

Near-death experiences and the change of worldview in survivors of sudden cardiac arrest: A phenomenological and hermeneutical study

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ABSTRACT

Near-death experiences (NDEs) can occur during episodes of unconsciousness from life-threatening conditions, such as sudden cardiac arrests (SCAs). This study is based on interviews with patients who had an NDE. The interviews were analyzed with phenomenological hermeneutical method for their lived experiences and the meaning for the view of life and death. Four participants were interviewed 10 weeks after their NDE. Four themes emerged: being on the other side, in another dimension; not dreaming, this is a real experience; being in a non-physical condition without my body; and comparing views of life and death before and after the NDEs. The participants described the NDEs as an experience of another realm as non-physical in nature and existing beyond space and time. This study shows that this experience of another state of being, through the lived experiences of NDEs, gave the participants an entirely new meaning on life and death. To them, death was no longer viewed as an end but a passage into something else and that life continues after death. This realization instantly changed their worldview.

Introduction

This study began out of curiosity after the first author met a patient who spontaneously talked about her experience of a tunnel of light following a sudden cardiac arrest (SCA). She described the light as peaceful and loving, and said that she felt very welcome and had neither anxiety nor fear. The experience changed her view of life and death. She became convinced that life continued after death and said she had no more anxiety around death or dying, illustrating the potential for fundamental changes in a person's perspective following a near-death experience (NDE).

In this article, we limit our use of "NDE" to mean a life-threatening episode accompanied by an altered state of perception (Greyson, 1994; Moody, 1975). The phenomenon has been reported in many different circumstances such as SCAs, massive blood loss, strokes, traumatic brain injuries, near drownings, and asphyxia (Agrillo 2011, van Lommel 2010). Often, patients resuscitated from NDEs report memories of out-of-body experiences, pleasant emotions, seeing a tunnel of light (or just a light), meeting with deceased relatives, and/or life reviews, meaning parts or one's whole life are re-experienced (van Lommel, et al., 2001). Various studies have found that about 10 to 20% of survivors of

SCAs have reported NDEs (Greyson, 2003; Parnia et al., 2001; Schwaning et al., 2002; van Lommel et al., 2001).

As practicing physicians, we wanted to know more about what NDA patients think about their experiences to better communicate with them and to share our understanding with other healthcare providers. Effective communication is, of course, fundamental to fostering mutual comprehension between patients and healthcare providers. Mutual comprehension, in turn, is crucial in building trust and effective patient/provider relationships.

We therefore approach this article from a phenomenological perspective, meaning that we suspend our preconceptions regarding what patients experience in the minutes of unconsciousness during NDEs. Temporarily putting aside our perspectives rooted in medical science, we give full attention to what patients tell us so that we can better understand what they believe about their experiences, trying to see circumstances from their points of view. Gaining that understanding from their perspectives will allow us to find a new place, a kind of middle ground, in which to engage with and serve patients who experience NDEs in a more informed way.

Research exploring the nature of NDEs has been extensive in recent years (see, e.g., Parnia, 2017; Pratte, 2022), and qualitative research methods have brought a deeper understanding of the characteristics and interpreted meanings of NDEs (see, e.g., Seifu et al., 2022). For example, a thematic analysis of 34 cardiac survivor NDE narratives by Cassol et al. (2018) provided detailed information about the vocabulary used by people who have experienced NDEs to describe their experiences. Their study found 11 themes demonstrating the diversity of how NDEs are experienced and described. Another study of a physician who had an NDE after surviving an SCA suggested that NDEs have a tendency to trigger a long-term process of spiritual transformation and a change in patients' understanding of the nature of consciousness (Woollacott & Peyton, 2021).

In a study conducted in the Netherlands between 1988 and 1992 (van Lommel et al., 2001), 62 (18%) out of the 344 survivors of SCAs had experiences of NDEs. These 62 patients, together with a matched control group consisting of 74 patients without reported NDEs, were interviewed two and eight years after their SCAs. The study showed that participants in both groups had positive transformational changes with more self-assurance, social awareness, and religious beliefs compared to how they were prior to their health crises. However, participants who had NDEs experienced more significant changes, including having more complex coping processes, becoming more emotionally sensitive and empathic, having little to no fear of death, and believing strongly in an afterlife. These changes were also more pronounced among the NDE participants at the two- and eight-year follow-ups.

