



The International NERSH Data Pool of Health Professionals' Attitudes Toward Religiosity and Spirituality in 12 Countries

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Abstract

The amount of research concerned with the values of health professionals (HPs) is steadily growing. Around the world HPs face similar challenges when patients express their existential and spiritual views. How HPs engage these views, and the degree of embedment into consultations, differ across cultures. Today, more than ever before, researchers in this field need to share experiences and build new knowledge upon local findings. To meet this demand, we founded the international collaboration “Network for Research on Spirituality and Health” (<https://NERSH.org>). One of the central projects of our network has been to build a large international data pool of health professionals' attitudes toward religiosity and spirituality. Today the data pool hosts answers from more than 6,000 health professionals from 17 separate surveys derived from 12 countries. Data were gathered by either the questionnaire “Religion and Spirituality in Medicine, Perspectives of Physicians” (RSMPP) or its successor ‘NERSH Questionnaire’. In this article we describe the methodology behind the construction of the data pool. We also present an overview of five available scales related to HP religiosity and spirituality, including a description of scale reliability and dimensionality.

Keywords Religion · Spirituality · Health professionals · Religiosity scale · Data pool

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Introduction

Severe illness often challenges patients' existential understanding of themselves. If health care systems want to take responsibility for the whole person, and not just the bodily diseases, this understanding must be a topic that can be brought up in conversations between health professionals and patients during all treatment phases.

Patients' existential and spiritual experiences (these terms will be used interchangeably in this paper) can easily become unmanageable for health professionals; partly due to lack of education in this field, but also because these experiences are not easily described in objective terms. Rather it is necessary for the health professionals to invest themselves as persons in the relationship, and accept patients as existentially equal individuals. Only through mature and insightful relationships with patients can health professionals continually approach a better understanding of the patients' phenomenological experiences. This process not only demands a large personal investment by health professionals, but also threatens the façade of the ideal of value-neutrality. We fear that such mutually honest and candor relationships between patients and health professionals, in many health care systems world-wide, are still rare.

This recognition has fostered scientific interest in the values of health professionals. More articles are published on this topic than ever before, and stakeholders extend beyond patients and health professionals into clergy members, philosophers and politicians.

Being part of this research field our research collaboration Network for Research in Spirituality and Health (<https://NERSH.org>) has now gathered the worlds' largest international data pool of health professionals' attitudes toward religiosity and spirituality. The present article is a methodological description of the construction of this data pool, including an overview of the development and validation of four new scales of different religious dimensions of health professionals. For a thorough description of the NERSH collaboration, questionnaire development and an overview of our results please see Hvidt 2019 (in writing).

Background

Since 2002 several surveys have been conducted investigating health professionals' (HP) attitudes toward religiosity/spirituality (R/S), including opinion on whether R/S influence patient health, HPs' willingness to discuss R/S issues with patients, their attitudes toward objections against a list of ethical dilemmas, and about potential barriers against addressing R/S in clinical practice. This process began with the US American questionnaire "Religion and Spirituality in Medicine: Physicians' Perspectives" (RSMPP) developed by Curlin and colleagues (2004). Based on this questionnaire, Curlin presented evidence that physicians' attitudes towards religion and spirituality influence their interaction with patients (Curlin et al. 2004, 2005, 2006, 2007a). Starting in 2008 several research groups picked up the questionnaire, and found results supporting the findings by Curlin (Lee and Baumann 2013; Lucchetti et al. 2016; Ramakrishnan et al. 2014a;

Butcher 2013; Al-Yousefi 2012; Randwijk et al. 2018), albeit significant cross-cultural differences existed, mainly regarding prevalence and distribution of religious faiths. Over the years collaboration between the research groups developed into the foundation of the global *Network for Research in Spirituality and Health* (<http://NERSH.org>) (Hvidt et al. 2016).

Within the NERSH collaboration, we are continuously collecting and pooling data on HP values from independent studies conducted by research teams around the world. At the time of writing (April 2019) the data pool comprises more than 6,000 respondents from 17 survey samples from 12 countries. Four scales have been developed to cover religious dimensions of relevance to the research of HP religiosity.

The Questionnaire

Since its development, the RSMPP questionnaire was translated into five languages (German, Danish, Portuguese, French and Korean), and research teams from around the world published their national findings in the following decade (Lee and Baumann 2013; Lucchetti et al. 2016; Ramakrishnan et al. 2014a; Al-Yousefi 2012; Lee et al. 2011; Ramakrishnan et al. 2014b, 2014c; Tomasso et al. 2011). Most research teams added and/or subtracted items to fit their study needs. After the NERSH collaboration was founded in 2014 at Freiburg Institute for Advanced Studies (FRIAS) by Hvidt, Büssing and Baumann and joined by Frick, the content and structure of the RSMPP were discussed at two meetings. NERSH researchers decided to add some new items and to remove obsolete ones based on a decade of experience with the original questionnaire worldwide. One limitation of the original RSMPP was that it targeted particularly physicians. Thus, revision targeted this problem by adjusting the scope of several of the questions to target all health professionals. The total amount of changes was considered substantial enough to merit a new name for this questionnaire. Formally titled “Questionnaire of the NERSH—Religiosity/Spirituality in Health Professions”, it is most often referenced by the short-hand name: “NERSH Questionnaire”. For a rich description of the development of the NERSH questionnaire as a research tool see (Hvidt et al. 2016).

