

AWARE study initial results are published!



The [AWARE study](#) (AWAreness during REsuscitation) is a multi-hospital clinical study of the brain and consciousness during cardiac arrest, including testing the validity of perceptions during the out-of-body part of near-death experiences (NDEs). [Dr. Sam Parnia](#) is the principal investigator. The initial results, from the first four years of the study, [were published last December](#) in the medical journal *Resuscitation* ([PDF](#)).

Of the 2,060 cardiac arrests during the study, 140 patients survived and could be interviewed for the study. Of these, 101 patients had detailed interviews, which identified 9 patients who had an NDE. Of the 9 NDEs, two had detailed memories with awareness of the physical environment. One NDEr's experience was verified as accurate; the other was too ill for an in-depth interview. These two NDEs occurred in non-acute areas where no visual target was present, so further verification of visual awareness was not possible. Further study and, perhaps, a reassessment of the methodology and goals of the study are warranted.

Methods and Results

The AWARE study has two objectives, (1) to examine the incidence of awareness and the variety of mental experiences during cardiac arrest (CA) resuscitation, and (2) to develop a methodology to test the accuracy of reports of visual and auditory perception during CA. The study began in 2008 and, over the first four years, examined 2,060 patients from 15 hospitals in the UK, the US and Austria.

Cardiac arrest survivors were interviewed in three stages, (1) to determine if there were memories or perceptions during the CA, (2) to determine if the memories or perceptions constituted an NDE (with or without auditory/visual awareness), and (3) to verify the accuracy of any auditory/visual perceptions of the physical environment that were experienced during the NDE.

To assess the accuracy of claims of visual awareness (VA), 50 to 100 shelves were installed in each hospital near the ceiling of areas where CA resuscitation was likely to occur. Each shelf had an image that was visible only from above the shelf. The study's hypothesis was that the images on the shelves could potentially test the validity of claims of accurate VA, *provided enough cases of NDEs occurred* where the patient had visual awareness from a vantage point high enough to see the image.

Of the 2,060 patients in the study, only 140 survived and were well enough to have a Stage 1 interview. Of these 140, 39 were not able to complete the Stage 2 interview, mostly due to fatigue. Of the remaining 101 patients interviewed in Stage 2, only 9 were deemed to have had an NDE (9%) and of these 9 NDEs, only two reported memories of auditory/visual awareness of the physical environment. Of these two, one was not able to follow up with an in-depth Stage 3 interview due to ill health. The other patient had verified perceptions of CA events:

- During the NDE, the patient felt quite euphoric.
- The patient heard an automated voice saying "Shock the patient, shock the patient."
- The patient rose near the ceiling and looked down on his physical body, the nurse and another man, bald and "quite a chunky fella", who wore blue scrubs and a blue hat. The patient could tell the man was bald because of where the hat was.
- The next day, the patient recognized the bald man who attended him during the resuscitation.
- The medical record confirmed the use of an AED (Automated External Defibrillator) that would give the automated instructions the patient heard and the role that the identified man played during the resuscitation.

Unfortunately, both cases of CA NDEs with auditory/visual awareness occurred in non-acute areas of the hospital, without shelves, so further analysis of the accuracy of VA was not possible.



Conclusions

The study's authors concluded that:

- In some cases of cardiac arrest, memories of visual awareness compatible with so called out-of-body experiences may correspond with actual events.
- A number of NDErs may have vivid death experiences, but do not recall them due to the effects of brain injury or sedative drugs on memory circuits.
- The recalled experience surrounding death merits a genuine investigation without prejudice.

Regarding the one case that was validated and timed using auditory stimuli during cardiac arrest, Parnia concluded, "This is significant, since it has often been assumed that [these] experiences ... are likely hallucinations or illusions, occurring either before the heart stops or after the heart has been successfully restarted, but not an experience corresponding with 'real' events when the heart isn't beating. In this case, consciousness and awareness appeared to occur during a three-minute period when there was no heartbeat. This is paradoxical, since the brain typically ceases functioning within 20-30 seconds of the heart stopping and doesn't resume again until the heart has been restarted. Furthermore, the detailed recollections of visual awareness in this case were consistent with verified events.

"Thus, while it was not possible to absolutely prove the reality or meaning of patients' experiences and claims of awareness, ... it was impossible to disclaim them either and more work is needed in this area. Clearly, the recalled experience surrounding death now merits further genuine investigation without prejudice."