Building on the thematic research conducted by Cassol et al. (2018), our goal in this study is to explore NDE ex-

periences using phenomenological and hermeneutical methods of inquiry developed by Lindseth and Norberg (2004) (see also Dahlberg, 1995.) As such, we endeavour to understand the meanings of NDEs as experienced by patients, with particular attention being placed on how NDEs transform patients' perspectives on life and death, specifically, as well as their effects on patients' worldviews, in general. Our intention is to deepen our awareness of NDE experiences to better understand, communicate with, and serve patients who share these life-altering incidents (see also, Somoilo & Corcoran, 2020).

The first author of this study works in a clinic as a pulmonologist where he interacts with students and patients daily. The second author is newly retired, and has worked until lately as a practicing physician and clinical lecturer. She is an assistant professor who had a lengthy career in the ICU as a researcher and nurse in which she treated several patients who had experienced NDEs.

Throughout the data collection, analysis, and reporting of this research, both authors strived to maintain their openness toward the topic of NDEs, meaning that we remained aware of our pre-understanding and preconceptions about NDEs derived from formal medical training, while, at the same time, being sensitive to participants' perceptions and interpretations of NDEs (see Gadamer, 1989).

The research period was from August 2016 to August 2017. We included SCA patients via initial convenience sampling in an emergency ward of a Swedish hospital. All participants had a confirmed SCA, and they were resuscitated through the use of defibrillators. Defibrillators have a built-in electrocardiogram function that monitors the electrical activity of the heart and is programmed only to function (giving electrical shocks) when there is ventricular fibrillation, i.e. electrical disorder and no cardiac contractions (SCA). In that sense, all participants have been declared clinically dead.

During the research period, five out of 30 patients (22 men, eight women) who were successfully resuscitated from their SCAs had reported experiences from the SCAs that were initially perceived as possibly being NDEs. One of these five died a few days after the first contact with the researchers before being interviewed; thus, four were included in the study. All participants were male and middle-aged or older.

Ethical considerations

This study was approved by the Regional Committee of Medical Research Ethics at the University of Lund Sweden in August 2016 (Dnr 2016/87). Patients were informed about the study and its purpose and processes. Participants gave their written consent, and they were informed about their right to withdraw at any time without having to give a reason in accordance with the Declaration of Helsinki (World Medical Organization, 1996). Pseudonyms are used to maintain participant anonymity.

Materials and Methods

Data collection

All nurses and physicians working in the medical wards at the hospital were asked to contact the first author if they were caring for a patient who had an SCA (via the emergency ward) and had been successfully resuscitated. If the patient talked about memories after and during the SCA, they were asked if the first author could contact them by phone and send them information about the study by mail. Eight weeks after the SCAs, the first author phoned the patients to ask if they wanted to participate in the study. By then, the patients had recovered and were given the opportunity to give their formal consent to participate. Interviews were conducted by the first author in a quiet room at the hospital 10 weeks after participants' SCAs, were tape recorded, and lasted about one and a half hours each.

Interviews were semi-structured and began as a simple conversation, starting with an open question: "What were your first experiences, thoughts, and feelings when you woke up after you had been unconscious in association with your cardiac arrest?" For the most part, the patients talked spontaneously about their experiences and feelings of having had an NDE. It was important to let the participants use their own phrases and words. Thus, the interviewer waited and was patient in allowing the participants enough time to express themselves. To get participants to elaborate more, when necessary, a follow-up question, such as, "What do mean by that?" was asked. Near the end of the interviews, there were some specific questions on worldview changes such as, "Have your values or thoughts about life and death changed since the NDE?"

Analytical method

Our initial analytical step was to carefully read the interviews, each of which was transcribed verbatim by the first author. Following Lindseth and Norberg (2004), we interpreted transcripts by conducting a naive reading followed by a thematic structural analysis. By "naive reading," we mean that it was important to let the text speak for itself without interpretation. As such, both authors read the transcribed interviews several times separately, letting the narrators describe their memories in their own ways while we set aside our preconceptions about physiological conditions accompanying NDEs (see, e.g., Gopalan, et al., 1999; de Vries, et al., 1998).

