Near-death experiences: clinical implications

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Abstract

Background: When some people come close to death, they report a profound experience of transcending the physical world that often leads to spiritual transformation. These "near-death experiences" (NDEs) are relevant to clinicians because they lead to changes in beliefs, attitudes, and values; they may be mistaken for psychopathological states, although producing different sequelae requiring different therapeutic approaches; and because they may enhance our understanding of consciousness. **Objectives:** This literature review examined the evidences regarding explanations proposed to explain NDEs, including expectation, birth memories, altered blood gases, toxic or metabolic hallucinations, and neurochemical and neuroanatomical models. **Methods:** The literature on NDEs of the past 30 years was examined comprehensively, including medical, nursing, psychological, and sociological databases. **Results:** NDEs typically produce positive changes in attitudes, beliefs, and values, but may also lead to interpersonal and intrapsychic problems. These problems have been compared to various mental disorders, but are distinguishable from them. Various therapeutic strategies have been proposed to help experiencers with problematic aftereffects, but have not been tested yet. **Conclusions:** The mystical consciousness and higher mental activity during NDEs, when the brain is severely impaired, challenge current models of brain/mind interaction and may occasionally lead to more complete models for the understanding of consciousness.

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When some people come close to death, they go through a profound experience in which they believe they leave their bodies and enter some other realm or dimension, transcending the boundaries of the ego and the ordinary confines of time and space. Such experiences had been described sporadically in the medical literature since the 19th century (Greyson, 1998a) and had been identified as a discrete syndrome more than a century ago (Heim, 1892). Moody (1975) introduced the term *near-death experiences* (NDEs) for these phenomena, and outlined 15 characteristic features commonly reported by American survivors. These 15 features, which have come to define near-death experiences both among the academic community and in the popular imagination, include ineffability, hearing the news of one's death, overwhelming feelings of peace, hearing a noise, seeing a tunnel, a sensation of being out of the body, meeting nonphysical beings, a "Being of Light," a life review, a border or point of no return, coming back to life, telling others about the experience, effects on lives, new views of death, and corroboration of knowledge not acquired through normal perception (Moody, 1975).

Recent research suggests that near-death experiences are reported by 12% to 18% of cardiac arrest survivors (Greyson, 2003a; Parnia et al., 2001; van Lommel et al., 2001). Near-death experiences are important to physicians for three reasons. First, NDE precipitate pervasive and durable changes in beliefs, attitudes, and values. Second, they may be confused with psychopathological states, yet have profoundly different sequelae requiring different therapeutic approaches (Greyson, 1997a, 2003b). Third, clarification of their mechanisms may enhance our understanding of consciousness and its relation to brain function (Greyson, 1998b; Parnia and Fenwick, 2002).

One of the problems with research into NDEs is that, with a few notable exceptions, almost all NDE research has been retrospective, raising the question of the reliability of the experiencer's memories (French, 2001). Embellishment of near-death experience accounts, if it occurred, would diminish their importance and theoretical challenge. Autobiographical memories are subject to distortion over years, and memories of unusual or traumatic events may be particularly unreliable as a

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result of emotional influences. To test the reliability of NDE accounts, Greyson (2006, in press) administered the NDE Scale, a quantitative measure of near-death experiences, to the same experiencers on two occasions about 20 years apart, in the early 1980s and then again in the 2000s. Contrary to claims that NDE accounts are embellished over time, there were no statistically significant differences between the NDE Scale scores on the two administrations, and changes in the NDE Scale score were not significantly associated with the elapsed time interval. This evidence that accounts of near-death experiences are reliable over a period of two decades supports the validity of studies of such experiences that had occurred years before their investigation.

