Antecedents of Uncertainty in Adults with Oncologic Diagnosis: Literature Integrative Review

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Antecedentes da Incerteza em Adultos com Diagnóstico Oncológico: Revisão Integrativa da Literatura

Antecedentes de la Incertidumbre en la Persona Adulta con Diagnóstico Oncológico: Revisión Integradora de la Literatura

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ABSTRACT

Introduction: The uncertainty frequently occurs in individuals with oncological diagnoses, when the individual cannot assign a defined value to the events and accurately predict the results. Currently, there is no organized evidence about the antecedents of uncertainty in adult individuals with cancer. **Objective:** To identify the antecedents of uncertainty in adults with cancer in the available literature. **Method:** Integrative literature review of articles from 2010 to 2022 at the electronic databases EMBASE, ProQuest Dissertations & Theses Global, LILACS, and ScienceDirect. The selected articles were assessed for their quality and analyzed using the constant comparison method and uncertainty theory. **Results:** Regarding the structure of the stimulus, antecedents of uncertainty have been found as distinctiveness and inconsistency of the symptoms, self- and vicarious experience, system orientation and routine disruption, and consistency between the expected and the experienced. Age, emotional chaos, and physiological events are cognitive antecedents. And knowledge, constant and quality human interaction, emotional and instrumental support and education are important antecedents of structure providers. **Conclusion:** Understanding uncertainty in illness and its antecedents allows to know and guide the caring needs of the oncologic population, providing theoretical knowledge that can be applied in clinical practice.

Key words: Adult; Oncology Nursing; Uncertainty; Neoplasms/epidemiology; Nursing Theory.

RESUMO

Introdução: A incerteza ocorre com frequência em pessoas com diagnóstico de câncer, uma situação em que o indivíduo não tem a possibilidade de atribuir um valor definitivo aos eventos, assim como de prever os resultados com precisão. Atualmente, não há evidências organizadas sobre os antecedentes da incerteza em adultos com câncer. **Objetivo:** Identificar na literatura disponível os antecedentes da incerteza em pessoas adultas com diagnóstico de câncer. **Método:** Revisão integrativa de artigos de pesquisa de 2010 a 2022 nas bases eletrônicas de dados: EMBASE, ProQuest Dissertations & Theses Global, LILACS e ScienceDirect. Os artigos selecionados foram avaliados quanto à qualidade e analisados utilizando o método de comparação constante e a teoria da incerteza. **Resultados:** Com relação à estrutura de estímulo, foram encontrados antecedentes de incerteza, como distinção e inconsistência dos sintomas, experiência própria e vicária, orientação do sistema e interrupção das rotinas, e consistência entre o esperado e o experimentado. Idade, caos emocional e eventos fisiológicos são antecedentes cognitivos. E o conhecimento, a interação humana constante e de qualidade, o apoio emocional e instrumental e a educação foram importantes antecedentes dos provedores de estrutura. **Conclusão:** A compreensão da incerteza diante da doença e de seus antecedentes nos permite conhecer e orientar as necessidades de cuidados da população oncológica, fornecendo conhecimento teórico que tem a possibilidade de ser aplicado na prática clínica.

Palavras-chave: Adulto; Enfermagem Oncológica; Incerteza; Neoplasia/epidemiologia; Teoria de Enfermagem.

RESUMEN

Introducción: La incertidumbre ocurre frecuentemente en personas con diagnósticos oncológicos, situación en la que el individuo no puede asignar un valor definido a los eventos y no puede predecir los resultados con precisión. Actualmente no existe evidencia organizada acerca de los antecedentes de incertidumbre en personas adultas con cáncer. **Objetivo:** Identificar en la literatura disponible los antecedentes de la incertidumbre en la persona adulta con diagnóstico oncológico. **Método:** Revisión integradora de artículos de investigación que abordaron los antecedentes de la incertidumbre frente al cáncer del 2010 al 2022, cualitativos, cuantitativos, mixtos o revisiones. Las bases de datos incluidas fueron EMBASE, ProQuest Dissertations & Theses Global, LILACS y ScienceDirect. Los artículos seleccionados fueron evaluados en su calidad y analizados con el método de comparación constante y la teoría de la incertidumbre. **Resultados:** Con respecto al marco de los estímulos se encontraron antecedentes de la incertidumbre como la distinción y la inconsistencia de los síntomas, la experiencia propia y vicaria, la orientación en el sistema y la disrupción de rutinas, y la coherencia entre lo esperado y lo experimentado. La edad, el caos emocional y los eventos fisiológicos son antecedentes cognitivos. Y el conocimiento, la interacción humana constante y de calidad, el soporte emocional e instrumental y la educación fueron importantes antecedentes de los proveedores de estructura. **Conclusión:** Comprender la incertidumbre frente a la enfermedad y sus antecedentes permite conocer y orientar las necesidades de cuidado de la población oncológica, aportando conocimiento teórico que puede ser aplicado en la práctica clínica.

