

Review Article

Psychological and Biological Aspects of “Without-Body Bereavement”: Reflections at COVID-19 Pandemic Time

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Grief is an individual, family, and social psychological process following the death of a loved one, during which the pain caused by loss follows several stages that will lead to the reorganization and acceptance of the mourning event. In this article, we will examine some elaboration processes that can allow for an analysis of the cultural, social, and religious processes and structures as a consequence of the “grief without a body,” namely, the mourning by the relatives who have experienced the loss of a loved one without being able to ritualize the social function of the funeral because of the outbreak of the coronavirus pandemic. Furthermore, some biological and neurological processes that modulate and allow for the mourning process will be synthesized.

1. Introduction

The emotions accompanying mourning are always painful and experienced at any age. Sadness, nostalgia, deep discomfort, guilt, and feelings of loss are just some of the emotions that overwhelm people who are experiencing the death of a loved one [1]. Over time, these emotions are remodeled, allowing the survivor to resume the ability of the individual to actively participate in social and working life, together with the acceptance of loss and absence, without return [2]. The terms bereavement and grief are used in the literature to refer to either the state of having lost someone to death or the response to such a loss [3, 4].

Described as the mourning process, with its phases, the person “who has been left alone” begins to retie the broken, “interrupted” thread of his own existence and supported by a series of remodulations of memory and “hopeful” perspectives of their future. Therefore, separation, loss, and death are emotionally painful, distressing, and threatening [5].

Archaeological evidence indicates that from time immemorial, individuals’ encounters with loss and death have been approached within a framework of resources and struc-

tures of meaning [6]. They are designed to support those experiencing the loss and death of a significant person in their life. In everyone, the painful experience is strongly mediated by the structural meanings of the cultural, family, and religious resources that help to “organize” this emotional experience. The time following the loss of a loved one is characterized by the loss of the previous and/or ideal self-image. The survivors must cope with loss, as well as heal from grief, intrusive flashbacks, nightmares, and the feeling of having undergone personality and behavior changes [7]. Furthermore, grief requires a recognition of the actual losses that have occurred in the person’s life. The survivors must find the good aspects of the past, which will never return. People can lose the memories of the person who is no longer there.

These personal, family, and social aspects have increased and strengthened during the COVID-19 pandemic. Above all, the repercussions on the emotional and psychological state of family members who were unable to deal with adequate mourning due to the absence of a body to cry on were evident and painful. For health reasons, the bodies of people who died from COVID-19 were often buried or incinerated

without being left to their families. Health authorities have prohibited or significantly limited access to the bodies of loved ones. For these reasons, they have not been able to adequately elaborate on the secular processes affected by the religious and social traditions of the culture to which they belong [8]. The absence of family and collective rituals may have significantly affected the psychophysical state of loved ones, increasing their anxieties, fears, and worries [9]. Several studies have highlighted the increase in negative psychological responses in family members of people who died due to COVID-19. In a recent study, it was shown in those who lost loved ones due to COVID-19 that the most common symptoms and characteristics of grief were guilt, the search for an explanation, somatic reactions, and denial [10]. Severe grief is common among bereaved family members during the COVID-19 pandemic, regardless of the cause or circumstances of the death, and even if their loss occurred before the pandemic began. This suggests that some aspects of the pandemic itself contribute to severe pain and that factors that normally mitigate pain may not be as effective [11]. There is an elevated risk of severe grief among family members of people who experience bereavement during the pandemic period, even if their family member died before the pandemic itself. Severe pain is a substantial source of psychological morbidity in the wake of the COVID-19 pandemic, persisting more than a year after death. Unlike studies reported before the COVID-19 pandemic, there was a significant association between persistently elevated or worsening pain symptoms and intubation, but not physical presence or COVID-19 status [12]. Survivors may likely experience increases in the incidence of organic pathologies as observed in studies before the COVID-19 pandemic. Several studies have shown an increased risk of cardiovascular disease and psychiatric disorders in the decade following the death of a spouse [13] and a notable reduction in social interactions four years after the death of a spouse or loved one [14]. The study findings from Lapenskie et al.'s group highlight that the severity of grief in the pandemic was likely influenced as much by the experience of grief and the grieving process during the pandemic rather than by the time of death itself, by the specific circumstances of the deceased person, or care received before death [12].