Explanatory models

Researchers have identified very few personal traits or variables that can predict who will have an NDE or what kind of NDE a person may have. Retrospective studies of near-death experiencers have shown them collectively to be psychologically healthy individuals who do not differ from comparison groups in age, gender, race, religion, religiosity, or mental health (Gabbard and Twemlow, 1984; Greyson, 1991; Irwin, 1985; Ring, 1980; Sabom, 1982). Near-death experiencers are indistinguishable from others in intelligence, neuroticism, extroversion, trait and state anxiety, and relevant Rorschach measures (Locke and Shontz, 1983). However, some studies have suggested that NDErs tend to be good hypnotic subjects, remember their dreams more often, and are adept at using mental imagery (Irwin, 1985), and tend to acknowledge significantly more childhood trauma and resultant dissociative tendencies (Ring, 1992) than others. It is not clear, however, whether these distinguishing personal traits are the results of having had an NDE or whether people who already have those characteristics are more prone to have NDEs when they come close to death.

Expectancy

A plausible hypothesis postulates that near-death experiences are products of the imagination, constructed from one's personal and cultural expectations, to protect oneself from facing the threat of death (Greyson, 1983b; Rodin, 1980). Comparisons of NDE accounts from different cultures suggest that prior beliefs have some influence on the kind of experience a person will report following a close brush with death (Kellehear, 1993). However, it is unclear whether cultural beliefs affect the experience itself, or merely its recall and retelling, or the investigators' collection of the accounts.

Some data contradict the expectancy hypothesis. Individuals often report experiences that conflict with their specific religious and personal expectations of death (Ring, 1984). Furthermore, people who had no prior knowledge about NDEs describe the same kinds of experiences as do people who are quite familiar with the phenomenon, and the knowledge individuals had about NDEs previously does not seem to influence the details of their own experiences (Greyson, 1991; Greyson and Stevenson, 1980; Ring, 1980; Sabom, 1982). Experiences that were reported before 1975, when Moody's first book coined the term NDE and made it a well-known phenomenon, do not differ from those that were reported since that date (Athappilly et al., 2006), and young children, who are less likely to have developed expectations about death, report NDEs with features similar to those of adults (Bush, 1983; Gabbard and Twemlow, 1984; Herzog and Herrin, 1985; Morse et al., 1985; Serdahely, 1990). Even the cross-cultural differences observed suggest that it is not the core experience that differs but the ways in which people interpret what they have experienced. There seems to be an underlying core experience that is cast in the images, concepts, and symbols available to the individual (Roberts and Owen, 1988).

Birth memories

Sagan (1979), among others, interpreted NDEs, with their dark tunnel, bright light, and going to another realm, as a memory of one's birth. However, many NDEs do not contain the features of a tunnel or a light, and many other common features of NDEs are not accounted for by these "birth" models. Furthermore, newborns lack the visual acuity, spatial stability of their visual images, mental alertness, and cortical coding capacity to register memories of the birth experience (Becker, 1982). Finally, reports of out-of-body experiences (OBEs) and passing through a tunnel to another realm are equally common among persons born by Caesarean section and those born by normal vaginal delivery (Blackmore, 1983), contradicting the prediction of the birth-memory model that such experiences should be rare following Caesarean births.

Altered blood gases

A common assumption has been that anoxia or hypoxia, as a common final pathway to brain death, must be implicated in NDEs (Blackmore, 1993; Rodin, 1980). However, NDEs occur without anoxia or hypoxia, as in non-life-threatening illnesses and near-accidents. Furthermore, the experiential phenomena associated with hypoxia are only superficially similar to NDEs. Whinnery (1997) compared NDEs to "dreamlets" occurring during the brief periods of unconsciousness induced by rapid acceleration in fighter pilots, although he noted that his model does not explain all near-death phenomena. The major features acceleration-induced hypoxia shares with NDEs are tunnel vision and bright lights, floating sensations, pleasurable sensations, brief

fragmented visual images, and rarely a sense of leaving the body. In contrast to NDE, these "dreamlets" include visions of living people but never dead people, and no life review or panoramic memory (Whinnery, 1997); and NDEs do not include typical hypoxic symptoms of myoclonic convulsions, retrograde amnesia for events prior to unconsciousness, automatic movements, memory effects, tingling in extremities and around the mouth, confusion and disorientation upon awakening, and periawakening paralysis. Hypoxia or anoxia generally produces idiosyncratic, frightening hallucinations, and leads to agitation and belligerence, quite unlike the peaceful NDE with consistent, universal features. Furthermore, studies of people near death have shown that those who have NDEs do not have lower oxygen levels than those who do not have NDEs (Sabom, 1982; van Lommel et al., 2001).

