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REVIEW OF COMPLETED SUICIDE AND SUICIDAL IDEATION IN ONCOLOGIC PATIENTS FROM A GEOGRAPHIC CLASSIFICATION

REVISIÓN DE SUICIDIOS COMPLETADOS E IDEACIÓN SUICIDA EN PACIENTES ONCOLÓGICOS CON DISTRIBUCIÓN GEOGRÁFICA

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RESUMEN

El riesgo de suicidio en oncología es casi dos veces mayor que en la población general, principalmente asociado a trastornos de salud mental y al diagnóstico. A través de una búsqueda bibliográfica en MEDLINE, PsycINFO, ISOC y CISNE llevada a cabo entre el 2004-2015, se reportaron 823 artículos de los cuales, se revisó su relevancia a partir del resumen del artículo. Dos ciento quince artículos fueron identificados como relevantes y después de aplicar los criterios de inclusión y exclusión, 68 artículos se incluyeron en la revisión. El riesgo de comportamientos suicidas fue mayor en los Estados Unidos, Suecia y Corea del Sur. Principalmente en los hombres, con métodos más violentos de suicidio, la edad (adultos jóvenes y mayores >60), con tumores en la próstata, pulmón, páncreas, cabeza y cuello. Se encontró una alta prevalencia de comportamientos suicidas en la población con cáncer, sin embargo, las diferencias entre países demuestran lo poco que se ha investigado sobre los factores de riesgo..

Key words: Suicide; Suicide ideation; Suicide attempt; Cancer; Mental health.

ABSTRACT

The risk of suicide in oncology is almost two times higher than in the general population, mainly associated to mental health disorders and diagnosis. A literature search of MEDLINE, PsycINFO, ISOC and CISNE between 2004-2015, yielded 823 articles of which the abstract were reviewed for their relevance. Two hundred fifteen articles were identified as relevant and following application of inclusion and exclsuion criteria, 68 articles were included in the review. The suicide behaviors risk was higher in the USA, Sweden and South Korea. Mainly in men, with more violent methods of suicide, age (young adults and older>60), with prostate, lung, pancreas, head and neck tumors. There was high prevalence of suicidal behaviors in cancer population, however the differences between countries show how little risk factors has been researched.

Key words: Suicide; Suicide ideation; Suicide attempt; Cancer; Mental health.

INTRODUCTION

Cancer and suicide behaviors are considered life-threatening events causing million of deaths worldwide (Quill, 2008; Spoletini et al., 2011). In Europe, cancer is a leading cause of death with 1.5 million deaths (Malvezzi, Bertuccio, Levi, La Vecchia, & Negri, 2013; Torre et al., 2015). And, there are between 3 and 31.5 suicides every 100,000 persons (Hoven, Mandell, & Bertolote, 2010). Risk factors in general population can be applied to oncologic populations (Robson, Scrutton, Wikinson & MacLeod, 2010) i) gender, women have higher risk of suicide attempts than men, as well as higher levels of suicidal ideation and passive methods of suicide (Aghanwa, 2004) meanwhile men have higher risk of completed suicide and active lethal methods (Beautrais, 2003). ii) Age, young and old adults have a high risk of completed suicides, especially with socioeconomical problems (Carroll-Ghosh, 2003; Sudak, 2005). iii) The range of suicides of people with mental illnesses is 47%-74% , especially major depression and psychotic disorders (Nock, Hwang, Sampson, & Kessler, 2010).

Oncologic patients, and especially those in palliative situation, may have high levels of distress and mental disorders during illness process, especially anxiety and depression (Holland & Alici, 2010; Diaz-Frutos, Baca-García, García-Foncillas & López-Castroman, 2016). The prevalences of depression and anxiety in oncologic patients are 50% and 40%, respectively (Chochinov, 2001; Massie, 2004; Mitchell et al., 2011; Walker et al., 2014). However, around 10% of oncologic patients are referred to mental health professionals, hence the undermining of psychological problems may increase the risk of suicide behaviors (Holland & Alici, 2010; Weinberger, Bruce, Roth, Breitbart, & Nelson, 2011). There is a high risk of suicidal behaviors in oncologic patients, for instance, suicidal ideation is ranged around 10%-40% and completed suicides are twice than in the general population (Misono, Weiss, Fann, Redman, & Yueh, 2008). Other relevant risk factors are substance abuse (Botega et al., 2010; Passik & Theobald, 2000), bipolar disorders, psychotic disorders and personality disorders that may affect the adherence to treatments and survival of the patients (Chang et al., 2014; Miovic & Block, 2007; Tseng, Chang, Liao, Chen, & Lee, 2010) and the distress or psychological problems after surviving the cancer (Lu et al., 2013; Recklitis, Diller, Li, Najita, , Robison, & Zeltzer, 2010). This review aims at exploring the current literature to address the reported incidence and rates of suicide behaviors in cancer patients geographically. Moreover, this paper focus on identified risk factors related to suicide behaviors and cancer to overcome previous limitations (Robson, et al. 2010).

