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Mapping acceptance and commitment therapy outcomes in the context of infertility: a systematic review

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Abstract

Evidence suggests that individuals with infertility are confronted with psychosocial challenges. This has led to a significant number of studies highlighting the subsequent negative effects on mental health. Acceptance and Commitment Therapy (ACT) has already been established as having a beneficial effect on psychological issues related to other health conditions. Since infertility is a relevant stressor, ACT was also expected to have a protective effect on the mental health of individuals with this disease. A systematic review of the literature was conducted to identify studies assessing Infertility and ACT. Empirical and quantitative studies were considered when they assessed mental health variables and ACT hexagon model components in patients with infertility. Out of the 137 studies initially identified, six met the eligibility criteria and were included in the review. The samples were composed of women (three) and couples (three). Since ACT variables appear to be associated with better mental health outcomes, couples with infertility were expected to benefit from intervention addressing ACT components. Implications for future research include the need for a distinction between ACT variables, the use of validated assessment methods and the empirical examination of predictors of changes in ACT variables.

Keywords ACT · Infertility · Anxiety · Depression · Stress · Systematic review

Infertility is a disease characterised by the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse or due to an impairment of a person's ability to reproduce either as an individual or with their partner (Zegers-Hochschild et al., 2017). Infertility can be primary or secondary. Primary female infertility refers to a woman who has never been diagnosed with a clinical pregnancy and who meets the criteria of being classified as having infertility. Primary male infertility is the term to designate a man who has never initiated a clinical pregnancy and who meets the criteria of being classified as infertile. Secondary female infertility is when a woman is unable to establish a clinical pregnancy but has previously been diagnosed with a clinical pregnancy. Secondary male infertility is defined as a male's inability to initiate a clinical pregnancy, despite having previously initiated a clinical pregnancy (Zegers-Hochschild et al., 2017). This condition affects millions of people of reproductive age around the world (Mascarenhas et al., 2012) due to a variety of causes, of both a female and male nature, and may sometimes stem from unknown factors (Anwar & Anwar, 2016; Gelbaya et al., 2014). Hence, in view of the increasing number of infertility diagnoses, further research in this field is sorely needed.

In fact, being diagnosed with infertility can be a painful and stressful experience and may entail consequences for both partners (Luk & Loke, 2014; Rouchou, 2013). These consequences may take the form of emotional or behavioural reactions to an infertility diagnosis. The literature shows that an infertility diagnosis can cause anxiety, depression, obsessive–compulsive symptoms (Berardis et al., 2014; Lakatos et al., 2017; Pasch et al., 2016), anger, social isolation

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(Berardis et al., 2014), and a decrease in psychological well-being (Luk & Loke, 2014). It may also lead to other outcomes such as disorganisation, distractibility, exhaustion and fatigue, moodiness, and marital and personal stress (Lykeridou et al., 2009). An infertility diagnosis can also hinder perception of quality of life and psychological distress (Dyer et al., 2009; Monga et al., 2004). Therefore, one of the most difficult emotional consequences of infertility appears to be the sense of loss of control, and this may begin to emerge even before the formal diagnosis has been disclosed (Cousineau & Domar, 2007).

As already mentioned, an infertility diagnosis can be a stressful experience with an impact on mental health which leads to the assumption that therapy may bring benefits. In fact, infertility is an obstacle to a life goal for many individuals and couples (Greil et al., 2018). Consequently, more and more research has focused on this context, exploring variables that may be related to better or poorer adjustment. It is therefore important to explore therapies that may be effective in addressing the underlying consequences of the infertility context. In a recent systematic review conducted by Abdollahpour et al. (2021), the results showed the significant effects of second wave Cognitive Behavioral Therapy on reducing psychopathological symptoms in an infertility context. However, no significant effects were observed for depressive symptoms which, as mentioned above, may emerge in these patients. Indeed, more recent therapies such as Acceptance and Commitment Therapy (ACT) have been understudied in terms of their effectiveness in this context. Hence, other therapies need to be explored as they may prove to be effective within this scope.

