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HEALTH PSYCHOLOGY | REVIEW ARTICLE

From life-threatening to chronic disease: Is this the case of cancers? A systematic review

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Abstract: Problem identification: Given the importance of a common scientific background on what clinicians mean by the term chronic cancer (CC), the present review examines whether and to what extent a shared definition of CC exists in the literature.

Literature Search: A systematic search of the existing literature dealing with the definition of CC was performed.

Synthesis: Considering a statement of the American Cancer Society on CC, a list of attributes for a cancer to be considered chronic was drawn up and used as a common schema to evaluate and organize a description of CC provided by relevant articles.

Conclusions: Overall, most of the relevant articles recognized a time criterion as a peculiar attribute of a CC, however, there is only a limited degree of overlap within the literature definitions of CC.

Implication for Practice: It may be useful to talk about a chronic phase within a broader cancer disease continuum.

Subjects: Social Sciences; Behavioral Sciences; Education

Keywords: chronic cancer; chronic disease; definition; cancer care; oncology

1. Introduction

In recent years, improvements in the identification of risk factors, earlier diagnosis and new treatments have resulted in an increase of the number of cancer patients living longer; even in the case of malignancies that cannot be cured, but can be controlled, current treatments enable many patients to live for years after the diagnosis.

ABOUT THE AUTHORS

The authors are involved in research activities dealing with clinical and health psychology, psycho-oncology and cognitive sciences, with a specific focus on medical decision making. The research reported in the present work would help to shed light on the long-term cancer burden.

PUBLIC INTEREST STATEMENT

Novel therapies and prevention strategies have led to the idea that cancer can be considered a chronic disease. Viewing cancer as a chronic disease clearly changes the care flow pattern and shapes the point of view of both physicians and patients.

The authors tried to find out whether and to what extent the scientific community recognizes cancer as a chronic disease and how it is defined. Having a shared and common definition of chronic cancer might help physicians to have a common background in taking shared medical decisions and to better communicate with patients. It would also help patients to recognize their own needs more fully, depending on the disease phase that they are experiencing.

The transformation of cancer from a rapidly and inevitably fatal disease into a condition that can be managed over time, has led to the definition of **cancer as a chronic disease** (Schmidt, 2016; Ward, Schiller, & Goodman, 2014; WHO, 2015).

This kind of transition is not unique in the history of medicine; analogous cases could be described for kidney failure, chronic respiratory diseases, chronic cardiovascular diseases, diabetes and even AIDS/HIV, which like some cancers, cannot be cured, but can be controlled for extended periods of time.

Such transitions did not merely imply a change in the linguistic definition, but rather a pivotal shift in many aspects: from communication, to care flow models, to the role of the patients and their family systems, up to health-care policies. The shift to chronic illness, in fact, raises issues about patient empowerment and patient self-management (Bodenheimer, Wagner, & Grumbach, 2002; Boerger-Knowles & Tashi, 2015; Harley, 2012) and using the label “chronic” itself may shape the attitudes of doctors, patients and caregivers.

Within a chronicity framework, patients with a chronic cancer (CC) should, in fact, be considered as experts in their own condition, becoming their principal caregiver (Leventhal, Leventhal, & Breland, 2011; Wagner, 1998).

But, can cancer nowadays be considered a chronic illness?

Firstly, we should note that persons receiving a diagnosis of cancer, or patients at their first line treatments may believe that healing is the primary objective of care; conversely, a person diagnosed with diabetes or asthma, knows from the very moment of the diagnosis that the illness is a chronic one. A cancer may be stable, as abnormal proliferation and replication may be stopped, or may be progressive, as it continues to develop, whereby although the cancer cells cannot be interrupted, symptoms control is still possible. These aspects profoundly affect patient-physician communication and the cognitive aspects of coping with the illness (Gorini & Pravettoni, 2011).

From the oncologist’s point of view, even though clinicians already claim many advanced cancers as chronic diseases, there are as yet no international guidelines for the support of patients living with (chronic) cancers. Albeit worthy of attention, CC seems to be poorly defined and there seems to be no unified agreement on when the chronic phase begins or ends. The need for a better definition of cancer as a (chronic) disease is increasingly becoming recognized (Berlinger & Flamm, 2009; Berlinger & Gusmano, 2011; Harley, Pini, Bartlett, & Velikova, 2012), especially when it comes to devising interventions in the field of healthcare.

How do physicians categorize and recognize a CC patient? What features should CC present?

One of the major challenges in defining cancer as a chronic disease is the lack of unified criteria for an illness to be considered as “chronic” (Goodman, Posner, Huang, Parekh, & Koh, 2013). The term “chronic” itself resides between the category of cured and the category of terminal, encompassing many different and heterogeneous situations.

According to the World Health Organization (WHO, 2011) which lists cancers as one of the four main types of chronic illnesses, chronic diseases are diseases of long duration and generally slow progression, without any specification about functional limitation and need for ongoing medical treatments and care, conversely to the aforementioned definition. However, in the case of cancers, one must also take into consideration the potential need for ongoing medical treatment, significant impairment, and reduction in quality of life.