2. Bereavement and Psychological Pathways

Following the death of a loved one, the survivor goes through different stages of bereavement, which can be grouped into two categories: the initial bereavement and the mourning process [3]. Denial is one of the first and most widespread reactions. With denial, the person goes into the trenches and raises a barricade to try to absorb the excruciating blows inflicted by the pain. The brain tries to protect itself and prepares to accept the new reality. Their attention is focused on an event that does not exist—a fantastic event that is not real and, as such, not painful. A characteristic of these phases is to retrace the different phases of the day in the hopes of meeting the person who is no longer there [15]. During mourning and COVID-19, relatives unable to attend the funeral for sanitary hygiene reported the hope

that their relative was still hospitalized or in a residential facility [16]. They relived the moments of waiting to visit their relatives [17].

This phase's absence impedes the slow process of revisiting, reexamining, and transforming the initial "fantastic" denial. A lack of the last farewell and the funeral rites slows down the onset of the second phase: the processing of mourning. The dying person enters "another world," and a new life begins. Funeral rites mark the time of the passage. The deceased is still present; he/she still has a body that must be prepared for spiritual birth. Funeral rites are due. In archaic or tribal societies, the rite has the power of protection from the severe sanctions that the deceased and all ancestors can unleash against the survivors. The deceased must be "reassembled," washed, and dressed in the best clothes. They must be "touched" and "seen" [18]. Only in this way can temporal distancing begin.

The coronavirus disease (COVID-19) pandemic has precipitated the experience of severe, persistent, and disabling pain such as prolonged grief disorder or persistent complex bereavement disorder. Eisma and Tamminga [18] demonstrated that higher grief levels are experienced after COVID-19-related bereavement than natural bereavement. The grieving process may have processes that are different from those in the non-COVID period. Their study, conducted among a sample of 1600 bereaved adults (before or during the pandemic), demonstrated that no significant differences emerged between grief levels in the participants. However, the authors concluded that bereavement during the pandemic was associated with greater levels of grief compared to the previous period ($d = 0.17$, $d = 0.18$), suggesting that coping with loss may be more difficult during this health crisis.

However, such experiences may be experienced differently in different cultures, and there may be variations and differences in their expression between cultures. Please refer to the work of Hilberdink et al.'s group for further information on these aspects. Our observations focused above all on the experiential knowledge of the Italian population [19].

Moving away from the time of the deceased person allows the mourner to regain possession of their time, avoiding becoming bogged down in an unreal, past time that does not exist and will never return. The survivors move away from the deceased (they distance themselves without completely disappearing, at least over a long period). "Therefore, it is a question of giving the dead person, in new condition, a life that is a guarantee of life for the group to which she/he belongs: in short, a life in which there is (no longer) death" [20]. Fachinelli claims that funeral rites are fundamental, as they establish the "incorporation" process of the deceased. Thus, the deceased becomes a member, inspiration, and teacher of his community and his family, becoming eternal. The absence of the funeral parlor deprives the survivors of the incorporation process and, therefore, of the temporal distancing.

The person no longer there becomes a point of reference, a pedagogical passage. They become an archetype. Already in ancient Greece, it was customary to remember the fallen in steles positioned along the streets traveled by students to

reach the gymnasium, the place dedicated to their training as citizens. The fallen were, overall, examples to look at and, if necessary, models to emulate, in a word, archetypes of virtue, where it was easy and instinctive to identify [21]. The unusual mourning process during COVID-19 challenges the usual process of coping with loss. The absence of the funeral rite and coping during COVID-19 affects the grieving process [22, 23].

From a psychopathological point of view, studies are emerging that highlight the increase in psychiatric disorders in family members who were unable to “accompany” their loved ones with the funeral rites [24, 25]. They must go through the grieving process without a body to mourn and cannot receive warmth and affection from others. “It is reasonable to expect that a considerable portion of these people will not be able to overcome these traumas adaptively and, as a result, may face the development of psychopathological reactions and pathological pain, including complicated bereavement (CB)” [26].

The consequences of “body-less” bereavement in survivors of people who died during the COVID-19 pandemic may be like posttraumatic stress disorder (PTSD) [27]. The suffering of family members already originates from the days of the hospitalization of their loved ones.

