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Review

Organization, quality and cost of oncological home-hospitalization: A systematic review

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ABSTRACT

Background: Home-hospitalization might be a patient-centred approach facing the increasing burden of cancer on societies. This systematic review assessed how oncological home-hospitalization has been organized and to what extent its quality and costs were evaluated.

Results: Twenty-four papers describing parenteral cancer drug administration to adult patients in their homes were included. Most papers concluded oncological home-hospitalization had no significant effect on patient-reported quality of life (7/8 = 88%), but large majority of patients were satisfied (12/13, 92%) and preferred home treatment (7/8, 88%). No safety risks were associated with home-hospitalization (10/10, 100%). The cost of home-hospitalization was found beneficial in five trials (5/9, 56%); others reported no financial impact (2/9, 22%) or additional costs (2/9, 22%).

Conclusion: Despite heterogeneity, majority of reported models for oncological home-hospitalization demonstrated that this is a safe, equivalent and acceptable alternative to ambulatory hospital care. More well-designed trials are needed to evaluate its economic impact.

1. Introduction

Worldwide, cancer is a major threat to public health. The social as well as economic consequences remain significant for patients and societies (Luengo-Fernandez et al., 2013; Costa et al., 2016; Markman and Luce, 2010). The World Economic Forum estimated direct costs of cancer treatment and attended costs of income losses at US$ 290 billion in 2010 (Bloom et al., 2011). Within the European Union, total cancer costs were estimated at €126 billion in 2009, whereof €51 billion accounted for healthcare (Luengo-Fernandez et al., 2013). Given the increasing incidence and prevalence as well as the advanced screening and treatment modalities, there is no doubt cancer costs will only expand (Bloom et al., 2011; Siddiqui and Rajkumar, 2012; Mariotto et al., 2011; Meropol et al., 2009). Further, the awareness of the psychological impact for patients and the importance of maintaining health-related quality of life (HRQoL) during and after cancer therapy have strongly increased within past decades (Bottomley, 2002; Institute of Medicine Committee on Psychosocial Services to Cancer Patients/Families in a Community Setting, 2008). In the fields of surgical and radiologic oncology, great progresses have already been made, resulting in treatments with less side effects and patient-burden (Ahmad et al., 2012; Wyld et al., 2015). Systemic treatment modalities are rather lagging behind on this aspect of treatment. Despite the evolutions towards lower-dosed and less toxic chemotherapies, targeted- and immunotherapies, the high frequency and often continuous nature of these treatments are emotionally stressful for patients and interfere with their social functioning (Kelly et al., 2004; Hall and Lloyd, 2008). Moreover, the high frequency of hospital visits associated with current systemic treatments, along with the increasing prevalence and chronic nature of the disease, inevitably jeopardize the functioning of current

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Table 1
Search strategy.

	Homecare services	Cancer	Treatment
Mesh terms and key words	a. Home care services [Mesh] b. Home care services, hospital-based [Mesh] c. Home care agencies [Mesh] d. Home infusion therapy [Mesh] e. Home Care f. Home treatment	a. Neoplasm [Mesh] b. Oncologic nursing [Mesh] c. Cancer	a. Drug therapy [Mesh] b. Drug therapy [subheading] c. Drug therapy, combination [Mesh] d. Chemotherapy, adjuvant [Mesh] e. Consolidation Chemotherapy [Mesh] f. Induction Chemotherapy [Mesh] g. Maintenance Chemotherapy [Mesh] h. Antineoplastic combined Chemotherapy protocols [Mesh] i. Antineoplastic Agents [Mesh] j. Immunotherapy [Mesh] k. Antineoplastic Agents, Hormonal [Mesh] l. Molecular Targeted Therapy [Mesh] m. Cancer therapy
MEDLINE	(1) A–D/OR	(2) A–B/OR	(3) A–L/OR
The Cochrane Library	(1) A–D/OR	(2) A–B/OR	(3) A–L/OR
Web of Science	(1) E		(3) M
Clinicaltrials.gov	(1) F	(2) C	

cancer care facilities (American Society of Clinical Oncology, 2015; Department of Health Cancer Policy Team, 2010).