Following the naive readings, we conducted the thematic structural analysis by looking for patterns among stories told by multiple patients (Lindstedt and Norberg, 2004), with each author working independently, augmented by regular meetings to discuss what we had read. Patterns emerged from the data as we divided texts into meaning units, i.e., phrases and sentences that described similar thoughts, feelings, and perceptions (e.g., "On the other side" and "My consciousness had been in two different

rooms."). Themes such as *being in another dimension* emerged as we combined similar meaning units; by "theme," we mean a thread of meaning recurring through multiple texts.

After we read and interpreted the texts over several months, we took a step back to get a sense of the wider meaning of what having an NDE was to our participants. During this comprehensive reading, our pre-understanding, the naive reading, repeated readings of the interviews, and the structural analysis were all reflected upon. Engaging with the text in this way allowed us to build a hermeneutic circle, using phenomenological, hermeneutic interpretation developed by Ricoeur (1991) as an iterative movement among i) listening, ii) interpreting, and iii) explaining (see also, Kemp & Kristenson, 1989). The resulting dialectic between understanding and explanation, which is characteristic of Ricoeur's method of interpretation, implies a spiraling movement between the three phases while reflecting upon relationships between the entirety of our data and the analytical parts (Ricoeur, 1976). Following this approach, together, we refined our interpretations by re-reading the interviews as patterns emerged, followed by further discussion on our interpretations until we reached a point of interpretive saturation.

Participants

Anders was married and 74 years of age. He had ended his working career in a leading position for a company with 20 employees. He viewed himself as an easy-going man who, for the most part, had a bright outlook on life. He experienced an NDE during an SCA that lasted nearly two minutes. He said that the NDE started with a brightly lit, joyful meeting with his parents when he was about two or three years old, followed by a life review, where he re-experienced his life at intensely high speed. He said that if he had compared it to the world's fastest computer, the computer would have been slow in contrast. To him, the experience was clear and vivid, featuring memories and people from his past who were alive again. He also explained that before the experience, he did not believe in any form of continuation of life after death, although he said he had thought about it previously.

Bertil was 57 years old, married, and had adult children. He was an officer in law enforcement. He recalled experiencing a tunnel of light during an SCA that also lasted approximately two minutes. The experience was very real to him. He felt like he was completely there with his whole consciousness and that he was moving forward inside a tunnel of light that he perceived to have an end, but which he never reached. The tunnel and the surroundings were full of life, and he said that never thought it had anything to do with death. He felt comfortable and unafraid. He was very curious about the tunnel and all that was going on there. As with Anders, Bertil was also very clear about a non-belief in continuation of life after death before his experience.

Sven was the youngest in the group at 41 years of age.

He was married and a father of two children in their early teens. He was an officer in the Swedish military. Sven experienced an NDE lasting approximately five minutes during an SCA at his work, and he was resuscitated by his colleagues. He experienced a light that he described as very strong, full of life, and without any evil at all. His impression was that he was standing at the beginning of something, as if on a threshold, as he watched a light all around and in front of him. To him, the experience was also very clear, and he felt calm and without fear. In the distance, he also heard the voices of his colleagues who were resuscitating him. He felt an enormous resistance against returning to his body. His impression was that his consciousness had experienced another realm, completely different from the current physical world. He said that he did not have many thoughts or firm beliefs about the continuation of life before his NDE experience.

John was the oldest participant at 88 years of age. He was a widower whose wife passed away many years ago. He lived by himself in a house in the countryside. He described himself as a man from nature, a down-to-earth human being who appreciated the small things in life such as a deer passing over the field next to the house where he lived. His experience was of being in between the physical world and something he described as “the world of the dead” during an SCA that lasted six to eight minutes. He had no visions, but rather a vivid sense of traveling towards something that he described as “the other side” where the atmosphere was peaceful and very welcoming. He loved the atmosphere, and he cried deeply when he described how it was there. He was also aware of his own body and had a strong feeling of wanting the people who were helping him to stop their resuscitation attempt. He did not want to go back to what he described as “life” again. He wanted to go on. Prior to the NDE, his view of life after death leaned in the direction that there was a possibility of life after death, but his NDE experience cemented that belief.

Findings

Analysis of the four interviews resulted in four main themes: i) being on the other side, in another dimension; ii) not dreaming, this is a real experience; iii) being in a non-physical condition without a body; and iv) comparing views of life and death before and after NDEs.