This anguish is already experienced during hospitalization, without being able to comfort one’s relative and without being able to witness the last moments of his or her life. The thought of the sealed coffin and the suspension of funeral rites empties the farewell rituals of symbolic meaning and incorporation of the loved one. All this makes it even more difficult to accept the loss.

The attention sustained to help those who experience the loss of a loved one, physically separated from the deceased in the burial and funeral ritual, represents a fundamental part of the human cultural tradition. The need to support this ritual highlights the interruption and deconstruction of the meaning of death [28]. The essential nature of the process in cases where the absence of the funeral rite becomes the presence of a break in the structural scaffolding of social, cultural, and religious norms determines the repercussions on the grieving process. However, human adaptation to loss and death consists of survival, adaptation, and a “mix of scar tissue and renewed growth” [29].

The psychological effects secondary to losing a loved one can be profound, but they can vary significantly in duration and intensity [3]. Predicting the effects of mourning is complex and affected by the different interpretations and descriptions that the scientific literature has reported on the subject. The long-term effects of losing someone, and the seemingly transient effects for others, have been a source of dismay for writers, doctors, ministers, and scientists. Following the loss of a loved one, the emotional shock and a sense of disbelief can delay an immediate awareness of the event. When the emotional shock wears off, preeminent experienced emotions can be a potent mix of anxiety, depression, anger, helplessness, and guilt. Simplifying the discussion, as Siggins puts it, “Everything reflects the response to the deceased’s inability to protect himself or close relationships from the reality of death and that, after

death, it is not even possible to maintain the pre-loss bond with those whom we love” [30].

According to Siggins, our inability to control destiny and the definitive separation of contact with the loved one simultaneously attacks two foundations of human agency: the desire to be with meaningful relationships and the desire to be able to influence the surrounding environment [28].

Unlike the dominant Western thought, Neimeyer et al. [31] states that pain/mourning is not primarily an internal, intrapsychic process but an “intricately” social process since mourning generally seeks meaning in this unexpected transition that is not only personal and family-oriented but, above all, within the social and cultural context. A model of the social construction of mourning is thus supported, in which the narrative processes through which meanings are identified, appropriated, or assembled. They occur within the intrapsychic world and, above all, among the spectators/actors of the event (the participants in the funeral ritual). In this perspective, indicated by Neimeyer, mourning is a “positioned” interpretative and communicative activity charged with establishing the meaning of the life and death of the deceased, as well as the postmortem status of the bereaved person into the broader community, that is interested in the loss. Deprived of the “loved object” and the ability to influence the world in which one lives, it is no wonder that losing a loved one devastates the survivor.

The rituality of the funeral can represent a shared narrative and a community representation of a canvas that absolves and contains the psychological dislocation of the shattering of the routine of the life of the surviving person. It is represented through the “fascination” of mourning [32, 33].

“An uncertain perspective relating to the goods of life” considering them “evils to be faced with realistically oriented behavior”.... “But the most serious evil occurs when the same possibility of behaving is undermined, and when the sense of domination intervenes to signal this risk of a dark fascinating force, which leaves the individual presence without margin of autonomy” [33].

Through ritual and the development of shared forms of communication, such as collective crying, social culture controls the pain and suffering from loss through all the stages of mourning and controls despair. Siggins also remembers that “as a result of the dislocation produced by the loss, bereavement is immersed in an emotional crisis. The routine life has been displaced” [30]. All of this highlights a breakdown of physiological homeostasis through sleep and nutrition disorders, difficulty concentrating, and conceptual deficits [34].

The funeral structure’s representation is how one remembers, “internalizes,” and maintains the continuity of the psychological involvement with the deceased, who is at the center of the mourning structure [35].

In this way, people remember, imagine, accompany, and separate from the loved one in an “*affascinato* (fascinated)” and symbolic rite of the future elaboration of mourning. Thus, the funeral rite represents the story’s structure and the realization of the psychological path that will lead to the definitive grieving process [32]. The absence of this

“scenographic” representation risks reverberating uninterrupted the natural psychological path of the reelaboration of grief, preventing the person from reaching the acceptance stage. The consequence of emotional and experiential experiences in this highly critical period may be the exacerbation or increase of mental disorders, exacerbated by fear, self-isolation, and physical distancing, which can lead to an increase in suicidal phenomena [36–38].