The US Department of Health & Human Services states that chronic diseases are “conditions that last a year or more and require ongoing medical treatment and/or limit activities of

daily living.” (Goodman et al., 2013) Certainly, some advanced cancers, such as chronic myelogenous leukaemia (CML) (Pulte, Redaniel, Bird, & Jeffreys, 2015) meet the criteria in terms of duration, the need for ongoing medical treatment and functional impairment. However, a 12-month criterion for a disease to be chronic is possibly not applicable to the field of cancer care. This is first because in the case of some malignancies the situation may unpredictably worsen within time, and secondly because, as mentioned previously, patients diagnosed with cancer, unlike patients with other well-known chronic conditions, may believe that a cure is possible.

A description provided by the American Cancer Society (2013) lists some features of CC, characterizing it as an advanced cancer that can be managed for months or even for years, that can become stable using treatments or enter a repeating cycle of remission and recurrence.

Even if such a definition offers some important boundaries for identifying what a CC should “look like”, several particular aspects of cancer still render its shift into a “chronic condition” problematic (Tritter, 2002).

Cancer is a cellular categorization, rather than a singular entity or disease, and it encompasses a broad range of illnesses. This means that it is very hard to provide a list of unique features for a “template” of cancer to be considered chronic, since there are many diseases/cancers (lung, breast, ovarian, bowel, etc.), and many different illnesses affecting the same localization (e.g., mesothelioma, small cell lung cancer, etc.). Each disease has different incidences, mortality rates and may require treatments that differ markedly. Furthermore, the predictability of treatments and prognosis even in the light of the same microscopic characteristics is rather low compared to other chronic diseases (Hebdon, Foli, & McComb, 2015; Tritter, 2002).

We dare say that patients’ common-sense definition and that of oncologists differ markedly so that a potentially insidious misunderstanding occurs. For example, after a recurrence of an ovarian cancer, the oncologist may tell the patient that no more curative intent is available and that they will try to “chronicize” the cancer. Patients usually understand that they are to live *with* ovarian cancer from that point on, as would be the case with a diabetes diagnosis. However, the median overall survival after the first, second, third, fourth and fifth ovarian cancer relapse (Hanker et al., 2012) is very different from that associated with diabetes or asthma.

Given the importance of a definition for the health-care flow and for the patients’ mindset, to shed light on the definition of chronic cancer(s), papers dealing with the concept of cancer as a chronic illness were systematically reviewed to find out whether and to what extent a shared definition of cancer as a chronic disease can be found in the literature.