METHODS

Out search strategy included the following databases Medline, Pubmed, PsycInfo, Web of Science and ISOC/CISNE (spanish databases) searched between January 2004 and April 2015, using keywords (spanish-english): cáncer-cancer, suicidio-suicide, ideación suicida-suicide ideation, intento suicida-suicide attempt, conductas suicidas-suicidal behaviors", we did not exlude any age or type of cancer or suicide behaviour. Search results were merged and duplicate studies removed to produce one set of results with 823 articles. The abstracts of these 823 articles were reviewed for their relevance to the current review. This produced 215 articles for review, 68 of which met the inclusion criteria: papers within the specified 11-year period, written in english or spanish, the population of study was oncologic patient, the subject of study was completed suicide, suicide attempt or suicidal ideation risk, the sample size was greater than 10 and 1 or more of the variables associated with cancer and suicide such as gender, age, type, site of cancer, risk factors including psychological and clinical (time of diagnosis, treatment and prognosis), and country of origin.

RESULTS

Major findings were completed suicides and suicidal ideation and the following risk factors: country, type of tumor, gender, age, depression, time from diagnosis, time of hospitalization, and other sociodemographic and clinical variables (employment, education, religion...). Following, we have included the percentage of papers by every country and the incicende/prevalence of suicide behaviours in each country. Although the methodology and study population vary greatly, we present data from the reviewed papers in order of relevance in the text and year in the tables.

Completed suicide in oncologic patients

This review shows that 34.9% of the articles were from the USA, 44.2% Europe, 11.6% Asia and 2.3% Iberoamerica (Table I). The reported incidence of suicide in the USA was 31.4 every 100,000 especially during the first 5 years after diagnosis (Fang, Keating, Mucci, Adami, Stampfer, Valdimarsdóttir, & Fall, 2010; Johnson et al., 2012; Ward et al., 2013). In Canada, a high risk of suicide was found in the first three months after diagnosis (Chung & Lin, 2010; Lin, Wu, & Lee, 2009) as well as in Taiwan (Chung & Lin, 2010; Lin et al., 2009). Especially high levels of completed suicide in oncologic patients have been found in South Korea during the first year of diagnosis (Ahn et al., 2010). In Europe, the stimated rates vary between 1.3 and 16 depending on origin, type of tumor and time after diagnosis (Fall et al., 2009; Fang, Fall, Mittleman, Sparén, Ye, Adami, & Valdimarsdóttir, 2012; Yousaf, Christensen, Engholm, & Storm, 2005). Scandinavian countries, especially Sweden have the highest prevalences in Europe (Fang et al., 2012).

Accordingly, the type of cancer (lung, head, neck, oral, gynecologic and pancreas) is a risk factor of completed suicide (Dormer, et al., 2008; Kendal & Kendal, 2012; Mahdi et al., 2011; Misono et al., 2008). Males, under 18 or over 60, unemployed, without religious beliefs and without social su-