Theme 1: Being on the other side, in another dimension

Anders, Bertil, Sven, and John all described their experiences during the SCAs as being on route to another place, a kind of alternate reality that they had never experienced before. They described it as a liminal state existing in between the physical world and the world coming after. As Anders said, “I was on the other side and had this experience. . . .” Bertil similarly described the experience in spatial terms, but also as “knowledge”: “Yes, yes clearly, but it is an experience of a completely different realm, and it is

clear, and to me it is knowledge.” Similarly, Sven described his experience as being in a space consisting of an altered reality: “But definitely, something else exists, which is not this in any way. . . . My experience is that I have been in a completely different, in a completely other state.”

John was particularly descriptive about being on his way to “the other side” and described the atmosphere as a room of total peace and a welcoming kind of “warmth”—something he had never experienced before:

Yes, I was on the way to death, yes, in that direction. I say that I was going to leave the earthly [realm] and move into all. I was sure of that, yes, the spiritual world. Sure. . . . because I was going toward something. I was not somehow. . . . dead.

For participants, “the other side” consisted of a very strong and bright light that was full of life, free from all evil, vivid, and perfectly still. The light was perceived as a place existing outside of physical reality. As Sven explained:

Yes, it is, it is utterly light. There is nothing. It is entirely. . . . It is. . . . There is no place on Earth that looks like this. . . . but that feeling. . . . and that peacefulness. That does not exist on Earth.

Bertil recalled traveling in an infinite tunnel of light that, paradoxically, had an end that he would have reached if he has travelled a while longer. The tunnel was full of life, and in the background, people were “babbling” as a sign of an ongoing activity, which contributed even more to the calmness, safety, and curiosity he felt.

None of the participants were surprised at being in that condition or in that place, and interestingly, they perceived the return to their normal, physical reality as being more confusing. Bertil, for example, recounted:

No, I was not surprised at all, because all of a sudden, I just stood there in that tunnel, and I was not astonished, and I just moved ahead and heard these voices and all that. So, I was not surprised at all, but when I woke up again, I felt a little confused. Then, I did not really understand where I was because there were two different worlds. The tunnel I found myself in was more real than the world I came back to. I went from one world [and] back to the normal world again.

Bertil’s observation that the tunnel was “more real” than normal reality is particularly interesting, emphasizing the vividness of his experience—a factor to which we return in Theme 2.

Anders described his experience as reliving his life with a clear concept that the experience took place on “the other side.” Again, the experience was clear, concrete and, in An-

ders' case, went very quickly, as if time did not exist in that place. He explained that being on the other side allowed his brain to work extremely fast:

My brain was rapid before when I was on the other side. It is completely inconceivable that you can, that it is so clear.... Yes, it was my life in *bbbb-sssspppp* [sound]...in such a short time.... Honestly speaking, how can something be that fast, in little over one and a half minutes then?

Bertil similarly reflected on his own expanded perception within the space that he perceived:

Yes, it is...yes, it is, what shall I say? My experience is that.... My brain has been in two different places. My mind, my consciousness, has been in two different rooms. Then, I cannot say it was another world, but my mind has registered another place, or another state that has given me that feeling, very clearly.... No, I cannot say what it was, other than it exists in, in...another dimension or something. Another dimension...exists, somehow.

While perceptions of altered space have been commonly reported in studies of NDEs (see, e.g., Khanna & Grayson 2014), we believe that the salience of that perception is a crucial factor conditioning participants' memories and the meanings that they attached to those memories. What is perhaps most significant is that they associated that space with complete lack of doubt. Indeed, any uncertainty that they expressed pertained to how they processed their return to their former sense of reality.

Theme 2: Not dreaming, this is a real experience

Reinforcing the feeling of certainty associated with an alternate space, participants were adamant that their memories were not dreams. Dreams, according to participants, were much more transparent in their character and did not have the same weight and impact as the NDEs which were described as utterly real and very clear. Indeed, participants were eager to contrast dreams and their NDEs. As Anders explained: "This was real in my consciousness, and it was crystal clear all the time, and it was not a dream. So, this is very, very real for me, this experience." And Sven concurred:

This had a completely other power...and strength. A dream is...then you just hiccup and are awake, no, no. I have never dreamed in that direction before, no, absolutely not. A dream does not have the same weight as this experience.

