

## Is there a relationship between positive affect and other dimensions of quality of life in colorectal cancer patients?

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**Título:** ¿Hay una relación entre estado de ánimo positivo y calidad de vida en enfermos con cáncer colorrectal?

**Resumen:** La investigación ha evidenciado que las emociones positivas pueden mejorar la salud de pacientes con diferentes enfermedades. El objetivo del presente trabajo es analizar si el estado de ánimo positivo (EAP) está relacionado con la calidad de vida de pacientes con cáncer colorrectal (CRC) y si pueden establecerse directrices para desarrollar intervenciones eficaces que mejoren ese estado de ánimo. Se lleva a cabo una revisión de artículos publicados entre enero de 2001 y Marzo de 2012 a partir de las bases de datos Medline, ISI Web of Knowledge, Psycho Inf y Cochrane y las palabras: emociones positivas, EAP, indicadores de salud, calidad de vida CRC y cáncer. Los artículos se clasificaron en dos grupos: a) Artículos descriptivos; b) Artículos de intervención. Los resultados de los artículos descriptivos indican que el estado de ánimo positivo está relacionado con mejor estado de salud, mejor funcionamiento social, mayor crecimiento personal, mayor bienestar, y menores niveles de ansiedad y depresión. El EAP aumenta cuando se realizan diferentes actividades. Los resultados de los artículos de intervención sugieren que las intervenciones pueden ser adecuadas para mejorar el EAP de los pacientes. Se proporcionan algunas orientaciones que pueden ser útiles para los pacientes con CRC.

**Palabras clave:** Emociones Positivas; estado de ánimo positivo; intervenciones psicológicas; calidad de vida; cáncer colorrectal.

**Abstract:** It can be stated from the previous research that positive emotions should allow to better health outcomes in sick populations. The aim of the present work is to know the state-of-the-art of how positive affect (PA) relates with quality of life in colorectal cancer (CRC) patients, as well as to give some guidelines to develop more efficacious psychological interventions in CRC patients to enhance positive affect. This review describes a search of published literature from January 2001 to March of 2012 on the Medline, ISI Web of Knowledge, Psycho Inf and Cochrane databases using publications that contain positive emotions, positive affect, health outcomes, quality of life, CRC and cancer. These articles were classified into two groups: a) "descriptive papers" b) "interventional studies". Results from "descriptive papers" suggest that positive affect (PA) was significantly associated with greater levels of general health, better social functioning, benefit finding, positive changes, low depression, less anxiety and greater psychological well-being. PA also increases when different activities are developed. The overall results from interventional studies suggest that the interventions described can be recommended for improving patient's levels of positive affect. The present review offers some suggestions which could be useful for CRC patients.

**Key words:** Positive emotions; positive affect; psychological interventions; quality of life; colorectal cancer

### Introduction

Colorectal Cancer (CRC) is a significant cause of morbidity and mortality worldwide (Fitzell & Pakenham, 2010). In the USA is the third most common cancer found in men and woman (American Cancer Society, 2011) and in Europe, and most of the industrialized world, CRC is the third most common cancer and the third most common cause of cancer deaths (Ferlay et al., 2008). The death rate from colorectal cancer has been going down for more than 20 years. Thanks to colorectal cancer screening, polyps can be found and removed before they turn into cancer. If it is detected in its earlier stages, CRC is highly treatable and potentially curable (American Cancer Society, 2011).

Receiving a cancer diagnosis represents an enormous psychological challenge (Simon, Thompson, Flashman, & Wardle, 2009). Cancer can affect social relationships (Northouse, Mood, Templin, Mellon, & George, 2000), which may in turn influence the support the patients receive during their illness (Reynolds & Perrin, 2004). Cancer and its treatment including surgery/chemotherapy/radiotherapy can also impose a variety of physical and functional disabilities that compromise the patient's ability to work or to maintain independence (Wright, Kiely, Lynch, Cull, & Selby, 2002).