Finally, psychopathological evidence, closely linked to complicated bereavement, and often in comorbidities, is posttraumatic stress disorder (PTSD), especially in cases where the disappearance of the loved one occurs due to violent death or with dynamics that do not respond to moral and ethical social standards and expectations [27].

This happened during the early stages of the COVID-19 pandemic when many family members could not accompany their loved ones on “the last trip” [35, 39]. Given the social restrictions and economic uncertainties during the COVID-19 pandemic, many people were experiencing a sense of lack of control over their life [40, 41].

The appearance of symptomatology is characterized by unpleasant intrusive memories related to the event, cognitive and behavioral avoidance, a marked alteration of arousal, negative alterations of thoughts and emotions, such as negative beliefs about oneself and others, and a sense of guilt, and the inability to experience positive emotions can manifest itself in the family members of loved ones who have suffered death with the characteristics above [40]. Difficulty may be a slower but not necessarily more intense process. In these cases, various therapeutic strategies have been implemented, such as the design of a cognitive behavioral intervention that uses strategies such as emotional spillover, such as systematic desensitization, and in vivo exposures [42, 43]. The cognitive strategy, on the other hand, must be aimed at modifying the convictions of guilt and related maladaptive cognitive schemes, as well as at reconstructing a narrative perspective that returns a story of the resolute trauma, a so-called “solution-focused” strategy, contrary to the so-called “problem-focused” one [43, 44].

However, it must be underlined the substantial difference in the impact of mourning during COVID-19 and that of the psychological burden determined by the pandemic itself on the general population. In particular, numerous studies have been carried out which have highlighted a significant increase in posttraumatic stress disorder, anxiety, and depressive disorders.

There is extensive literature to support this evidence, above all regarding groups of individuals more vulnerable to the negative consequences of the COVID-19 pandemic on psychopathology [45].

The effects of the COVID-19 quarantine period with the consequent social isolation have led to important consequences for patients suffering from substance use disorders (SUDs) and/or behavioral addictions [46]. The presence of a moderate psychopathological burden correlated to poor quality of life and low craving scores represented the main outcomes. A study by Martinotti et al.'s group reported moderate rates of depression (22.9%), anxiety (30.1%), irritability (31.6%), and posttraumatic stress (5.4%) symptoms

in 153 addicted patients [47]. Furthermore, the study suggests that it underlines the link between craving and quality of life, defined as the perception that the individual has regarding the effects that an illness, and its treatment, have on his physical, emotional, and social well-being. The authors indicate, in conclusion, the need to improve the quality of life, for example, through physical exercise can play an important role in reducing craving and, therefore, abusive behaviors, relapses, and abandonment of treatment [48].

During the period of social isolation and interruption of interpersonal relationships in person, they led to an increase in the use of online tools to communicate [49]. A cross-sectional study conducted by the research group coordinated by Burkauskas et al. [50] evaluated online behaviors and their association with a series of psychological and behavioral factors during the COVID-19 pandemic. This international multicenter study involved 2223 participants ($M = 33$ years, $SD = 11$), 70% of whom were women.

The most performed activities included social networking, streaming, and general browsing. A strong association between these online behaviors and appearance anxiety, self-compassion, and the use of performance-enhancing drugs (IPEDs) was found. The study also highlighted significant cross-cultural differences in the amount of time spent online during the initial stages of the COVID-19 pandemic. The strongest effects were observed for general Internet surfing, streaming, social networking, and pornography use.

The complexity of the phenomenon of “without-body bereavement” that has exploded during the COVID-19 pandemic requires further evaluations that bring together experiences across different cultures. The psychological processes of mourning in this condition could help better understand the problem and implement therapeutic strategies to support people who have lost a loved one.

2.1. Potential Psychotherapeutic Treatments. Various therapeutic strategies have been proposed and used to help survivors of the death of loved ones. These strategies could also support people who have experienced “body-less grief” [51].

