common chronic diseases), schizophrenia (representing a mental disease, the impact of which is likely to considerably increase in the future), and multiple sclerosis (a chronic disease with different phases of severity), together covering a broad range of chronic illness consequences. In line with previous research [20–23], integrated care models were categorized according to the components of the chronic care model (CCM) of Wagner. Therefore, for the fourth inclusion criterion, the models were considered as "integrated care" if they targeted two or more CCM components. Finally, to assess the positive or negative economic impact of a given model, the presence of an alternative type of care, typically usual or standard care, was required.

Search Strategy

A systematic literature review was conducted in the 50th week of 2014, searching the electronic peer-reviewed databases EMBASE, MEDLINE, and Web of Science. The search strategy was divided into three categories: 1) alternative terms of integrated care, 2) cost analysis, and 3) chronic disease. Table 1 lists the corresponding Medical Subject Headings (MeSH) and keywords for each category. The search was performed using the following queries: ("integrated delivery system" [MeSH] OR "integrated care" OR "disease management" [MeSH] OR "case management" [MeSH] OR "patient care management" [MeSH] OR "patient-centered care" [MeSH] OR "managed care" OR "transmural care" OR "coordinated care" OR "seamless care" OR "continuity of patient care" [MeSH] OR "clinical pathways" OR "patient care planning" [MeSH] OR "patient care team" [MeSH]) AND ("cost analysis" [MeSH] OR "economic evaluation" OR "economic impact" OR "cost-minimization analysis") AND ("diabetes mellitus type 2" [MeSH] OR "schizophrenia" [MeSH] OR "multiple sclerosis" [MeSH]). Because different terms are used for labeling particular models of integrated care, broad search terms were applied without date restrictions to make the search strategy as sensitive as possible. In addition, bibliographies of included articles were hand-searched for other relevant articles.

Study Selection and Data Abstraction

After removal of duplicates, the first selection of articles was made on the basis of their titles and abstracts. Articles selected for full-text review were screened according to the eligibility criteria. Two reviewers (M.D. and D.V.) investigated independently the relevance and methodological quality of the extracted articles. In case of inconclusiveness, a third researcher (S.V.) helped to obtain consensus. For each study found eligible for this systematic review, the study characteristics (i.e., author, year, country, study design, study period, usual care condition, and term used for the integrated care model), components of the CCM included in the intervention (i.e., characteristics of the integrated care model), characteristics of the cost analysis (i.e., type of costs and viewpoint