Other authors have suggested that hypercarbia may contribute to NDEs (Jansen, 1997; Morse et al., 1989). However, the NDE-like features that have been reported in hypercarbia, such as a sense of leaving the body, bright light, dark void, memory revival, and sense of peace, are rare and isolated. Furthermore, there have been reports of NDE in patients in whom carbon dioxide levels were not elevated (Morse et al., 1989; Parnia et al., 2001; Sabom, 1982). Finally, if anoxia and hypercarbia played an important role in NDEs, NDEs should be much more common than they are in patients with cardiac arrest (Kelly et al., 2006; van Lommel et al., 2001).

Toxic or metabolic hallucinations

Because near-death experiencers report events that others around them cannot see or experience, it is plausible to hypothesize that NDEs are elaborate hallucinations produced either by medications given to dying patients or by metabolic disturbances or brain malfunctions as a person approaches death. However, many NDEs are recounted by individuals who had no metabolic or organic malfunctions that might have caused hallucinations, and patients who receive medications in fact report fewer NDEs than do patients who receive no medication (Greyson, 1990; Osis and Haraldsson, 1977; Sabom, 1982).

Furthermore, organic brain malfunctions generally produce clouded thinking, irritability, fear, belligerence, and idiosyncratic visions, quite unlike the exceptionally clear thinking, peacefulness, calmness, and predictable content that typify the NDE. Visions in patients with delirium are generally of living persons, whereas those of patients with a clear sensorium as they approached death are almost invariably of deceased persons (Osis and Haraldsson, 1977). Patients who were febrile or anoxic when near death report fewer NDEs and less elaborate experiences than do patients who remain drug-free and are neither febrile nor anoxic (Osis and Haraldsson, 1977; Ring, 1980; Sabom, 1982). Such findings may suggest either that drug- or metabolically-induced delirium, rather than causing NDEs, in fact inhibits them from occurring or that delirious patients tend not to recall their experiences upon recovery (Kelly et al., 2006).

Neurochemistry

NDEs have been speculatively attributed to a number of neurotransmitters in the brain, most frequently endorphins or other endogenous opioids released under stress (Blackmore, 1993; Carr, 1982; Saavedra-Aguilar and Gómez-Jeria, 1989). However, endorphins produce pain relief and a sense of well-being that persists for hours, whereas the peace and cessation of pain in the NDE are brief, often only a few seconds.

A more comprehensive model suggests that a ketamine-like endogenous neuroprotective agent (hypothesized but not yet found to exist) may be released in conditions of stress, acting on N-methyl-D-aspartate (NMDA) receptors. Ketamine can produce feelings of being out of the body and sensations as of travel through a dark tunnel into light, believing that one has died, or communing with God (Jansen, 1997). However, ketamine experiences usually involve bizarre imagery and are frightening and recognized as illusions (Fenwick, 1997), whereas NDErs usually find their experiences blissful and "realer than real."

Other models have implicated serotonin, adrenaline, vasopressin, and glutamate (Jansen, 1997; Morse et al., 1989; Saavedra-Aguilar and Gómez-Jeria, 1989). These speculations are based on hypothetical endogenous chemicals or effects that have not been shown to exist, and are not supported by any empirical data.