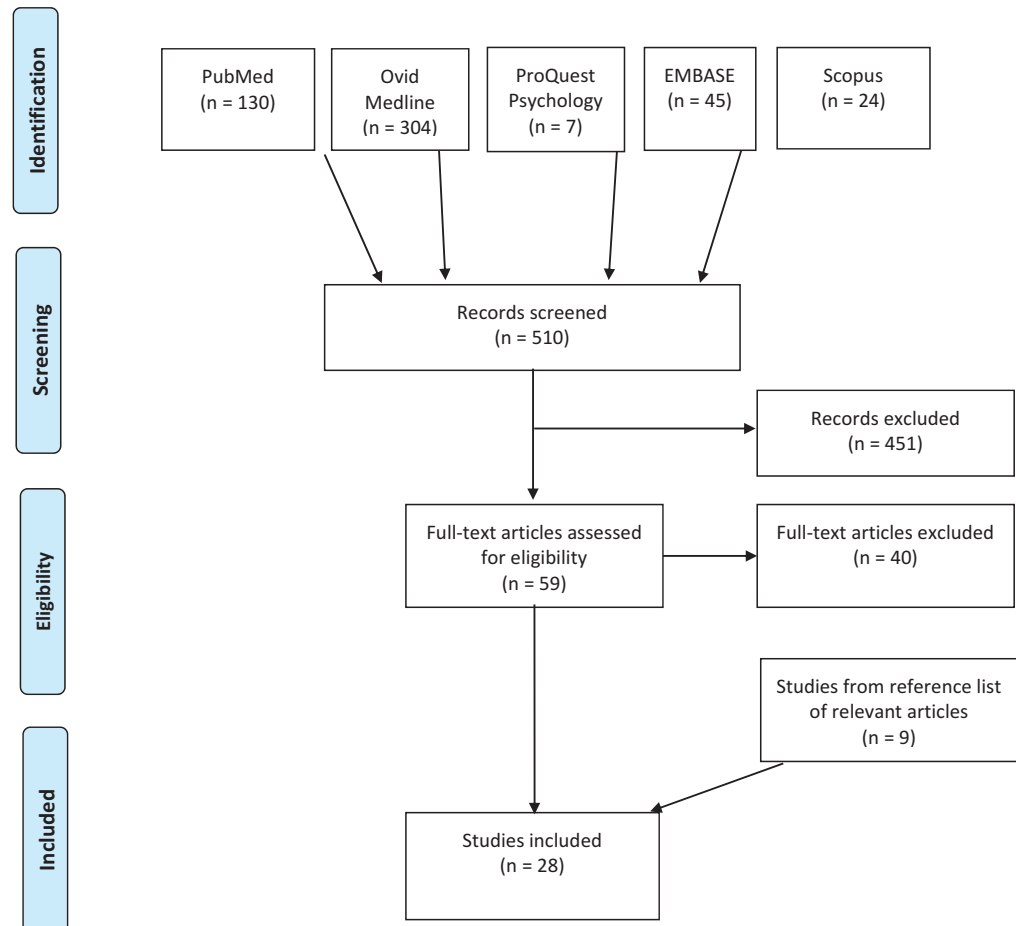
2. Methods

2.1. Selection procedures and data collection

2.1.1. Search strategy

A comprehensive literature search was designed and conducted by an experienced medical librarian (WRE) with input from the study investigators. We searched the electronic databases Ovid MEDLINE, Embase, Scopus, Pubmed and ProQuest Psychology. Various combinations of database-specific controlled vocabulary (subject headings) were used, supplemented by keywords, title and abstract terms for the concepts and synonyms relating to chronic cancer and its definition. Bibliographies of relevant papers were examined and citing articles were identified using ISI Web of Science. English language restrictions were applied, and the date restriction was from 1980 onwards. The full search strategies employed are reported in the Table A1.

Figure 1. Flow Chart of the studies selection procedure. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, et al., 2009).



2.1.2. Inclusion criteria

Articles included for the systematic review dealt with the concept of CC as they (a) clearly attempted to give a general definition of CC, (b) stated that some specific cancers must be defined or considered as chronic diseases, (c) considered some clinical issues regarding cancer patients within a framework of chronicity, giving some specific attributes or definition of CC.

All the included articles were written in English and dealt with human cancers.

The search results are summarized in the (Prisma) Flow Chart in Figure 1.

2.1.3. Exclusion criteria

Articles excluded from the review were: (i) duplicates, (ii) articles that did not provide any definition or description of what they considered as CC or of which attributes are related to CC.

2.1.4. Included studies

A total of 510 studies were identified through the initial search strategy from databases, 451 were removed by after examining the title and abstract.

A total of 40 were excluded as they did not provide an explicit definition or specific criteria to explain or characterize cancer as a chronic illness.

A total of 19 of the studies identified through the initial search were included in the review and 9 additional studies that met the inclusion criteria were found through a manual search of the bibliography of the initial relevant studies. In all, 28 articles were included in the present review.

3. Results

3.1. Study characteristics

Overall, 28 studies were included in the present review.

Among the included articles, there are four reviews, one concept analysis, 17 editorials, commentaries, special issues or theoretical articles, four cross-sectional or longitudinal studies on cancer patients, and two case studies.

Overall, two studies explicitly attempted to define CC, while there were nine articles stating that some specific cancer types may be considered as chronic illnesses. Sixteen articles listed cancer or some specific cancer types as chronic disease, giving a detailed description of what or why they considered cancers disease to be chronic.

3.2. CC features

Overall, each one of the included articles provided some attributes or criteria for CC.

Considering the American Cancer Society (2013) regarding CC, a list of characteristics of CCs was drawn up. Definitions or descriptions of the features of CC provided by relevant articles were organized according to those specific features.

The first key feature we identified from the American Cancer Society statement (2013) was (i) *cancer stage* (advanced or metastatic); the second referred to the possibility of healing or not (ii) *curative intent*; the third related to the fact that existing treatments may allow for symptom control, rendering CC manageable (iii) *symptom control* and the fourth dealt with the presence of (iv) *cycle of remission and recurrence*. The last category refers to the time dimension and to the possibility of a long-term survivorship (v) *estimated survival*.

Descriptions of relevant articles were organised according to those key features in Table 1, to highlight which characteristics were represented the most in the literature and to assess whether and to what extent some shared characteristics of what is considered CC can be determined in the literature. Studies' characteristics and the extent to which they overlap with the definition provided by the American Cancer Society (on a scale from 1 to 5 point, representing the key features aforementioned) are reported in Table 2.

Overall, 23 articles recognized time criterion (*estimated survival*) as a CC characteristic, while 10 identified the presence of *cycle remission and recurrence* in CCs. There were nine articles which listed *symptom control* and seven mentioned *cancer stage* as relevant aspects of CC, while five articles addressed the *curative intent* dimension of CC.

3.3. General CC definitions

In 1953, Morton and Morton summarized clinical cases with cancers behaving as chronic diseases, showing that chronicity was not related to a specific cancer type (1953).

Within a chronic disease framework, Dorsett (1991) analyses the trajectory of cancer recovery, considering cancer a chronic disease characterized by episodic and acute morbidities, with the possibility of more prolonged remission compared to the past.