Palabras clave: Adulto; Enfermería Oncológica; Incertidumbre; Neoplasia/epidemiología; Teoría de Enfermería.

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INTRODUCTION

The uncertainty in face of a disease is related to the individuals' inability to assign value to their health processes or conditions[1]. It occurs frequently in case of oncologic diagnoses at any moment during the course of the disease, in the context of several stressors, signs and symptoms and the unpredictable evolution of cancer which makes the understanding of treatments and prognostic difficult, causing negative physical and emotional impacts on how they will cope with the disease and quality of life; the uncertainty occurs not only at the moment of the diagnoses but it can grow or decline while the disease evolves[2].

The social and scientific relevance of identifying and understanding its antecedents lies on the impacts over the health outcomes and care provided to the individuals. Health professionals should guide the individuals through their uncertain trajectory, detecting their needs and creating trustworthy relations, offering a customized support that stimulates their ability to face the obstacles; additionally, it can improve the emotional well-being of the individual with cancer but changes their experience, favoring a more effective adjustment and improving their quality of life[3].

The theory of uncertainty of Merle Mishel explains how the individuals process cognitively the illness-related stimuli and assign values to these events. Uncertainty events evaluated as danger, imply harm and coping strategies are implemented to overcome it[1]. On the other hand, whether seen as an opportunity, it can imply in positive outcome and coping strategies to keep the uncertainty are implemented[1].

The information processed by the individual to create their cognitive schema originates from the antecedents as: 1) stimuli frame, 2) cognitive capacity and 3) structure providers[1]. Stimuli frame refers to the form, composition and structure of the stimuli that the individual perceives and has three components[1]: 1) symptom pattern (the degree to which symptoms present with sufficient consistency to be perceived as having a pattern), 2) event familiarity (the degree to which the situation is habitual, repetitive or contains recognized cues) and 3) event congruence (consistency between the expected and the experienced in illness-related events).

The components of the stimuli frame reduce the uncertainty[4] and are influenced by other antecedents: the cognitive capacity and structure providers[1]. Cognitive capacity refers to the information-processing abilities of the individual[1]. Only a limited amount of information can be processed at any one time. Limited cognitive capacity will reduce the ability to perceive symptom pattern, event familiarity and event congruence[1]. Structure providers refer to resources available to assist the individual in the interpretation of the stimuli frame and reduce the state of uncertainty both directly and indirectly[1]. Structure providers are: 1) educational level, 2) social support and 3) credible authority[1].

Currently, there is a systematic review and meta-analysis aimed to identify variables correlates that are associated with illness uncertainty according to Mishel theory in adult cancer survivors and their families[5]. In this study, important antecedents can be found as sociodemographic aspects as age, sex and race, stimuli frame (symptoms and cancer history) and structure providers (education)[5]. However, there are no literature reviews able to identify specific antecedents of the adult population with cancer at any stage of the illness and not even of the population of survivors. The objective of this study is to identify the antecedents of the uncertainty in adult individuals with oncologic diagnosis in the available literature (stimuli frame, cognitive capacity and structure providers).

METHOD

The integrative literature review followed the stages of Whittemore and Knafl[6]. The research question is: What are the antecedents of uncertainty of the adult individual with oncologic diagnosis according to the scientific literature available?

The search was made at the following databases: EMBASE (Medline), ProQuest Dissertations and Theses Global, LILACS, ScienceDirect.

The inclusion criteria are:

1) Scientific production addressing uncertainty in face of cancer.

2) Adult population with oncologic diagnosis at any stage of the course of the disease.

3) Articles published in the period 2010-2022, that, according to a librarian's early literature review, is a period with great production of uncertainty publications in general and not only for individuals with cancer.

4) Primary experimental and non-experimental researches, mixed qualitative researches, secondary researches, thesis or dissertations.

The exclusion criteria were :

1) Unavailable articles.

2) Essays, reports, abstracts and experts criteria.

The terms selected for the search were based on Health Science Descriptors (DeCS) and Medical Subject Headings (MeSH) in Spanish, English and Portuguese and Boolean operators "AND" and "OR" (Chart 1). The next step was the application of filters: elimination of duplicates, reading of titles and abstracts and later, the full text, in addition to PRISMA flowchart[7] to demonstrate the selection process.

The critical appraisal tools of the Joanna Briggs Institute were utilized to appraise the methodological quality of the articles and the Mixed Methods Appraisal Tool (MMAT)[9] for mixed design studies, further to Polit and Beck[10] appraising evidence levels.

The articles included were coded and relevant information as the characteristics of the article (author, year, country, objective, design and sample) and main results (antecedents) were extracted. The method of constant comparison with four phases was applied to analyze the data: summary, visualization, comparison, conclusions and verification[6]. The software QDA Miner[11] lite was adopted to support the analysis of the texts.