Memories of the NDEs were vivid and specific. They did not fade in the same way dreams often do:

A dream can be, that anything can become anything. Then, then it is possible to confuse a "prince for a pauper." No, but this, understand me, I am coming back to, you see, that...it is so clear...in such a short time. Yes, that is so amazingly strange. (Anders)

As Anders suggests, while NDEs were not interpreted as dreams, they were also fundamentally different—"strange"—in contrast to normal experience. Furthermore, these examples demonstrate that participants were adamant that there was a sharp contrast between dreams and the NDEs—i.e., between dreams and their new senses of reality.

Theme 3: Being in a non-physical condition without my body

Participants described in different ways how the environment they experienced during the resuscitation and the NDEs was non-physical in its essence:

You do not see any walls; you do not see any...ultimate border. No roof, no nothing. Everything is like you have put on...10,000 watts of light in this room, but with a warm and comfortable part. (Sven)

Within this new context, participants described finding themselves with full consciousness and the ability to observe a realm of non-physical characteristics without borders and beyond time. As we have seen, for example, Anders described reliving his life in a blink of an eye, and in that sense, time seemed irrelevant or nonexistent.

Similarly, within the context described, participants' physical bodies also lost their significance. As Bertil said: "I did not know if I had my body with me because I did not see it and no, no my eyes were not there...but, I still have the picture of what it looked like, anyway." Sven also felt disconnected from his body during resuscitation. He remembered thinking that this was strange because he felt that resuscitation should be rather painful. As noted above, Sven experienced a powerful resistance toward coming back to his body occurring at the same time as he heard the voices of the people who resuscitated him:

Because I was pretty badly battered when my body laid on the floor, but I had no sense of that with me in that condition. That feeling I am in great danger here...and somehow it is like that. That strikes me actually now.... I should actually, if that feeling... If that comprehension should be linked to my body, then I should have felt that I have had pain there. Terrible pain because they were pumping quite hard on me. But, on the contrary. I was completely peaceful; it felt totally calming for me.

Bertil similarly felt disconnected from his body:

My physical body was in the ambulance, all the time. Yes, in one way or another, my consciousness had left the body when I moved into that tunnel.... But, it was still me who was in that tunnel, and it was me who visualized and saw in the tunnel, but my body was left there [in the ambulance]. Mmm, so for me, in that, in what I experienced then, there was not any end...but, if I had continued another few minutes, then I would have seen the end of the tunnel.

Participants' descriptions of full or partial disassociation from their body is, thus, on the far end of the spectrum that Frank (2013, p. 33) describes as "body relatedness." Their sense of of "I" with respect to their identification with corporeal identity temporarily diminished fully or in large part within a remembered context that is paradoxically within and beyond space and time. As such, participants remembered being fully alive and conscious, but also limitless without constraints imposed by their bodies in an environment which also seems to be of the same nature: limitless, with no borders, highly alive, and conscious.

Theme 4: Contrasting views of life and death before and after the NDE

Anders, Bertil, and Sven each explained that prior to their NDEs, they had thought that when life ended, it was like falling asleep and never waking up again. (As noted above, John already had a belief in life after death prior to his NDE.) Their NDEs completely changed their thoughts about existence beyond death, which, in turn, changed their perceptions of what life really is. Following their NDEs, Anders, Bertil, and Sven (as well as John, but to a less extent) each re-evaluated their concepts of life and death, now believing that human existence consists of at least one more realm or dimension that one's consciousness can experience. As Bertil put it:

This has totally changed my view of what death is. Sure, one maybe has used words like, "if there is any life after death," without knowing the deeper meaning behind it.... I have lived my whole life thinking that death is something frightening and was the end of life. Then everything ceases to exist, but now, I see it differently. It [life] does not [cease to exist].

Anders saw also life differently after his experience and explained it in this way:

Yes, this experience has changed my view about life, and I can say right away that I am not afraid of death any more, as I was before. Yes, of course there is something there. It must be because how else could it have turned out like this.... But what is it then?