During an anthropological analysis on chronic illnesses, Heurtin-Roberts and Becker (1993) include cancer as a chronic condition and define chronic illnesses as health conditions that can

Table 1. Chronic cancer attributes

Study		Cancer stage	Curative intent	Symptoms control	CC features Cycle of remission and recurrence	Estimated survival	Specific cancer type
Armstrong, 2002					Persist or relapse		Ovarian cancer
Berlinger & Flamm, 2009	Advanced	Cannot be cured	Treatments render cancer stable	Cycle of remission, recurrence can be anticipated			Chronic myelogenous leukaemia (CML)
Berlinger & Gusmano, 2011			Single drug therapy continues to be effective over many years	Many years			CML
Bernell, Howard, & Paterson, 2016			Treatment options exist	Fatal not in near term			Multiple Myeloma
Bodai & Tuso, 2015				Long-term duration			Breast cancer
Boerger-knowles & Tashi, 2015	Advanced		Can be stabilized with treatment	Enters a repeating cycle of remission and recurrence	Months or years		
D'Angio, 2007					Prolonged course		Mesenchymal chondrosarcoma Alveolar soft part sarcoma
DePue, 2008					Patients live long		Hematologic cancer
Dorsett, 1991				Episodic and acute morbidities			
Doyle-Lindrud, 2007					Long term and increasing survival rate		
Frick et al., 2017	Advanced or metastatic		Can be stabilized with treatment	Recurrent disease or second diagnosis	Months or years		Chronic lymphocytic leukaemia, CML
Gosain & Miller 2013			Active and controlled	maintained remission	Chronic survivorship		
Guttila, Bortolami, & Evangelista, 2015					42 months of medial survivor		Prostate cancer

(Continued)

Table 1. (Continued)

	Study		CC features				Specific cancer type
	Cancer stage	Curative intent	Symptoms control	Cycle of remission and recurrence	Estimated survival		
Harley et al., 2012	Advanced or metastatic	Cannot be cured	Treatments allow for symptom control, slow disease progression or prolong life		More than only months to live		
Hebdon, Foli, & McComb, 2015		Controlled but not cured	Treatment with long lasting consequences	Acute exacerbation and chronic management	Long lasting condition		
Heurtin-Roberts & Becker, 1993		Can be managed, but not cured		Periodic exacerbation or acute episodes			
Kagawa-Singer, 1993					2 years		
Lage & Crombet, 2011	Advanced				Many years of survival		
Markman & Malviya, 2008					Prolong survival	Ovarian cancer	
Markman, 2006				Recurrent	Prolong duration	Ovarian cancer	
McCorkle et al., 2011		Can be managed as a chronic illness			Patients live longer		
Morton & Morton, 1953	Malignancy				Extended periods of survival		
Naus, Ishler, Parrot, & Kovacs, 2009					Long term disease		
Phillips & Currow, 2010				Recurrent or ongoing cancer			
Polinsky, 1994					Life-long follow up medical care	Breast cancer	
Reed & Corner, 2015	Metastatic				Extended time duration	Metastatic breast cancer	
Sutton, 2016			Need for ongoing medical care for long time		Duration of survival	Nonmelanoma skin cancer	
Walker, 2001					Improved survival rates		

Abbreviation: CC (chronic cancer), CML (chronic myelogenous leukaemia), CLL (chronic lymphocytic leukaemia)

Table 2. Studies' description and the extent to which they provide definition features overlapping with the American Cancer Society

Study	Objective/Topic	Article type	Sample	Definition
Armstrong, 2002	Review and discuss long term management issues in cancer patients	Brief review and Case Study	One case	●○○○○
Berlinger & Flamm, 2009	Discuss effectiveness in the field of CC	Opinion	-	●●●○
Berlinger & Gusmano, 2011	Policy challenges in CC	Perspective	-	●●○○○
Bernell, Howard, & Paterson, 2016	Define chronic diseases	Opinion	-	●●○○○
Bodai & Tusso, 2015	Issues and recommendation in breast cancer survivorship	Review	-	●○○○○
Boerger-knowles & Tashi, 2015	Explore theoretical perspectives for counselling patients with CC	Perspective	Case reports	●●●○
D'Angio, 2007	Discuss if childhood cancer can be considered a chronic disease	Perspective	-	●○○○○
DePue, 2008	Hematologic cancer considered as a chronic disease	Symposium	-	●○○○○
Dorsett, 1991	Give a theoretical framework for the trajectory of cancer recovery	Perspective	-	●○○○○
Doyle-Lindrud, 2007	Describe the evolution of prostate cancer	Case Study	One case	●○○○○
Frick et al., 2017	Analyse treatment-related effects and need of cancer survivors	Original Article	5847 cancer survivors	●●●○
Gosain & Miller 2013	Overview of the natural history of cancer survivorship	Review article	Two case studies	●●●○
Guttilla, Bortolami, & Evangelista, 2015	Analyse the course of prostate cancer	Review article	-	●○○○○
Harley et al., 2012	Define chronic cancer	Original Article	56 patients with advanced cancer	●●●○
Hebdon, Foli, & Mccomb, 2015	Define cancer survivor	Concept Analysis	Case reports	●○○○○
Heurtin-Roberts & Becker, 1993	Give an anthropological perspective on chronic diseases	Perspective	-	●●○○○
Kagawa-Singer, 1993	Define a broad concept of health	Original article	50 cancer patients	●○○○○
Lage & Crombet, 2011	Analyse the course of chronic cancer	Review	-	●●○○○
Markman & Malviya, 2008	Describe recurrence and remission of ovarian cancer	Case Study	1 patient	●○○○○