ACT is a form of cognitive-behavioural therapy, and its theoretical basis is drawn from behavioural analysis, while its content focuses on cognitions and emotions (Hayes et al., 1999; Twohig, 2012). Therefore, the ACT approach follows a health model and reiterates the fact that suffering is universal and its cause stems from the intrusion of language into areas where it is not functional (Hayes et al., 1999). According to ACT, ordinary human psychological processes can lead to extremely destructive and dysfunctional outcomes and can amplify or exacerbate unusual pathological processes, particularly those involving human language (Hayes et al., 1999). A central ACT component is teaching cognitive defusion skills, which involves distancing oneself from the literal meaning and content of language (Arch & Craske, 2008). Thus, the central goal of ACT is not to change cognition and emotions but to apply willingness to support action that is consistent with chosen values, in addition to mindful tolerance and acceptance of cognitions and emotions (Arch & Craske, 2008; Hayes et al., 1999). ACT is experience- oriented and aims to increase psychological flexibility (i.e., "the ability to contact the present moment more fully as a conscious human being, and to change or persist in behaviour when doing so serves valued ends") and uses six psychological constructs: acceptance, contact with the present moment, values, committed action, self as a context, and defusion (Hayes et al., 2006). Each of these constructs are conceptualised as a positive psychological skill positioned at one end of the continuum and their opposites of change at the other (Hayes et al., 2006; Twohig, 2012). The results of a systematic review of 15 studies authored by Salari et al. (2021) showed that ACT reduced anxiety and depression scores after treatment, as well as during follow-up in patients diagnosed with cancer. Also, another systematic review conducted by Chunxiao et al. (2020) concluded that ACT significantly reduced cancer patients' psychological distress, improved psychological flexibility, quality of life and sense of hope. Fayazbakhsh and Mansouri's (2019) study also revealed findings indicating that ACT decreased the intolerance of uncertainty, experiential avoidance and symptoms of generalised anxiety disorder in an individual with type II diabetes. In fact, ACT has been applied in other contexts such as cancer and chronic pain, and has been shown to be effective in these situations (Feros et al., 2013; Hughes et al., 2017). However, in the context of infertility, studies are scarce and samples are heterogeneous, making it difficult to generalise the results.

The aim of this systematic review was to summarise and examine the available evidence regarding how ACT variables are associated with or may impact the mental health outcomes (such as anxiety, stress, quality of life, and depression) of patients with an infertility diagnosis. This knowledge is of particular value to researchers and clinicians as it can provide them with evidence-based data on the psychological health needs of this population, thus contributing to the design of interventions.

Methods

Search strategy

A literature search was conducted from the inception date to 11 February 2022 on the following electronic databases: Web of Science, Pubmed, and B-On. No restrictions were established for the time of publication. In order to be considered in this review, studies had to be written in English, Spanish or Portuguese. Studies published only as abstracts, dissertations, reviews, or case reports were not considered. The key search terms used were: (((Infertility OR Fertility) AND (Acceptance and Commitment Therapy OR ACT OR Contact with the present moment OR Values OR Committed action OR Self as context OR Defusion OR Experiential Acceptance OR Psychological flexibility OR Experiential Avoidance OR Dominance of the conceptualised past OR Lack of values OR Inaction OR Attachment to the

conceptualised self OR Cognitive Fusion OR Psychological Inflexibility) AND (Depression OR Anxiety OR Stress OR Distress OR Mental health OR Quality of life OR Health-related quality of life OR HrQoL OR QoL))).

Study screening, selection process, and data extraction

All records were stored on a database using Endnote 20.2.1. Manual inspection was performed by the first author and cross-checked by the other two authors; disagreements were discussed and resolved by consensus among the three reviewers. Six full texts were then independently examined by two of the authors and included whenever they met the following criteria: 1) studies assessing mental health variables (e.g., anxiety, depression, stress, quality of life) in individuals dealing with infertility, and 2) studies assessing ACT hexagon model components.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed to report the analysed data. The PRISMA flowchart presents the data of the identified results and studies included (Fig. 1). The initial search identified 137 studies from which 43 articles were excluded during the screening process since they were duplicates. A further 73 articles were then excluded based on the title and nine were excluded based on the abstract.