For cancer patients, psychosocial adjustment involves making life adjustment to adapt to these altered roles and mental changes from the experience of cancer (Nishigaki et al., 2007). In short, both the disease itself and the side effects of interventions produce psychological distress and reduce the quality of life of the patients.

Although "psychological distress" is widely used to refer to the effects produced by cancer and its treatments, its sense varies across researchers. However, it seems that most studies consider that psychological distress includes feelings labeled as "affect" (Hou, Law, & Fu, 2010), "mood" (Listing et al., 2009), or "emotion" (Cameron, Booth, Schlatter, Ziginskas, & Harman, 2007). "Affect" is the most used term, referring to a subjective feeling state that incorporates long-lasting mood states, such as cheerfulness, depression, happiness or anger. Mood and emotion are generally seen as subtypes of affect, with emotions being more strongly directed toward a specific stimulus— be it a person, an object, or an event (Frijda, 2009). Negative affect has been constructed as a general dimension of subjective distress, reflecting undifferentiated bad moods and low self-concept. Thus, negative affect can be regarded as a category that encompasses traditional concepts such as anxiety, depression, neuroticism, or general maladjustment.

Thus, cancer patients experiencing psychological distress show intense negative affective states (sadness, anger, worries) which can appear at diagnosis, treatment and/or survival stages. Anxiety and depression disturbances can be found in more than 25% of breast cancer patients (Millar, Purushotham, McLatchie, George & Murray, 2005), and

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some studies suggest that this proportion can be extended to a 33% if different kind of tumors are included (Nekolaichuk, Cumming, Turner, Yushchyn, & Sela, 2011). Although no data has been found about which proportion of CRC patients experience negative affective states, there is no reason to not assume that that proportion is similar.

These negative affective states interfere normal activities and could decrease patient's health behaviors (Schofield et al., 2004) and increase treatment side-effects (Blasco, Pallarés, Alonso, & López López, 2000). Furthermore, psychological distress could even decrease survival rates in some cancers (Hamer, Chida, & Molloy, 2009). Thus, interventions addressed to reduce negative affective states have been widespread used in cancer patients (Greer, 2008).

Although "negative affect" (NA) has been the most frequent topic in psycho-oncology research and interventions addressed to psychological distress and quality of life, a new trend has appeared during the last years in the field of health psychology, and authors are also considering "positive affect" when persons experience general levels of well-being, energy, and high activity (Aspinwall & MacNamara, 2005). The focus of interest has been to know whether positive affect can enhance quality of life and/or decrease emotional disturbances which appear in health problems.

Recent studies have begun to explore the protective effects of positive affect (PA) on physical health, including cardiovascular risk factors, such as hypertension and diabetes and others have suggested an inverse relationship between positive affect and incident stroke and mortality in medical in-patients as well as diabetic patients (Ostir, Markides, Black, & Goodwin, 2000; Scherer, & Herrmann-Lingen, 2009). However, much less is known about the potential impact of positive affect in cancer patients (Penninx et al., 2000; Koenig, 2000), and it is not still well known whether positive emotions would improve quality of life and disease evolution in CRC patients.

The aim of the present work is to know the state-of-the-art of how PA relates with well-being and quality of life in CRC patients, as well as to give some guidelines to develop more efficacious psychological interventions in CRC patients.

## Method

This review describes a three-stage review process. First, we conducted a search of published literature from January 2001 to March of 2012 on the Medline, ISI Web of Knowledge, Psycho Inf and Cochrane databases using the following search terms (Cancer OR Colorectal) AND ("Positive Emotions" OR "Positive Affect") AND ("Quality of Life" OR "Health Outcomes"). It was expected to found a larger number of studies assessing CRC patients. However, less than ten studies did it. Thus, all papers will be considered in spite of the kind of cancer patients assessed. From this first search we found 78 articles. Second, the abstract of each resulting article was then read by three researchers and a determination was made by consensus if the study discussed positive emotions or positive affect in cancer patients. From this selection, 35 articles met the inclusion criteria. In the third stage, studies developed only in survivors of cancer were excluded, and theoretical studies which did not provide empirical data were also not considered.