Neuroanatomy

NDEs have also been speculatively linked to a number of anatomic locations in the brain, most often the right temporal lobe (Morse et al., 1989; Saavedra-Aguilar and Gómez-Jeria, 1989), based on purported similarity of NDEs to temporal lobe seizure phenomena. However, NDE-like phenomena are almost never seen in temporal lobe seizures (Devinsky et al., 1989; Rodin, 1989), and electrical stimulation of the temporal lobes may elicit fragmented bits of music, isolated and repetitive scenes that seemed familiar, hearing voices, experiencing fear or other negative emotions, or seeing bizarre, dream-like imagery, in addition to a wide range of somatic sensations that are never reported in NDEs (Gloor, 1990; Horowitz and Adams, 1970). Reports of phenomena induced by transcranial magnetic stimulation of the temporal lobes that bear vague resemblance to NDE-like phenomena (Persinger, 1994) have failed attempts at replication and have been attributed to suggestion (Granqvist et al., 2005).

Other neuroscientists have argued for involvement of the frontal lobe attention area, the parietal lobe orientation area, the thalamus, the hypothalamus, the

amygdala, and the hippocampus, and Reissner's fiber in the central canal of the spinal cord (Carr, 1982; Jourdan, 1994; Saavedra-Aguilar and Gómez-Jeria, 1989; Wile, 1994). These putative neurological mechanisms, for which there is little if any empirical evidence, may suggest brain pathways through which NDEs are expressed or interpreted, but do not necessarily imply causal mechanisms (Kelly et al., 2006).

Multifactorial models

Despite the shaky foundations for assertions that NDEs are similar to experiences associated with abnormal temporal lobe activity, anoxia, ketamine, or endorphins, several multifactorial theories, based on these foundations, combine these putative causes at will to account for whatever constellation of features is observed in any given NDE. For example, it has been argued that sensory isolation or bodily malfunction lead a person to feel detached from the body; then endorphins lead to analgesia and feelings of peace; then with increasing anoxia, the visual system may be compromised, producing the illusion of a tunnel and lights, and temporal lobe seizures stimulate a life review; while visions of deceased persons and of another realm are simply hallucinations produced by expectations of what will happen at death (Blackmore, 1993; Saavedra-Aguilar and Gómez-Jeria, 1989). Although physiological, psychological, and sociocultural factors may indeed interact in complicated ways in conjunction with NDEs, theories proposed thus far consist largely of unsupported speculations about what *might* be happening during an NDE. None of the proposed neurophysiological mechanisms have been *shown* to occur in NDEs, and some, such as the role of expectation or the presence and effects of anoxia, are inconsistent with the data we do have (Kelly et al., 2006). Even if supporting data were found for some of these physiological models for NDEs, they would be philosophically ambiguous: Correlating a brain state with an experience does not necessarily imply that brain states cause the experience; the brain state may alternatively allow access to or simply reflect the experience, an interpretation proposed by some researchers who have championed neurophysiological studies of NDEs (Kelly at al., 2006).

Effects of near-death experiences

Positive effects

Regardless of their cause, NDEs can permanently and dramatically alter the individual experiencer's attitudes, beliefs, and values. The literature on the aftereffects of NDEs has focused on the beneficial personal transformations that often follow. Aftereffects typically reported include increases in spirituality, concern for others, and appreciation of life, and decreases in fear of death, materialism, and competitiveness (Sabom, 1982).

In studies comparing the experiencers' attitudes before and after their NDE, they report reduced fear of death, a sense of relative invulnerability, a feeling of special importance or destiny, and a strengthened belief in *postmortem* existence (Noyes, 1980). They also report greater appreciation for life, a renewed sense of purpose, greater confidence and flexibility in coping with life's vicissitudes, increased value of love and service and decreased concern with personal status and material possessions, greater compassion for others, a heightened sense of spiritual purpose, and a greatly reduced fear of death (Ring, 1980, 1984). NDEs lead to significant positive changes in the purpose and meaning of life and in death acceptance (Bauer, 1985). These profound changes in attitudes and behavior have been corroborated in long-term studies of near-death experiencers and in interviews with their significant others (Ring, 1984).

