DANISH MEDICAL JOURNAL

Original Article

Validation of the Near-Death Experience Content Scale in cardiac arrest survivors

Tobias Anker Stripp[1, 2, 3] & Niels Christian Hvidt[4]

1) Centre for Science and Faith, Systematic Theology Section, University of Copenhagen, 2) Comparative Pediatrics, Department of Veterinary and Animal Sciences, University of Copenhagen, 3) Research Unit for General Practice, Department of Public Health, University of Southern Denmark, 4) User Perspectives and Community-based Interventions, Department of Public Health, University of Southern Denmark, Denmark

Dan Med J 2026;73(7):A12251012. doi: 10.61409/A12251012

ABSTRACT

INTRODUCTION. Near-death experiences (NDEs) are phenomena reported by individuals who have been, or perceived themselves to be, close to death. Although extensively studied internationally, no validated questionnaire exists in Danish. We aimed to evaluate the psychometric properties of the Danish version of the Near-Death Experience Content Scale (NDE-C).

METHODS. We conducted a cross-sectional survey of out-of-hospital cardiac arrest survivors (2016-2020) identified through the Danish Cardiac Arrest Register. Survivors reporting memories of their arrest completed the 20-item Danish NDE-C. Among the 2,262 invited patients, 855 responded (37.8%), and 226 completed the NDE-C.

RESULTS. Internal consistency was excellent (Cronbach's α = 0.92). Confirmatory factor analysis supported the conceptual five-factor structure; however, global fit indices were mixed (comparative fit index = 0.858; Tucker-Lewis Index = 0.831; root mean squared error of approximation = 0.093; standardised root-mean squared residual = 0.062). Factor loadings and discriminant validity were satisfactory.

CONCLUSIONS. The Danish NDEC scale showed excellent internal consistency and a preliminary factor structure consistent with the original instrument. Supported by prior qualitative work, the scale appears suitable for overall scoring, screening and guiding clinical dialogue about NDEs. However, subscale interpretation should be approached with caution until validated in larger samples. This study represents an important step towards systematic NDE research on prevalence estimates, cross-cultural comparisons and evidence-based clinical care for experiencers and their relatives in Denmark.

FUNDING. This work was supported by the University of Southern Denmark and the University of Copenhagen, and funded by Samfonden, Denmark.

TRIAL REGISTRATION. Not relevant.

Near-death experiences (NDEs) are profound phenomena reported by individuals who have been, or perceived themselves to be, close to death. Despite decades of international research and growing public interest, systematic investigation of NDSs in Denmark is minimal. To move beyond anecdotal accounts and enable rigorous inquiry into NDEs in a Danish context, a validated instrument for measuring NDEs is essential. Such a tool would allow reliable prevalence estimates and cross-cultural comparisons, thereby providing a foundation for evidence-based clinical practice while potentially improving care for critically ill patients with NDEs and their families.

NDEs are clinically relevant because they occur with notable frequency among critically ill patients [1].

Prospective studies report varying prevalences of NDEs in cardiac arrest survivors (6.3-39.3%) [2]. In Denmark, the annual prevalence of out-of-hospital cardiac arrest (OHCA) is ~ 5,000 (~ 70% male), with a 30-day survival of ~ 13% [3]. This corresponds to an estimated annual prevalence of 40-255 individuals among OHCA survivors alone. While often described as positive, a considerable minority (14%) report distressing experiences [4], which may have negative psychological sequelae [4, 5]. Aftereffects – such as increased meaning in life, spirituality and reduced fear of death – are consistently reported and can profoundly influence the near-death experiencer (NDEr) across the lifespan [5]. However, psychological integration of the experience can be challenging [6]. Healthcare professionals therefore need awareness and sensitivity when encountering patients who disclose NDEs [7].

Beyond clinical implications, NDEs raise fundamental questions about consciousness and its relationship to brain function, particularly in light of reports of veridical perception during periods of clinical death [8]. Systematic study of NDEs in Denmark, as well as internationally, is thus not only a matter of patient care but also of scientific inquiry into one of medicine's most profound and still unresolved questions.