(Continued)

Study	Objective/Topic	Article type	Sample	Definition
Markman, 2006	Discuss the meaning of considering ovarian cancer as a chronic disease	Editorial	-	●●○○○
McCorkle et al., 2011	Chronic patient empowerment	Review	-	●●○○○
Morton & Morton, 1953	Describe cases with chronic cancer	Case reports	17 case studies	●●○○○
Naus, Ishler, Parrot, & Kovacs, 2009	Model of cancer as a chronic disease	Perspective	-	●○○○○
Phillips & Currow, 2010	Overview	Perspective	-	●○○○○
Polinsky, 1994	Demonstrate chronic nature of cancer	Original Article	223 cancer patients	●○○○○
Reed & Corner, 2015	Explore the illness trajectory of metastatic breast cancer	Original Article	10 cancer patients	●●○○○
Sutton, 2016	Debate on skin cancer as a chronic disease	Commentary	-	●●○○○
Walker, 2001	Definitions and needs related to chronic illnesses	Perspective	-	●○○○○

Abbreviation: CC (chronic cancer)

be managed over time, but not cured, and that have periodic or ongoing symptoms. Authors referred in particular to the Kagawa-Singer paper, (1993) that examines how a sample of cancer patients, viewed as chronic patients, can live with a particular state of health, unlike health definitions commonly used in health-care settings. The majority of the sample is composed of breast cancer and colorectal cancer patients; the remaining patients had cancers of various sites.

For Walker (2001) according to the improvement of cancer survival rate, some cancers, such as those of the cervix, prostate and oesophagus, are more probably to be included among chronic diseases, than among terminal ones. Possible distinguishing features of chronicity, according to the author, may be duration, the insidious and incurable nature of the disease and its periodic, episodic or recurrent nature (2001).

In a commentary on childhood cancer, D'Angio (2007) wrote that some malignant entities that typically have a prolonged course, might be labelled as chronic in a proper way, thus referring the “chronicity” label to diseases with favourable survival rates. The author lists mesenchymal chondrosarcoma and alveolar soft part sarcoma as examples of malignant entities that might well be termed as chronic.

According to Berlinger and Flamm (2009) CC can be used to address advanced cancers, that cannot be cured, but can be stable or be stabilized with treatments, or cancers with cycles of recurrence, remission and treatment that can prevent cancer.

Naus, Ishler, Parrott and Kovacs (2009) placed cancer survivorship within a chronicity framework, focusing on the need for a long term adjustment for cancer patients.

In a review concerning the shift of cancer from a rapidly fatal disease to a chronic condition, Lage and Crombet (2011) trace lines of evidence of a transition of advanced cancers to chronicity in the improvement of long term survival rates (2011). According to Phillips and Currow (2010) living as a cancer survivor means living with a chronic recurrent or ongoing condition.

According to Berlinger and Gusmano (2011) some incurable but treatable cancers, could potentially be considered as CCs and be managed as chronic conditions by the patient's self-management as his or her own principal caregiver. CML is recognized by the authors as a disease that fits easily into a category of chronic disease (2011).

McCorkle et al. (2011) analysing self-management needs of patients living with cancer as a chronic condition, state that, as patients are living longer, cancer may be managed as a chronic illness occurring on a continuum that runs from prevention to end of life.

Harley et al. (2012) built up a "working definition" of CC, identifying boundaries to establish when the chronic phase of cancer begins or ends in selected breast, renal, colorectal, gynaecological and prostate cancer patients.

The principal point listed by Harley et al. (2012) relates to the fact that CC is a cancer that cannot be cured, but it is active, advanced or metastatic and can be managed with treatments that lead to slow disease progression, symptom control and prolonged life. When patients are likely to have only months of survival and no treatments still exist, the chronic phase ends (2012).

Gosain and Miller (2013) in a review on symptom management in long-term cancer survivors, described a phase of chronic cancer survivorship as a phase in which patients live with a CC that may be either on an ongoing remission or active but controlled.

In a 2015 concept analysis on survivor in cancer context Hebdon, Foli and McComb (2015), highlight that the most descriptive term in the context of cancer is "malignancy", a category that includes carcinoma, sarcoma, leukaemia, lymphoma and central nervous system cancers. The authors also discussed the variability within cancer patients (Hebdon et al., 2015), who have different personal experiences within the cancer care flow continuum, needing individualized care.

Boerger-knowles and Tashi (2015) focusing on the fact that living with CC often causes functional and relational changes, explicitly reported the American Cancer Society (American Cancer Society, 2013) definition in the introduction of their manuscript, stating what they considered to be CC. Authors also described cases with recurrence and remission.