Building the NERSH Data Pool

The process of building the data pool was broken down into six phases. (1) Defining the inclusion and exclusion criteria, (2) Literature search, (3) Data Collection, (4) Analyzing data for item compatibility, (5) Selecting items for the data pool, (6) Data management and enforcement of compatibility rules.

Defining Inclusion and Exclusion Criteria

We were interested in all questionnaire data based on either the RSMPP or NERSH Questionnaire. We accepted customized versions of the questionnaires

as long as core parts of the questionnaire were extracted from the RSMPP or NERSH Questionnaire version. Only respondents of health professionals were included, but all health care occupations were included on equal terms.

Empty responses were excluded. Information about gender was mandatory. As some responders were students, the minimum age was set to 18 years.

Literature Search

Based on the NERSH collaboration all samples gathered by collaborators were collected by the first (AK) and last author (NCH). In addition, the same authors performed a citations search in Web of Science and also a systematic literature search in Medline, Embase, PsycInfo, Web of Science and Google Scholar in April 2016 in order to identify any surveys conducted by researchers outside the network. The citations search looked for articles citing any of eight articles by Curlin based on the original RSMPP survey (Curlin et al. 2006, 2004; 2007a, b, c, d, e, 2008). Search strings are available in the supplemental material.

The citation search found 316 publications, and the literature search found 1572 articles. A systematic review of the articles was done by the first and last authors using the software program Covidence in April 2016. Two previously unknown samples were identified: a survey of Brazilian nurses and their teaching professors by Tomasso et al. (2011) and a Saudi-Arabian survey by Al-Yousefi focusing on Muslim physicians (Al-Yousefi 2012). Both corresponding authors were contacted and invited to join the collaboration, and both agreed.

Data Collection

All participating research groups signed agreements to share their original questionnaire data. Data from all surveys were sent to the first author (AK) as data manager of the NERSH Data Pool. The first deadline for submitting samples to the data pool was August 2016, where the first version of the data pool was built (Kørup et al. 2017). By March 2019, a second version of the data pool was built including three additional samples from Brazil, Switzerland and South Korea.

The size of the questionnaires ranged from 24 variables in the surveys from Saudi Arabia and Brazil (nurses study) to 185 variables in the surveys from India and Indonesia.

Analyzing Data for Item Compatibility

Data were synchronized by their comparability using a matched intersection design using the original RSMPP questionnaire as a baseline. The original RSMPP covers 110 unique variables. Often, local editions of the questionnaire omitted several original items, and several studies added new items to the RSMPP questionnaire. The size of additions varied from two additional variables in the Saudi Arabian study to 96 additional variables on R/S's impact on mental

health services in the Indian and Indonesian studies. Some of the German and Austrian studies also included whole batteries of previously validated questions, like Aspects of Spirituality (ASP, 26 items), Benefit-scale (6 items), and Brief Multidimensional Life Satisfaction Scale (BMLSS, 11 items) all developed by Büssing (Büssing et al., 2009, 2007; Büssing and Koenig 2008).

Items in each survey were evaluated for wording comparing it to its RSMPP equivalent. A likewise comparison was made for all option complexes. Both the first (AK) and last author (NCH) are fluent in English, German and Danish. The only questionnaires not available to us in any of these three languages were in Portuguese (Brazilian), Korean and French (Congo). The Portuguese questionnaire has been backward validated, and the corresponding English text was written under each Portuguese item in the questionnaire making identification straight forward. The Korean questionnaire was developed as a direct translation of the German language items used in the nation-wide study based in Freiburg, also using forward–backward translations. Comparisons were done using the German version. The French questionnaire was translated (forward and backward) from the NERSH Questionnaire used in the Munich Perinatal survey issued from the Ludwig-Maximilians Universität München. As the dataset was coded in German and not French language, we had no problem identifying and interpreting the items in the French dataset.

In some cases where item options were only slightly altered in wording and/or amount of choices, we could ensure compatibility by deciding on a new standard for the options. All new standards of option complexes were double-checked for validity in conference with last author (NCH) and second author (JS).

In RSMPP the item “When, if ever, is it appropriate for a physician to initiate discussion with patients about religious beliefs or experiences with a patient?” has option complex “Always appropriate, Usually appropriate, Usually inappropriate or Always inappropriate”. The Saudi Arabian sample had changed this to “Always, Whenever the physician decides, Only when the patient asks, or Never” which after discussion were accepted as compatible choices.

The option complex for the item “Is the influence of R/S on health generally positive or negative?” was changed in the Freiburg questionnaire to measure the frequency of positivity instead of directional influence as asked in the RSMPP, and hence was not compatible. Also, in the Freiburg questionnaire the wording of items “When, if ever, is it appropriate for a physician to talk about his or her own religious beliefs or experiences with a patient?” and “When, if ever, is it appropriate for a physician to pray with a patient?” was altered significantly (i.e., to focus on opinion about self, and not generally speaking), hence they were considered entirely new questions, and thus omitted.

In the Danish questionnaire, the item “Do you believe in God?” was extended to include eight possible options to distinguish between various attitudes toward a personal God. After discussion, the item was omitted due to dilution of the options.

In the Saudi Arabian item options for questions “Is the influence of r/s on health generally positive or negative?”, “In general is it appropriate or inappropriate for a physician to discuss religious/spiritual issues when a patient brings them up?” and “In general, is it appropriate or inappropriate for a physician to inquire

Table 1 Included options for ‘Church attendance’, ‘Religious affiliation’, and ‘Occupation’ items

Church attendance	Religious affiliation	Occupation
Never	No affiliation (None, atheist or agnostic)	Registered as physicians
Twice a year or less	Buddhist	Physician
Several times a year	Hindu	Resident
1–3 times a month	Jewish	Intern
Weekly	Mormon	Not registered as physicians
Several times a week	Muslim	Midwife
	Protestant	Nursing care
	Catholic	Psychologist
	Orthodox Christian	Other therapist
	Other Christian	Chaplain
	Other	Teacher
	Unanswered	Student
		Other

about a patient’s religion/spirituality?” were only slightly altered and options were recoded to.