Several instruments have been developed to study NDEs. Ring's Weighted Core Experience Index was an early attempt, but the Greyson Near-Death Experience Scale from 1983 [9] became the gold standard. A Norwegian translation of the Greyson scale exists but lacks psychometric validation. Other tools, such as the Mystical Experience Questionnaire [10], assess related phenomena but are not specific to NDEs and omit distressing content. To reflect advances in NDE research, improve psychometric properties of previous scales and capture negative experiences, researchers developed the 20-item Near-Death Experience Content Scale (NDE-C), updating Greyson's scale [11]. Confirmatory factor analysis (CFA) supports a five-factor structure: Beyond the usual (paranormal sensations, veridical perceptions), Insight (life review, sudden understanding), Border (point-of-no-return, fear/void), Harmony (peacefulness, unity), and Gateway (bright light, tunnel or door).

We used an exploratory cross-sectional survey among out-of-hospital cardiac arrest survivors to provide an initial psychometric evaluation of a Danish translation of the NDE-C by assessing its internal consistency and testing its structural validity using CFA.

Methods

This study is based on survivors of OHCA from 2016 to 2020 (n = 2,785) identified through the Danish Cardiac Arrest Register, who participated in the EXICODE study (a national survey linked to administrative health register data) [12]. Survivors were invited via secure digital mail to the survey, which included a unique question about having any memories from a life-threatening situation, such as their cardiac arrest: "A life-threatening situation or illness (such as an accident, cardiac arrest or cancer) can cause some people to lose or experience an altered sense of consciousness. Some may subsequently recount memories from the time when they had lost or experienced an altered state of consciousness, whereas others cannot remember anything. Do you have any memories from such an experience?" [13]. This probe was successfully tested through cognitive interviews with self-identified NDErs [13]. If responding "yes" or "don't know", they were presented with a question panel including the NDE-C. Data were collected between 1 November and 13 December 2021. A single reminder was sent to any non-responders.

Measures

The primary outcome was the intensity of NDEs, measured using the Danish version of the 20-item NDE-C [11]. The translation of the NDE-C into Danish and its qualitative testing were reported elsewhere [13]. The scale is a Likert-type instrument with the following response options: "0 - not at all; none", "1 - slightly", "2 - moderately", "3 - strongly; equivalent in degree to any other strong experience", and "4 - extremely; more than any other time

in my life and stronger than 3". The total score is the sum of all items (range: 0-80). In the development study, the authors reported an overall Cronbach's α of 0.85 and suggested a cutoff of> 27 points for considering an experience/memory as an NDE [11].

Age and sex (considered binary as biological sex) were drawn from register data based on the unique ten-digit personal identity number that all Danish citizens have (CPR number).

Statistical analyses

The psychometric properties of the NDE-C were tested by Cronbach's α and CFA in a structural equation model framework that tested both four- and five-factor models with item-factor relations informed by the original validation article, using only full NDE-C datasets. Goodness-of-fit was assessed by the following measures and associated predefined thresholds for a good fit: root mean squared error of approximation (RMSEA): < 0.08; standardised root-mean squared residual (SRMR): < 0.08; Tucker-Lewis Index (TLI): ≥ 0.95; Comparative Fit Index (CFI): ≥ 0.90 [14]. Participants were excluded from the main analyses if they had not responded to the question enquiring about their memories during cardiac arrest. Only register variables had missing values (0-1.8%). Missing categorical variables were imputed to the majority category. Missing values for continuous variables (0-2%) were imputed using the overall mean. All statistical analyses were performed using STATA 18 with a 5% significance level.

Trial registration: not relevant.

RESULTS

In total, 2,262 individuals received the invitation (n = 523 did not). Among the invited individuals, 855 OHCA survivors responded (response rate: 37.8%), with 738 included in the final analyses (n = 117 had missing data on the memory question during life-threatening illness). The mean age was 63.6 years (SD = 10.7 years), and 80% of responders were male. The mean overall score of the NDE-C was 14.7 (SD = 15.3), with the mean score for those with overall scores ≥ 27 being 40.3 (SD = 12.3). The distribution of responses is shown in **Table 1**, which also includes both Danish and English item versions.