The use of psychotherapy can play a decisive role in the treatment of the psychological consequences of survivors from the trauma of the COVID-19 pandemic [52]. Among the various interventions, psychotherapy with crisis intervention has an important role [53]. It is a form of problem-solving, solution-focused, trauma-informed brief psychotherapy that uses an individual or systemic/family-centered approach. Another approach used by survivors of family members who died from COVID-19 is mindfulness. This therapeutic approach may be suitable for responding to current mental health challenges and managing the short- and long-term mental health impact of the pandemic itself and measures to mitigate it [54]. The practice of mindfulness facilitates the acceptance of difficult and painful experiences, allowing us to perceive them without coloring them with judgment, helping to let them go and acquiring new experiential and behavioral possibilities.

Mindfulness can reduce stress and emotional exhaustion, increase mindful awareness, and increase feelings of

personal accomplishment after the intervention. A study conducted by Osman et al. showed that central themes such as loss of control and a sense of helplessness due to COVID-19 were observed in the preintervention analysis. However, in the analysis after mindfulness, a sense of greater acquired control and empowerment through greater awareness was highlighted [55].

Another psychotherapeutic intervention used for the management of bereavement pain, and in particular, in survivors of family members, caregivers, or friends of people who died from COVID-19 during the pandemic, is CBT (cognitive behavioral therapy). It is an effective psychotherapy in the treatment of trauma as it helps patients reevaluate their thinking patterns, allowing them to identify thought distortions [56]. Wahlund et al. [57] conducted a randomized controlled trial on a brief online cognitive behavioral therapy (CBT) for dysfunctional worry related to COVID-19. Another study that delivered face-to-face CBT sessions also reported reductions in depression, anxiety, and stress [58]. A recent study by Penington et al.'s group [59] showed the effectiveness of Internet cognitive therapy for posttraumatic stress disorder (iCT-PTSD) with an excellent cost/benefit ratio and could be considered for clinical implementation.

Eye movement desensitization and reprocessing (EMDR) is another psychotherapeutic approach that can be used to alleviate psychological symptoms during COVID-19. This intervention is aimed at alleviating the discomfort associated with traumatic memories. It involves attention to three periods, past, present, and future, particularly to disturbing memories of the past and related events [60]. During the restrictions and social isolation, the use of online therapies was carried out. With EMDR, qualitative studies have also shed light on its feasibility and online accessibility during the pandemic. This approach offers an alternative tool for reducing trauma symptoms [61]. Another interesting therapeutic tool evaluated during the COVID-19 pandemic was group psychotherapy. Despite the operational difficulties in implementing them during the restriction period, some studies have highlighted their effectiveness [62]. A study evaluated remote dyadic developmental psychotherapy in families [63] during COVID-19 pandemic. It is a family-based therapy for adopted children that aims to achieve a secure attachment between the child and the parent.

Psychosocial and behavioral interventions have proven effective on depressive and anxiety symptoms during the COVID-19 pandemic. One review showed that these therapeutic strategies had statistically moderate effects on depression and more significant effects on anxiety. Exercise and cognitive behavioral therapy were found to be the most effective treatments with moderate-to-large effect sizes for depression and anxiety during the outbreak of COVID-19. The results suggest that cognitive behavioral therapy and physical exercise intervention are significantly effective for depression and anxiety related to the COVID-19 pandemic regardless of the delivery modes, and gender differences should be taken into consideration for better implementation of interventions in clinical and community practice [64].

Therefore, overall, the clinics have numerous therapeutic tools available that can be of help to people who are suffering from psychological disorders because of the loss of a loved one.

3. Bereavement and Modulation of the Emotional Areas

The development of neuroscience has led to a profound change in the methodology of scientific research on the study of any neuronal correlates that underlie the intra- and extrapsychic processes linked to the modulation of emotions and, consequently, of bereavement [65–67].

Indeed, neuroscientific research has focused its gaze on the main tasks of mourning by simplifying them in reducing the frequency and intensity of three cardinal symptoms: intrusive thoughts of the deceased, sadness, and a desire to reunite with the deceased [43].

While in acute and non-“pathological” bereavement, these aspects are considered normal, and recovery is the ability to tolerate the deceased’s memories without symptom induction, the presence of symptom behavior within 12 months of the mourning episode can lead to a diagnosis of “persistent complex bereavement disorder (PCBD).”

This diagnosis is still under research in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th edition) [68], while it is fully recognized as prolonged pain disorder (PGD) in the 11th revision of the International Classification of Diseases [69, 70], which develops in between 7% and 22% of bereaved people [45].