Categories and subcategories have been determined *a priori* for each antecedent of uncertainty (1. Stimuli frame (symptoms pattern, event familiarity, event congruence), 2. Cognitive capacity and 3. Structure providers (credible authority, social support and education)), the emerging codes of each prior category or subcategory have been determined according to the main results.

Each investigator selected, evaluated and analyzed the data independently and later the results were compared to reach a consensus.

RESULTS

2,596 articles have been identified, 14 of which were analyzed. Figure 1 depicts the selection process.

The articles were published between 2011 and 2021 in ten countries, with qualitative, quantitative, mixed design and a scoping review (Chart 2). The scores of the evaluation of the quality ranged between 70% and 100% and evidence level between hierarchy level IV and VI; no article was excluded for that matter.

The articles included individuals from 18 to 88 years of age, with different oncologic diagnoses, with predominance of breast cancer followed by solid tumors of colon, head and neck, lung, testicle, ovary, cervix, sarcoma, kidney, gastric and prostate, in addition to hematologic tumors as myeloma and non-Hodgkin lymphoma managed in different phases (diagnostic, treatment (chemotherapy, radiotherapy, surgery) and palliative) (Chart 2[12-25]).

Chart 3 portrays the antecedents of uncertainty identified.

STIMULI FRAME

Poor distinctiveness or clarity of symptoms prior to the diagnosis and the inconsistency between the number and frequency of symptoms, mainly during the oncologic treatment, may cause more uncertainty within the concept of symptoms pattern[20,22].

In addition, situations that led to establish or not an event familiarity (cancer) with impact on uncertainty have been identified. The knowledge acquired with the self-experience contributed to assign meaning to what the individual with cancer is living[13]. The vicarious experience has also contributed for the familiarity with cancer, allowing to best anticipate the symptoms and prognosis of the illness with impacts on uncertain situations[18,23]. The practical guidelines of the health system, particularly organizational routines, schedules, proper signaling and be welcomed by health professionals helped the patient to feel in safe hands[17,21]. On the other hand, routines disruption due to medication toxic effects, constant visits and admission to the hospital negatively impacted the familiarization due to hostile and complex environments the patient is submitted to[12,20].

Regarding events congruence, it was possible to identify that signs of relapse[12], confirmation of the diagnosis[19] and results of the treatment[20] led to inconsistency between the expected and the experienced, making difficult to understand the meaning of the events.

COGNITIVE CAPACITY

The moment when the individual receives the diagnosis is traumatic, causing emotional chaos, hampering the processing of the information and consequently to understand its meaning and how to use it, provoking high levels of uncertainty[15,16,20]. Internal physiological events as pain and fatigue can change the capacity to understand and absorb the information[19,22]. Furthermore, as older the patient, high is the uncertainty[22,25], and age is connected to the cognitive capacity because of alterations of memory, processing speed and attention, which makes difficult the understanding of the illness and its management[20,23]. The findings indicate that the interpretation of the meaning of the events associated with the illness become more complex for older adults[22,25].

STRUCTURE PROVIDERS

Within the concept of credible authority, health professionals create knowledge that allow the individual to understand the context of the illness[12,17,21,24]. In addition, the quality and stability of the professional-individual relationship ensures reliability and reduces the uncertainty when good communication, empathy and frequency along time occur[18-21,24].

Social support favors the understanding of the symptoms, treatments secondary effects and situations pertinent to the oncologic disease through human interaction as source of information, facilitating the

Chart 1. Strategy of search with descriptors DeCS and MeSH per database

Database	Search strategy	Filters
Embase	('uncertainty'/exp OR uncertainty) AND ('neoplasms'/exp OR neoplasms OR 'cancer'/exp OR cancer OR 'tumor'/exp OR tumor OR carcino- OR onco-) AND ([embase]/lim NOT ([embase]/lim AND [medline]/lim) OR ([medline]/lim NOT ([embase]/lim AND [medline]/lim) NOT ([embase classic]/lim AND [medline]/lim))) AND (2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py OR 2020:py OR 2021:py OR 2022:py) AND ([adult]/lim OR [aged]/lim OR [middle aged]/lim OR [very elderly]/lim OR [young adult]/lim) AND ('article'/it OR 'review'/it)	• Age • Date of publication • Type of publication • Full text
ProQuest Dissertations and Global Thesis	(uncertainty AND (neoplasms OR cancer OR tumor OR carcino- OR onco-)) AND (la.exact("ENG" OR "POR" OR "SPA") AND diskw.exact(("Cancer" OR "Breast cancer" OR "Nursing" OR "Prostate cancer" OR "Uncertainty") AND ("Quality of life" OR "Social support" OR "Depression" OR "Oncology" OR "Anxiety" OR "Metastasis" OR "Cancer survivors" OR "Breast Cancer" OR "Cancer screening" OR "Radiotherapy" OR "Tumor" OR "Ovarian cancer")) AND pd(20100101-20221108))	• Date of publication • Language • Full text
ScienceDirect	uncertainty AND (neoplasms OR cancer OR tumor OR carcino- OR onco-)	• Date of publication • Full and open text • Journals subscribed • Theme: nursing and health professionals
LILACS	uncertainty AND (neoplasms OR cancer OR tumor OR carcino- OR onco-) AND (fulltext:("1") AND db:("LILACS") AND la:("es" OR "pt" OR "en")) AND (year_cluster:[2010 TO 2022])	• Date of publication • Language • Full text