Finally, we select 22 articles which were classified into two groups: a) Studies which described positive emotions assessed in cancer patients and which will be labelled as "Descriptive papers" (13 articles which included 14 studies); b) Studies which applied psychological interventions addressed to enhance positive emotions and that will be labelled "Interventional studies" (9 articles).

## Results

### Descriptive Papers

Table 1 presents the main features of the 14 descriptive studies. It must be stated that in two couples of studies, data provided belonged to the same sample. These were the cases of the Rinaldis' studies (Rinaldis, Pakenham, Lynch, & Aitken, 2009; Rinaldis, Pakenham, & Lynch, 2010) and the Schroevers' studies (Schroevers, Kraaij, & Garnefski, 2008; Schroevers, Kraaij, & Gamefsky, 2011). However, for the proposal of the present study, they will be considered as independent studies. Information provided in Table 1 allow to the following considerations concerning each of the features presented.

**Table 1.** Descriptive Studies.

Study	Country	Cancer Type	<i>n</i>	Positive affect measures	Aim	Conclusion
Christie et al., 2009	U.S.A.	Prostate Cancer	57	The Positive and Negative Schedule (PANAS)	To examine whether patients involved in treatment decision making report better quality of life after treatment.	Discussing treatment options with physicians increased positive affect after treatment.
Helgeson & Tomich 2005	U.S.A.	Breast Cancer	491	The Positive and Negative Schedule (PANAS)	To compare the quality of life of patients with recurrent breast cancer, survivors and controls.	Patients with recurrence had worse quality of life, less positive affect, more general fatigue and more intrusive avoidant thoughts.
Hirsh et al., 2012	U.S.A.	Lung Cancer	133	NEO-Five Factor Inven-	To examine the association of affective experience and health-	Positive affect was significantly associated with greater levels of social function-

Study	Country	Cancer Type	<i>n</i>	Positive affect measures	Aim	Conclusion
				tory (NEO-FFI) – positive and negative affect	related quality of life in lung cancer patients.	ing and general health, over and above the effects of negative affect.
Hou et al., 2010	China	Colorectal Cancer	215	The Positive and Negative Schedule (PANAS)	To assess whether differential patterns of change in Positive Affect (PA) were associated with psychological distress.	PA mediated and moderated the associations between increased symptom distress and anxiety and depressed mood. Continuous physical symptom distress reduces PA and reduced PA brought to higher levels of anxiety and depressed mood.
Lechner et al., 2006 (Study 1)	U.S.A.	Breast Cancer	230	The affects Balance Scale (ABS)	To examine associations between benefit finding and psychosocial adjustment	The high and low Benefit Finding reported higher positive affect and lower negative affect.
Lechner et al., 2006 (Study 2)	U.S.A.	Breast Cancer	136	The affects Balance Scale (ABS)	To examine associations between benefit finding and psychosocial adjustment	Benefit finding was stronger linked with positive outcomes than absence of negatives outcomes.
Manne et al., 2008	U.S.A.	Primary Gynecological Cancer	114	Positive affect of Mental Health Inventory (MHI)	To identify demographic, medical, and psychological predictors of well-being.	Women who were less expressive of positive emotions were less able to find something positive in the cancer experience and reported poorer adaptation.
Pinquart et al., 2007	Germany	Non Hodg-kin's Lymphoma, Acute Myelogenous Leukemia, Plasmocytome, Colon Cancer.	153	The Positive and Negative Schedule (PANAS)	To test whether perceived gains and losses predicted change in psychological well-being.	Finding positive consequences of cancer promoted psychological wellbeing.
Rinaldis et al., 2009	Australia	Colorectal Cancer	1800	Bradburn's Affect Balance Scale	To develop a colorectal cancer specific measure of coping.	Seeking Social Support was the only subscale that predicted positive affect, and hence the only subscale that accounted for change.
Rinaldis et al., 2010	Australia	Colorectal Cancer	1750	Bradburn's Affect Balance Scale	To identify benefits perceived by those diagnosed with colorectal cancer.	Benefit-finding domains accounted for significant amounts of variance in positive affect.
Schroevers et al., 2008	Netherlands	Lymphoma, Breast Cancer, Leukaemia, Colorectal Cancer, Lung Cancer and Prostate cancer	108	The Positive and Negative Schedule (PANAS)	To test whether patients' ability to manage goals is related to their psychological well-being	Focusing on pleasant issues was also significantly associated with less negative affect.
Schroevers et al., 2011	Netherlands	Lymphoma, Breast cancer, Leukemia, Colorectal Cancer, Lung Cancer, Prostate Cancer.	108	The Positive and Negative Schedule (PANAS)	To investigate the relationship between positive and negative changes, and their association with positive and negative affect. And to examine the correlation of positive and negative changes, specifically the role of coping and goal reengagement.	More positive changes were related to more positive affect, whereas more negative changes were related to more negative affect and less positive affect.
Shapiro, et al., 2010	U.S.A.	Breast cancer, Lung cancer, Colon Cancer, Lymphoma, Prostate Cancer, Leukemia, Ovarian Cancer, Myeloma, Pancreatic Cancer, and	283	Emotional approach coping scales) – emotional processing and emotional expression (EACS)	To examine relationships between emotional adjustment and a number of coping styles and strategies in people with cancer.	That emotional processing was associated with more distress and less positive emotion on some measures. That benefit finding was associated with less depression and more positive affect. High levels of hope were associated with low depression and high levels of happiness and positive affect.