Bertil also came to realize that his earlier fear of death had an unconscious impact on his life, especially in relation to decisions he made throughout his life. His NDE gave him pause to reevaluate past behaviors and to reconsider how he will behave in the present so that some things he used to do had markedly changed after the NDEs, resulting in decisions and behaviors that were more conscientious, conditioned by fearlessness with regard to death:

Yes...and, even though I know that the other side exists, that I have been there, and I am not afraid of it, so I appreciate life more today than I did a half a year ago, and I believe it is that fear, which does not exist anymore. That fear of death is not there any longer. Then I can actually appreciate more of what I have today.

Bertil further described how his new conceptualization about continuity of life after death had been revelatory:

I have lived my whole life with a belief that death is something frightening and is an end and everything ceases to exist. That is not how it is. Yes, it is like you are walking around your whole life with a certain perspective and abruptly realize that I cannot support this perspective any longer, and that is also something very disruptive.

Note that Bertils' change of perspective was immediate—that he "abruptly realize[d]" that he needed a change in perspective. Similarly, Svens' testimony suggests a sudden change in perception, occurring just minutes after his resuscitation:

That thought that I have been in a different place came already when they carried me out to the ambulance. It must have been somewhere before or between the resuscitation and the resistance, when I got that sense.

A little later in the interview, Sven explained that this realization fundamentally changed his view of life and what happens thereafter:

This is knowledge. I know this exists...but I was only briefly there, and I cannot return, in my own control.... But definitely, something else exists... which is not this [the physical reality] in any way, and this has changed my view of what happens after this....

It is important to note that, according to Sven and Bertil, the perspectival shift occurred immediately, before they had much time to contemplate the meaning of what happened. While the rapidity with which the shift in worldview can occur might be common among those ex-

perceiving NDEs, we did not notice it mentioned in scholarship on this topic.

All participants also described an increased thankfulness and respect toward life, explaining that they felt more alive and aware. This led them to set new priorities after their NDEs, such as focusing less on material items while focusing more on relationships, especially familial relationships. They also mentioned that they have changed as humans, becoming, for example, more vulnerable and sensitive and that they have started to reflect more on life and existential questions:

Yes, it has transformed me. I have become a...more sensitive human, yes. Emotional, yes greater.... Emotion to a larger extent... has a depth in another way... but likewise, it has changed my view... of what happens after this. Yes, that little bit of anxiety I had before is gone. That does not exist any longer as, as like what happens after. Well, well more sensitive, more thankful towards life. (Sven)

Participants' altered conceptions of space and time, along with their perceived relationships between self and body thus had far reaching personal consequences on their beliefs and behaviors moving forward from their NDEs. Interestingly, this altered conception of reality also seems to have happened quickly and within minutes of resuscitation as indicated by Sven and Bertil.

Discussion

A worldview consists of an individual's most fundamental beliefs regarding human existence, life and death, and reality (McAninch, 2020; Sire, 2009). In his influential model on existentialism, Jeffner (1973) separates the worldview into three components: i) knowledge of self and the surrounding world, ii) central values, and iii) basic attitudes towards life. Central values consist of the intrinsic rules and norms guiding a person's behavior and opinions on what is essential in life and what is good vs. evil, permissible vs. impermissible, and lawful vs. unlawful. Basic attitude toward life, on the other hand, is more of a general view of life; while some look more positively on life, others have a darker perspective. Knowledge of self and the world are the most fundamental of the three elements because it conditions the other two elements; if that knowledge changes considerably, a person tends to also change their central values and/or the basic attitude toward life to a substantial degree (see also, Gustavsson, 2020).

The findings of this study are consistent with what was found by van Lommel et al. (2001) and other researchers (e.g., Greyson & Khanna, 2014) who have found associations between NDEs and changes in central values and perspectives on death. In this study, however, we are particularly interested in understanding how the

dominant themes found in participant interviews correspond with potentially sudden shifts in worldview resulting from changes in assumptions about reality (which, in turn, condition changes in values and attitudes) and how we might better understand those shifts as we engage with NDE patients.

The first three themes (*another dimension, a real experience and not a dream, and being without a body*) correspond with Jeffner's model regarding knowledge of self/world. Those themes pertain to perceptions of place and one's position in that place, i.e., "the other side" where there were no limitations regarding the physical body, space, or time. Metaphorically, this can be seen as if the participants had been able to walk through a door and enter a room they previously did not know existed. Participants interpreted this realm as an extension of reality, reflecting an expansion of perception regarding the structure of existence. Bertil, for example, described it as being "there" without his eyes, yet he still recalled images from it.