TABLE 1 The Danish and English versions of the Near-Death Experience Content Scale (NDE-C) and the distribution of responses (N = 226).

Item no.	Question: Danish English	Category, n (%) 0: not at all	1: slightly	2: moderately	3: strongly[a]	4: extremely[b]
NDE-C1	Din tidsopfattelse blev ændret Your perception of time was altered	101 (44.7)	36 (15.9)	42 (18.6)	24 (10.6)	23 (10.2)
NDE-C2	Dine tanker blev hurtigere? Your thoughts speeded up?	118 (52.2)	35 (15.5)	37 (16.4)	30 (13.3)	6 (2.7)
NDE-C3	Du hørte en eller flere stemmer, som ikke kom fra en fysisk krop? You heard one or more voices that had no material incarnation?	178 (78.8)	14 (6.2)	14 (6.2)	14 (6.2)	6 (2.7)
NDE-C4	Du havde opfattelsen af pludseligt at forstå dig selv, andre og/eller universet fuldstændigt? You had the feeling of suddenly understanding everything about yourself, the others and/or the universe?	154 (68.1)	29 (12.8)	26 (11.5)	12 (5.3)	5 (2.2)
NDE-C5	Du havde en følelse af fred og/eller velvære? You had a feeling of peace and/or well-being?	105 (46.5)	29 (12.8)	34 (15.0)	27 (11.9)	31 (13.7)
NDE-C6	Du havde en følelse af harmoni eller samhørighed, som om du var en del af et hele? You felt a sense of harmony or unity, as if you belonged to a larger whole?	125 (55.3)	32 (14.2)	26 (11.5)	25 (11.1)	18 (8.0)
NDE-C7	Du så eller var omgivet af et skinnende lys uden et bestemt fysisk udgangspunkt? You saw or felt surrounded by a bright light without any determined material origin?	166 (73.5)	23 (10.2)	11 (4.9)	11 (4.9)	15 (6.6)
NDE-C8	Du havde usædvanlige sanseoplevelser (se, høre, lugte, føle og/eller smage)? You experienced unusual sensations (sight, hearing, smell, touch and/or taste)?	146 (64.6)	26 (11.5)	22 (9.7)	17 (7.5)	15 (6.6)
NDE-C9	Du var bevidst om ting ud over hvad dine sanser sædvanligvis kan opfatte? You were aware of things beyond what your senses can usually perceive?	144 (63.0)	32 (14.2)	18 (8.0)	19 (8.4)	13 (5.8)
NDE-C10	Du opnåede indsigt i fremtiden? You gained insightful knowledge about the future?	175 (77.4)	19 (8.4)	19 (8.4)	9 (4.0)	4 (1.8)
NDE-C11	Du havde en følelse af at være udenfor eller adskilt fra din krop? You had the impression of being outside of, or separated from, your own body?	156 (69.0)	24 (10.6)	16 (7.1)	14 (6.2)	16 (7.1)
NDE-C12	Du havde en oplevelse af at forlade den jordiske verden eller at gå ind i en ny dimension og/eller nyt miljø? You had the sensation of leaving the earthly world or of entering a new dimension and/or environment?	165 (73.0)	18 (8.0)	17 (7.5)	14 (6.2)	12 (5.3)
NDE-C13	Du genså eller genoplevede én eller flere begivenheder fra din fortid? You saw or relived events from your past?	176 (77.9)	20 (8.8)	15 (6.6)	7 (3.1)	8 (3.5)
NDE-C14	Du mødte en tilstedeværelse og/eller et væsen (f.eks. en afdød person)? You encountered a presence and/or an entity (who might be deceased)?	187 (82.7)	6 (2.7)	14 (6.2)	11 (4.9)	8 (3.5)
NDE-C15	Du havde en følelse af ikke-eksistens, af fuldstændig tomhed og/eller frygt? You had a feeling of non-existence, of being in a total void, and/or of fear?	161 (71.2)	28 (12.4)	24 (10.6)	4 (1.8)	9 (4.0)
NDE-C16	Du havde oplevelsen af en grænse og/eller et punkt, hvorfra du ikke ville kunne komme tilbage igen? You came close to a border and/or point of no return?	180 (79.6)	17 (7.5)	18 (8.0)	5 (2.2)	6 (2.7)
NDE-C17	Du tog beslutningen om eller var tvunget til at komme tilbage fra oplevelsen? You made the decision, or were forced, to come back from the experience?	157 (69.5)	26 (11.5)	19 (8.4)	7 (3.1)	17 (7.5)
NDE-C18	Du fik indtryk af at dø og/eller at være død? You had the feeling of dying and/or being dead?	144 (63.7)	24 (10.6)	17 (7.5)	22 (9.7)	19 (8.4)
NDE-C19	Du så eller kom ind i et overgangsområde (f.eks. en tunnel eller en port)? You saw or entered a gateway (for instance a tunnel or a door)?	180 (79.6)	15 (6.6)	11 (4.9)	10 (4.4)	10 (4.4)
NDE-C20	Du oplever, at du ikke besidder de rette ord til at beskrive din oplevelse? You sense that the experience cannot be described adequately in words?	120 (53.1)	33 (14.6)	29 (12.8)	19 (8.4)	25 (11.1)