Study	Country	Cancer Type	n	Positive affect measures	Aim	Conclusion
		widely dispersed among a number of other types of cancer.				
Voogt et al., 2005	Netherlands	Breast Cancer, Colorectal Cancer, Ovarian Cancer, Lung Cancer, Prostate Cancer	105	The Positive and Negative Schedule (PANAS)	To assess the levels of positive and negative affect in patients with advanced cancer.	Psychological distress of patients with advanced cancer that seems to be mainly caused by low levels of positive affect and no by high levels of negative affect.

*Country*

Studies have been developed mainly across western countries (Australia, United States of America and Europe), but there are not samples providing patients from Latin cultures. Only one study was developed in China, but no more Asian populations have been assessed.

*Cancer Type*

Samples of patients with the more frequent cancers (breast, colorectal, gynaecological, lung and prostate) are represented in the studies that provide homogenous samples (nine studies) as well on those that provided mixed samples of patients with different tumours (five studies).

*Number of participants*

Sample sizes are very different, with a minimum of 57 prostate cancer patients, and a maximum of 1800 colorectal cancer patients. However a majority of the studies (seven studies) provided samples between 100-150 patients, whereas only four studies provide samples between 200-500 patients. Two studies with colorectal cancer patients provide more than 1700 patients, although the sample used was the same in both papers.

*Positive Affect Measures*

Positive and Negative Affect Schedule (PANAS) is the most used assessment tool to assess positive and negative affect (seven studies). This enhances direct comparisons across studies. However, in the other seven studies, there is

not a common questionnaire assessing affect and comparisons between results are more difficult.

*Aim*

Aims of the studies are very different. Only one study focused exclusively in assessing positive and negative affect levels (Voogt et al., 2005). The other studies assessed affect inside of a more widespread research focused on quality of life, and tried to ascertain which factors allow to greater levels of PA and lower levels of negative affect, or tried to identify the relationships between affect and other measures of the patients' psychological state.

*Conclusions*

Nine studies found that PA was significantly associated with greater levels of general health, social functioning, benefit finding, positive changes, and psychological well-being, as well as with low depression and less anxiety. Five studies suggested that PA increases when different activities are developed (i.e. discussing treatment options with physicians or seeking social support).

**Interventional Studies**

Table 2 resumes the main features of the nine interventional studies selected. It must be stated that two studies (Manne et al., 2007; Manne et al., 2010) used data providing from the same sample of patients. Following the same criteria used in Table 1, we will consider these researches as independent studies.