Reception

A number of news articles acclaimed the study as proving or at least suggesting the reality of life after death. These interpretations are clearly exaggerated. At the same time, Dr Jerry Nolan, Editor-in-Chief of *Resuscitation*, was more reserved: "The AWARE study researchers are to be congratulated on the completion of a fascinating study that will open the door to more extensive research into what happens when we die."

Skeptical interpretations were exaggerated in the opposite direction -- that the study proved nothing. Skeptical neuroscientist Steven Novella [commented](#) that one case verified out of the set of "highly selected and filtered from a larger set of data" hardly demonstrates anything. Apparently Novella didn't read the report very carefully or understand the criteria for including only cases that actually were (a) NDEs (only 9) with (b) reported memories of auditory/visual awareness of the physical environment (only 2). Then Novella criticizes Parnia for reporting the actual verified results of the one subject that was able to be checked: "Parnia, in my opinion, is desperately trying to rescue the study by falling back on simply reporting subjective accounts of what people remember long after the event."

Skeptical parapsychologist Caroline Watt likewise felt that the verified case didn't demonstrate anything: "The one 'verifiable period of conscious awareness' that Parnia was able to report did not relate to this objective test. Rather, it was a patient giving a supposedly accurate report of events during his resuscitation. He didn't identify the pictures, he described the defibrillator machine noise. But that's not very impressive since many people know what goes on in an emergency room setting from seeing recreations on television."

Commentary

Robert and Suzanne Mays, [NDE Researchers](#)

While the AWARE study has been an ambitious project that has garnered considerable interest, support and media attention, we believe that the study design has significant problems. The fundamental issue is that it considers only those cases that have occurred *during cardiac arrest* and only in an *experimental model* of hidden visual targets placed on shelves. The study objective is to document cases of "apparently non-physical veridical perception" (AVP) of the hidden target during cardiac arrest (CA), that is, while there was no electrical activity in the brain.

So the study has three basic problems: (1) very few cases are found for a tremendous investment of effort and when those cases finally come, the investigators need to show (2) that the target was seen (to satisfy the experimental criteria) and (3) the target or any other perceptions were perceived while the heart was stopped. We're not sure if Dr. Parnia would include a case where there were no AVPs during the actual cardiac arrest resuscitation, but the patient later saw and then accurately described the hidden target in the ICU while he/she was on life support and in a coma!

First problem - very low yield of results for a large, prolonged effort

The initial results of the study (Parnia et al., 2014) show that a large number of cardiac arrests need to be screened in order to yield even one result that can be analyzed. Investigators considered 2,060 CA cases in 15 hospitals over a period of four years to have one case that was able to be analyzed with an in-depth interview. Of course, 84% of the cases could be immediately excluded because the patient was not resuscitated or died shortly afterward and another 9% could readily be evaluated as being too ill or declined to be interviewed. The remaining 140 patients had the Stage 1 interview to categorize whether there had been awareness or memories. Of these, 39 patients (another 2% of the original CA cases) could not complete this Stage. So of the original 2,060 CA cases considered, 95% of them had been excluded before an assessment could be made whether the case had included an NDE.

The remaining 101 patients had the Stage 2 interview to identify if there was an NDE and whether there were memories of auditory/visual awareness of the physical environment. There were 9 NDE cases. Of these only two cases qualified for the Stage 3 interview to determine the accuracy of the AVPs and only one could complete this detailed analysis.

Based on this experience, further studies will have only 5% of CA arrest cases that can be interviewed and of these only about 10% will have had an NDE of which only 2 out of 10 will potentially have AVPs that can be analyzed for accuracy. The yield is then about 0.1% of the total CA cases. Of these, some will not be able to go further with the Stage 3 interview, say 1 in 5. And of these only a small number will notice the target and want to remember it, let's say again 1 in 5.

(Note that many NDErs state that they would never have looked at or noticed the hidden target during their NDE. On the other hand, there are a number of cases where the NDEr noticed something unusual and wanted to investigate that detail in order to verify the reality of their experience to themselves and to others. Some of the more notable cases are Maria's shoe located on a window ledge of another part of the hospital, the 1985 quarter on the top right-hand corner of an 8-foot-high cardiac monitor and the 12-digit serial number at the top of a 7-foot-high ventilator machine. By our estimate, the proportion of these cases may be on the order of 1 in 5.)