Compared to non-experiencers, NDErs report greatly increased concern for others, decreased fear of death, and increased belief in an afterlife, increased religious interest and feeling, and lessened desire for material success and approval of others (Flynn, 1982). Compared to persons who had come close to death but not had NDEs, experiencers place significantly lower value on social status, professional and material success, and fame (Greyson, 1983a), and find death less threatening (Greyson, 1992).

Recurrent auditory hallucinations

Following their NDEs, some experiencers report continued "internal voices" that are experienced as real but are not heard by others (Greyson, 1993b, 1997a; Liester, 1998; Moody, 1975; Ring, 1980), comparable to the benign auditory hallucinations acknowledged by between 10% and 47% of healthy persons (Bentall, 2000; Greyson and Liester, 2004).

In a study comparing NDErs' "internal voices" and auditory hallucinations of psychotic patients, 97% of the near-death experiencers reported some positive attitude toward their auditory hallucinations, but only 52% of psychiatric patients reported some positive attitudes. On the other hand, whereas only 51% of the near-death experiencers reported any negative attitude toward their auditory hallucinations, 98% of psychiatric patients reported negative attitudes. The marked differences in attitudes of near-death experiencers and schizophrenic patients toward auditory hallucinations suggest that the "internal voices" commonly heard following NDEs are highly valued by the experiencers and associated with better rather than worse psychosocial functioning (Greyson and Liester, 2004).

Negative effects

Although NDErs sometimes feel distress if the NDE conflicts with their previously held beliefs and attitudes,

the emphasis in the popular media on the positive benefits of NDEs inhibits those who are having problems from seeking help. Sometimes people who have had NDEs may doubt their sanity, yet they are often afraid of rejection or ridicule if they discuss this fear with friends or professionals. Sometimes, NDErs do receive negative reactions from professionals when they describe their experiences, which discourages them even further from seeking help in understanding the experience (Greyson, 1997a; Greyson and Harris, 1987).

Most NDErs gradually adjust on their own to their experience and its effects. However, that adjustment often requires them to adopt new values, attitudes, and interests. Family and friends may then find it difficult to understand the NDEr's new beliefs and behavior. On the one hand, family and friends may avoid the NDEr, who they feel has come under some unwelcome influence. On the other hand, family and friends influenced by the popular publicity about the positive effects of NDEs may place the experiencer on a pedestal and expect unrealistic changes. Sometimes, friends expect superhuman patience and forgiveness from the NDEr or miraculous healing and prophetic powers; they may then reject the NDEr who does not live up to these unrealistic expectations (Greyson, 1997a; Greyson and Harris, 1987).

Emotional problems after NDEs include anger and depression at having been resuscitated or "sent back," perhaps unwillingly. NDErs often have problems reconciling the experience with their traditional religious beliefs or their previous values and lifestyles. Because the experience seems so central to their sense of self and seems to set them apart from other people around them, NDErs may come to define themselves exclusively as experiencers. Because many of their new attitudes and beliefs are so different from those around them, NDErs can overcome the worry that they are somehow abnormal only by redefining for themselves what is normal. NDErs may feel a sense of distance or separation from people who have not had similar experiences and may fear being ridiculed or rejected by others – sometimes, of course, with good reason. Difficulty reconciling the new attitudes and beliefs with the expectations of family and friends can interfere with maintaining old roles and lifestyle, which no longer have the same meaning. NDErs may find it impossible to communicate to others the meaning and impact of the NDE on their lives. Frequently, having experienced a sense of unconditional love in the NDE, the experiencer cannot accept the conditions and limitations of human relationships (Greyson, 1997a; Greyson and Harris, 1987).

Researchers have noted that the value incongruities between NDErs and their families lead to a relatively high divorce rate among NDErs (Bush, 1991). The "social death" that occurs when the familiar personality of an NDEr dies can be as disruptive to a family as the physical death of that person (Insinger, 1991). The effects of an NDE "may include long-term depression, broken relationships, disrupted career, feelings of severe alienation, an inability to function in the world, long years of struggling with the keen sense of altered reality" (Bush, 1991, p. 7).