According to Sutton (2016), non-melanoma skin cancer can be considered chronic diseases in a specific subgroup of patients, as it meets the US Department of Health & Human Services definition of chronic disease (Goodman et al., 2013) by reason of its prolongation, need for ongoing medical care and for the functional damage it causes.

Frick et al. (2017) identify the category of CC survivors in those patients living with a metastatic or recurrent cancer or new diagnosis of a second cancer, as well as those who had a diagnosis of chronic lymphocytic leukaemia (CLL) or CML, at least at two years from their diagnosis. The greatest percentage of CC survivors identified is composed of breast cancer patients (2017).

3.4. Specific CC definitions

Breast, ovarian and prostate cancer have been identified as chronic cancers by several authors.

According to Polinsky (1994), long-term breast cancer survivors (from 16 months to 32 years from their original surgery) live a chronic illness characterized by lifelong follow up medical care.

Reed and Corner (2015) explore the illness trajectory of metastatic breast cancer patients, that ranged from 13 months to 5 years and 9 months, concluding that metastatic breast cancer is increasingly becoming of a chronic nature. A 2015 comprehensive review dealing with breast

cancer survivorship (Bodai & Tusso, 2015) assesses long term medical and lifestyle issues, considering breast cancer as a CC because it leads to long term survivorship.

For ovarian cancer, the median survival range of 12 to 24 months of patients with recurrent ovarian cancer is said by Armstrong (2002) to demonstrate that the disease has a “chronic natural history”.

In a 2006 editorial, Markman (2006) stated that ovarian cancer can be considered a CC, due to the fact that for a significant percentage of ovarian cancer patients the disease can recur, and the patient becomes a prolonged survivor whose life expectancy may be measurable in years and for whom cure is not a plausible aim (2006).

In a subsequent case study, Markman and Malviya (2008) report the 11-year survival of a woman with recurrent advanced epithelial ovarian cancer, underlining that it can be considered chronic in nature.

Finally, as regards prostate cancer, Doyle-Lindrud (Doyle-Lindrud, 2007) concludes that prostate cancer possesses a chronic nature that needs extensive medical management. Guttilla, Bortolami, and Evangelista (2015) summarized and evaluated cost-effectiveness and follow-up of prostate cancer as a chronic disease, stating that this oncological condition can be considered chronic, because of its long median survival (42 months).

Hematologic cancer has also been considered as a chronic condition. According to DePue (2008), many hematologic cancers (i.e. multiple myeloma) are now perceived as chronic conditions, as a result of multiple therapies that allow a longer survival.

4. Discussion

Even though there appears to be no unique and common definition of chronic cancer emerging from the relevant published medical literature, a certain degree of overlap can be observed between the attributes of CC and with the description given by the American Cancer Society (2013).

It is not surprising that only certain CC features are reported and discussed by the selected articles, as the aim of most the papers was not to provide an explicit and complete definition of what CC is.

Overall, most of the articles recognized a time criterion for a CC definition, i.e. the estimated survival, and almost all the articles that identify a specific cancer type as a CC, made use of a time criterion. In a longitudinal perspective, beginning with cancer diagnosis itself, it seems that the term “chronic” fits well with the recognition of a specific phase in the cancer trajectory more than as an attribute of the cancer itself.

According to selected articles, the time course for a cancer to be considered chronic ranged from months to years of survival, with the end of the chronic phase being placed when the patient, as referred to by Harley et al. (2012) had only months to live. Although the majority of the articles identified “time to live” as a basic criterion for CC, no common start and endpoint emerged and, as Harley and colleagues noted, the lack of a shared definition of when the chronic cancer phase should begin or end, poses some difficulties in defining what is a CC in a unique way (2012). Thus, it emerges from the literature that cancer can be defined as “chronic” on the basis of the characteristics of some of its phases and not as a chronic illness itself such as asthma or diabetes. Noteworthy, as it is difficult for oncologists to predict cancer time course and knowing disease duration a priori, it is hard to establish when the chronic care phase should begin for the specific patient.

Furthermore, as mentioned in the introduction, a 12-month criterion for a disease to be chronic may not be appropriate in the field of cancer care, as in the first treatment year, many particular difficulties may arise.

The initial diagnosis of cancer often requires a substantial and immediate treatment (e.g., in the case of liquid tumours), in contrast to the typical responses to a chronic disease (Bell & Ristovski-Slijepcevic, 2013); in addition, a tumour may respond unpredictably to treatment and may display a significant capacity to change (Berlinger & Flamm, 2009).

Cancer is still associated with mortality by newly-diagnosed patients (Tritter, 2002). Few other chronic illness diagnoses raise such strong concerns about death, rendering the diagnosis of cancer a very stressful event, both for the patients and their family.

Finally, considering the model of chronic illness trajectories (Wellard, 1998), there are other huge differences between cancer and other chronic illnesses. Register (1987) described chronic illness as involving a first adjustment phase defined as “legitimization of symptoms”: this is not the case for cancer patients for whom the initial psychological burden is that of processing the socially recognized life-threatening nature of diagnosis and of nurturing hope regarding the possibility of being cured.