Results

Study characteristics

A total of six studies were included in this review (Table 1). All the studies were published between 2012 and 2020 and were from two countries: Portugal ($n=4$) and Iran ($n=2$). The studies consisted mainly of randomised controlled trials (Hosseinpanahi et al., 2020; Rahimi et al., 2019), cross-sectional studies (Cunha et al., 2016; Galhardo et al., 2019; Pinto-Gouveia et al., 2012), and one validation study (Galhardo et al., 2020). The sample sizes ranged from 40 to 326, including couples (three studies) or women only (three studies). The participants were predominantly in their thirties and had over 10 years of schooling. Four of the six studies included participants who had been in a relationship between five and almost 11 years. The participants had been diagnosed with infertility and were predominantly undergoing fertility treatment or had already received this treatment.

Of the six studies, Pinto-Gouveia et al. (2012) sought to explore the relationship between emotional regulation processes (psychological flexibility/acceptance and coping styles) and adjustment (depression and self-efficacy) in patients diagnosed with infertility. The aim of Cunha et al.'s (2016) study was to find differences between groups (participants without fertility problems, participants who had been diagnosed with fertility problems) in emotional regulation processes (psychological inflexibility/experiential avoidance

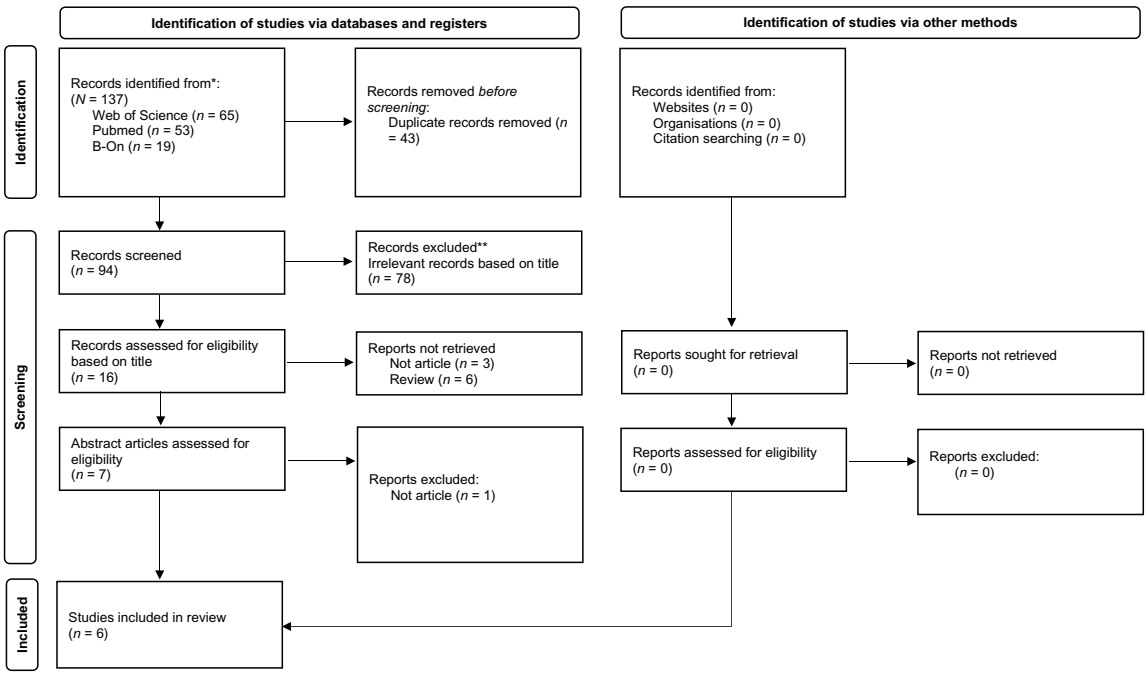

Fig. 1 PRISMA 2020 Flow Diagram

Table 1 Mains characteristics and findings of all studies included in this review