TABLE I. Completed suicide in oncologic patients

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	STIMATED RISK OF COMPLETED SUICIDE (OR)	RISK FACTORS (OR)
Hem, Loge, Haldorsen, & Ekeberg, 2004	589 (Norway)	SMR=1.6 (1.4-1.7) men SMR= 1.4 (1.2-1.6) women	Respiratory tumors in Men (SMR=4.1 (3.0-5.5) Oral & pharynx in Women SMR=3.7 (1.4-8.0) Breast after 5 years (SMR=1.8 (1.3-2.5) Single First month after diagnosis
Miccinesi, Crocetti, Benvenuti, & Paci, 2004	90,197 (Italy)	SMR= 1.85 (1995-1999)	First year after diagnosis Age ≥75 years
Björkenstam, Edberg, Ayoubi, & Rosén, 2005	1,031,919 (Sweden)	Male SMR= 2.5 in 1965-74 SMR= 1.5 in 1985-94. Female SMR= 2.9 in 1965-74 SMR= 2.3 in 1985-94.	Women, Severity, tumors: Pancreas, Esophaus, Lung, Biliary. In fact, a slightly higher rate for women was observed for 1985-94 than for 1975-84.
Llorente et al., 2005	667 (USA)	Men SMR= 4.24	First 6 months, depression, doctor visit 1 month before suicide,
Yousaf et al. 2005	564,508 (Denmark)	SMR=1.7 (1.6-1.8) men SMR=1.4(1.3-1.5) women	Firs 3 months Men RR= 2.4 (1.9-3.1) First year Women RR= 2.0 (1.6-2.7) Bad prognosis, breast and respiratory tumor
Christensen, Yousaf, Engholm, & Storm, 2006	91,310 (Denmark)	SMR= 1.0 (0.9-1.2) men SMR= 1.3 (1.1-1.6) women	1 & 3 year SMR=1.5 (1.0-2.2) Age (0-49) SMR=1.2 (0.7-2.0)
Schairer et al., 2006	723,810 (USA)	SMR =1.37 (1.28-1.47)	25 years after diagnosis SMR=1.4 (0.8-2.1) Age (50-59) SMR=1.5 (1.3-1.7) Black SMR= 2.9 (1.4-5.2)
Kendal, 2007	1,316,762 (USA)	OR=6.2 (5.4-7.1) men	Colon-rectal Women HR=0.02 (0.01-0.04) Prostate HR=0.18 (0.16-0.19) Head & neck HR=0.3 (0.3-0.4) Leukemia HR=0.1 (0.08-0.2) Metastasis men HR=2.84 (2.49-3.24) Diagnosis time HR=1.03 (1.02-1.03) Problem surgery HR=3.0 (1.3-6.8) Age HR= 1.03 (1.02–1.03)
Zebrack, Ell, & Smith, 2007	35,814 (USA)	SMR=11 (7.8-15.3)	Age 10-14 years SMR=12.9 (5.6-25.4) 15-20 years SMR=12.1 (7.7-17.9)
Dormer, McCaul, & Kristjanson, 2008	121,533 (Australia)	SMR=1.7 (1.4-2.1) men SMR=1.2 (0.8-1.9) women SMR=1.6 (1.4-1.9) both	First 3 months SMR=5.8 (3.9-8.5) Esophagus, tongue, pharynx, stomach, lung, breast, ovary, ...SMR=3.4 (2.5-4.6)
Miller, Mogun, Azrael, Hempstead, & Solomon, 2008	1,408 (USA)	OR= 2.3 (1.1-4.8)	Mental disorder OR=2.3 (1.3-4.2) Anxiety & personality OR=2.2 (1.3-3.6) Antidepressants OR=2.0 (1.2-3.2) Opioids OR=1.6 (1.0-2.5) Psychiatric comorbidity OR=1.1 (1.0-1.2)