regularity of the experience and adaptation[13,17,18,20]. Furthermore, family, friends and support group provide emotional context that help to overcome the uncertainty[12,14,15]. Social support is also instrumental to fill in the gaps of daily life as caring for children, transportation and recollecting information, which helps to diminish the uncertainty[15,21].

Education creates knowledge as a base of meaning and context. The individuals use information to assign meaning to symptoms and control the information provided by a health professional[13,15,16,18,21]. However, difficulties to understand and assign meaning to processes or situations associated with health condition appear if the information is complex or fragmented, is poorly phrased and biased in relation to the speciality[16,19,21] often neglecting the needs of the individuals. Additionally, there is a negative relation between the education level and uncertainty, as low the education level is, high is the uncertainty[22,23,25].

These results will be integrated into the model of the theory of uncertainty for best theoretical understanding of the antecedents in the context of the individual with cancer (Figure 2).

DISCUSSION

The present investigation identified the specific and different antecedents of uncertainty in adults with cancer, most of them middle-aged or older where cancer incidence is high[26,27]. The articles included samples with several types of cancer and phases with the most representative results.

The evaluation of symptoms prior to diagnostic confirmation can be difficult because at that phase the symptoms may not be so evident and they should be palpable to be included in the symptoms pattern in the context of stimuli frame[28]. Symptoms evaluation is based on their number, intensity, frequency, duration