The presence of cycles of remission and recurrence and the possibility of controlling symptoms were reported by almost one-third of relevant articles. Existing treatment options that allow for cancer stabilization and its cyclic nature were considered as salient attributes of CC.

Thus, according to studies emerging from the medical literature, cancer as a chronic disease is something that can be medically controlled and managed for a certain time extent or that can present a recurrent form.

Importantly, only certain cancer types may be included in these criteria, as most cancers, unlike other chronic illnesses, can become resistant to the treatment and adapt themselves (Berlinger & Flamm, 2009), with a capacity to change that is the norm rather than the exception (2009).

In terms of cancer stage and the goal of treatment, a minority of authors explicitly described CC as advanced or metastatic and as a disease that cannot be cured. Such criteria have been explored in more depth by certain authors probably as a result of the heterogeneity of cancer types considered in relevant articles. The heterogeneity of different cancer types (stage, site, type of cancer) is reflected also by the fact that most authors recognized different cancer forms as template or examples of CC.

According to some authors, certain specific cancer types fit better with the model of CC: breast, ovarian and hematologic cancers were those most identified (Armstrong, 2002; Berlinger & Flamm, 2009; Berlinger & Gusmano, 2011; Bodai & Tusso, 2015; DePue, 2008; Frick et al., 2017; Markman, 2006; Markman & Malviya, 2008; Polinsky, 1994; Pulte et al., 2015; Reed & Corner, 2015).

Because the definition of CC given by the American Cancer Society (2013) encompasses a broad and heterogeneous population of patients, distinct patient groups, for instance, those with different cancer sites or those with metastatic cancers versus locally recurrent cancers, should be studied separately (Frick et al., 2017).

When it comes to authoritative definitions, it is worth noting that authors took into consideration patients suffering from chronic cancer who received diagnosis at least from a 12 to 16 month period (Armstrong, 2002; Harley et al., 2012; Polinsky, 1994; Reed & Corner, 2015), meeting the duration criterion listed by the US Department of Health and Human Services. Aspects related to functional limitations as well as to the need for ongoing medical treatment were also addressed or considered to some extent by a relevant number of papers (Berlinger & Flamm, 2009; Berlinger & Gusmano, 2011; Bodai & Tusso, 2015; Boerger-Knowles & Tashi, 2015; D’Angio, 2007; Dorsett, 1991; Frick et al., 2017; Guttilla et al., 2015; Harley et al., 2012; Hebdon et al., 2015; Lage & Crombet, 2011; Markman, 2006; Markman & Malviya, 2008; McCorkle et al., 2011; Reed & Corner, 2015; Sutton, 2016), showing that, at least to some degree, the US Department definition of a chronic disease was reflected in the literature.

Overall, in terms of seeking clarity amongst the range of possible definitions, the following general and interrelated issues seem to be resolved or to have been taken into consideration in building a shared concept of what comprises CC.

There is a significant *variability* within different cancer types, given by the fact that “cancer” is an umbrella term for uncontrolled cellular replication, identifying a group of illnesses, rather than a unique condition (Hebdon et al., 2015; Tritter, 2002): different cancers may behave in very different ways throughout time, and different sites and stages define different populations of patients (Frick et al., 2017). The American Cancer Society’s definition itself encompasses different cancer types, such as ovarian cancer, chronic leukaemias, and some lymphomas, as well as metastatic breast or prostate cancer (2013).

There are also chronic *changes* associated with therapies: cancers may modify themselves with unpredictable cellular proliferation (Berlinger & Flamm, 2009; Berlinger & Gusmano, 2011), leading to a random growth and to unstable responses to therapies. Furthermore, cycle of recurrence and remission may take place. Acute episodes may occur many times, rendering it difficult to apply a consistent label to cancer as “chronic”.

In the cancer trajectory, there are some chronic and some acute phases, therefore, it is not possible to talk about cancer as a chronic disease in its entirety, rather it is possible to identify a chronic phase in cancer course. Furthermore, acute episodes that usually occur during the “chronic” phase, leading to a repetition of acute and chronic phases, provoke a continuous shift in the patient’s self-perception of his/her illness (Tritter, 2002).

Moreover, the features associated with CC, are very *broad characteristics*, with ambiguous boundaries. It is difficult to define a long-term survivorship or to define in a unique way the fact that a cancer may be controlled but not cured or to what extent symptoms are truly controlled.

Another point worthy of emphasis centres on the impact of using the adjective “chronic” in cancer care considering the patient–health-care provider relationship and communication issues: very often, cancer patients in their 50s and 60s are also affected by some other chronic conditions such as cardiovascular disease or diabetes. If their cancer recurs or is advanced at diagnosis, when they hear their oncologists talk also about their cancer as a chronic condition, a misunderstanding is created because they overlap the model of chronicity that pertains to diabetes with that which pertains to cancer. It is well-known that cancer treatments exert a more profound impact on quality of life than do treatments for other chronic conditions.