TABLE I. Completed suicide in oncologic patients *(continuation)*

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	STIMATED RISK OF COMPLETED SUICIDE (OR)	RISK FACTORS (OR)
Misono, et al. 2008	3,594,750 (USA)	SMR= 1.88 (1.83-1.93)	Men, White, single, advanced cancer Age (70-74) SMR= 2.5 (2.3- 2.6) Lung SMR=5.74 (5.3-6.2) Stomach SMR=4.7 (3.8-5.7) Oral & PharynxSMR=3.7 (3.2-4.2) Larynx SMR=2.83 (2.3-3.4) After 5 years diagnosis SMR=2.4 (2.3-2.5)
Fall et al., 2009	168,584 (Sweden)	RR=2.6 (2.1-3.0) HR=1.1 (0.8-1.5) men	After first week RR=8.4 (1.9-22.7) Age 65-74 years RR=2.6 (2.0-3.4) ≥75 years RR=2.5 (1.8-3.4)
Robinson, Renshaw, Okello, Møller, & Davies, 2009	417,572 (UK)	SMR= 1.45 (1.20-1.73) men SMR= 1.19 (0.88- 1.57) women	First year after diagnosis: Men SMR= 2.4 (1.8-3.1) Women SMR= 1.4 (0.8-2.3) Cancer types-gender Men SMR 2.7 (1.7-4.0) Women SMR 2.2 (0.8-4.7) Age (> 75) SMR=1.6 (0.4- 6.2)
Bill-Axelson et al., 2010	77,439 (Sweden)	SMR=1.5 (1.3-1.8)	1 & 2 year SMR=2.2 (1.5-3.0) Advanced cancer SMR: 2.2; 95% CI, 1.6–2.9 Metastasis SMR=2.1 (1.2-3.6) Age ≥75 years SMR=1.57 (1.19-2.03) PSA ≥ 100 Low income SMR=1.72 (1.35-2.17)
Ahn et al. 2010	816,295 (South Korea)	SMR=2.1 (1.9-2.2) men SMR=1.9 (1.7-2.0) women SMR=2.0 (1.9-2.1) both	First year SMR=3.45 (3.2-3.7) Pancreas Men SMR=6.01 (4.3-8.3) Lung Women SMR=3.55 (2.5-4.9) Single RR= 1.44 (1.3-1.6) Unemployed RR= 1.4 (1.3-1.5) Low education RR=1.5 (1.3-1.8)
Conwell et al., 2010	86 (USA)	OR=4.4 (1.2-22.2)	Cancer diagnosis
Chung & Lin. 2010	368,643 (Taiwan)		Unemployed (p<.001) Low income (p<.005) Age ≥ 65 years Oral and respiratory tumors
Fang et al., 2010	168,584 (USA)	SMR = 1.9 (1.4-2.6)	3 months after diagnosis SMR = 1.9 (1.4-2.6) PSA SMR=2.4 (1.2-4.3)-3.2 (2.0-4.8) White SMR=2.2 (1.6-3.0) Age ≥80 SMR=2.4 (1.3-4.1) Single SMR=3.0 (1.9-4.6)
Tseng et al., 2010	672 (Taiwan)	OR=1.8 (0.7-4.6)	Psychiatric comorbidity first month OR=1.8 (0.7-4.6) Psychiatric comorbidity first year OR= 2.5 (1.2-5.3)

TABLE I. Completed suicide in oncologic patients *(continuation)*

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	STIMATED RISK OF COMPLETED SUICIDE (OR)	RISK FACTORS (OR)
Mahdi et al., 2011	252,235 (USA)	SMR= 1.4 (1.2-1.7)	Single SMR= 3.1 (1.9-4.9) White SMR= 2.8 (1.9-3.9) Ovary cancer SMR= 2.8(2.0-3.8) Advanced cancer HR=2.6 (1.6-4.2) First year HR=1.6 (1.0-2.6)
Turaga, Malafa, Jacobsen, Schell, & Sarr, 2011	36,221 (USA)	SMR=10.8 (9.2-12.7) both OR=13.5 (3.2-56.9) men OR= 2.5 (1.0-6.5) women	Age ≥60 OR= 2.2 (0.7-6.5) Surgery OR=2.5 (1.0-6.4) Married OR=0.3 (0.1-0.6)
Alanee & Russo, 2012	23,381 (USA)	SMR=1.2 (1.1-2.1)	Age < 30 HR=1.2 (0.5-3.1) stage II HR= 0.5 (0.1-2.1), stage III HR= 0.6 (0.1-2.4)
Crocetti et al., 2011	136,105 (Italy)	SMR= 1.47	Bad prognosis (SMR=2.27 First year SMR=2.87) Age (55-64 years) SMR=2.27
Fang et al. 2012	534,154 (Sweden)	OR=2.6 (2.2-3.1) both RR= 3.2 (2.8–3.7) men RR=2.5 (1.9-3.2) women	First week after diagnosis RR=12.6 (8.6-17.8) Lung RR= 12.3 (7.4-18.9) Esophagus, liver, pancreas RR= 16.0 (9.2-25.5) Age (65-74) RR= 3.7 (2.9-4.5) Psychiatric history RR= 1.7 (1.3-2.2)
Johnson, Garlow, Brawley, & Master, 2012	3,678,868 (USA)	One in three (701 of the patients) who committed suicide in the first year did so within 1 month of diagnosis	0.2% (5875 patients) committed suicide, 36% (2111 patients) within 1 year of diagnosis
Kendal & Kendal, 2012	4,449,957 (Canada)	HR=6.603 (5.997–7.270) men	Age HR=1.017 [1.015-1.018] Head & Neck HR=0.9 (0.8-1.1) Mesenchymal HR= 1.0 (0.8-1.3) Respiratory tumors 1.2 (0.97-1.35)
Nakash, Barchana, Liphshitz, Keinan-Boker, & Levav, 2012	Europe, America, Africa & Asia Israel	SIR=1.9 (1.5-2.2)	Americans and europeans (40-64years) SIR=3.5 (2.1-5.0) women SIR=2.2 (1.2-3.1) men American and european men ≥65 years SIR=1.9 (1.5-2.2)
Nakash, Liphshitz, Keinan Boker, & Levav, 2013	Israel (200)	men: (0.90, 95% CI 0.60–1.19) women: (0.95, 95% CI 0.55–1.37)	Jewish-Israelis of European origin Holocaust men: (0.90, 95% CI 0.60–1.19) women: (0.95, 95% CI 0.55–1.37)
Carlsson et al., 2013	105,736 (Sweden)	RR=6.5 (4.0-10)	Metastasis RR=10 (5.1–21) men RR= 5.2 (2.3-12) Age ≥75 RR=7.8 (3.7-16) Single RR= 9.0 (3.1-26) Socioeconomic level RR=8.1 (3.7-18) 6 months after diagnosis RR=6.5 (4.0-10) States III-IV RR=9.1 (4.9-17) PSA ≥100