Attitudes toward suicide

In striking contrast to the sometimes difficult adjustments to life after an NDE, the experience itself may foster a reassuring view of death, including positive affect, absence of anxiety or pain, apparent reunion with deceased loved ones, and a sense of unconditional love. This "romanticization" of death has been postulated to encourage suicidal ideation (Van Del, 1977), and NDErs have been shown to have less death anxiety than nonNDErs (Sabom, 1982) and view death as less threatening (Greyson, 1992). Yet, NDEs are typically followed by a paradoxical but pronounced decrease in suicidal intent (Greyson, 1981; Ring, 1984). Although NDEs may "romanticize" death, they also appear to imbue life with a sense of meaning and purpose: NDEs may reduce suicidal ideation primarily by fostering a sense of unity with something that transcends the self, by decathecting personal failures and losses; by enhancing the meaningfulness and joy of life; and by enhancing self-esteem (Greyson, 1993a).

Near-death experiences and mental health

As noted above, retrospective studies of near-death experiencers have shown most of them to be psychologically healthy individuals, who do not differ from comparison groups in measures of mental health (Gabbard and Twemlow, 1984; Greyson, 1991; Irwin, 1985; Locke and Shontz, 1983). However, NDEs have been speculatively linked to several psychopathological conditions.

Depersonalization

NDEs have been described as a type of depersonalization, or feeling of strangeness or unreality, that mimics a state of death and serves as a sacrifice of a part of the self to avoid actual death, although depersonalization would not account for the hyperalertness and mystical consciousness seen in NDEs (Noyes and Kletti, 1977). Furthermore, depersonalization differs from NDEs in its age and gender distribution, unpleasant and dreamlike quality, and separation of the observing self from the functioning self (Gabbard and Twemlow, 1984).

Dissociation

NDEs have been compared with dissociation, the separation of thoughts, feelings, or experiences from the normal stream of consciousness and memory that is an adaptive response to trauma common in otherwise normal people. Many NDEs share with dissociation the

disconnection of perception, cognition, emotion, and identity from the mainstream of the individual's conscious awareness (Greyson, 1997b). Researchers have speculated that people who have NDEs may have a tendency to dissociate in response to catastrophic events, though not in response to everyday stressors (Irwin, 1993; Ring, 1992). Symptoms of dissociation are more common among near-death experiencers than among individuals who have come close to death without NDEs, although they are still within the range of the normal population and far below that seen in clinical dissociative disorders (Greyson, 2000). The dissociative symptom profile of NDErs is suggestive of a normal psychophysiological response to stress, a shifting of attention from the physical environment to an altered state of consciousness, rather than a pathological type of dissociation or a manifestation of dissociative disorder.

Post-traumatic stress disorder

Among the many possible psychological and biological responses to trauma is post-traumatic stress disorder (PTSD), which involves a biphasic pattern of reliving the trauma through intrusive memories, alternating with avoidance of reminders and numbing. NDEs may lead to typical PTSD symptoms like recurrent, intrusive recollections of the event, recurrent distressing dreams of the event, diminished interest in previously important activities, estrangement from others, and a sense of foreshortened future (Greyson, 1997a, 2001). Dissociation at the time of trauma often leads to later PTSD; it would be plausible to suspect PTSD following NDEs, which are similar to peritraumatic dissociation. In fact, the incidence of PTSD symptoms among NDErs is higher than that among survivors of close brushes with death without NDEs, although it is within the normal range and far below that seen in clinical PTSD (Greyson, 2001). The NDErs' profile of moderate elevation of intrusive thoughts, images, feelings, and dreams, but no elevation of avoidant psychic numbing, behavioral inhibition, or counterphobic activities, is typical of a nonspecific response to catastrophic stress rather than of PTSD.