	Authors, Year	Country	Databases searched	Type of study	Population and sample size	Measure used	Mean age, Mean years of education, Mean age of diagnosis	Reproductive and relationship status	Main findings
1	Cunha et al. (2016)	Portugal	PubMed	CROSS SECTIONAL	326 couples	Coping Styles Questionnaire (CSQ; Roger et al., 1993) Acceptance and Action Questionnaire II (AAQ-II; Bond, et al., 2011) Self-Compassion Scale (SCS; Neff, 2003)	*Fertile couples* M_{age} = 36.79 (*SD* = 5.71) $M_{years\ of\ education}$ = 13.79 (*SD* = 3.72) $M_{years\ of\ relationship}$ = 10.35 (*SD* = 5.70) *Infertility Group* M_{age} = 34.63 (*SD* = 5.05) $M_{years\ of\ education}$ = 14.09 (*SD* = 3.51) $M_{years\ of\ relationship}$ = 6.10 (*SD* = 3.55) $M_{years\ of\ diagnosis}$ = 2.95 (*SD* = 2.83) *Adoption Group* M_{age} = 37.30 (*SD* = 6.16) $M_{years\ of\ education}$ = 11.31 (*SD* = 4.19) $M_{years\ of\ relationship}$ = 10.75 (*SD* = 5.76) $M_{years\ of\ diagnosis}$ = 8.23 (*SD* = 7.07)	120 fertile couples, 147 couples with an infertility diagnosis who were undergoing fertility treatments, and 59 couples with infertility applying for adoption *Infertility Group* 73.5% had already been submitted to infertility treatments and 26.5% were undergoing their first treatment cycle *Adoption Group* 74.6% had previous attempts to get pregnant through medical treatment and 25.4% selected adoption as the first choice for having a child	Infertility group couples present higher psychological inflexibility/ experiential avoidance scores than adoption group ($p < .001$) and fertile group ($p < .001$) couples. Women exhibit more psychological inflexibility/ experiential avoidance than men (Women: *M* = 7.86, *SD* = 7.53; Men: *M* = 4.95; *SD* = 5.70)
2	Galhardo et al. (2019)	Portugal	PubMed	CROSS SECTIONAL	124 women	Acceptance and Action Questionnaire II (AAQ-II; Bond, et al., 2011) Fertility Problem Inventory (FPI; Newton et al., 1999) Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995)	M_{age} = 35.81 (*SD* = 4.24) $M_{years\ of\ education}$ = 15.62 (*SD* = 3.15) $M_{years\ of\ diagnosis}$ = 5.04 (*SD* = 3.95)	124 women with infertility diagnosis and undergoing fertility treatments 63.7% were married and 36.3 were living with a partner 82.3% had previously undergone infertility treatment and 17.7% were pursuing treatment for the first time 15.3% were using donated oocytes or sperm and 84.7% were undertaking treatment with their gametes	The direct effect of representations about parenthood on depressive symptoms was nonsignificant (effect = .04, SE = .02, $p = .127$) The indirect effect of representations about the importance of parenthood on depressive symptoms, while modeling the influence of intervening variables (Impact of infertility on life domains and experiential avoidance), was significant (indirect effect = .03, 95%CI: [.015; 050])

Table 1 (continued)

	Authors, Year	Country	Databases searched	Type of study	Population and sample size	Measure used	Mean age, Mean years of education, Mean age of diagnosis	Reproductive and relationship status	Main findings
3	Galhardo et al. (2020)	Portugal	Web of Science	DEVELOPMENT AND VALITADION STUDY	287 women	Acceptance and Action Questionnaire II (AAQ-II; Bond, et al., 2011) Fertility Problem Inventory (FPI; Newton et al., 1999) Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) Infertility Self-efficacy Scale (ISE; Cousineau et al., 2006)	$M_{age} = 35.75$ ($SD = 4.52$) $M_{years\ of\ education} = 15.11$ ($SD = 3.04$) $M_{years\ of\ diagnosis} = 4.97$ ($SD = 4.25$)	124 women with an infertility diagnosis 80.1% were married or living with a partner and 19.9% were single 39% mentioned female factor infertility, 22.3% a male factor, 17.8% both female and male factors and 20.9% stated that their infertility etiology was unknown 81.9% had previously undergone infertility treatments and 18.1% were pursuing medical treatment for the first time 42.2%were waiting for a medical treatment schedule, 26.1% were performing in vitro fertilization, 11.8% were pursuing intracytoplasmic sperm injection, 4.2% were taking hormonal stimulation and 1.4% were performing intrauterine insemination	Significant moderate to large correlations were found between psychological inflexibility and depressive ($\eta^2 = .65$, $p < .01$), anxiety ($\eta^2 = .44$, $p < .01$), and stress ($\eta^2 = .53$, $p < .01$) symptoms A positive large correlation was found between psychological inflexibility and infertility-related stress ($\eta^2 = .69$, $p < .01$) Psychological inflexibility predicted infertility-related stress ($R^2 = .41$, $p < .01$) and less self-efficacy ($R^2 = .19$, $p < .01$) to deal with the demands of an infertility diagnosis and medical treatment When considering general mental health outcomes, psychological inflexibility acted as a significant predictor for depressive ($R^2 = .38$, $p < .01$), anxiety ($R^2 = .24$, $p < .01$), and stress ($R^2 = .30$, $p < .01$) symptoms