TABLE I. Completed suicide in oncologic patients *(continuation)*

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	STIMATED RISK OF COMPLETED SUICIDE (OR)	RISK FACTORS (OR)
Lu et al. 2013	7,860, 629 (Sweden)	RR= 1.6 (1.0–2.4)	First year after fiagnosis RR= 4.0 (1.6-8.1) Cervical and Brain tumors
Panczak et al., 2013	7,280,246 (Switzerland)		Religion
Smailyte et al., 2013	215 (Lithuania)	SMR=1.43(1.23-1.66) men SMR=1.32(0.95-1.80) women	First year after diagnosis SMR=1.12 (0.93-1.34) Low education Men SMR=2.03 (1.62-2.52) Age (60-69) SMR= 1.72 (1.35-2.17) Divorced SMR=2.84 (1.55-4.77) Widow SMR=1.94 (0.71-4.21) Esophagus SMR=7.07 (2.29-16.50) Hematopoietic SMR=3.19 (1.04-7.46) Colon-rectum SMR 3.15 (1.36-6.20)
Ward, Roncancio, & Plaxe, 2013	350,962 (USA)	RR=1.3 (1.1-1.5)	White, married, first 4 years diagnosis Gynecologic 30%
Cole, Bowling, Patetta, & Blazer, 2014	217 (USA)	OR=17.2 (10.9-27.0) men OR=2.6 (1.8-3.7) both	Age ≥ 71 OR=1.3 (0.9-1.9) White OR= 9.7 (6.1-15.5) Low social support OR=0.3 (0.2-0.4) Stressful events OR=2.8 (2.0-3.9)
De la Grandmaison, Watier, Cavard, & Charlier, 2014	232 (France)	OR=2.4 (1.1-5.4)	Men, thryoid, prostate
Mohammadi et al., 2014	46,309 (Sweden)	IRR=2.96 (1.6-5.5) women IRR=1.8 (1.3-2.6) men IRR=1.9 (1.4-2.5) both	Myeloma IRR=3.5 (2.1-6.0) Linfoma IRR=1.9 (1.3-2.7) Migrants
Yamauchi et al., 2014	102,843 (Japan)	RR=1.7 (1.2-2.6) men RR= 2.1 (1.1-4.2) women	Age (40-64) RR=1.9 (1.3-2.8) First year RR= 23.9 (13.8-41.6) Located tumor RR=2.3 (1.3-3.9)
Bolton et al., 2015	1,2 millones (Canada)	OR=1.5 (1.2-2.0)	First 90 days AOR=4.1(1.7-9.8) First year AOR=2.2 (1.1-4.3)
Hultcrantz et al., 2015	47,220 (Sweden)	HR=1.7 (1.3-2.2) men HR=2.1 (1.5-2.7) women HR=1.6 (1.2-2.1) both	Firs 3 years HR=1.9 (1.5-2.3) Myeloma multiple HR= 3.4 (2.3-5.0) Mental illness HR=23.3 (16.6-32.6) Age ≤ 69 HR=1.9 (1.5-2.5)
Vyssoki et al., 2015	915,303 (Austria)	SMR=1.41(1.35-1.47) men SMR= 1.24(1.15-1.34) women SMR=1.23(1.19-1.28) both	First year SMR=3.2(3.0-3.4) Lung SMR=3.9 (3.4-4.4) CNS SMR=2.8 (1.9-4.0) Esophagus, liver, pancreas SMR=2.6 (2.1-3.3)
IBEROAMERICA			
Fanger et al. 2010	675 (Brasil)	OR=4.8(3.3-6.7)	Depression OR=18.3(15.4-21.4)