The result of these proportions is that only perhaps 0.004% of the total CA cases will report seeing the target *if a target is present*. But not all locations will have the hidden target present, say half of them. So the net result is that only perhaps 0.002% of the total CA cases will report seeing the target. So at the rate of the first four years of the AWARE study, it would take quite a few *decades* to come up with even one potential case of seeing the target.

A number of steps could be taken to improve the yield of various aspects of the study -- more hospitals, more hidden targets, better resuscitation and treatment methods for CA survivors and so on -- but even with significant improvements in different aspects of the study, it may easily take 10 to 15 years to encounter one potential case of seeing the target.

Can the AWARE study continue for the next 10 to 15 years with an increased focus (more hospitals, more hidden targets, more rapid and thorough screening of CA survivors, etc.), before there is a case where the NDEr reports seeing the shelf where the hidden target might have been seen? If there are no cases of seeing the shelf but there are verified cases of AVPs -- as there was with this initial phase -- what can be concluded? How many cases of verified perception of the hidden target would be needed to satisfy the experimental criteria?

(Note that a negative result -- no cases of the target seen -- does not at all mean failure to demonstrate the hypothesis. In order to conclude that the AWARE study has demonstrated that reported AVPs are not real, there needs to be a sufficient sample size of NDEs with visual awareness in rooms with a target but not seeing the target to come to even a tentative conclusion that non-physical veridical perceptions are in fact hallucinations. And the

cases where the target was not seen would need to be weighed against the cases where there were other veridical perceptions that could not have been perceived by ordinary physical means.)

Second problem - experimental versus phenomenological emphasis

There is general confusion among many lay people and a number of scientists that the only acceptable scientific evidence comes from experiments conducted under controlled conditions. This erroneous impression probably comes from the testing of pharmaceutical drugs in "randomized, double-blind, placebo-controlled" [clinical trials](#). However, there are numerous phenomena where controlled experiments are impossible or impractical. In these cases, scientists use [phenomenological investigation](#) in conjunction with [theoretical development](#), for example, in the field of astrophysics and in the early development of quantum physics (with blackbody radiation, the photoelectric effect, the Bohr model of the atom, etc.). With this alternative method, the investigator looks for anomalous phenomena (or anomalous aspects of a known phenomenon) and develops a theoretical model that explains the phenomenon, including the anomalous aspects. The explanation may or may not be mathematical in nature.

NDEs are very amenable to phenomenological investigation and the variety of NDEs contain numerous anomalous or paranormal aspects, where an anomaly may appear in a small number of cases, but nonetheless is repeated sufficiently to warrant theoretical development. Clear examples of an anomalous NDE aspect, of course, are apparently non-physical veridical perceptions -- AVPs -- which have been studied statistically (Holden, 2009) and phenomenologically (Rivas, Dirven & Smit, 2013), with recent theoretical development (Mays & Mays, 2015, submitted for publication). ([IANDS is now working to translate the Rivas, Dirven & Smit book.](#))

On the other hand, imposing an *experimental requirement* in investigating NDEs, as in the AWARE study, is problematic because the experimental conditions can't be controlled. In the AWARE study set up, where and when an NDE might occur, whether the NDEr might look in the direction of the target, recognize it, remember it and be inclined to report it, can't be controlled. The target itself is problematic requiring choosing where and how many targets should be installed and in protecting the confidentiality of the images.

Third problem - considering only cardiac arrest cases as the best model

From the beginning of NDE research in the 1970s, there has been the underlying assumption that NDEs must occur "near death", especially with the choice of terminology of "near-death experience" and "near-death studies". However, there have always been cases reported where the NDEr was not "near death" at all, so-called near-death-like experiences. NDE researchers have known these cases for decades, with well-documented cases of anticipatory NDEs ("fear death" experiences), going at least back to Albert von St. Gallen Heim (1892). The [recent study by Vanessa Charland-Verville, Steven Laureys et al.](#) (2014) has shown convincingly that there is no difference in intensity and content between NDEs resulting from sleep, syncope (fainting) and meditation and those resulting from coma-related incidents (drowning, cardiac arrest, serious illness).