Table 1 (continued)

	Authors, Year	Country	Databases searched	Type of study	Population and sample size	Measure used	Mean age, Mean years of education, Mean age of diagnosis	Reproductive and relationship status	Main findings
4	Hosseinpanahi et al. (2020)	Iran	Web of Science	RANDOMIZED CONTROLLED TRIAL	54 couples	General Health Questionnaire-28 (GHQ-28; Goldberg & Hiller, 1979) Fertility Quality of Life (FertiQoL; Boivin et al., 2011)	*Intervention group* $M_{\text{age women}} = 31.5$ ($SD = 5.3$) $M_{\text{age men}} = 33.3$ ($SD = 5.5$) $M_{\text{years of marriage}} = 5.0$ ($SD = 2.2$) $M_{\text{of diagnosis}} = 3.0$ ($SD = 2.1$) *Control group* $M_{\text{age women}} = 30.3$ ($SD = 4.6$) $M_{\text{age men}} = 31.9$ ($SD = 4.8$) $M_{\text{years of marriage}} = 5.0$ ($SD = 1.3$) $M_{\text{of diagnosis}} = 2.4$ ($SD = 1.2$)		The mental health total score was significantly lower in the intervention women than the control women one month after the intervention ($p < .001$) The mental health total score was significantly lower in the intervention men than the control men one month after the intervention ($p < .001$) The fertility-specific quality of life was significantly higher in the intervention women than the control women one month after the intervention ($p < .001$) The fertility-specific quality of life was significantly higher in the intervention men than the control men one month after the intervention ($p < .001$)
5	Rahimi et al. (2019)	Iran	Web of Science	RANDOMIZED CONTROLLED TRIAL	40 women	Fertility Quality of Life (FertiQoL; Boivin et al., 2011)	*ACT group* $M_{\text{age women}} = 32.7$ ($SD = 5.1$) $M_{\text{age husbands}} = 36.8$ ($SD = 4.8$) $M_{\text{duration of marriage}} = 8.6$ ($SD = 5.8$) *Control group* $M_{\text{age women}} = 29.5$ ($SD = 8.5$) $M_{\text{age husbands}} = 33.4$ (SD = 6.2) $M_{\text{duration of marriage}} = 5.8$ ($SD = 2.6$)		There was a significant increase in the components of quality of life and in the quality of life in the post-test of the ACT group ($M = 69.3$, $DP = 9.6$) compared to those in the pre-test ($M = 53.7$, $DP = 8.6$), whereas no significant change was observed between the pre-test ($M = 55.2$, $DP = 12.4$) and the post-test ($M = 55.1$, $DP = 12$) of the control group Although, there was no significant difference between the means of the components of the quality of life in the ACT and control groups in the pre-test ($p = .6$), there was significant differences in the post-test ($p < .001$)

Table 1 (continued)