Other pathological conditions

NDEs have sometimes been confused with autoscopy, seen in a variety of brain lesions. However, NDEs differ from autoscopy in that the observing self or point of perception is experienced as outside the physical body, from which perspective the subject sees his or her own inactive physical body rather than an active apparitional "double" (Gabbard and Twemlow, 1984). NDEs also have superficial similarities to psychoactive substance-induced hallucinations, but are more complex than the mental imagery induced by drugs, and more often endowed with personal meaning (Bates and Stanley, 1985), and often occur in the absence of psychoactive substances. Although schizotypal personality disorder can include cognitive and perceptual distortions, it is a pervasive pattern of interpersonal deficits that is not seen in NDErs (Gabbard and Twemlow, 1984; Irwin, 1985; Locke and Shontz, 1983). NDEs can be differentiated from brief psychotic disorders by their acute onset following a stressful precipitant, and by the experiencers' good premorbid functioning and positive exploratory attitude toward the experience (Lukoff, 1985).

Religious or Spiritual Problem

The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* warned against misinterpreting religious or spiritual experiences as mental disorders, and distinguished from mental disorders a category of problems labeled "other conditions that may be a focus of clinical attention," which includes a specific subcategory of "religious or spiritual problem," an example of which is the NDE (Lukoff et al., 1992). Just as the diagnosis of a major depressive episode would not be given when depressive symptoms result from normal, uncomplicated bereavement, so too NDEs and their effects should not be viewed as evidence of a mental disorder, but rather as normal reactions to a life-threatening stressor (Turner et al., 1995). An intended function of the diagnostic category of "religious or spiritual problem" was to anchor the nonpathological end of a differential diagnostic spectrum, and to guide clinicians to relevant diagnostic and treatment literature (Turner et al., 1995).

NDEs in psychiatric patients

As noted above, studies of NDErs have shown them to be psychologically healthy without prominent symptoms of diagnosable psychiatric disorders. Another way of looking at a possible association between NDEs and mental illness is to examine the prevalence of NDEs among psychiatric patients. Coming close to death is a traumatic event that may lead to clinically significant psychological distress, decreased functional capacity, and need for psychiatric services. In a large sample of consecutive patients presenting for the first time to a psychiatric outpatient clinic, 33% reported having been close to death, among whom 22% (7% of the total patient population) had NDEs (Greyson, 2003b). On every measure of psychological distress in this sample, scores were higher for those patients who had been close to death than those who had not. However, among those patients who had come close to death, on every measure of psychological distress, scores were lower for those who reported NDEs than for those who did not. Thus, having come close to death was associated with increased psychological distress, but NDEs seemed to have a protective effect against that trauma (Greyson, 2003b). The percent of patients in this study reporting

near-death experiences was comparable to that found in the general population (Greyson, 1998a), suggesting that mental illness itself bears no association with near-death experiences.

Treatment of NDE-related problems

The way a psychotherapist responds to a near-death experiencer can have a tremendous influence on whether the NDE is accepted and becomes a *stimulus* for psychospiritual growth or whether it is regarded as a bizarre experience that must not be shared, for fear of being labeled as mentally ill. The literature of NDE-related problems includes clinical vignettes that illustrate requests for psychiatric intervention for problems secondary to NDEs and that raise questions not only of differential diagnosis of the comorbid conditions but also of the causal relationship between them: that is, whether NDEs may predispose toward certain mental disorders, and whether certain mental predispose toward spiritual problems in NDErs (Clark, 1984; Greyson, 1997a).

Although there have been no controlled outcome studies of therapeutic approaches to NDE-related problems, clinicians have developed a *consensus* of psychotherapeutic strategies (Greyson, 1997a; Greyson and Harris, 1987). For example, it is usually helpful to encourage patients who have had NDEs to verbalize their confusion and distress, to reflect and clarify rather than interpret patients' perceptions and emotions, to provide objective information about NDEs to both patients and their families, to avoid a sense of victimization in the patient but rather help the patient grieve for the loss of ego. Patients who find their NDE ineffable may be able to express their conflicts using nonverbal media or through hypnosis or guided imagery (Greyson, 1997a; Greyson and Harris, 1987).