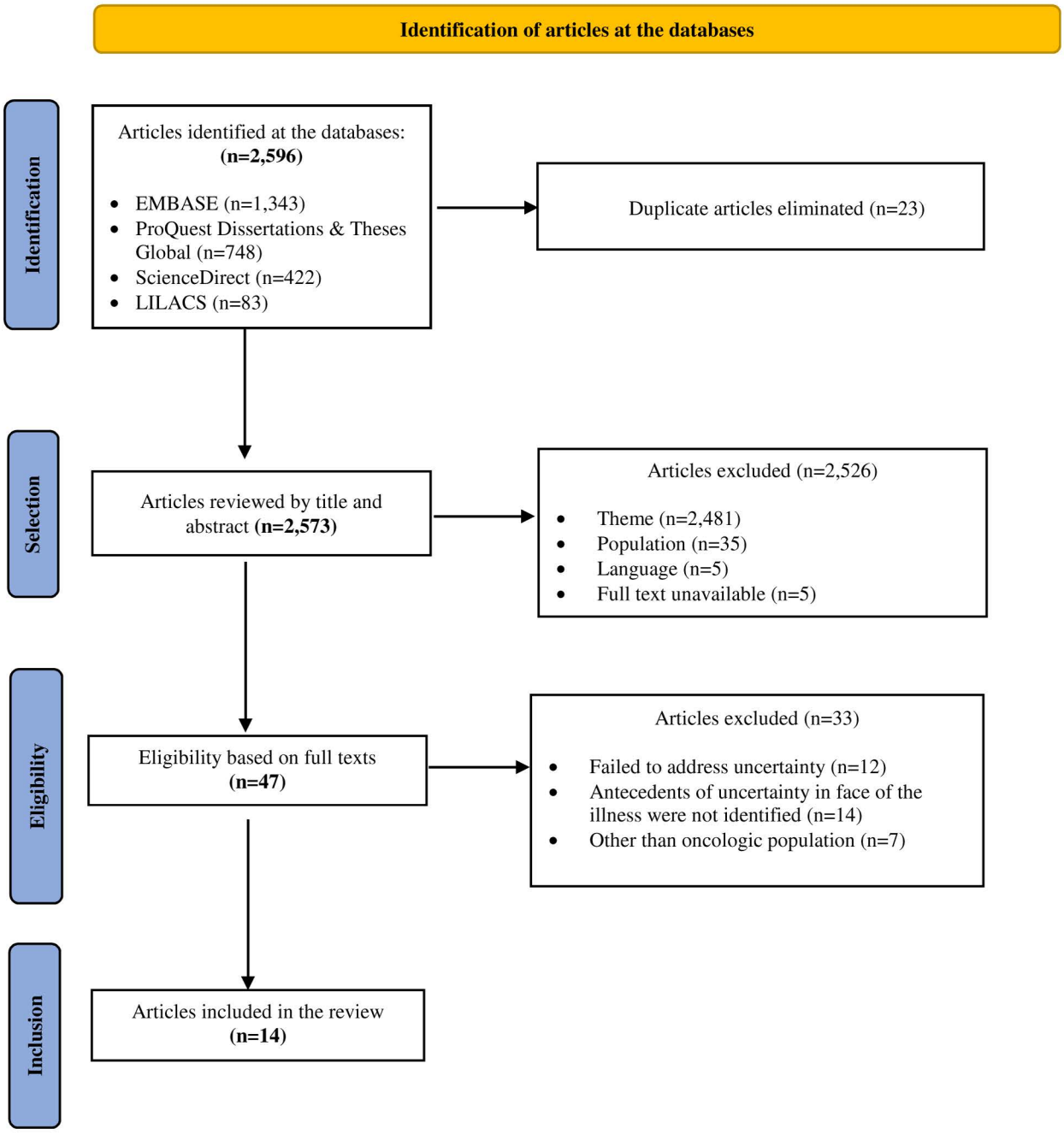

Figure 1. PRISMA flowchart – identification of articles
Source: Adapted from Prisma[7].

and site that can change in each phase of the disease; if these characteristics are inconsistent, it is not possible to determine a pattern which creates uncertainty[1,29]. The unpredictable and changing nature of the symptoms in the diagnosis or during treatment favors a negative evaluation of the physical symptoms and influence how to cope with and adapt to the illness[30].

Self and vicarious experience are elements that the individual utilizes to create a cognitive schema and familiarity with the illness[13,18,21,23]. Knowing that other individuals are experiencing the same situation provides references for behavior, actions and decision-making, in addition to new perspectives of understanding, opportunities sharing and helps to best absorb the experience and adaptation[31].

Several studies indicate that learning from self and vicarious experience helps to clarify what is still unknown in the disease, treatment, complications and care, in addition to potential doubts and obtain support from others living the same difficulties; therefore, it is possible

Chart 2. Characteristics of the publications included in the review

Author (year) Country	Objective	Design	Sample	LE*
Maher y de Vries (2011)[12] United Kingdom	Explore the experience of living with relapsed multiple myeloma	Qualitative, phenomenological, hermeneutic	5 men and 3 women diagnosed with myeloma, aged 48-74 years	VI
Wall et al. (2011)[13] United Kingdom	Identify and describe the essences of patient's experiences during the period leading up to the diagnosis of non-Hodgkin lymphoma (NHL)	Qualitative, phenomenological, descriptive	15 men and 16 women with NHL, aged 56 years (age-range 29-79)	VI
Yusuf et al. (2013)[14] Malaysia	Explore the experience of Malaysian and Chinese women newly diagnosed with breast cancer at the Malaysia peninsular eastern coast	Qualitative, phenomenological, longitudinal	20 women with primary breast cancer, aged 34-59 years	VI
Inan et al. (2016)[15] Turkey	Describe the experiences of Turkish women during diagnosis of breast cancer	Qualitative phenomenological	9 women with breast cancer. Mean age 42.22 years, age range 33-55 years	VI
Hillen et al. (2017)[16] The Netherlands	Investigate deeply the evolution of uncertainty of second opinions on breast cancer	Qualitative exploratory	24 men with prostate cancer. Mean age 65 years (age range 52-73)	VI
Appleton et al. (2018)[17] United Kingdom	Explore how oncologic services promote and support the well-being of patients during their oncologic treatment	Qualitative exploratory	30 participants, 18 men and 12 women with colorectal, head and neck and lung cancer with curative or palliative intent. Age range 52-88 years	VI
Ramírez-Perdomo et al. (2018)[18] Colombia	Describe the meaning of the experience in face of a cancer diagnosis in the construction of the individual and subjective reality developed	Qualitative, phenomenological, hermeneutic	6 participants, 2 with testicle cancer, 1, with breast cancer, 1, with ovary cancer and 2 with cervical cancer. Age-range 24-36 years	VI
Vedelø et al. (2018)[19] Denmark	Identify and describe the patient's experiences and care needs during the diagnosis of an integrated brain cancer pathway	Qualitative case report	4 participants, 2 men and 2 women with brain tumor. Age range 63-78 years	VI
Lidington et al. (2021)[20] United Kingdom	Explore the psychosocial and practical experiences of young adults diagnosed with cancer in the United Kingdom and during their treatment	Qualitative phenomenological	65 participants with multiple types of tumors, the most frequent were sarcomas (n=13; 20.0 %), breast cancer (n=12; 18.5 %) and central nervous system tumors (n=12; 18.5 %). Age range 25-39 (mean 33.6 years)	VI