The first three themes in the data coalesced around participants' description of this enhanced sense of reality, described in paradoxical terms: a tunnel with no end, decades passing in an instant, and movement without a body. This sense of enhanced reality resulted in the fourth theme: a changed worldview which, in turn, led to a realization that existence could also involve non-physicality and that death is not an end, but a beginning of something new. Again, as Bertil explained, the experience was like being at a train station where a person changes tracks to other destinations.

This shift in knowledge about self and reality, in turn, affected each participant's values and attitudes towards life and death in various ways, again, consistent with Jeffner's model. For instance, three of the participants also expressed a decrease in anxiety about death. This phenomenon has also been found and discussed by other authors and studies, for example, van Lommel et al. (2001) and Greyson and Khanna (2014) who also found that survivors of traumatic events who had an NDE reported greater spiritual growth than survivors who did not experience an NDE. Important to note, however, is that in this study, we found that the change of the worldview at least sometimes occurred very quickly after resuscitation, demonstrating rapidity of impact.

This fundamental, potentially sudden shift appears to largely be the result of a new awareness—indeed, one could say a certainty—of some form of personal consciousness after death. Neither Sven, Bertil, nor Anders had previously held these existential beliefs before the NDEs. For John, in contrast, the experience confirmed what he had previously thought was a possibility. Thus, the change of the worldview was linked to a changed perception of what "death" means. Without this shift in perspective, Theme 4 (*Contrasting views of life and death before and after the NDE*) would have been unlikely to

emerge in the analyses with respect to Sven, Bertil, and Anders. John, too, was changed by the experience, but in his case, he became more invested in a worldview that previously he had only thought was a possibility.

In summary, participants of the current study perceived their NDEs as unquestionably real, which, in turn, led to a fundamental shift in perceptions about self and reality, followed (immediately so, in the cases of Bertil and Sven) by a change in worldviews (see also Facco et al., 2015; Khanna & Greyson, 2014; van Lommel, 2011).

Implications for healthcare providers

Experiencing an NDE has the potential to fundamentally change patients' worldviews, usually leading to a loss of anxiety around death and a changed view of life. It has long been known that NDEs have caused patients to reevaluate their lives (van Lommel, 2001); however, as practicing physicians, our research has deepened our personal and professional understanding of how patients see the world—their world—following an NDE experience.

The focus of this study was to understand the meaning of NDE experiences to better be able to communicate with and treat patients who have had NDEs. Ideally, by understanding patients' interpretations of their NDEs, we as practitioners will develop deeper, more informed means of serving our patients—not only those who have had NDEs already, but also those who will have them in the future.

Based on our experience in writing this article, our primary takeaway message for healthcare providers—who may be the first person a patient meets after they have had an NDE—is to remain open about the phenomenon (see also, Somoilo & Corcoran, 2020). From a clinical perspective, this means listening to what the patients say in their own phrases and language without judgment and knowing that NDEs are a reality for the patient and that nobody has the answers of what causes the phenomenon.

This study's findings indicates that the change of the worldview is potentially fast or even instantaneous and is caused by a perception of what for patients is undeniably another existing reality. In contrast, van Lommel's study (2001) demonstrates that this experience most likely takes years to consolidate in the minds and lives of patients. It could be that both patterns are compatible, meaning that the change of the worldview can be rapid, even immediate, but that the full effect could take years for patients to process. We believe is important for healthcare providers to keep this in mind in their order to best support the processing of the NDE for the patients.

Furthermore, by better understanding thematic patterns in patients' NDE narratives, healthcare providers can be ready to assure patients that their recollections are common so that they do not feel alone in their experience. This does not mean that we need to uncritically accept patients' interpretations of their experiences, but rather, to demonstrate our openness as we listen to and share in their telling

of what can be a defining moment in their lives. Most significantly, we need to be aware of what it means for patients to fundamentally change their views on life, death, and reality so that we can help them adjust to their new perceptions without fear of rejection.