**Table 2.** Interventions Studies.

Study	Country	Cancer Type	n	Positive affect measures	Intervention	Follow-up	Conclusion
Antoni et al., 2001	U.S.A.	Breast Cancer	100	The Profile of Mood States (POMS)	Cognitive Behavioral Stress management (CBSM)	10 weekly 2hr sessions structured group intervention 3 month and 9 month	The intervention also increases participants' reports that having breast cancer had made positive contributions to their lives and it increase generalized optimism. The

Study	Country	Cancer Type	n	Positive affect measures	Intervention	Follow-up	Conclusion
							intervention reduces depression but did not affect other measures. Also increase benefit finding an optimism (in women with low optimism at baseline)
Antoni et al., 2006	U.S.A.	Breast Cancer	199	The Positive States of Mind (PSOM) The affects Balance Scale (ABS)	Cognitive Behavioral Stress management (CBSM)	10 weekly 2hr sessions.	1 year after randomization The intervention reduces reports of social disruption and increases positive states of mind and benefit finding.
Badger et al., 2005	U.S.A.	Breast Cancer	48	The Positive and Negative Schedule (PANAS)	Counseling (TIP-C) focused on cancer education, role disputes, social support, and management of depressive symptoms. Also, partners received three calls	6 weekly telephone calls (average 32.9 minutes).	1 month. Positive emotions increased and stress decreased; but results are inconclusive for negative emotions, depression and fatigue.
Branstrom et al., 2010	Sweden	Breast Cancer, Gynecological Cancer, Lymphatic Cancer, Pancreatic Cancer, Cancer in the Neck	71	The Positive States of Mind (PSOM)	MBSR Program (Self report mindfulness).	8-week mindfulness training	3 month Participants in the mindfulness training group has significantly decrease perceived stress and post-traumatic avoidance symptoms and increase positive states of mind..
Danhauer et al., 2009	U.S.A.	Breast Cancer	44	The Positive and Negative Schedule (PANAS)	Ryoga classes. No home yoga practice was instructed nor required.	10 weekly 75-minute	No Women with higher NA and lower emotional well-being obtain greater benefit from RY. PA increase in RY group. In depression scale and mental health scale are also better in RY group after treatment.
Manne et al., 2007	U.S.A.	Primary Gynecological Cancer	353	Emotional Expressiveness Questionnaire (EEQ)	a.- Coping and communication intervention. b.- Supportive Counseling (SC) c.- Usual	Six 1 hour sessions plus one booster phone session	6 and 9 months Both interventions are effective in treating depressive symptoms. Women with greater than average increases in physician-rated physical symptoms and/or women who are more expressive of positive emotions benefited more from
Manne et al., 2010	U.S.A.	Primary Gynecological Cancer	203	Emotional Arousal scale of the Therapy Session Report	a.- Coping and communication intervention (CCI). b.- Supportive Counseling (SC) c.- Usual	Six 1 hour sessions.	3 months Therapeutic bond predict openness in terms of positive affect experienced during sessions, and both aspects of openness (positive and negative affect), in turn, predict more therapeutic realizations
Ramachandra et al., 2009	U.K.	Metastatic Breast or Prostate Cancer	27	Hospital Anxiety and Depression Scale (HAD)	A brief self-administered psychological intervention (Keeping a well-being diary, Using a mindfulness CD, Planning a pleasurable activity).	Keeping a well-being diary for each day; 2. Using a mindfulness CD: 10 min was given to participants to use twice a day.	6, 12 and 18 weeks Both qualitative and quantitative data showed that the intervention was acceptable to users. This brief well-being intervention appears to be a promising technique for improving quality of life of cancer patients, without making undue demands on staff resources or patient time.

Study	Country	Cancer Type	n	Positive affect measures	Intervention	Follow-up	Conclusion
Vadira-ja et al., 2009	India	Breast Cancer	88	The Positive and Negative Schedule (PANAS)	a.-Integrated yoga program b.-Control group: usual supportive care.	3. Planning a pleasurable activity for each three in-person sessions/week for 6 weeks	No There is a significant positive correlation between positive affect with role function, social function and global quality of life.