In the Korean survey the options for five items in the battery of questions regarding how the HP handles situations where R/S issues come up in discussions with patients, were altered significantly from “Never, Rarely, Sometimes, Often, Always and Not apply” to “Definitely not true, Tends not to be true, Tends to be true and Definitely true of me” and therefore omitted.

The Indian and Indonesian surveys included an option to refer patients to Traditional Complementary/Alternative Medicine (TCAM)-healers in the question “A patient presents to you with continued deep grieving two months after the death of his wife. If you were to refer the patient, to which of the following would you prefer to refer first?”. TCAMs are not equal clergy members and compassion of this response becomes unclear in relation to the remaining samples. The item was thus omitted.

The New Zealand survey collected the age group of respondents, and not the actual age. The responses were included, and age groups were calculated for all other samples. Actual age was preserved in all other samples where available.

Frequency of Church Attendance

Frequency of church attendance was measured as an ordinal value across all datasets, but the available options varied from six to nine increments all starting from “Never” to “Several times a week”. A joint six-option standard was agreed upon that was compatible with all datasets (Table 1).

Religious Affiliation

Religious affiliation was collected at various levels in the questionnaires; some did not include all major religions, some did not distinguish between the various

Christian faiths. All questionnaires included an ‘Other’ option. Atheists, agnostics, or respondents of no religious affiliation were sometimes measured separately, sometimes grouped together. To encompass these options, “No affiliation” was kept as a combined option including also atheists and agnostics. Major religious directions were included in the final list of options including an “Other Christian” category to support this option. An aggregated value of all Christian faiths is also included in the final dataset (Table 1). We did not have information on Muslim or Jewish diversities.

Occupations

As later surveys have focused on occupations other than physicians we agreed upon a list of occupations that covered the options in all surveys. The term ‘physician’ is not used exclusively for doctors who have completed specialty training, but in some studies also includes interns, residents undergoing specialty training, or persons holding graduate degrees in medicine practicing within traditional, complementary, and alternative medicine. We created a grouping variable expressing a terminologically very broad definition of physician as a person with a graduate degree in medicine working with patients (Table 1).

Medical specialties

There is no world-wide consensus regarding the categorization of medical specialties. The list of specialties included in the NERSH data pool was developed to cover all specialties available in all 14 studies, and in addition, we created an aggregated grouping variable with the categories of medical specialties, surgical specialties, general practitioners, obstetrics and gynecology, pediatrics, psychiatry, para-clinical specialties, and others Table 2.

Selecting Items for the Data Pool

Our goal was to build a data pool as large and substantial as possible. We had no intention of adding items that were only available in fraction of the surveys. The selection of items was done in 2016, and based on the 14 samples we had collected at that time. We agreed upon the following inclusion criteria for items: (1) items supported by at least half of the surveys, or (2) items that had been answered by at least half of the total amount of responders, or (3) items from the Duke Religiosity (DUREL) index.

In conclusion 77 items, 75 of which stem from the original RSMPP questionnaire, and two DUREL items added in later questionnaires, were selected for the NERSH Data Pool. The questionnaires validated by the NERSH group and a data sheet with the complete list of variables in the NERSH data pool can be found in the toolbox available at NERSH.org as well as in the supplemental material of this article.

Table 2 Included options for 'Medical specialties', and aggregation used for groups

Medical specialties	Grouped specialties
Anesthesiology	Medical subspecialty
Neurology	
General medicine	
Emergency medicine	
Dermatology	
Medical subspeciality	
Internal medicine	
Intensive Care	
Oncology and palliative care	
Cardiology	
Endocrinology	
Geriatrics	
Haematology	
Infectiology	
Nephrology	
General practitioner	General practitioner
General medicine	
Family practitioner	
Obstetrics and gynaecology	Obstetrics and gynaecology
Ophthalmology	Surgical subspecialty
Surgical subspeciality	
Orthopedics	
General surgery	
Otorhinolaryngology	
Urology	
Pathology	Paraclinical specialty
Radiology	
Anatomy	
Biochemistry	
Pharmacology	
Microbiology	
Forensic	
General pediatrics	Pediatric and subspecialty
Pediatric subspeciality	
Psychiatry	Psychiatry
Other	Other
Unanswered	Unanswered

Data Management Incl. Enforcement of Exclusion Criteria and Compatibility Rules

The data management was done by the first author (AK) who is also a certified database specialist. In cases where interpretation of the data was unclear, or other vital

information could not be extracted from published articles, the relevant researchers were contacted by email, and asked to supply details about sampling criteria, response rate, any data management tasks performed on the raw data, and the questionnaire used.

Enforcement of inclusion and exclusion criteria resulted in the exclusion of 745 non-responders without any user input at all. Also, observations without information on gender were excluded ($n=130$), which according to t-tests for age and all five scales of religious dimensions (described below) did not differ significantly compared to the remaining observations (analysis details not reported here but available upon request). We also excluded seven responses with registered age below 18 years ($n=7$), some most likely students and a few due to mistyping.