The unfortunate choice of the terminology and the underlying assumption have also limited the scope of investigation and the choice of what evidence to pursue in studying NDEs. So a lot of theoretical work and analysis has gone into showing that NDEs occur in their "purest" and "deepest" form when the brain's electrical activity has stopped. Thus, any anomalous aspect that can be shown to have occurred during electrical flat line will provide the clearest evidence that consciousness can operate independent of the brain. So the best model of NDEs occurring "near death", as Parnia and other NDE researchers assert, is "actual death", the clinical death that occurs with cardiac arrest.

Unfortunately, the choice of clinical death due to cardiac arrest as the "gold standard" for NDE evidence is based on an incorrect assumption and, in our opinion, unfortunate earlier analyses of NDE data (see Mays & Mays, 2015). Furthermore, the requirement to demonstrate there was no brain electrical activity and therefore there was a real "separation" of the mind from the body is very problematic because of the generally short window between an arrest in a hospital setting and the resuscitation. The cardiac arrest model is also problematic because it engenders endless debates as to when exactly the NDE awareness occurred, when the brain activity stopped and restarted, and whether there was residual brain activity happening anyway in between those times.

There are further problems in limiting a prospective NDE study to cardiac arrest cases: (1) the difficulty of getting enough cases due to the low survival rate, and (2) the likely confounding factor with cardiac arrest (in cases where there has not been significant cooling of the brain), namely, damage to the hippocampus. According to the literature, the hippocampus is the most susceptible part of the brain to damage from lack of oxygen.

Proposal for an alternative experimental design

Rather than operate under the restrictions of the AWARE study's protocol -- only cardiac arrest cases using an experimental model of hidden visual targets -- we would propose a prospective phenomenological analysis of all cases in a hospital where there was a planned or unplanned loss of consciousness (anesthesia, trauma, syncope, coma, etc.). A follow-up protocol would be used to ask the patient if anything unusual had occurred. If something unusual was experienced, then employ follow-up interviews to determine if an NDE had occurred, further whether there was any auditory/visual awareness of the physical world and further to investigate and check the accuracy of those perceptions.

Hidden targets should also be used as in the AWARE study, with the more modest objective to increase the possibility that a purely visual, idiosyncratic object might be perceived that was clearly out of the physical sight of the patient (and everyone else). The hidden targets could be placed in every room where a patient might be, in a single hospital.

All aspects of any reported AVPs should be investigated in detail, especially purely visual, idiosyncratic perceptions, especially the hidden images (Mays & Mays, 2009). Independent accounts from other relevant witnesses should be collected, as well as ancillary evidence from the NDEr and witnesses, like drawings and photographs of the relevant aspects of the experience.

This proposed protocol is very similar to the prospective studies done by [intensive care nurse Penny Sartori, Ph.D.](#) (2008, 2014) and, less formally, by [critical care physician Laurin Bellg, M.D.](#) (2015), so a pilot study to test the efficacy of the protocol could be abbreviated. The proposed protocol could be expanded to investigate and document *all* paranormal aspects of NDEs that are encountered, not just AVPs (for example, cases of unusual healings), as did both Sartori and Bellg.

The theoretical value of such a protocol is comparable to the AWARE study's without the latter's problems:

- There would be many more cases of NDEs with less difficulty obtaining thorough patient interviews and later follow ups.
- The evidential value of the hidden targets remains, as another potential unusual visual perception than as the requirement for hypothesis validation. Because the targets are highly unusual and are deliberately placed out of physical sight, if a target is seen and accurately identified, it becomes very potent evidence for mind-body separation.
- It is much easier to show that there was no physical way that the perceptions could have occurred and therefore the mind (the locus of consciousness) must have separated from the body than to show that the perceptions occurred during the few minutes of the cardiac arrest when the brain was not functioning. Debates about the timing of electrical brain activity become irrelevant under this protocol.
- If the event or object is unusual or idiosyncratic then the arguments about prior knowledge and reconstructed memories are also eliminated for all but the most ardent skeptics.
- As a prospective phenomenological study, this protocol will rely on the weight of evidence from analyzing numerous instances of "free-range" AVPs rather than the documented results of an experimental setting. Arguments about the lack of positive results (such as, "In all of the studies, there has never been a single case where the hidden target was seen.") will become irrelevant, particularly if one of the hidden targets is ultimately seen.

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