a) Equivalent in degree to any other strong experience.
b) More than any other time in my life and stronger than 3.

Psychometric analyses (n = 226) of the NDE-C estimated internal consistency with an overall Cronbach's α of 0.92. The CFA indicated that a five-factor model was superior to a four-factor model in terms of goodness of fit, although the overall model fit for both models was mixed. The global fit indices were generally below the predefined thresholds for a good fit, with the CFI at 0.858 and the TLI at 0.831. Furthermore, the RMSEA of 0.093 suggested that the model is not a close fit to the data. Conversely, the SRMR of 0.062 was well within the acceptable range, indicating that the model successfully reproduced the observed correlation matrix. Locally, the model exhibited excellent convergent validity, as demonstrated by the overwhelmingly strong factor loadings between observed and latent factors throughout (**Figure 1**). For instance, item NDE-C2 ("Your thoughts speeded up") loaded at 0.97 on the *Beyond the usual* latent factor, indicating that it is an exceptional measure of its construct. Discriminant validity was also satisfactory, with in-between factor correlations of 0.41-0.73, the largest correlation was found between *Border* and *Gateway*. While the relationship between the two factors was strong, it allowed them to remain conceptually distinct and statistically distinguishable.

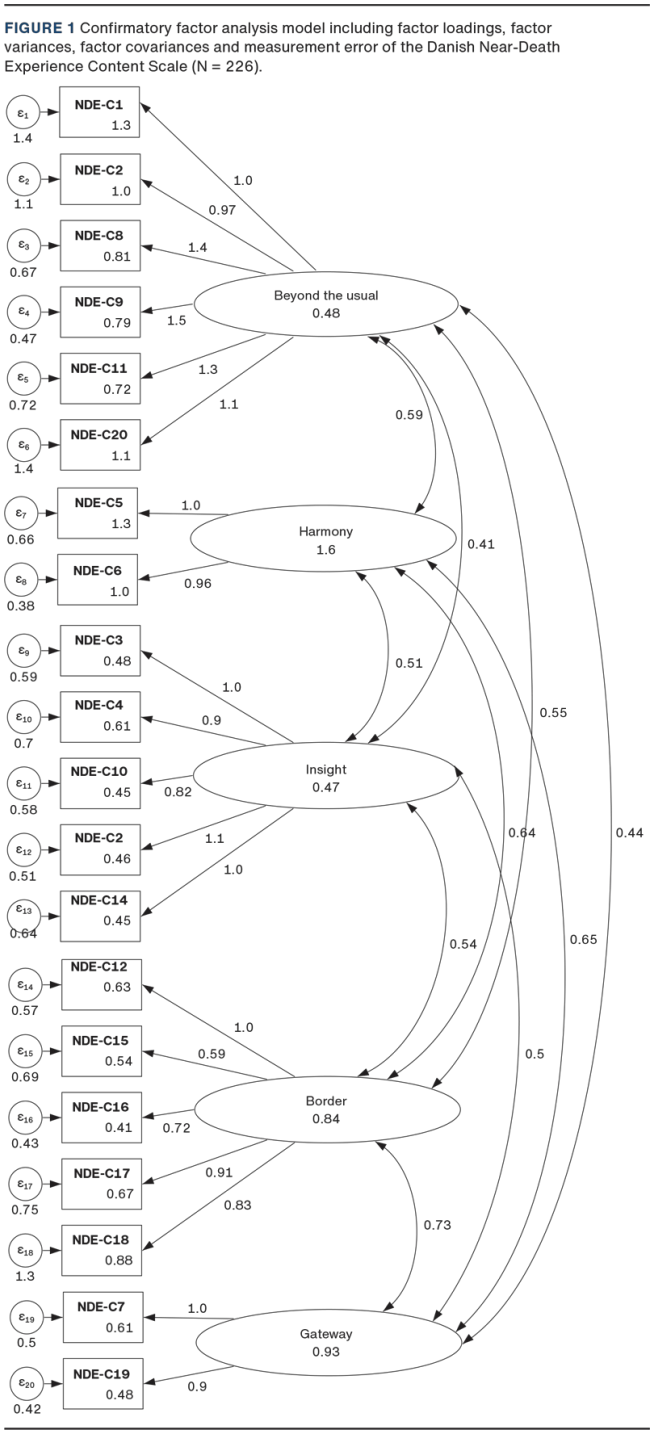

FIGURE 1 Confirmatory factor analysis model including factor loadings, factor variances, factor covariances and measurement error of the Danish Near-Death Experience Content Scale (N = 226).

DISCUSSION

This study presents an initial psychometric evaluation of the Danish NDE-C scale in a sample of 226 OHCA survivors between 2016 and 2020.

The Danish NDE-C appears suitable for use in both research and clinical contexts, with strong internal consistency (Cronbach's α of 0.92) and good content validity (supported by prior qualitative cognitive interviews [13]). This supports the use of the NDE-C total score to assess NDE phenomenology among Danish OHCA survivors (and potentially other critically ill patient groups, although this remains to be assessed). Researchers