Once all final items were selected and imported into the data pool, a codebook was developed documenting data types and constraints of each variable ensuring a high standard of data integrity. Datasets sent to us in SPSS and Excel format were converted directly to Stata version 13.1 datasets (.dta). Original datasets were never altered but reside with us in their original form. To ensure uniform synchronization of the datasets a conversion-script was developed for each unique dataset. Data from Brazil, India, and Indonesia was sent to us in a single dataset and thus converted in a single script. All conversion scripts and statistical analyses were done in Stata 13.1.

The conversion strategy is outlined in Fig. 1. All scripts (.do-files) are available upon request. The first version of the data pool thus included 14 samples from 10 countries, and was built in 2016. Later in 2019 we included another three samples and released NERSH Data Pool 2.0. The updated version is what gave rise to this article.

Data Security and Accessibility

The data pool is stored in Stata-format (.dta) on a secure server at the Research Unit of General Practice at the University of Southern Denmark according to the General Data Protection Regulation defined by the European Union. Access to the data pool can be made available upon reasonable request. As the data pool is currently under jurisdiction of the Danish Data Protection Agency, all applications for exchange of data must be approved by the agency before any data can leave our secure server. After potential delivery, the receiver is responsible for applying local standards of data protection according to local law. Contact the corresponding author for further information on how to apply for access to the data pool.

The Contents of the Data Pool

The current data pool consists of 17 samples from 12 countries. Sampling varied from nation-wide surveys to single facility surveys. Curlin's original data collection using the RSMPP was sent to a sample of 2000 practicing U.S. Physicians (Nation-wide, random sample) (Curlin et al. 2004). The first version of the RSMPP was translated into German by Lee and Baumann at Freiburg, Germany in 2008, first used in a local pilot survey, and later a nation-wide survey (in the data pool referenced as the 'Freiburg'-study). AlYousefi used an abbreviated form of the English RSMPP in

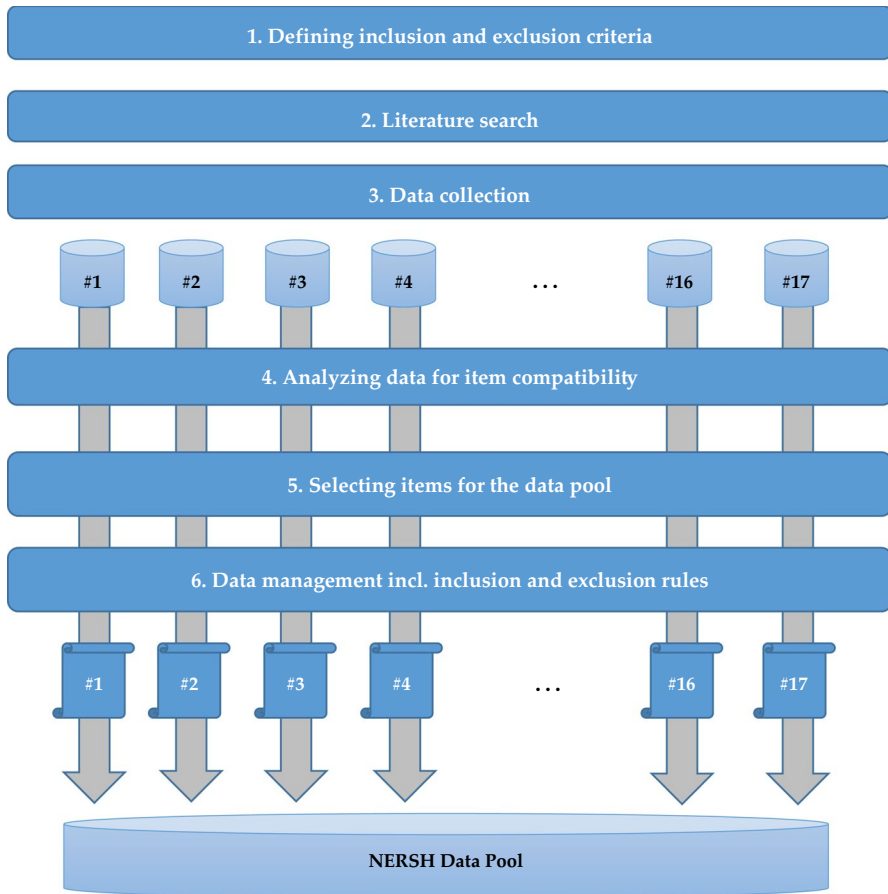


Fig. 1 Illustration of the development phases of NERSH Data Pool 2.0

2009–2010 (single facility, Riyadh, Saudi Arabia, King Abdul-Aziz Medical City, all physicians) (Al-Yousefi 2012). In 2010, Tomasso et al. surveyed 148 Brazilian nurses and their teaching professors (single facility, nurses and professors) (Tomasso et al. 2011). Samples from Indonesia and India were collected in a joint collaboration under a single study. The Indonesian sample by Karimah was finished in 2010 (single facility, Dr. Soetomo General Hospital, Surabaya, East Java, all physicians) (Ramakrishnan et al. 2014a), and the Indian sample was collected from 2010 to 2012 by Ramakrishnan (multiple facilities, mixed HPs) (Ramakrishnan et al. 2014a, b, c). The Danish version was translated in 2009 and data were collected in the years 2011–2012 (Region of Southern Denmark, all physicians) (Randwijk et al. 2018). Meanwhile in Freiburg, Germany, Baumann et al. collected their data using the German translation in 2008 (pilot from single facility, Freiburg University Clinic, all psychiatric staff) and in 2011 (nationwide, all psychiatry) (Lee and Baumann 2013; Lee et al. 2011). In 2012, samples were collected in New Zealand (nationwide, all