	Authors, Year	Country	Databases searched	Type of study	Population and sample size	Measure used	Mean age, Mean years of education, Mean age of diagnosis	Reproductive and relationship status	Main findings
6	Pinto-Gouveia et al. (2012)	Portugal	Web of Science	CROSS SECTIONAL	200 couples	Beck Depression Inventory-II (BDI-II; Beck et al., 1961) Acceptance and Action Questionnaire II (AAQ-II; Bond, et al., 2011) Infertility Sel-efficacy Scale (ISE; Cousineau et al., 2006) Coping Styles Questionnaire (CSQ; Roger et al., 1993) Self-Compassion Scale (SCS; Neff, 2003)	*Infertile Group* M_{age} = 34.29 (SD = 5.04) $M_{years\ of\ education}$ = 14.47 (SD = 3.42) $M_{years\ of\ marriage}$ = 6.14 (SD = 3.31) *Control Group* M_{age} = 35.16 (SD = 4.37) $M_{years\ of\ education}$ = 14.40 (SD = 3.14) $M_{years\ of\ marriage}$ = 8.8 (SD = 4.15)		The infertile group showed lower scores than the control group when observing psychological flexibility/ acceptance, $p < .001$ In the infertile group, were found higher scores of depression ($p < .001$), lower scores of psychological flexibility/ acceptance ($p < .001$), and emotional/ detached coping styles ($p < .001$) In comparison to men, women showed more depressive symptoms (Women: M = 11.14, SD = 7.27; Men: M = 5.90, SD = 6.59), less psychological flexibility/ acceptance (Women: M = 44.23, SD = 11.08; Men: M = 50.35, SD = 17.28), and less emotional/detached coping styles (Women: M = 33.68, SD = 7.48; Men: M = 37.74, SD = 7.22) Self-efficacy was positively correlated with acceptance (η^2 = .55, $p < .01$), emotional/ detached (η^2 = .66, $p < .01$), and rational coping styles (η^2 = .51, $p < .01$) and negatively correlated with depression (η^2 = -.42, $p < .01$) and avoidant coping styles (η^2 = -33, $p < .01$) Psychological flexibility/ acceptance was the only negative predictor of depression (β = -.63, $p < .001$) Psychological flexibility/acceptance (β = .36, $p < .001$), rational coping style (β = .32, $p < .001$), and avoidant coping style (β = -.26, p = .01) were significant predictors of depression and infertility self-efficacy

and self-judgment) and coping styles (emotional/detached avoidant and rational). Galhardo et al. (2019) proposed to explore the mediating role of experiential avoidance in the relationship between infertility-related stress (impact of infertility on women's life and representations regarding the importance of parenthood) and depressive symptoms. Rahimi et al. (2019) studied the effect of an ACT intervention on the quality of life of women diagnosed with infertility during treatment. Galhardo et al. (2020) developed and validated the Psychological Inflexibility Scale-Infertility, assessing psychological inflexibility, infertility-related stress, infertility self-efficacy and anxiety, depression, and stress symptoms. Hosseinpanahi et al. (2020) studied the effect of an ACT intervention on mental health and quality of life in couples diagnosed with infertility.

ACT and infertility

The study conducted by Pinto-Gouveia et al. (2012) pointed to a negative correlation between both depression and avoidant coping and infertility self-efficacy. This study also revealed a positive correlation between self-efficacy and acceptance, emotional/detached coping, and rational coping. Psychological inflexibility was shown to be associated with depression (Galhardo et al., 2020; Pinto-Gouveia et al., 2012), anxiety, stress, infertility-related stress, and self-efficacy (Galhardo et al., 2020). In the study of Pinto-Gouveia et al. (2012) rational coping, psychological flexibility, and avoidant coping were associated with depression and self-efficacy. This study also revealed that the group diagnosed with infertility presented lower scores of psychological flexibility/acceptance ($p < 0.001$), lower scores in emotional/detached coping styles ($p < 0.001$) and higher scores in depression ($p < 0.001$) than the control group from the general population. Galhardo et al. (2019) found a significant indirect effect of representations regarding the importance of parenthood on depressive symptoms, through the association with the impact of infertility on life domains and experiential avoidance (Impact of infertility on life domains and experiential avoidance; indirect effect = 0.03, 95%CI: [0.015; 050]).