To be continued

Chart 2. Continuation

Author (year) Country	Objective	Design	Sample	LE*
Volungholen Sollid et al. (2021)[21] Norway	Explore and describe experiences of older patients with cancer throughout their radiotherapy treatment, from diagnosis until follow-up after treatment	Qualitative, descriptive, exploratory	12 participants (7 men and 5 women) with cancer reaching the end of radiotherapy. Age-range 66-80 years (mean 73 years)	VI
Kim et al. (2012)[22] South Korea	Compare the levels of symptoms and uncertainty, their associated factors, relationships between them and predictors of uncertainty by treatment trajectory among breast cancer survivors	Quantitative, cross-sectional, correlation, descriptive	252 breast cancer survivors, mean-age 47.5 years (range 27-73 years)	IV
Jeon et al. (2016)[23] South Korea	Examine the relationships between gastrointestinal symptoms, uncertainty, and perceived recovery in gastric cancer patients after gastrectomy	Quantitative, cross-sectional, correlation, descriptive	146 participants with gastric cancer submitted to gastrectomy (92 men and 54 women). Mean age 54.7, age-range 30-78 years)	IV
Traeder (2015)[24] USA	Determine whether women who have access to a patient navigator during breast cancer decision-making better manage uncertainty and experience greater patient satisfaction with the overall care experience than women who do not have access to a patient navigator	Mixed methods	124 breast cancer survivors. Mean age 35 years (age-range 18-55)	
Ghodraty Jabloo et al. (2017)[25] Canada	Comprehensive understanding of the antecedents and outcomes of uncertainty in older adults with cancer in the existing literature	Scoping review	44 studies were included (30 qualitative, 12 quantitative and 2 mixed methods). The studies enrolled individuals with several types of cancer (n=12), prostate cancer (n=11), breast cancer (n=6), gastrointestinal cancer (n=6), lung cancer (n=4), hematological cancer (n=3), head and neck cancer (n=1) and kidney cancer (n=1)	V

Source: Polit and Beck[10].
Caption: *LE = Level of evidence.

to achieve a psychological impact that is able to diminish the uncertainty of coping with the disease[31-33].

New health-related aspects hamper the development of events familiarity. System's guidelines make these new aspects more manageable and the individuals feel less disturbed and in control when their environment is familiar and meaningful[17]. Steer the individuals through the hospital environment, lab tests and procedures can help them to manage uncertain situations and develop the required skills to adapt positively to the events, as opposed to the loss of safety and poor familiarity when they have to tackle unknown hospital environments[34]. On the other hand, routines disruption, very common in cancer, interrupt the activities of daily life swiftly, pushing the individual to cope with new situations[12,20] and this may undermine the psychological well-being

Chart 3. Antecedents of uncertainty identified in the literature selected

Antecedents of uncertainty		Codes identified
Category	**Subcategory**	
Stimuli frame	Symptoms pattern	Distinctiveness of symptoms[14,18]
		Inconsistency of symptoms[18,20]
	Event familiarity	Self experience[13,21]
		Vicarious experience[18,23]
		System guidelines[17,21]
		Routines disruption[12,20]
	Event congruence	Inconsistency between expected and experienced[12,19,20]
Cognitive capacity		Age[22,25]
		Emotional chaos[15,16,20]
		Internal physiologic events[19,22]
Structure providers	Credible authority	Credible authority as generator of knowledge[12,17,21,24]
		Quality and stability of the professional-individual relation[18-21,24]
	Social support	Human interaction as source of information[13,17,18,20]
		Emotional support[12,14,15]
		Instrumental support[15,21]
	Education	Knowledge as base of meaning and context[13,15,16,18,21]
		Complex and fragmented information[16,19,21]
		Education level[22,23,25]