As this study and others have demonstrated, NDEs have the potential to change patients' worldview about life and death. Based on this study's findings, the change can be rather quick, occurring as early as only a few minutes after the awakening of the resuscitation. As such, a shift in worldview is potentially already manifest in the patient when the first meeting with a healthcare provider takes place after resuscitation. Awareness of this possible sudden change on the part of the healthcare provider will most likely also affect how the conversation with the patient will unfold.

Perceived experience of another place that is equally real (if not *more* real) than normal, day-to-day circumstances reinforces patients' understanding that there is something more to what most people consider physical reality, and that resulting perception will likely never be undone. Therefore, it is also highly likely that this change of worldview is strongly anchored within the patient. This understanding is not anything that needs to be conveyed to each patient, but it is good to keep in mind when conversing with them, especially early on when the experience is still very fresh within the mind of the patient.

Following these observations, it seems likely that the situation is one in which the patient is most likely to be sensitive and vulnerable to external impressions. If the healthcare provider takes a more explanatory approach to the patient—for example, explaining his or her own medical beliefs about the phenomenon—there is a risk that the patient will respond with silence and avoidance. A more open and curious attitude by the healthcare provider would invite more of a dialog and an exploration of the experience together with the patient. This will facilitate the necessary process to incorporate and deal with this newly experienced perception, while reinforcing patient trust in their healthcare providers.

Another consideration is that the participants of this study often expressed an inability to convey the experience in the way they wished—as demonstrated by the hesitancy in forming sentences throughout the examples used above. Two further quotes from Sven and Anders demonstrate their inability to verbalize their memories very well: "...a depth in a way...yes...I don't know...I cannot really explain this, but honestly...no, it is thus...it is. It is maybe so, that my vocabulary is just too small to explain this..." (Sven), and "... that is... but I am sorry, no, but you know... how to explain it" (Anders). When trying to express himself, each participant did so in a cautious way with the use of circumscriptions, images, and analogies. This has to be remembered when meeting patients who had an NDE in order avoid misunderstanding.

Indeed, difficulty in communicating about NDE ex-

periences might extend to family members, causing further stress and worry for patients, and this should be kept in mind among healthcare providers who interact with patients' families. For example, although Bertil and Sven reported that their relationships with their wives deepened through discussion of their NDES, Anders' wife initially rejected his recalled experience. Healthcare providers should, therefore, be aware of variable potential responses family members might express regarding patients' memories and potential shifts in worldviews and how those responses might affect the mental and physical wellbeing of patients who experience NDES.

Finally, we concur with Somoilo and Corcoran (2020) that hospitals and health departments should offer lectures to their healthcare providers about NDE and implement protocols for them to resort to when they are going to meet a patient having experienced an NDE. The protocol should contain information about NDEs and, preferably, a framework on how healthcare providers are expected to relate to patients and their families, with particular attention paid to radical changes likely in patients' worldviews. For this to be realized, hospital and health department should appoint someone on staff with a particular interest in this topic as a point of contact for information and advice.

Strengths and limitations

Participants in this study all suffered SCAs, and their perceptions of NDEs took place during the SCA or in very close proximity to it. The fact that the interviews were conducted shortly after the SCAs can be considered a strength of this research, as it shows that the change of the worldview was detected soon after the SCAs (Theme 4), linking NDEs more directly to the SCA. This change could only have occurred somewhere between the SCA and the interview 10 weeks later, thus supporting our conclusion that the shift in worldview occurs very quickly—perhaps almost immediately.

A limitation of the study is that there were only four participants all of whom were adult males of Scandinavian origin. The goal had been to include six to eight participants; however, given the topic of the study, only a small number of patients met the inclusion criteria. This led to a rather homogeneous participant group with similar linguistic, cultural, and historical backgrounds so that that extrapolation of our results to other cases needs to be drawn with caution. A more heterogeneous group would have been preferred; however, all participants based on the inclusion criteria were included; thus, there was no selection bias.

Given the relatively few participants of this study, and the homogeneous composition of the participants, future research should investigate a diverse sampling of other patients who have experienced SCAs and NDEs with a similar methodological approach to get a larger, more heterogeneous participant group for comparison analysis.

Conclusions

As a final note, we wish to express our gratitude for the patients who shared their experiences with us. This article would not have been possible without their trust in our ability to listen, understand, summarize, and interpret their stories.

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