and clinicians can use the scale for overall measurement, screening and structuring clinical dialogue to explore, validate and normalise patient experiences. Currently, NDE scholars recommend an open and non-judgemental approach to NDE disclosures [7], as no neurophysiological model (e.g. pharmacological effects, delirium, hallucination, cerebral hypoxia, etc.) fully explains the phenomenon [15-17]. Structural validity remains preliminary due to mixed CFA fit indices. While the SRMR fell within the acceptable range, the CFI, TLI and RMSEA did not meet conventional thresholds for a good fit. A likely explanation is the relatively low number of respondents relative to the model's complexity and parameter count, along with sampling differences from the original validation (OHCA survivors versus self-identified NDErs). This suggests that the observed model-fit issues may reflect samplerelated artefacts rather than genuine structural weaknesses. Even so, interpretations at the subscale or dimension level should remain tentative until the scale is validated in larger samples.

The NDE-C was developed to improve the Greyson NDE scale by adding an item to capture potentially negative experiential content. A related theoretical concern is whether reported negative experience content [4] reflects the “NDE proper” or stems from misinterpretations of real medical interventions, e.g., cardiopulmonary resuscitation and/or emergence from coma, as some scholars argue [16]. If the latter is the case, including an item on negative experience content that contributes to the overall NDE score would negatively affect content validity and the cut-off criteria.

Furthermore, since item “NDE-C15” is triple-barreled in probing “void/fear/non-existence”, it is impossible to assess the actual emotional valence of a positive response, let alone for the specific narrative content to which the respondent refers. Fear is likely negative or distressing, whereas experiences of void/non-existence are not necessarily so. Accompanying qualitative data, a single-barreled item on distressing content and/or research into the shifting valence and its explanatory mechanisms are warranted. In any case, classification of NDEs - whether containing distressing elements or not, as simply negative or positive, is likely an overly crude reduction. Due to these potential conceptual limitations and other reasons, a comprehensive psychometric comparison between the original Greyson NDE scale and the NDE-C scale, which was published after the present research, actually recommends staying with the original Greyson scale [18]. Time will tell whether a validation of the Greyson scale in Danish will be relevant.