In 1961, in an article published in *Psychosomatic Medicine*, Engel [71] wrote: “Is Grief a Disease? A Challenge for Medical Research.” He suggested that grief was a legitimate topic for medical research. This article has indicated the way forward in the search for the correlation of the “biological, physiological, and psychological” mechanisms linked to bereavement.

To underline the clinical relevance of bereavement in the developmental and differential evaluation of pathological affective states, the NIMH Research Domain Criteria (RDoC) Initiative [72] has included bereavement among the fundamental endophenotypes for the characterization of related psychopathology. The problem raised by this inclusion is the emphasis on emotions and psychological experiences following the loss of a loved one in the context of emotional disturbances.

Several authors have begun to develop research procedures through functional neuroimaging studies to evaluate the neuropsychological processes associated with the mourning process. Pioneering but methodologically criticized was the work of Gündel et al. [73], who evaluated brain image scans in eight women who were shown photographs of their deceased loved ones, compared with images of unknown people (neutral images). For the first time, the results showed that three brain regions are activated independently: the posterior cingulate cortex, the superior/medial frontal gyrus, and the cerebellum. Grief/bereavement is also mediated by a neuronal network that contributes to the processing of affectivity, mentalization, the recall of

episodic memory, the processing of familiar faces, and the modulation and coordination of these functions [74, 75]. These results highlighted a more general phenomenon characterized by neural activations shared between direct intrapsychic direct experience and the self's experiential evaluation of the other. Furthermore, the results are consistent with the observations made by studies on the neuroanatomical correlates of cognition.

In a group of brain areas collectively referred to as the "mirror neuron system" areas, previous neurophysiological recordings of motor and sensory neurons had provided decisive evidence for shared motor activities [76].

According to Levenson et al.'s model [77] of "pain elicitation," the sensory inputs are constantly monitored by phylogenetically older brain centers (amygdala, insula, and anterior cingulate cortex) in a rapid assessment process designed to detect inputs that are particularly critical for individual well-being and survival. Emotions can interrupt the homeostatic activity of the brain network and quickly reallocate the resources necessary to face challenges, threats, and opportunities. The grieving mothers performed worse than controls on neuropsychological learning, memory, and executive function tests, linked with grief severity [78].

From this evolutionary/functional point of view, subjective emotional experiences would not constitute the central nucleus of emotions. However, they would emerge from the process of afferent information from sensory stimuli. The working hypothesis on the involvement of these same brain areas in the modulation of shared emotional expressions has prompted scientific research to try to identify their anatomical correlates.

It was also highlighted that the sharing of neuronal activations plays a functional role in motor activities and the emotional expression of shared activities (affective, emotional, etc.). A study by Rütgen et al. [79] showed that the induction of a placebo effect compared with a pain-evoking stimulus affects individuals' ability to empathize with others, simultaneously showing a reduction in the involvement of cortical areas associated with the affective component of pain. These results have led researchers to search for neuropsychological correlates in bereavement processing [80].

We underline a study conducted by the German group of Labek et al. [81], which compared iconographic representations of mourning (such as images, drawings, and paintings) and depictions of neutral images in a group of 19 subjects. The results revealed significant bilateral activations in the posterior superior temporal gyrus extending deep into the Sylvian fissure, reaching the parietal operculum. The stimulation of these structures is accompanied by more circumscribed activity in the supramarginal and postcentral gyrus. At the same time, in the medial brain wall, this contrast is associated with more significant activity in the mid/posterior cingulate and the cuneus/precuneus. The same study also highlighted an essential differential activation in one of the most ancient phylogenetic areas, the amygdala, during the presentation of images associated with mourning. The role of the amygdala in the origin of negative emotions, such as fear and anxiety, has been confirmed by several studies [82, 83].

Since the amygdala is a place where the nerve activities produced by both sound stimuli ("ritual crying", for example) and noxious stimuli (painful reenactments) can be processed, it is reasonable to assume that the amygdala is also the location where the stimuli that generate fear are learned [84].

These results have led to the hypothesis that the amygdala modulates the associations between neutral sensory stimuli and stimuli with reinforcing qualities and the orbital and medial prefrontal cortex. These territories of the prefrontal cortex associate all types of sensory information by integrating various signals related to the experience.