SMR, standardized mortality ratio; OR, Odds ratios; HR, hazard ratio; RR, relative risk; SIR, standardized incidence ratios; IRR, incidence rate ratio

TABLE II. Suicidal ideation and suicide attempt in oncologic patients

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	RISK FACTORS
Recklitis, Lockwood, Rothwell, & Diller, 2006	226 (USA)	Leukemia, Depression, Hopelessness, Pain
Rasic, Belik, Bolton, Chochinov, & Sareen, 2008	863 (Canada)	Major depression OR=3.18 (1.69-5.96) Panic disorder OR=2.15 (1.22-3.77) Agoraphobia OR=5.94 (1.68-21.03) Social phobia OR=5.94 (1.68-21.03) Men OR=0.79 (0.63–1.00) Single OR=0.41 (0.22-0.75) Low education OR=1.39 (1.12-1.72)
Schneider, et al., 2008	980 (USA)	Married, mental illness, lung cancer, other physical illnesses
Walker et al., 2008	229 (UK)	Stress OR=11.2 (7.8-16.0) Pain OR=2.3 (1.6-3.2)
Akechi et al., 2010	5,343 (Japan)	Advanced cancer OR=1.96 (1.20–3.21).
Recklitis et al., 2010	9,126 (USA)	CNS OR=1.5 (1.2-1.9) Low education OR=2.4(1.9-3.1) Poor health OR=12.5 (8.0-19.5) Depression OR=20.4 (17.2-24.3) N Hospitalizations OR=2.8 (1.6-4.8)
Kim & Lee, 2010	138 (South Korea)	Existential vacuum Social support
Madeira, Albuquerque, Santos, Mendes, & Roque, 2011	130 (Portugal)	Major depression (76.9%; p=-.27) Panic disorder (46.2%; p=.001)
Spencer et al., 2012	718 (USA)	Panic OR= 3.2 (1.0-10.4) PTSD OR=4.0 (1.1-14.1). Mental illness OR=4.2 (2.3-7.6)
Lu et al. 2013	7,860,629 (Sweden)	Suicide attempt First year RR=2.3 (1.5-3.3) Cervical & brain tumors
Kim et al., 2013	284 (South Korea)	Allele neurotrophic factor OR=2.56 (1.10-5.93) Depression and anxiety (OR=1.4 (1.1-1.7) Alone OR=3.6 (1.1-7.8) Advanced cancer OR=2.0 (1.1-3.7)
Leung et al., 2013	4,822 (Canada)	Problematic making decision process in Men
Balcı Şengül, Kaya, Şen, & Kaya, 2014	102 (Turkey)	Illness stage, Depression, Anxiety
Brinkman et al., 2013	9,128 (USA)	Poor health OR=1.9 (1.3-2.7) Depression OR=3.0 (2.1-4.1)
Choi et al., 2014	378 (South Korea)	Diarrhea OR= 2.8(1.4-5.6) Alopecia OR=2.8 (1.0-7.4) Fatige OR= 2.3 (1.3-4.1)
Costantini et al., 2014	136 (Italy)	Lung cancer Hopelessness (t=2.54;p=.005) Depression (t=5.30; p=.001)

TABLE II. Suicidal ideation and suicide attempt in oncologic patients *(continuation)*