Perspectives

Having a validated Danish measure of NDE content is a key step towards research into these experiences and their impact on patients and their relatives in a Danish context [19]. This could support the disclosure of religious or spiritual experiences in secular Danish health care contexts. Such disclosure may be influenced by barriers like time constraints, shame or professional insecurity when dealing with these topics, despite reported spiritual needs [20]. NDEs occupy an important and growing intersection between clinical medicine, neuroscience, psychology and existential or spiritual care, yet remain underexplored. In Denmark, as in many other countries, the field has received limited research attention and minimal dedicated funding, despite societal interest and growing evidence that NDEs can profoundly affect individuals’ beliefs, values and mental health.

Strengths and limitations

The sampling was strengthened by comprising the full population of OHCA survivors in Denmark from 2016 to 2020, identified through a nationwide cardiac arrest register, which renders sampling bias unlikely. The number of respondents who completed the NDE-C (n = 226) is relatively small for a complex CFA model, which may have contributed to the marginal global fit indices. Validation against the Greyson scale and inclusion of qualitative narratives would have been ideal, but space limitations in the EXICODE study made this impossible.

Conclusions

This psychometric evaluation of the NDE-C in a sample of OHCA survivors found that the instrument demonstrates excellent internal consistency and an acceptable, though still preliminary, factor structure that is broadly aligned with the original validation. Content validity was established through previous qualitative interviews conducted during translation. These findings provide an initial foundation for using the NDE-C in both research and clinical contexts to systematically assess the phenomenology of NDEs in Denmark. In practice, the scale appears suitable for overall measurement (i.e., the total NDE-C scale score), screening, and structuring clinical dialogue, including supporting clinicians in validating and normalising patient experiences. However, because structural validity remains provisional and likely influenced by sample size, subscale-level interpretations should be treated cautiously until further validation in larger samples is available. Future research in Denmark should continue to explore NDEs, including basic prevalence studies and investigations of how NDE content relates to clinical outcomes and to patients' existential or spiritual care needs.

Correspondence *Tobias Anker Stripp.* E-mail: tas@teol.ku.dk

Accepted 13 February 2026

Published 23 June 2026

Conflicts of interest TAS reports financial support from or interest in the University of Southern Denmark, the University of Copenhagen, and Samfonden Denmark. Both authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. These are available together with the article at ugeskriftet.dk/dmj

Acknowledgements The authors take this opportunity to express their gratitude to the study participants who willingly contributed their stories and data to enhance care for cardiac arrest survivors and science at large. Additionally, the authors thank Dr Sonja Wehberg, University of Southern Denmark, for statistical support and help in designing the study, and Prof. Jens Søndergaard, University of Southern Denmark, for help in designing the study

References can be found with the article at ugeskriftet.dk/dmj

Cite this as Dan Med J 2026;73(7):A12251012

doi 10.61409/A12251012

REFERENCES

1. Michael P, Fritz P, Gosseries O, et al. The central clinical relevance of near-death experiences in acute care contexts: identification, prediction, and management. Front Psychol. 2025;16:1544438. https://doi.org/10.3389/fpsyg.2025.1544438
2. Kovoor JG, Santhosh S, Stretton B, et al. Near-death experiences after cardiac arrest: a scoping review. Discov Ment Health. 2024;4(1):19. https://doi.org/10.1007/s44192-024-00072-7
3. Møller SG, Wissenberg M, Møller-Hansen S, et al. Regional variation in out-of-hospital cardiac arrest: incidence and survival - a nationwide study of regions in Denmark. Resuscitation. 2020;148:191-199. https://doi.org/10.1016/j.resuscitation.2020.01.019
4. Cassol H, Martial C, Annen J, et al. A systematic analysis of distressing near-death experience accounts. Memory. 2019;27(8):1122-1129. https://doi.org/10.1080/09658211.2019.1626438
5. Miquel-Sendra A, Garcia-Alandete J. Systematic review on the aftereffects of near-death experiences. Omega (Westport). 2025;302228251350515. https://doi.org/10.1177/00302228251350515
6. Rominger R. Integration of spiritually transformative experiences: models, methods, and research. J Near-Death Stud. 2013;31(3):135-150
7. Holden JM, Kinsey L, Moore TR. Disclosing near-death experiences to professional healthcare providers and