The aforementioned challenges in cancer care, and specifically those arising with the systemic cancer treatments, stress the importance for all involved stakeholders to look for new high-quality, patient-centred and cost-effective healthcare models. According to the Institute of Medicine (IOM), healthcare systems should meet six fundamental dimensions to ensure quality of care: (1) safe; (2) effective; (3) patient-centred; (4) timely; (5) efficient and (6) equitable (Institute of Medicine Committee on Quality of Health Care in America, 2001). Recently, the Strategic Advisory Board for Welfare, Health, and Family Policy (*Strategisch Adviesraad voor Welzijn, Gezondheid en Gezin*) of the Flemish Government (Belgium) added two more components: (7) continuity and (8) integration of care. A potential application of such new healthcare models is home-hospitalization; defined as "a service that provides active treatment by healthcare professionals in the patient's home, for a condition that otherwise would require acute hospital in-patient care" (Shepperd and Iliffe, 2000). Home-hospitalization in general is considered an appropriate strategy to lower healthcare-associated costs by decreasing the duration and number of hospital stays; and an opportunity to provide more integrated care (DH Cancer Policy Team, 2010; Shepperd and Iliffe, 2000; Farfan-Portet et al., 2015; Chevreul et al., 2004; Leff et al., 2005). Furthermore, it is often believed that the patient's quality of life benefits from staying longer in a familiar environment (Farfan-Portet et al., 2015; Chevreul et al., 2004; Shepperd et al., 2016; Tralongo et al., 2011).

The primary aim of this systematic literature review was to present a general overview of the elaborated care models for oncological home-hospitalization (OHH), with specific interest for the types of cancer treatments administered at home, the targeted populations and the health professionals responsible for this specialized type of homecare. A second aim was to evaluate the effects of administrating cancer therapies at patients' homes, focussing on patient-reported outcomes: quality of life (QoL) and satisfaction; safety and cost-efficiency.

2. Methods

A systematic review was carried out according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines and the Cochrane Handbook for Systematic Reviews (Moher et al., 2010; Cochrane Collaboration, 2011). A quality assessment of the final literature overview was performed using the PRISMA checklist (Appendix A).

2.1. Eligibility criteria

All articles describing parenteral cancer drug administration to adult patients in their own homes were included in this review. Papers describing home infusion treatments, without specific home cancer drug administration; or describing administration of drugs for supportive care were excluded. The same applied for editorials, opinion articles, discussions and reviews referring to existing initiatives. All prospective randomized and non-randomized trials as well as retrospective papers analysing patient's quality of life, patient's satisfaction, safety or costs within the setting of interest, were included in the systematic review. Only articles published in English, French or Dutch were included. No date or country restrictions were applied.

2.2. Search strategy

Data was systematically identified using the electronic peer-reviewed databases MEDLINE, Web of Science and The Cochrane Library, in March 2017. The Clinicaltrials.gov database was searched for relevant ongoing clinical trials. The search strategy consisted of: (1) terms for 'Homecare services' AND (2) terms for 'Cancer' AND (3) terms for 'Treatment'. The corresponding MeSH terms and key words, as well as the queries that were used are presented in Table 1. The search strategy was initially created for MEDLINE and subsequently adapted for the other databases. Key words with a broader scope were used for searching Web of Science and Clinicaltrials.gov, as the initial MEDLINE search strategy was too strict for these databases (Table 1). Search strategy focused on human studies only. During preparation of the manuscript, the search strategy was repeated weekly in order to identify potentially new relevant publications (last search on 23/10/2017). Additionally, the reference lists of all included papers were handsearched for other relevant articles. A bibliographical database was manually created to store and manage the retrieved references.

2.3. Study selection and data abstraction

After removal of duplicates, relevant articles were selected based on title and abstract. Selected articles were independently screened for relevance by two reviewers (L.C. and K.V.E.), according to the a priori proposed eligibility criteria. In case of inconclusiveness, a third researcher (D.V.) helped to obtain consensus. For those articles meeting the eligibility criteria, study characteristics (i.e., author, year, country, article type, indication, treatment intent, cancer drug(s) administered at home, cancer drug administrator and number of patients treated or cycles administered at home) were extracted using a data extraction