### Country

Studies were mainly developed in western countries, mainly in United States of America (U.S.A.). Two studies were developed in Non-Latin European countries, whereas only one study was developed in Asian patients.

### Cancer Type

Most of studies enrolled only female patients, with breast cancer patients representing the most commonly recruited patient group. Five studies enrolled patients with breast cancer and two studies recruited primary gynecological cancer patients. One study used mixed types of cancer for psychological intervention but included only one man and seventy women. Finally, only Ramachandra's study (Ramachandra, Booth, Pieters, Vrotsou, & Huppert, 2009) included both women (metastatic breast cancer) and men (metastatic prostate cancer). Interventions have been applied at different moments across the evolution of the oncological disease. One study used patients who were not undergoing radiation or chemotherapy as current treatment (Branstrom, Kvillemo, Brandberg, & Moskowitz, 2010). Six studies were developed in patients who were receiving radiation or chemotherapy treatment (Antoni et al., 2001, 2006; Badger et al., 2005; Manne et al., 2007, 2010; Vadiraja et al., 2009). One study used both breast cancer patients under treatment or without treatment (Danahauer et al., 2009). One study used patients with advanced cancer and it does not indicate which kind of treatment was applied (Ramachandra et al., 2009).

### Number of participants

There were three studies in this review with less than 50 patients; three studies which included samples between 50-100 patients, and only three studies with more than 100 patients.

### Measures

Although PANAS is the most used tool, (three studies), some other questionnaires and strategies have been used. Thus, it is more difficult than in the case of descriptive stud-

ies to achieve comparisons from the affective state of the different patients assessed.

### Type of intervention

There were different types of psychological interventions. Two of them used cognitive-behavioral stress management intervention; four of them applied counseling and education interventions; two studies were based on yoga programs and one study developed a mindfulness training program.

### Number of sessions

There were five studies in this review which applied a program with 6 weekly sessions, one study with 8 weekly sessions and three studies with 10 weekly sessions.

### Follow up

Some studies have reported results at different follow-up points. Two studies assessed patients immediately after the intervention (Danahauer et al., 2009; Vadiraja et al., 2009); one study collected data one month after treatment (Badger et al., 2005); and two studies developed a three-month follow-up (Branstrom et al., 2010; Manne et al., 2010). Two studies made assessments at two follow-up points: 3 and 9 months (Antoni et al., 2001), and 6 and 9 months (Manne et al., 2007). One study developed a 1-year follow-up (Antoni et al., 2006). Follow-up was not allowed in one study (Ramachandra et al., 2009) since patients had an advanced stage disease and some of them died even during the intervention phase.

### Conclusions

The overall results from interventional studies suggest that the interventions described can be recommended for improving patient's levels of PA. However, information about the effect size obtained with each intervention is not provided.

## Discussion

The number of studies about PA in cancer patients published during the last ten years is scarce. Thus, only limited conclusions and considerations can be allowed. There are even a small number of studies in CRC patients, and any intervention study was specifically addressed to CRC patients. Thus, it is difficult to state considerations about the role of PA in CRC patients. Because of that, we will discuss the features that can be followed from the present review without considering the kind of tumour, and we will offer some suggestions which could be useful for CRC patients. In spite of that, one contribution of our study is to show that research about PA in CRC patients is largely needed.

### Descriptive Papers

Although it seems that PA is related with higher levels of well-being and that social support and benefit finding increase PA, more studies that include samples providing from other countries in America, Asia and Europe are needed to replicate these results and to confirm that there are not cultural differences.

Since patients assessed had different kind of tumours, it can be suggested that the relationship between PA and well-being can be found across all cancer patients. More than this, since the studies with larger samples included CRC patients (Rinaldis et al., 2009, Rinaldis et al., 2010), it should be stated that this relationship is strong in this kind of patients. However, the studies do not provide enough evidence about whether cancer stage or kind of treatment could influence in the PA and well-being relationship. Thus, further studies which analyze these features are needed.