Finally, the amygdala, with its connections to the prefrontal cortex and the basal ganglia, influences the selection and initiation of behaviors aimed at obtaining gratification or avoiding punishment. Some neuroimaging studies have confirmed a significant interaction between exposure to images/stimuli associated with death and the activation of brain areas, including the amygdala, cerebellum, and hippocampus, in patients with complicated bereavement disorder. People with this disorder have distinct emotional processing for different types of emotional stimuli. An intense amygdala and middle frontal gyrus activation response was recorded in subjects with this disorder who were exposed to images evocative of death versus images evocative of pleasant images. Other studies have confirmed the activation of the nucleus accumbens in complicated bereavement [85]. Romantic love imaging studies, in which fRMN scans of people subjected to viewing images of loved ones and neutral photos are compared, have confirmed the activation of these brain regions [86, 87].

Since the activation of the nucleus accumbens is elevated when images of loved ones are shown [88], as well as in those with complicated bereavement, a plausible hypothesis is that the activation of this region in response to the memory of the deceased person decreases over time in uncomplicated bereavement, just as the memory of the attachment figure no longer generates an intense desire response [89, 90]. Instead, the high activation of the nucleus accumbens remains high in complicated mourning, and it is associated with a continuous desire for the deceased loved one. The nucleus accumbens could therefore have a fundamental role in the genesis of attachment to child parental figures [91, 92].

However, in a study by Schneck et al.'s group [65], it was observed through images from brain scans obtained with fMRI that unconscious processing self-generated by the loss of a loved one is correlated with reduced severity of pain. This activity, supported by a cognitive-social neural architecture, would have the task of accompanying and directing the adaptation of the survivor to the loss through an adequate mourning process. Participants in the study (29 subjects who had experienced the loss of a loved one in the previous 14 months) underwent, during the scan, words (content) and images (context) through the attribution of attention to the deceased. When the content of the loss processing is perceptually driven, external stimulation may fail to incorporate the specific needs of the bereaved individual. The brain regions activated by the processing

of unconscious thought self-generated by external stimuli associated with the loss are consistent with the role of adaptation and the modification of the representation of the mourning process.

The brain regions involved in the social processing of information and social abstraction, as well as the temporoparietal junction, the superior parietal lobule, and the lateral occipital cortex, can modify and update the “mnemonic” representation of the deceased. In contrast, the dorsolateral prefrontal cortex can exclude this painful processing from the unconscious. Ultimately, these regions can reflect neural reactions and the regulation of representations of the deceased.

From the description of these neurobiological dynamics associated with the processing of mourning, probably, these mechanisms may also be evident in people who have experienced the death of a loved one without being able to participate in the cultural rituals of their funeral. These mechanisms could be self-reinforcing and determine an accentuation of the psychological experiences experienced. There is a need for further studies that can confirm these assumptions.

4. Conclusions

The study of psychological and neurobiological phenomena associated with the emotional process of “normal” and complicated mourning has undergone a significant notional push in recent years with the advent of neuroscience [67]. The loss of a loved one is inevitably a harrowing event, and it is accompanied by a series of highly emotional experiential pathways. Social evolution has developed shared and participatory paths for the family and the entire community, allowing a model or scheme of the mourning process through the funeral rite. Extraordinary or sudden dramatic and tragic events, such as the coronavirus pandemic, can negate this process of sharing and participation. The failure to experiment with the funeral and the absence of a last farewell to a loved one can interrupt standard processing and neurobiological modulation, as evidenced by recent neuroimaging research [93].

The hope of the last farewell, the anguish of the last moments of the loved one’s life in an unshared pain, the guilt and anger towards the absent loved one, and the failure to celebrate the funeral rituals risk reverberating in an uninterrupted circuit of anxiety, painful recall, and emotional repercussion in the survivor.

Psychological and psychotherapeutic intervention strategies for remodeling pain/bereavement must be immediately undertaken to avoid chronicity towards a complicated bereavement process with the loss of homeostasis in the network of brain circuits.

Data Availability

The primary data used to support the findings of this study are available with the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

Authors’ Contributions

FF and BS contributed to the conceptualization. FF, AC, WDN, MT, and GT wrote the original draft preparation. FF, BS, and GT wrote, reviewed, and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

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