Changes in values, beliefs, and attitudes may require changes in familial interactions; a here-and-now focus in the therapy may help individuals integrate the experience into their daily lives. Couples or family therapy may be indicated when changes in the experiencer demand changes in close relationships, as well as changes in career (Greyson, 1997a). With an experience as foreign to mundane life as the NDE, exploring problems and solutions with fellow experiencers can reduce the sense of bizarreness associated with the phenomenon. Some experiencers may find it easier to explore issues in a psychotherapy group composed of patients who have had NDEs or a near-death experiencer support group, which can help normalize the experience (Greyson and Harris, 1987).

Some writers have cautioned against medicating individuals in the midst of spontaneous spiritual awakening, as that may freeze the process in mid-course and prevent any further reparative developments (Wilber, 1984). As an alternative, contemplative disciplines such as meditation or prayer may help the individual in spiritual crisis (Wilber, 1984).

Near-death experiences and consciousness

Some of the phenomenological features of NDEs are difficult to explain in terms of our current understanding of psychological or physiological processes. For example, experiencers sometimes report having viewed their bodies from a different point in space and are able to describe accurately what was going on around them while they were ostensibly unconscious (Sabom, 1982, 1998); or that they perceived corroborated events occurring at a distance outside the range of their sense organs (Clark, 1984; Ring and Lawrence, 1993), including blind individuals who describe accurate visual perceptions during their NDEs (Ring and Cooper, 1999). Sabom (1998) described in great detail the NDE of a woman undergoing surgical hypothermic cardiac arrest, in which she met all the accepted criteria for brain death, and yet described accurately many specific and unexpected details of her surgery. The meticulous physiological monitoring of this patient provided evidence against the common speculative explanations for NDEs, such as temporal lobe electrical activity and reconstruction based on overheard conversations during the operation or based on observations before and after she was anesthetized.

Furthermore, some NDErs report having encountered deceased relatives and friends, and some child NDErs describe meeting persons whom they did not know at the time of the NDE but later identified as deceased relatives from family portraits they had never seen before (Badham and Badham, 1982). Other experiencers report having encountered recently deceased person of whose death they had no knowledge (Badham and Badham, 1982; Moody, 1975; Ring, 1980; Sabom, 1982). These aspects of NDEs present us with data that cannot be accounted for by current physiological or psychological models or by cultural or religious expectations (Blackmore, 1993).

These transcendental or mystical features and the occurrence of heightened mental functioning when the brain is severely impaired challenge the common assumption in neuroscience that consciousness is solely the product of brain processes, or that mind is merely the subjective concomitant of neurological events. An analogy can be drawn with Newtonian mechanics, which appears to explain the physics of everyday life. It was only the investigation of extraordinary circumstances, involving extremely small or large distances, speeds, or mass, that revealed the limits of the Newtonian model and the need for additional explanatory models. So too with the question of the mind-brain relationship: exploration of extraordinary circumstances such as NDEs may reveal limitations of the current model of mind-brain identity and the need for a more comprehensive explanatory model.

An adequate model of mind/brain interactions must be able to explain how complex consciousness in NDEs, including thinking, sensory perception, and memory, can occur under conditions in which current physiological models of mind deem it impossible, such as under general anesthesia and in cardiac arrest (Kelly, Greyson, and Kelly, 2006). Scientific discussions of consciousness, to be responsible intellectually, must take these data into account. Only when researchers approach the study of NDEs with this question firmly in mind will we progress in our understanding of NDEs beyond unsatisfactory neuroscientific conjectures. Similarly, only when neuroscientists examine current models of mind in light of NDEs will we progress in our understanding of consciousness and its relation to brain.

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