AUTHOR/YEAR	PARTICIPANTS/ COUNTRY	RISK FACTORS
Fang et al., 2014	200 (Australia)	Desmoralization (t = 2.84, p < 0.01)
Lehuluante & Fransson, 2014	3,512 (Sweden)	QOL, Pain, Single
Mohammadi et al. 2014	46,309 (Sweden)	Suicide attempts Myeloma IRR=2.1(1.4-3.3) Linfoma IRR= 1.3 (1.1-1.7)
Trevino, Balboni, Zollfrank, Balboni, & Prigerson, 2014	603 (USA)	Non-religious OR=3.67 (1.84-7.32) Metastasis OR=1.80 (1.03-3.15) Negative religious adaptation OR=2.7 (1.2-5.7) Phsysical symptoms OR=1.2 (1.1-1.3) Major depression OR=3.4 (1.8- 6.7) PTSD OR=6.4 (2.3-17.3)
Trevino, Abbott, et al., 2014	93 (USA)	Physical symptoms OR=1.3 (1.0-1.5) Major depression OR=6.4 (1.6-25.6) PTSD OR=5.0 (1.0-24.6) Low thereapeutic adeherence OR=.26 (.07- .97)
Tanriverdi, Cuhadar, & Ciftci, 2014	105 (Turkey)	34.3% of patients thought of suicide
Eskelinen et al. 2015	115 (Findland)	Hopelessness, negativity, frustration
Jokinen et al. 2015	186,627 (Sweden)	Pharynx SIR=2.9 (2.2–3.8) LarinxSIR= 4.6 (3.3-6.3) Women Oral SIR=3.3 (2.6-4.1) Men Liver SIR=3.3 (2.7-3.8) Men.
(Hultcrantz et al. 2015	47,220 (Sweden)	Myeloma Multiple HR =3.4(2.3-5.0) Psychiatric history HR=23.3 (16.6-32.6) Age ≤ 69 years. HR=1.9 (1.5-2.5)
Zhou, Hu, Kantoff, & Recklitis, 2015	656 (USA)	Age OR= .98 seniors Etnia OR=1.47 Divorced OR= 1.58 No previous oncology doctor visit 1 year OR=2.57
IBEROAMERICA		
Vargas-Mendoza, 2010	10 (Mexico)	Higher suicide ideation in women
Botega et al. 2010	671 (Brasil)	Women OR= 5.6; 95% CI: 4.6–6. Age OR= 8.3 young patients Alcohol OR= 2.3 Tobacco OR= 1.8
Díaz-Frutos, et al. 2015	202 (Spain)	Depression OR=3.6 (1.3-11.7) Hopelessness OR=8.8 (3.4-25.9) Personality traits OR=.44 (.2-.96) Age >60 OR= 2.6 (1.2-6.0)

SMR, standardized mortality ratio; OR, Odds ratios; RR, relative risk; SIR, standardized incidence ratios; IRR, incidence rate ratio.

pport have higher risk of suicide and violent methods (Chun & Lin, 2010; Kendal, 2007; Lin, Wu, & Lee, 2009; Panczak et al., 2013; Robinson et al., 2009). The first year of diagnosis is extremely crucial (Dormer et al., 2008; Hem et al., 2004; Mahdi et al., 2011; Robinson et al., 2009) especially with advanced cancer (Alanee & Russo, 2012; Fang et al., 2012; Mahdi et al., 2011; Yamauchi et al. 2014) and other medical illnesses (Bolton, Walld, Chateau, Finlayson, & Sareen, 2015) or mental health illnessess (Fang et al., 2012; Fanger et al., 2010; Hultcrantz et al. 2015; Llorente et al., 2005; Miller et al., 2008; Tseng et al. 2010). Finally, the first month after diagnosis is a crucial moment for preventive propose or treatment (Holland & Alici, 2010; Miovic & Block, 2007; Misono, Weiss, Fann, Redman, & Yueh, 2008; Robson, Scrutton, Wilkinson, & MacLeod, 2010).