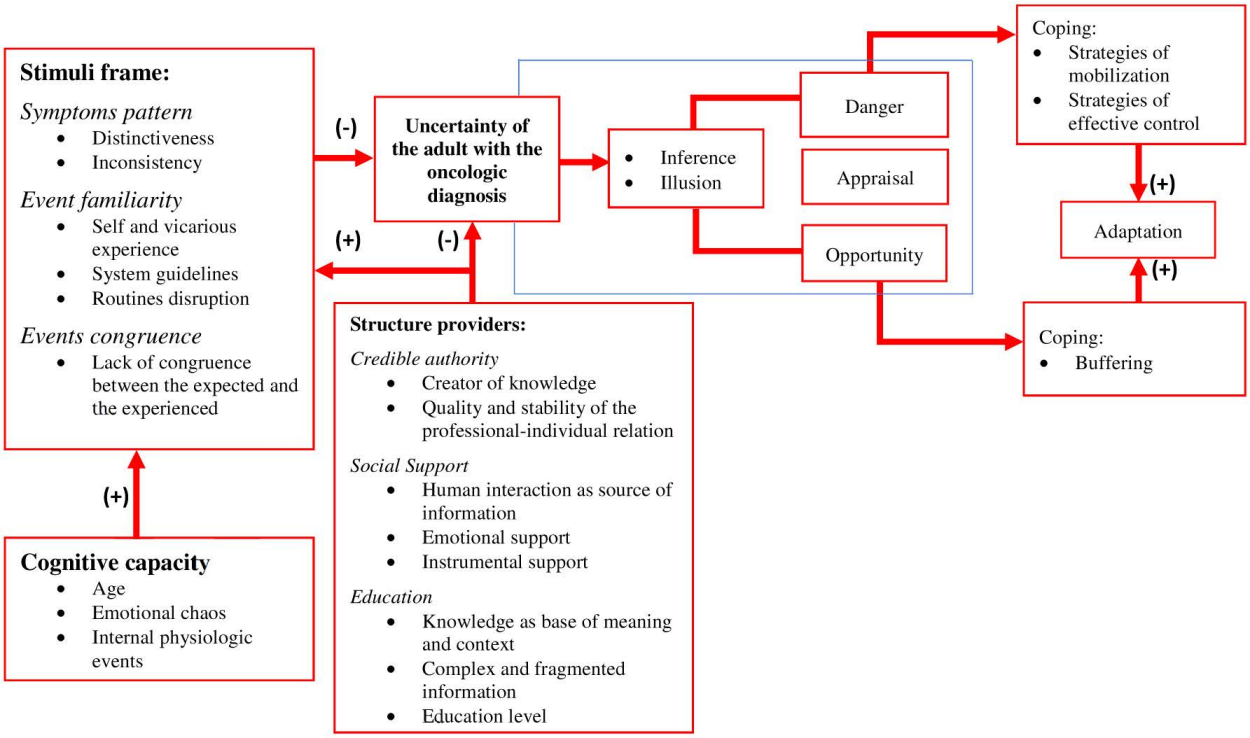

Figure 2. Antecedents of uncertainty identified in adult individuals with oncologic diagnosis categorized within the conceptual schema of the theory of uncertainty in illness

Source: The authors, based on the uncertainty theory in illness[1].

and recovery. Poor familiarity exacerbates feelings of uncertainty[14,23].

Furthermore, in cases of inconsistencies between the expected and the experienced raises doubts about the predictability and stability of the cancer events[1]. The consistency is strongly influenced by the information provided to the individual according to the stage of the disease that can trigger unrealistic expectations that do not materialize in a later phase, failing to achieve the event congruence, which impacts the status of uncertainty[29].

Cognitive capacity favors or restrains the subjective interpretation of the illness and treatments[35]. Elements that can interfere with the processing skills of the information have been identified, impeding the cognitive structuring of the stimuli frame[1]. Firstly, the age: previous findings indicate that the interpretation of the meaning of the symptoms becomes more complex for older adults, given their reduced skills of concentration and memory[22,25]. Older adults have low cognitive functioning in the domains of attention and concentration, speed of information processing, ability to learn and memorize potentialized by secondary symptoms or effects of the oncologic treatment which hinders the interpretation of the stimuli frame[27,36].

Secondly, the emotional chaos generated after the diagnosis of cancer can diminish the skills of information processing[15,16,20]. When individuals perceive the health environment as a danger, the cognitive efficiency diminishes and less signals are processed, hazardous situations tend to expand the level of arousal, which shifts the attention to the most important aspects of the situation[18,35]. When they attempt to recollect the events, only the most evident are accessible, reducing the ability to associate incoming stimuli with pre-existing cognitive schema[18,35]. Therefore, the interpretation of the stimuli frame is impacted, reducing the ability to interpret correctly the information related to their own health[35].

The proper moment to provide information is crucial to avoid the individuals to feel overwhelmed to process highly complex information soon after they receive the diagnosis; health professionals can appraise their emotional chaos after they become aware of the cancer diagnosis and adjust the time and amount of information to be provided subsequently[34,35].

Finally, internal physiological events can change the skills of concentration and absorbing the information[19], inducing modifications of utilization of resources and compete with other attention demanding stimuli[29]. Pain, fatigue and poor nutrition can monopolize the cognitive capacity and deteriorate the individuals' processing skills[37].

The credible authority generates knowledge to understand the context of the illness and help to strengthen the stimuli frame[12,17,21,24]. Health professionals provide information about the causes and consequences of the symptoms, share information about manifestations of the illness and functioning of the health system, which improves the event familiarity and congruence while ensuring a frame to interpret the experiences as the individuals go through them[1,15].