nonprofessionals. Spiritual Clin Pract. 2014;1(4):278-287. https://doi.org/10.1037/scp0000039

8. van Lommel P. Near-death experiences: the experience of the self as real and not as an illusion. Ann N Y Acad Sci. 2011;1234:19-28. https://doi.org/10.1111/j.1749-6632.2011.06080.x
9. Greyson B. The near-death experience scale. Construction, reliability, and validity. J Nerv Ment Dis. 1983;171(6):369-375. https://doi.org/10.1097/00005053-198306000-00007
10. Maclean KA, Leoutsakos JMS, Johnson MW, et al. Factor analysis of the Mystical Experience Questionnaire: a study of experiences occasioned by the hallucinogen psilocybin. J Sci Study Relig. 2012;51(4):721-737. https://doi.org/10.1111/j.1468-5906.2012.01685.x
11. Martial C, Simon J, Puttaert N, et al. The Near-Death Experience Content (NDE-C) scale: development and psychometric validation. Conscious Cogn. 2020;86:103049. https://doi.org/10.1016/j.concog.2020.103049
12. Stripp TK, Wehberg S, Büssing A, et al. Protocol for EXICODE: the EXIstential health COhort Denmark - a register and survey study of adult Danes. BMJ Open. 2022;12(6):e058257. https://doi.org/10.1136/bmjopen-2021-058257
13. Stripp TA, Viftrup DT, Nissen RD, et al. Testing the acceptability and comprehensibility of a questionnaire on existential and spiritual constructs in a secular culture through cognitive interviews. Surv Res Methods. 2023;17(1):75-89. https://doi.org/10.18148/srm/2023.v17i1.7971
14. Hooper D, Coughlan J, Mullen M. Structural equation modeling: guidelines for determining model fit. Electron J Bus Res Methods. 2008;6(1):53-60. https://doi.org/10.21427/D7CF7R
15. Parnia S, Post SG, Lee MT, et al. Guidelines and standards for the study of death and recalled experiences of death - a multidisciplinary consensus statement and proposed future directions. Ann N Y Acad Sci. 2022;1511(1):5-21. https://doi.org/10.1111/nyas.14740
16. Parnia S, Shirazi TK, Patel J, et al. AWAreness during REsuscitation II: a multi-center study of consciousness and awareness in cardiac arrest. Resuscitation. 2023;191:109903. https://doi.org/10.1016/j.resuscitation.2023.109903
17. van Lommel P, van Wees R, Meyers V, et al. Near-death experience in survivors of cardiac arrest: a prospective study in the Netherlands. Lancet. 2001;358(9298):2039-2045. https://doi.org/10.1016/S0140-6736(01)07100-8
18. Pehlivanova M, Lange R, Greyson B, Houran J. Operationalizing near-death experiences: stability of the NDE Rasch hierarchy over two decades. Conscious Cogn. 2026;139:103979. https://doi.org/10.1016/j.concog.2025.103979
19. Stripp TK, Joshi VL. A review of existential concerns of cardiac arrest survivors and implications for rehabilitation: do we need a new tool in the toolbox? Tidsskr Forsk Sygdom Samfund. 2023;20(38):25-48. https://doi.org/10.7146/tfss.v20i38.131489
20. Stripp TA, Jensen LH, Wehberg S, et al. Spiritual needs following cancer diagnosis: a national cross-sectional survey of randomly selected adults and cancer patients linked to nationwide registers. Soc Sci Med. 2025;381:118198. https://doi.org/10.1016/j.socscimed.2025.118198