Suicidal ideation in oncologic patients

This review shows that 30.7% of the articles are from the USA, 42.3% Europe, 11.5% Asia and 7.7% Iberoamerica (Table II). The prevalence of suicidal ideation in oncologic patients in the USA is around17.7% (Schneider & Shenassa, 2008). In Europe between a 7%- 25% of the patients had suicidal ideation (Costantini et al., 2014; Eskelinen, Korhonen, Selander, & Ollonen, 2015; Jokinen, Mattsson, Lagergren, Lagergren, & Ljung, 2015; Spencer, Ray, Pirl, & Prigerson, 2012; Walker et al., 2008; Díaz-Frutos, Baca-García, Mahillo-Fernández, García-Foncillas & López-Castroman, 2015), in Mexico was around a 20% (Vargas-Mendoza, 2010) and Brasil a 7 % (Botega et al., 2010; Fanger et al., 2010).

As it happens with completed suicide, there is a higher risk of suicidal ideation in determined types of tumor such as brain, lung, pancreas, breast, prostate and liver (Aketchi, et al., 2010; Jokinen et al. 2015; Kendal & Kendal, 2015; Recklitis, et al. 2010; Spencer, et al. 2012). Age, gender, socioeconomic status, ... are as well as relevant risk factos that may undermine patients´alternatives for seeking or receiving treatment (Akechi et al., 2010; Kim, Jang, Stewart, Kim, Kim, Kang, et al., 2013; Lehuluante & Fransson, 2014; Rasic, Belik, Bolton, Chochinov & Sareen, 2008; Recklitis et al., 2010). Finally, mental health issues, such as depression and hopelessness (Díaz-Frutos, et al. 2015; Kim et al., 2013; Rasic et al., 2008; Spencer et al., 2012) or the worsening of quality of life (Lehuluante & Fransson, 2014; Fang, et al. 2014; Rasic et al., 2008; Recklitis et al., 2010) are high risk factors for suicidal ideation.

DISCUSSION

Oncologic patients have approxiamtely twice of risk of suicide behaviors than the general population, overall patients with lung, pancreas, prostate, stomach, breast and head and neck cancers (Misono et al., 2008; Robson et al., 2010). The completed suicide rates ranged from 1.2 to 16 from different countries, noticing most studies are from the USA and that Scandinavian and Eaester European countries show the highest levels of suicide behaviours. It is evident in the general population (Nock et al., 2008; Nock et al., 2010) and in oncologic patients, that most of the risk factors of suicide behaviors are shared such as adult age, single status, low economical and educative status, psychiatric history or psychological factors (hopelessness, anxiety, depression, etc) or gender, affecting the making decisions process. Furthermore that completed suicide is not always conscutive to suicidal ideation, when those risk factors are taken into consideration (Aketchi, et al. 2010; Kendal et al. 2007). For instance, when men used more agressive methods to complete the act of suicide they do not always process thoughts or emotions (suicidal ideation) to make the decission, impulsivity may prevail (Chung & Lin, 2010). The review has stablished that the 5 years after cancer diagnosis, patients have more risk of suicide behaviors specially during the diagnosis and the last phase of life, advanced cancer patients may show high levels of psychological distress when receiving palliative treatments or lacking palliative care on different areas (Camidge et al., 2007). We found that most of the published data are from english speaking countries, USA and North european countries tend to produce more works and take higher interest on the health system costs and investments (García-Conde, Ibáñez-Guerra, & Durá-Ferrandis, 2008) hence the productivity of iberoamerican countries is very limited, however social health systems and family support may be affecting their results (Palacios-Espinosa & Ocampo-Palacio, 2011). These findings highlight the need for professionals to have a better understanding of differences between countries so that they can identify the risk factors in different populations that are migrating. And to ensure quality in their treatments when considering the patients needs.

The literature is not conclusive as to the effects of suicide behaviors in cancer. Many studies use collected data from national registers: Surveillance, Epidemiology, and End Results (SEER), and deaths or risk factors are not accurately classified. Because of the diverse methodology reviewed, it was not

possible to use formal criteria to classify the assessment tools and how they affected the studies´results. Furthermore, we included studies with different sample sizes ranging from 10, to which is important caution when interpreting the data. We have found more data about marital status, socioeconomic factors, ethnicity and mental health issues than in previous studies (Robson, et al. 2010). Our data suggest that the experiences of oncologic patients deservers further attention, particularly to provide appopriate interventions. The role of psychological factors and comorbidity invites further investigation to elucidate the relationship between phisical and psychiatric illnesses.

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