The fact that PANAS was the most used tool to assess positive and negative affect does not warrant that all studies provide comparable data, since some of them did not report the mean average of the sample and offered only the change levels in the scales across the longitudinal measures. For those studies which used the PANAS with the same scale range and provide mean rates for the sample, negative affect levels were low (between 15 and 19 in a 10-50 scale) and PA levels were moderate (between 27 and 33 in a 10-50 scale). These rates have also been observed in a sample of Spanish breast cancer patients (Bellver, Sánchez-Cánovas, Santaballa et al., 2009). Since these studies included different kind of tumours, it can be suggested that negative affect is not an outstanding feature in cancer patients. When questionnaires other than PANAS have been used, results are slightly different. Shapiro, McCue, Heyman, Dey and Haller (2010) reported moderate to high levels of PA (a mean range of 9.47 in a 0-12 range scale). Although these data suggest that PA in cancer patients is not absent, it could be possible that different profiles of negative and PA rates appear at different stages of the disease, and this possibility cannot be excluded since more studies which analyze this question should be developed.

In any case, the majority of studies reveal that changes in PA are best predictor of changes in quality of life and illness adaptation than changes in negative emotions. Nevertheless, an alternative explanation would be that the negative levels are lower and have less room for change. Possibly the most useful measure might be the positivity ratio developed by Fredrickson & Losada (2005), that consist in assess not absolute levels but the ratio between experienced positive and negative affect. This measure has been used successfully in other fields (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Cohn, Fredrickson, Brown, Mikels, & Conway, 2009).

As it has previously stated, it seems that PA is clearly related with higher levels of well-being and that social support and benefit finding increase PA. However, since studies have not always addressed to assess positive and negative affect as the main purpose of the research, there are still some features which need further study (i.e. whether levels of affect differ between male and female patients, or whether changes in these levels across the disease evolution which reached statistical significance allow to clinical changes that could be also relevant to enhance well-being of patients). Thus, studies focused on the accurate assessment of positive and negative affect and their rate are required, and links between PA and long-term changes in patient's feelings, such as posttraumatic growth, should be considered (Vázquez & Castilla, 2007).

### Intervention Studies

In most studies, interventions have been addressed to breast cancer patients (Antoni et al., 2001, 2006; Badger et al., 2005; Danhauer et al., 2009; Vadiraja et al., 2009), with gynecological cancer patients also as an important sample (Manne et al., 2007, 2010). Only just one intervention study with mixed sample (Branstrom et al., 2010) Only twenty four prostatic male cancer patients (Ramachandra et al., 2009) participated in one of the studies revised. It can be concluded that little is known about how useful these interventions should be in other kind of tumors and/or in male cancer patients in general. Although it can be expected that these results could be generalized to other samples of cancer patients, research which includes patients (specially male patients) with other kind of tumors must be developed. There are no data about CRC patients. Thus, specific research for this kind of tumor (the third common cancer) is needed.

Most studies were developed in patients undergoing current treatment and with larger expectation of survival. Thus, it can be concluded that interventions should be useful in these situations. However some studies suggest that interventions should be also useful in advanced disease (Ramachandra et al., 2009) and in patients at disease-free interval (Branstrom et al., 2010) although more studies should be developed.

Concerning the size sample, intervention groups ranged between 22 and 132 participants in randomized studies. These sizes can be considered as suitable in randomized de-



signs if we keep in mind that studies were developed in homogeneous samples with the same diagnosis. However, it must be pointed out that two studies used different number of participants belonging to the same sample of breast cancer patients (Antoni et al., 2001, 2006). Thus, it can be considered that only seven randomized trials have been developed. On the other hand, Manne et al., study, (2010) used the same data for a secondary analysis which did not use a randomized trial design. Although more research is needed, overall, the numbers of studies published provide more than some preliminary results and the following comments about the usefulness of the interventions based on enhance PA in cancer patients can be stated.

Type of interventions applied is mixed. Moreover, the descriptions are generic on the general direction of therapy, but there is no detailed description of its elements, although one can speculate that two main categories of strategies should be stated: cognitive and counseling based interventions (including cognitive behavioral stress management, education and counseling), and those which some authors call "mind-body therapies" (yoga and mindfulness). Whatever the case, results obtained suggest that PA is increased and quality of life is improved when applied to patients undergoing current treatment, even in cases of advanced disease (Ramachandra et al., 2009).