psychiatrists) (Butcher 2015), Congo (single facility, University Hospital of Kinshasa, all physicians), and Brazil (single facility, Marília University Hospital, all physicians) (Lucchetti et al. 2016). Later, a large German sample by Wermuth et al. was collected over two years from 2013 to 2014 (nationwide, perinatal HPs). During 2014, a German sample of HPs working in transplantation medicine was collected (single facility, University Hospital Munich, mixed HPs from 10 wards working in relation to organ transplantation) (Hvidt et al. 2016b), as well as the Austrian sample of hospital workers in Salzburg (single facility, Brothers of Mercy hospital, mixed HPs) (Hvidt et al. 2016b). In 2015 the researchers from Freiburg, Germany conducted a survey among Korean physicians from six clinics in three cities in South Korea (Lee and Baumann 2019). In 2016 Turkish physicians working in Germany (one facility, physicians with Turkish background) were recruited as part of the doctoral thesis by Kuseyri (2017). A random sample in the region of Bern, Switzerland was collected in 2017 (Münger 2017). Finishing in 2018 a Brazilian sample of medical residents was conducted at the University Hospital, Juiz de Fora, Brazil (not yet published).

After exclusion, the final data pool comprised 6,255 observations, including 3,572 females and 2,683 males. Mean age of females were 37.9 (95% CI 37.6–38.3) and 45.0 (44.5–45.5) for males (Table 3). Response rates ranged from 18% (116 responses out of 642 questionnaires sent in New Zealand with no possibility for follow-up on non-responders) to 95% (Brazil) and 99% (Indonesia)—the latter two secured due to tight follow-up including personal meetings and encouragements to complete the forms. Crude response rate was 57% for all currently included studies in the NERSH data pool (Hvidt et al. 2016).

A total of 4,175 physicians, 1,319 nurses, and 286 midwives were included. Other HPs such as psychologists, therapists, chaplains, and students are represented in smaller numbers Table 3. Medical specialties are presented in Table 4 grouped by study. The single largest group is obstetrics and gynecology with 1,788 participants mainly from the German sample of HPs within perinatal care, 999 psychiatrists, 953 from Internal Medicine, 737 general practitioners, 447 surgeons, 236 pediatricians, and 143 from para-clinical specialties.

Scale Development and Validation

In order to facilitate future analyses of HPs' attitudes toward R/S, it was essential for the data pool to include a measure of the respondents' religiosity. The DUREL index was already supported by four of the included surveys, but unfortunately not supported by the remaining eight samples at the time we built NERSH Data Pool 1.0.

While we fully acknowledge that scale development is a process that starts with domain identification and item generation based on literature reviews and focus group discussions, we had to adopt a different approach. We were not able to add new items to the surveys at this time, and thus relied on the validity of the instruments used to collect the available data (i.e., RSMPP and NERSH Questionnaires).

The Freiburg based FRIAS Research Project hosted a group workshop in 2013 where initial ideas for scale development were introduced. Building upon these

Table 3 Age, gender and occupational characteristics of respondents

	Age		Gender		Occupation							
	Mean	SD	Female (%)	Male (%)	Physician*	Midwife	Nursing	Psychologist	Other therapist	Chaplain	Student	Other
USA	49.0	8.3	300 (26)	842 (74)	1,142	0	0	0	0	0	0	0
Germany, Perinatal	38.9	10.3	1,398 (88)	195 (12)	515	286	636	18	1	0	0	46
Germany, Turkish	33.4	8.4	79 (66)	41 (34)	73	0	9	0	2	0	10	9
Germany, Transp.	34.8	11.4	132 (71)	53 (29)	48	0	125	0	0	5	0	6
Austria	39.7	11.0	132 (71)	53 (29)	28	0	113	0	0	0	0	28
Denmark	48.9	12.5	387 (42)	524 (56)	911	0	0	0	0	0	0	0
Germany, Freiburg	39.9	10.8	252 (63)	145 (37)	121	0	160	32	41	0	0	32
Saudi Arabia	36.6	9.2	97 (43)	128 (57)	225	0	0	0	0	0	0	0
Brazil, nurses	31.5	8.7	132 (90)	14 (10)	0	0	146	0	0	0	0	0
New Zealand	n/a**		39 (35)	73 (65)	112	0	0	0	0	0	0	0
India	32.5	10.8	161 (57)	121 (43)	282	0	0	0	0	0	0	0
Indonesia	29.2	3.8	65 (54)	55 (46)	120	0	0	0	0	0	0	0
Congo	35.2	7.9	28 (25)	84 (75)	112	0	0	0	0	0	0	0
Brazil, physicians	37.7	11.1	49 (25)	145 (75)	194	0	0	0	0	0	0	0
Brazil, residents	28.5	3.4	102 (60)	69 (40)	171	0	0	0	0	0	0	0
Switzerland	54.4	9.7	25 (32)	54 (68)	79	0	0	0	0	0	0	0
South Korea	34.0	9.4	194 (69)	87 (31)	42	0	130	28	1	0	0	0
Total	40.9	12.0	3,572 (57)	2,683 (43)	4,175	286	1,319	78	45	5	10	121

* Here a broad definition of physician also includes MDs undergoing their residency or specialty training