Finally, it is hard to establish which features of CC are necessary and sufficient for a cancer to be defined as chronic, since all the aspects listed in the medical literature are characteristics that a CC *may* possess, and not the characteristics that a CC *must* possess. This further serves to render the CC label susceptible to a certain vagueness and confusion.

5. Conclusions

To some extent, the features associated with the concept of CC in the literature overlap with one another and with the American Cancer Society (2013) statements on chronic tumours. There is also a certain degree of overlap between official definitions of a chronic disease (US Department of Health and Human Services, 2010; WHO, 2015) and the attributes of CC.

5.1. Implications for psychosocial oncology

The relevant heterogeneity within the definition of CC and the issues highlighted in the literature deserve attention. The label “chronic” should be used with caution. Indeed, besides the attributes and definitional issues pertaining to specific cancers, it is worthy of note that many authors also discuss the problematic issues in the transition of cancer into a chronic condition.

The scientific community should explore whether it makes sense to talk about the presence of a cancer phase with chronic characteristics rather than talk about cancer as a chronic condition itself. Including the model of chronicity in cancer care implies implementing and delivering specific training modules in communications skills to health-care professionals (Arnaboldi & Pravettoni, 2016) to face the issue of survival with long-lasting and demanding therapies, impaired quality of life and a non-defined temporal horizon.

When patients enter the “no longer curative phase”, oncologists have an important issue to overcome. With the number of drugs at their disposal that could improve survival for months and sometimes even years, they have to deal with the hope for cure of their patients. It is the case of patients whom they follow for months, even years and with whom a therapeutic relationship is always started. It happens that oncologists start speaking to their patients of the main treatment purpose being “to chronicize” their illness. In the mind of patients, hearing the term “chronic” as applied to cancer activates some cognitive maps that relate cancer to the course of other chronic illnesses such as diabetes and asthma. On the other hand, evidence from the literature affirms that the number of deaths following the cancers mentioned above did not decline regardless of the prevalence. This becomes a communication bias that creates a cognitive dissonance in the patient’s mind: patients feel reassured being told their cancer could be chronic (like diabetes and asthma) but they are also scared because they are confronted on a daily basis with people dying from the very same condition with which they are affected. This is a heavily demanding task for the team members who in the majority of cases have followed their patients for years along multiple chemotherapy regimens and life hopes. In some cases, the utilization of “chronic” as an adjective in cancer care may be more the result of an affective predisposition aimed at sharing hope rather than the result of a medical evidence. However, given the severity of cancer, there is a greater importance now ever before that CC patients receive the close attention they deserve, focusing on personal experiences and building personalized patterns of care aimed at the true empowerment of patients (Bailo, Guidi, Vergani, Marton, & Pravettoni, 2019).

5.2. Key messages

- There is a relevant heterogeneity within the definition of CC employed in literature
- As cancers’ shift into a chronicity framework presents several issues, the label “chronic” should be used with caution
- The scientific community should explore whether it makes sense to talk about the presence of a cancer phase with chronic characteristics rather than talk about cancer as a chronic condition itself

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Appendix A.

Table A1. Search strategy for scientific literature

Source	Search strategy	N hints
Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily, Ovid MEDLINE and Versions(R) <1946 to 31 January 2018>	1 (chronic or chronicity).m_titl. (400695) 2 defin\$.m_titl. (64100) 3 1 and 2 (824) 4 limit 3 to cancer (218) 5 exp Chronic Disease/(252703) 6 exp neoplasms/(3117934) 7 5 and 6 (17549) 8 defin\$.mp. [mp = title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (1165071) 9 7 and 8 (889) 10 neoplasms/(393294) 11 9 and 10 (186) 12 4 or 11 (400) 13 limit 12 to (humans and english) (337) 14 limit 13 to yr = "1991-2019" (304) 15 limit 14 to yr = "2018-2019" (7)	304
Embase	((("chronic":ti OR "chronicity":ti) AND ("cancer*":ab,ti OR "neoplas*":ab,ti OR "tumor*":ab,ti OR "tumour*":ab,ti OR "malignan*":ab,ti OR "carcino*":ab,ti) AND "defin*":ti) AND [embase]/lim NOT ([embase]/lim AND [medline]/lim) AND [english]/lim) AND "human"/de	45
PubMed	((chronic[Title] OR chronicity[Title]) AND cancer) AND defin*[Title]	130

(Continued)

Source	Search strategy	N hints
Scopus	((TITLE (chronic OR chronicity)) AND (TITLE (defin*) AND (TITLE-ABS-KEY (cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR carcino*))) AND NOT (INDEX (medline)) AND (LIMIT-TO (LANGUAGE, "English")))	24
ProQuest Psychology	(1) ti(chronic OR chronicity) AND defin* (2) ti(cancer* OR tumor* OR tumour* OR malignan* OR neoplas* OR carcino*) (3) 1 OR 2	7
Total Hints		510



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