Interventions always used weekly sessions, ranging from 6 to 10 weeks. It can be concluded that no more than one weekly session is needed, although it should be investigated in which cases a 6-week or a 10-week schedule should be recommended. It seems that interventions which use mainly counseling strategies are shorter than those using cognitive behavioral management techniques. Since increased PA is achieved on both cases, further research is needed in order to know which schedule provides a greater and/or lasting therapeutic effects or which schedule offers the best cost-benefit intervention.

Follow-up assessments suggest that therapeutic effects are maintained once the treatment has finished. In general, the studies showed that psychological intervention can produce substantial and durable effects on measures representing recovery of social functioning, reduction of negative affect, and increases in positive experiences. Although one might argue that the intervention's immediate impact on reports of benefit finding simply represents socially desirable responding, such an argument is far less persuasive for follow-ups. It is important to check whether such consolidation of psychological intervention is a reliable phenomenon and how durable it is across time. Accordingly, it is necessary that more studies follow participants for longer periods after the psychosocial intervention comes to its conclusion.

Overall, results suggest that all interventions have shown to be useful to increase PA and decrease negative affect. However, which kind of intervention should be recommended for which patients? Not all patients are able to develop some strategies or program schedules. For example, some patients at Ramachandra et al. (2009) study dropped

out arguing that the intervention was not for them. Thus, research comparing different kinds of interventions in the same kind of patients (as it was developed in Manne et al. (2007) study is needed in order to clarify which patients should benefit from each kind of intervention.

### **Integration between descriptive and interventional studies and implications for further studies and clinical interventions.**

There is a majority of studies developed in western countries and cultures. Studies on other populations are needed to know whether factors which seem allow to better levels of affect can be extended to other cultural settings. In the same sense, it must be confirmed in different cultural settings whether enhancing PA would allow to increase well-being in CRC patients. For example, in a study with Spanish breast cancer patients which received a psychological intervention (Bellver et al., 2009), it was observed that improvements in PA and decreases in negative affect were greater in patients with lower levels of well-being, and that these effects must be obtained at the first intervention session. In those cases where the first session did not provide improvements, these cannot be obtained in the following sessions of the intervention program. Results like that not only reveal that cultural differences can be found, but also that more knowledge about how psychological interventions produce beneficial effects in cancer patients is needed.

On the other hand, there is a methodological limitation that must be considered mainly in intervention studies: participants could be a biased sample that could not be represent the cancer patients population and, on the other hand, data did not include an important number of patients (ranging from 27 to 353) which rejected to participate or who dropped out from the studies. There was one study which did not indicate whether some patients dropped out of the studies (Badger et al., 2005). This is an important feature that should be analyzed in order to know whether this attrition rates are random or whether there are some reasons to explain why patients reject some therapeutic assistance that should be useful for them.

In spite of these considerations, some final guidelines can be suggested. Although there are results obtained in larger sizes in descriptive studies with CRC patients, and that it can be suggested that the relationships between PA and psychological well-being are strong, it is not clear that CRC patients have the same profile of the other kind of patients concerning their positive and negative affect levels, and much more research is still needed.

The same considerations can be stated concerning factors that should increase PA, although both cognitive-counseling interventions and mind-body interventions seem to enhance PA and decrease negative affect, mainly in women. However, it is not clear whether all patients should be able to follow therapeutic guidelines stated by these two main types of interventions. On the other hand, since it



seems that weekly sessions are the best schedule, it is not still known how many weeks are needed to achieve the best cost-benefit schedule. Our focus of interest (CRC patients) has not been satisfied, since no intervention studies with this kind of patients have been developed. Thus, a first research addressed to assess whether PA can be enhanced using

some kind of psychological intervention, in CRC patients is needed. Meanwhile, interventions addressed to enhance PA can be applied to CRC patients who want to receive it, since data provided by this review suggest that these interventions should be useful.

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