** Age group of respondents available but not reported here

Table 4 Distribution of grouped medical specialties in the studies

Study/medical specialty	Medical	GP	Obs/gyn	Surgical	Para-clinical	Pediatric	Psychiatry	Other	Total
USA	314	304	80	118	45	147	100	34	1,142
Germany, Perinatal	0	0	1,593	0	0	0	0	0	1,593
Germany, Turkish	29	0	5	21	0	9	9	28	101
Germany, Transplantation	116	0	0	38	0	0	0	28	182
Austria	66	0	0	37	0	0	0	60	163
Denmark	145	209	31	132	34	17	43	12	623
Germany, Freiburg	0	0	0	0	0	0	397	0	397
Saudi Arabia	70	73	31	30	0	21	0	0	225
New Zealand	0	0	0	0	0	0	112	0	112
India	17	49	11	9	50	11	45	33	225
Indonesia	8	23	7	25	14	2	1	17	97
Brazil, physicians	146	0	10	26	0	12	0	0	194
Brazil, residents	42	0	20	11	0	17	11	70	171
Switzerland	0	79	0	0	0	0	0	0	79
South Korea	0	0	0	0	0	0	281	0	281
Total	953	737	1,788	447	143	236	999	282	5,585

*The samples of Brazilian nurses and physicians from Congo contain no information about medical specialty

Also medical specialty was not mandatory, thus totals may differ from actual sample sizes

thoughts, and on the available items in NERSH Data Pool 1.0 (2016) the first and last authors decided to explore four domains of religiosity alluded to within the questionnaire: (a) Religiosity, (b) Willingness to engage in discussions about R/S, (c) Objections to controversial issues and (d) R/S as a calling. Actual scale development and item reduction was done by the first author.

The scales were evaluated for every sample that included the required items, and also assessed across the entire data pool. The reliability of all scales was measured using Cronbach's α with case-wise deletion (Cronbach 1951). A sample size of 25 observations was set as a minimum, removing four Austrian observations that completed the scale of "Willingness". A principle component analysis (i.e., exploratory factor analysis) was performed for each scale using un-rotated principal-component factors. Eigenvalues > 1 was set as the cut-off for the factors. Factor loadings above 0.5 were accepted. Factor loadings and Eigenvalues of the unidimensional factors are reported here. Further details of the factor analysis, including complete response formats, uniqueness and scree plots, are reported in the supplemental material.

DUREL

The DUREL scale developed by Koenig is an established instrument for measuring religiosity in epidemiological surveys (Koenig and Büssing 2010). The index was originally validated using a mixed population of Western religions, mostly Christianity but also comprising Judaism and Islam. Since then it has been validated in several validation studies world-wide including purely Muslim populations (Saffari et al. 2013). The scale assesses organized and non-organized religious activities and intrinsic religiosity with two single items and a three-item subscale derived from Hoge's 10-Item Intrinsic Religiosity Scale, i.e., (1) "How often do you attend church or other religious meetings?"; (2) "How often do you spend time in private religious activities, such as prayer, meditation or Bible study?"; (3) "In my life, I experience the presence of the Divine (i.e., God)."; (4) "My religious beliefs are what really lie behind my whole approach to life."; and (5) "I try hard to carry my religion over into all other dealings in life."

Six studies in the NERSH Data Pool 2.0 (2019) supported DUREL scores. The three intrinsic religiosity (IR) items from DUREL comprise a five-point Likert scale, and are implemented as such in the surveys of Freiburg (nation-wide) and of Brazilian nurses. The surveys from Austria and the sample of Turkish physicians from Munich use another version of the RSMPP questionnaire where these options are limited to four-point items omitting the middle 'unsure' option. To encompass this discrepancy values in all four studies have been altered to a four-option scale (1–4) removing the original value '3' for the IR items of the Freiburg and Brazilian nurse samples, and thus replacing values '4' by '3' and '5' by '4'. This resulted in a DUREL scale ranging from 5 to 24 instead of the traditional range from 5 to 27. We found the decrementing solution better than imputing dummy 'Unsure'-values where they were missing, because the imputation method would falsely potentiate the values of the 'tends to be true' and 'definitely true of me' options.

Sample wise measurements of Cronbach's α ranged from 0.72 to 0.93 as presented in Table 5. The combined 1,054 observations yielded a Cronbach's α of 0.92 indicating very high reliability. Factor loadings were 0.8136, 0.8552, 0.8917, 0.9107 and 0.8954. The primary factor had an Eigenvalue of 3.82 (76%), strongly indicating unidimensionality. The scree plot confirmed the one-factor solution as optimal. In conclusion, we affirm the DUREL index as a very good and reliable scale of religiosity.

Religiosity of HPs

Albeit the DUREL was only supported in four out of the initial 14 samples, two of the items were widely supported (1) "I try hard to carry my religious beliefs over into all my other dealings in life" and (2) "My whole approach to life is based on my religion". Leaning on a decade of evaluation of the DUREL items, these two items were obvious candidates for a new religiosity scale.

As health professionals more than laymen face sickness, human suffering and death, it is not unlikely that the religiosity of HPs differ slightly from that of laymen.