Efficacy of ACT

Quality of life was prospectively assessed by two studies. Hosseinpanahi et al. (2020) showed that fertility-specific quality of life was significantly higher in the group of women and in the group of men who had received the ACT intervention one month later ($p < 0.001$) than in the control group, which had not received an ACT intervention. Similarly, Rahimi et al. (2019) indicated a significant increase in quality of life following an ACT intervention ($M = 69.3$, $DP = 9.6$) compared to those in the pre-test ($M = 53.7$, $DP = 8.6$), whereas no significant change was observed between the pre-test ($M = 55.2$, $DP = 12.4$) and post-test ($M = 55.1$, $DP = 12$) of the control group and no differences were observed in the pre-test between groups. Hosseinpanahi et al. (2020) also analysed mental health following an ACT intervention noting higher scores in the test result reflecting mental health problems. In short, the authors observed that the total mental health (physical function, social function, depressive symptoms, anxiety symptoms and sleep disturbance) score was significantly lower for the women in the intervention group than for the women in the control group one month after the intervention ($p < 0.001$).

Discussion

The aim of this study was to summarise and examine the available evidence on how ACT variables are associated with or may impact the mental health outcomes, such as anxiety, stress, depression, and quality of life, of patients with an infertility diagnosis. Furthermore, considering the poor efficacy of the second wave Cognitive Behavioral Therapy in reducing depressive symptoms in an infertility context, the efficacy of ACT in the context of infertility was covered by this study. To the best of our knowledge, this is the first systematic review on this subject.

In line with the study of Lakatos et al. (2017), Pinto-Gouveia et al. (2012) also identified lower scores of psychological flexibility/acceptance in individuals diagnosed with infertility, while this was the only negative predictor of depression. In fact, couples diagnosed with infertility tend to have higher experiential avoidance scores (Cunha et al., 2016). Regarding coping styles, Pinto-Gouveia et al. (2012) found lower scores of emotional/detached coping styles in individuals diagnosed with infertility in their study compared with individuals without known fertility problems.

As in the study of Monga et al. (2004), in a systematic review conducted by Chachamovich et al. (2010) women were found to consistently reveal lower quality of life when compared to men or individuals from the general population. However, in the case of men, the results showed inconsistency regarding quality of life. In fact, Hosseinpanahi et al. (2020) revealed the effectiveness of ACT on quality of life in both women and men. They found that fertility-specific quality of life was significantly higher in the intervention group when compared with the control group one month after the intervention. Likewise, Rahimi et al. (2019), demonstrated increased quality of life following an ACT intervention in a sample of women.

The results of the study were congruent regarding ACT variables in individuals diagnosed with infertility. Thus, the literature suggests that ACT is a potentially suitable

approach and an effective treatment for patients dealing with infertility (Pinto-Gouveia et al., 2012; Cunha et al., 2016; Rahimi et al., 2019; Hosseinpanahi et al., 2020). Psychological inflexibility, a variable worked on/targeted in ACT, appears to be positively related to less depressive and anxiety symptoms. The results of a study conducted by Levin et al. (2014) suggest that psychological inflexibility is associated with several disorders such as anxiety and depression. Given that inflexibility has been viewed as a process that is present in mental disorders, ACT focused techniques may be promising, and not only for the fertility context. Hence, this transdiagnostic process deserves further consideration.

In fact, according to Galhardo et al. (2020), there appear to be significant moderate to large positive correlations between psychological inflexibility and depression, anxiety, and stress symptoms. Their study also pointed to a positive large correlation between psychological inflexibility and infertility-related stress, with the former predicting the latter, as well as depression, anxiety, and stress symptoms.

Like psychological inflexibility, experiential avoidance has also been identified as a transdiagnostic factor that deserves attention during treatment (Spinhoven et al., 2014). Indeed, Spinhoven et al. (2014) regards experiential avoidance as a risk factor that may determine the course and comorbidity of emotional disorders. Experiential avoidance is a factor that can deteriorate daily well-being and enhance the experience of negative affect (Machell et al., 2014). Therefore, when experiential avoidance is used to relieve the suffering resulting from infertility, it may increase the impact of this diagnosis on the lives of individuals.