An effective professional-personal relation can improve the perceptions and appraisals about a situation or circumstance[38], former studies indicate that individuals with oncologic diagnosis express several interpretations of their experiences with the illness, which requires a close relation with health professionals to enhance education and validate or stabilize the symptoms and experiences that potentially minimizes the uncertainty[30]; however, how the diagnosis is communicated and an impersonal relation may create uncertainty[34]. In addition, the uncertainty can persist for many years after the treatment as the individual has no more frequent contact with the health professionals, which impedes the clarification of new symptoms (new symptoms are related to the secondary effects of the treatment *versus* cancer relapse or a new health problem) and the risk of cancer relapse, which increases the uncertainty[39].

Health signs are better addressed by a credible authority; however, internal concerns, interpretation of physical signs and symptoms, organization of the life and personal responsibilities are better approached through the interaction with other relevant individuals[1]. The opportunity to clarify a situation through discussion and supportive interactions with others help to overcome the obstacles and stimulates the individuals to create a cognitive schema, indirectly reducing the uncertainty and fostering a better understanding of symptoms pattern[40,41]; sharing these experiences and knowledge facilitates the opportunity to search common grounds and stabilization of the experience and adaptation[14]. It is crucial to count with a social support network focused to continuous education to expand the knowledge about the illness[31,36].

Social support in the form of instrumental and emotional support helps to reduce uncertain situations to ensure the stability of the environment[30,41]. Empathy, help with the activities of daily life at home and transportation to hospitals are important to manage the uncertainty with the illness[12,14,15,21]. Emotional and instrumental support is a protective factor for individuals with cancer, it is the main source for the emotional well-being, care and adherence to the treatment. Individuals who perceive they are supported, have a positive self-perception of their illness[42,43].

Education is utilized to broaden the knowledge that grants meaning and context to events related to

the oncologic illness[13,15,16,18,21], allows the individuals to articulate the information they received to understand and assign meaning to the diagnosis and to detect the secondary effects of the treatments[44]; scarce information can predict uncertainty resulting from the inability to determine the meaning of the facts, which places the individual with cancer on an unfavorable position that can change their psychological well-being and ability to respond[44-46].

In addition, widen the knowledge through complex or fragmented information provided by the health professional can hinder the structuring of events within the stimuli frame[16,19,21] due to its volume, complexity, inconsistency and unpredictability[16]. Many studies indicate that the use of complex and fragmented language hampers the discussion about the diagnosis, treatment and prognosis of the illness, since the individual does not understand correctly the information, creating insecurities or inaccurate beliefs. Health professionals should provide the individual clear, accurate, required and sufficient information to make the message understandable, contributing to the management and reduction of uncertainty[21,34,47].

When education in itself is investigated, it is evident the direct impact it has on uncertainty and individuals with low education tend to have less opportunities to obtain information and understand the illness[22,23,25]. This condition can determine the prompt access to health services and delays the beginning of the treatment, which contributes to the increase of uncertainty and helps to deteriorate the well-being of the individual with cancer[45,48]. On the other hand, individuals with better education level have better opportunities for timely diagnosis and treatment justified by three main aspects: availability of means for early diagnosis with frequent lab tests, clinical exams and diagnostic confirmation; improved working relations with formal jobs, helping to boost the individual's contribution and finally, the education level potentializes the adoption of more effective coping strategies that allow best understanding and tackle the infirmity[42].

How health professionals understand the uncertainty of the illness and its antecedents allow to know and guide the care to the oncologic population, bringing theoretical knowledge that can be applied in clinical practice, strengthening the cognitive capacity of the individuals with cancer and their families, modifying the stimuli and favoring the adaptation to the health-illness process for preventive, curative, rehabilitation or palliative goals.

Future investigations or reviews can explore the differences of the antecedents according to diverse cultures, ethnicity, age, type and cancer staging because these factors could generate distinct antecedents of uncertainty.

The most important limitation was the scarce scientific production of the antecedents of the uncertainty utilizing the theory in the context of individuals with cancer, particularly in Latin America, which negatively affects the representativeness of the results.

CONCLUSION

Distinct and inconsistent symptoms, self and vicarious experiences, health system guidelines and routines disruption as modulators of the adverse events and discrepancies between the expected and the experienced are antecedents that change how the individual with cancer perceives the form, composition and structure of the stimuli that are not structured within a cognitive setting which creates uncertainty.

Demands that monopolize cognitive resources and factors that modify the cognitive ability as age, emotional chaos and internal physiologic events interrupt the processing of the information that structures the stimuli frame. Structure providers generate knowledge through clear, accurate, necessary and sufficient information that ensures individuals to understand the new experience they go through, most of all for those with low education level.

Likewise, a quality and consistent relation with the credible authority based on trust, and the emotional and practical support from the family, peers and friends help to clarify the situation and creates a cognitive setting, reducing the unpredictability of the events of the oncologic disease.

CONTRIBUTIONS

All the authors contributed substantially to the study design, analysis and/or interpretation of the data, writing and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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All content underlying the text of the article is contained in the manuscript.

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