Table 5 Reliability tests

Study/Scale*	DUREL (5 items)		Religiosity of HPs (4 items)		Willingness of physicians to interact with patients regarding R/S issues (5 items)		Religious objections to controversial issues in medicine (5 items)		R/S as a calling (4 items)	
	<i>r</i> ***	α	<i>r</i> ***	α	<i>r</i> ***	α	<i>r</i> ***	α	<i>r</i> ***	α
USA	-	-	0.65	0.88	0.53	0.85	0.06	0.75	0.47	0.83
Germany, Perinatal	-	-	0.63	0.87	0.29	0.67	0.08	0.78	0.25	0.73
Germany, Turkish	0.57	0.87	0.76	0.93	0.46	0.81	0.09	0.81	0.50	0.81
Germany, Freiburg	0.72	0.93	-	-	-	-	-	-	-	-
Austria	0.63	0.89	0.63	0.87	-	-	0.08	0.74	0.44	0.82
Denmark	-	-	0.68	0.90	-	-	0.01	0.63	0.36	0.78
India	-	-	0.38	0.71	0.27	0.64	0.08	0.76	0.27	0.69
Indonesia	-	-	0.36	0.69	0.34	0.72	0.06	0.64	0.16	0.71
Congo	-	-	-	-	0.30	0.69	0.12	0.86	0.30	0.81
Brazil, physicians	-	-	0.46	0.78	-	-	0.03	0.57	0.11	0.83
Brazil, nurses	0.34	0.72	-	-	-	-	-	-	-	-
Brazil, residents	0.63	0.89	0.59	0.85	0.55	0.86	0.10	0.81	0.40	0.82
Switzerland	-	-	-	-	0.35	0.73	0.04	0.67	-	-
South Korea	0.72	0.93	-	-	-	-	-	-	-	-
Total	0.70	0.92	0.66	0.89	0.44	0.80	0.08	0.78	0.46	0.82
<i>N</i> _{total}	1054		4242		1797		4076		4331	
Factor analysis***										
Eigenvalue (%)	3.82 (0.76)		3.00 (0.75)		2.75 (0.55)		2.68 (0.54)		2.64 (0.66)	

Table 5 (continued)

Study/Scale*	DUREL (5 items)		Religiosity of HPs (4 items)		Willingness of physicians to interact with patients regarding R/S issues (5 items)		Religious objections to controversial issues in medicine (5 items)		R/S as a calling (4 items)	
	<i>r</i> **	α	<i>r</i> **	α	<i>r</i> **	α	<i>r</i> **	α	<i>r</i> **	α
Factor loadings	0.8136		0.8170		0.7267		0.7912		0.5499	
	0.8552		0.8791		0.7244		0.6331		0.8905	
	0.8917		0.8766		0.7335		0.6365		0.8740	
	0.9107		0.8873		0.7662		0.7819		0.8846	
	0.8954				0.7563		0.7970			

* Samples from Austria, Germany Transplantation and Saudi Arabia did not support any of the scales and thus not in this table

** Interitem correlation

*** Please refer to the supplemental material for further details on the factor analysis including Scree plots

We thus built outward from the first two items, and sought to select further items distinguishing religiosity within the clinical setting, understood as both being and doing dimensions. We initially selected seven items, but after sample wise testing in the data pool the scale proved more reliable as a four-item standardized scale. The two DUREL items were kept in the scale, and thus constitutes half of the scale. This new scale now included a question on the influence of R/S in clinical settings: (3) “My religious beliefs influence my practice of medicine”, thus narrowing the scope of the scale especially relevant for HPs. The fourth item is a religiosity measure within the being dimension: “To what extent do you consider yourself a religious person?”. The final scale creates scores ranging from 4 to 16.

The scale yielded a Cronbach’s alpha of 0.89 when tested on 4,242 observations across nine studies. Sample wise tests are presented in Table 5 and range from 0.69 to 0.93. Factor loadings were 0.8170, 0.8791, 0.8766 and 0.8873. The primary factor had an Eigenvalue of 3.00 (75%) strongly indicating unidimensionality, and the scree plot confirmed the one-factor solution as optimal. We found it a good and reliable scale of degree of religiosity of HPs in the data pool.

Willingness of Physicians to Interact With Patients Regarding R/S Issues

Previous publications by NERSH collaborators have shown that religious HPs are more inclined to discuss R/S with their patients, and the American sample also indicates that psychiatrists are generally more comfortable addressing R/S (Curlin et al. 2007c). To enable further research along this dimension, we created a measure of the willingness of physicians to interact with their patients regarding R/S issues. The scale is based on existing items in the RSMPP. Situations where the physician is only passively observing or receiving information regarding R/S did not qualify for the scale. Initially, 14 items about situations where the physician actively discusses or contributes with his or her own values, or expresses positive attitudes toward such interaction, were considered for the scale. PCA revealed two items to load into a separate factor related to discussing R/S-issues when patients brought them up themselves, and these items were therefore removed. Three questions about attitudes toward other physicians (in third person) correlated as well and were also discarded. In addition, four items were discarded due to factor loadings under 0.5. The remaining items constitute a standardized five-item scale ranging from 5 to 24 consisting of the items (1) “Do you ever inquire about patients religious/spiritual issues?” (2) “How often do you inquire when a patient presents with a minor illness or injury?” (3) “How often do you inquire when a patient faces a frightening diagnosis or crisis?” (4) “How often do you inquire when a patient suffers from anxiety or depression?” and (5) “How often do you inquire when a patient comes for a history and physical?”.

The scale has a Cronbach α of 0.80 for all eight samples supporting the scale. Sample wise α tests are presented in Table 5 and ranges from 0.64 to 0.86. Factor loadings were 0.7267, 0.7244, 0.7335, 0.7662 and 0.7563. The primary factor had an Eigenvalue of 2.75 (55%) indicating unidimensionality, and a one-factor solution

was optimal according to the scree plot. In conclusion, we find the reliability of this scale acceptable.