Rational and avoidant coping are significant predictors of depression, as is psychological flexibility/acceptance (Pinto-Gouveia et al., 2012). According to Karekla and Panayiotou (2011), it should be noted that experiential avoidance can be related to other styles of coping, but should be considered separately as it has an additional contribution to predicting stress and quality of life. The authors suggest that experiential avoidance is related not only to avoidant coping but also to the expression of negative affect. Hence, experiential avoidance focuses more on the function and context of the behaviour while coping styles are related to the frequency and content of the behaviour. Therefore, individuals confronted with fertility problems tend to display maladaptive coping strategies as they tend to avoid thought, emotions, and situations that are somehow related to pregnancy or parenting as a way of dealing with the painful experience of infertility (Cunha et al., 2016; Galhardo et al., 2019). In this respect, Galhardo et al. (2019) found a direct effect of representations regarding the importance of parenting on depressive symptoms through the impact of infertility and, consequently, experiential avoidance.

Strengths and weaknesses

An extensive search of the literature was conducted to minimise the risk of missing information. However, this study should be considered in light of both its strengths and limitations. On the one hand, one of the strengths is its inclusion of studies over a broad timeframe (2012 to 2020), considering that research in this area is still recent. A review of the effect of ACT on mental health outcomes might help researchers and clinicians provide patients with evidence-based data on the psychological health needs of this population and contribute to developing interventions which may reduce symptoms of anxiety, depression, stress, and changes in the quality of life of patients with an infertility diagnosis. Also, the studies in this paper were all published in peer-reviewed journals and selected on the basis of eligibility criteria. The fact that all the included studies were congruous in their results seems to indicate consistent evidence, however further studies are needed to confirm this fact.

Nevertheless, the study has some limitations such as restricting our focus to English, Spanish and Portuguese papers, which may have resulted in the exclusion of other relevant studies. Moreover, only six studies were found from two countries (i.e., Portugal and Iran), which poses a high risk of cultural and demographic bias. All the samples included in this review were composed of heterosexual couples or women and, consequently, conclusions related to LGBTQIA + populations cannot be drawn. Although some studies focused on couples' perspective, half of the studies in this paper focused on a sample consisting solely of women, which may also cause a bias. Likewise, the experience or absence thereof of a previous failed cycle can reflect a significant bias, therefore a focus on the impact of infertility at earlier stages may be important. Further studies considering these limitations are recommended. Study designs demonstrating the long-term benefits of ACT should also be developed with a longitudinal methodology in order to strengthen the conclusions. The male population is also worthy of further attention. It would also be interesting to develop studies regarding the efficiency of ACT, adopting a feasibility methodology to understand whether the therapy is acceptable and feasible, followed by randomised controlled trials to assess its effectiveness. Given that ACT promotes psychological flexibility through psychological processes that are responsible for considerable human suffering, such an approach may hold promise in the infertility context, which is known to be a stressful and painful moment in the lives of individuals.

Conclusion

Despite a marked increase in the number of available studies, there is still a lack of evidence of ACT's impact in the case of infertility, which deserves to be further examined.

Nonetheless, this systematic review showed that ACT, as a psychotherapeutic treatment, is a potentially suitable approach that may have a positive impact on treatment for patients dealing with infertility. Therefore, in our view, ACT may contribute to improving mental health outcomes, such as anxiety, depression, quality of life and stress in patients diagnosed with infertility. However, great efforts are needed to test and reinforce the efficacy of ACT and to produce solid evidence in this regard.

Author's contributions CB gave substantial contributions to conception and design, acquisition of data and its analysis and interpretation, and wrote all the content, and is accountable for all the aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. SS participated in the design of the study, sample orientation, acquisition of data and its analysis and interpretation, revised it critically for important intellectual content, gave the final approval of the version to be published. JP participated in the design of the study, sample orientation, acquisition of data and its analysis and interpretation, revised it critically for important intellectual content, gave the final approval of the version to be published.

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Data availability The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval This is a systematic review. The Portucalense University Research Ethics Committee has confirmed that no ethical approval is required.

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

Consent to participate Not applicable.

Consent for publication Not applicable.

Informed consent Not applicable.

Conflict of interest The authors declare that they have no conflict of interest.

Human and animal rights This article does not contain any studies with human or animal subjects performed by any of the authors.

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