Religious Objections to Controversial Issues in Medicine

The NERSH questionnaire assesses HPs attitudes toward controversial issues in medicine, primarily regarding decisions on life versus death, and whether the HPs think that physicians are obligated to present all possible treatment options to patients regardless of possible moral or religious objections by the physicians. The responders were confronted with five life-death scenarios each with four possible options with they could state if they had any objections against the scenario. The four options were “No objection”, “Religious objections”, “Non-religious objections”, or “Both religious and non-religious objections”. If the respondent chose either “Religious objections” or “Both religious and non-religious objections” we assign the value of 1. The five items thus constitutes a scale ranging from 0 to 5. The included items are (1) “Please note if you object to physician-assisted suicide.” (2) “Please note if you object to sedation to unconsciousness in dying patients.” (3) “Please note if you object to withdrawal of artificial life support.” (4) “Please note if you object to abortion for congenital abnormalities.” and (5) “Please note if you object to abortion after failed contraception.”

The original RSMPP included a single question regarding prescription of contraceptives to teenagers aged 14–16, but the item was later rephrased in some questionnaires while it was totally excluded in eight other surveys, and hence this item was omitted from the scale.

The scale has a Cronbach’s α of 0.78 when tested on 4076 observations from eleven samples in the data pool, and similar α -values on sample wise testing, although the sample of Brazilian physicians only yields an α value of 0.57. The discrepancy between the sample of Brazilian physicians and the Brazilian medical residents sample and other remaining samples may likely be skewed due to differences in sampling procedures. Brazilian physicians were from a university hospital in a specific countryside area and respondents were interviewed and the questionnaire filled out face-to-face, which may have reduced the more extreme options due to anxiety of stigmatization. Although the Portuguese translation for the physician study was not cross-validated, later control by Lucchetti in relation to this study did not find any items suspect of translation errors. On the other hand, the later survey of Brazilian medical residents was derived using the newly developed NERSH questionnaire, was fully transcultural adapted, cross-validated and was based on anonymous self-report questionnaires, which may have reduced the previous social desirability. Factor loadings were 0.7912, 0.6331, 0.6365, 0.7819 and 0.7970. The primary factor had an Eigenvalue of 2.68 (54%) indicating uni-dimensionality, and a one-factor solution was optimal according to the scree plot.

R/S as a Calling

The RSMPP included a battery of questions related to the HPs attitudes toward R/S as guidance in the private as well as professional life. Based on this battery, we developed a four-item scale ranging from 4 to 16 based on the items (1) “For me, the practice of medicine is a calling.” (2) “My religious beliefs influence my practice of medicine.” (3) “I try hard to carry my religious beliefs over into all my other dealings in life.” and (4) “My whole approach to life is based on my religion.”

Based on 4331 observations across ten samples, the scale has a Cronbach’s α of 0.82 in the data pool. Factor loadings were 0.5499, 0.8905, 0.8740 and 0.8846. The primary factor had an Eigenvalue of 2.64 (66%) indicating unidimensionality. Also, the scree plot was in favor of a one-factor solution. Although the item “For me, the practice of medicine is a calling” had a markedly lower loading into the factor, compared to the remaining items, it was kept in the model as it met our criteria of a factor loading above 0.5. Different interpretations of the phenomenon of occupation as a calling could weaken the correlation of this item in relation to the factor. In conclusion, we find the reliability of the scale acceptable for use in the current data pool, although interpretation must be cautious. Further validation using Confirmative Factor Analysis (CFA) and also using additional survey samples should be performed to clarify the justification of this scale.

Limitations

Data for the NERSH data pool are gathered from culturally very different populations, and sampling criteria are heterogeneous across the samples. The variety of included professions and medical specialties add to this heterogeneity. Comparisons between the surveys are to be performed only with greatest caution and respect for reduced external validity.

The samples have been gathered over more than a decade and changes in the religious landscapes may have an effect on generalizability. None of the surveys have been repeated to control for any changes over time, so we are not able to control for this potential influence. Apart from different translations with varying semantics, different cultural interpretations should be considered, too.

Moreover, the respective items were not primarily intended to be used as part of specific scales but as single statements. Developing the scales, we simply tried to combine items with similar content to factors useful for comparative studies. We assessed the reliability of the four new using Cronbach’s α and exploratory factor analysis. Cronbach’s α has its limitations as described by Sijtsma (2009). The α values are not a direct measure of internal consistency but more correctly a measure of the average degree of interrelatedness of the items. The α values denote a lower boundary for the true reliability of the test score $\rho_{X_+X_+}$. Sijtsma suggest using the greater lower bound (glb) developed by Woodhouse and Jackson as a more precise measure. We chose to use Cronbach’s α as the α value is the most established measure and glb still has not worked its way into Stata. Also, Cronbach’s α is always smaller than glb, and therefore α is the strictest measure of reliability of the two.

Due to the nature of the data pool, we have not been able to validate the scales with test–retest measures. A strict analysis of the ‘Religiosity of HP’ is planned in near future using Confirmative Factor Analysis.

Generally, the sample of Brazilian physicians carried some caveats due to being based on interviews rather than self-administered questionnaires which may have reduced extreme option choices by respondents.

Strengths

The NERSH data pool enables researchers to study the values of HPs regarding R/S internationally, which has not previously been possible at this scale.

The synchronization has been done systematically, and conversion scripts (.do-files), as well as an overview of variables, are available upon request from the first and corresponding author. Likewise, access to the complete NERSH data pool can be facilitated upon request.

All data samples were collected through validated versions of the RSMPP questionnaire (later called NERSH Questionnaire), either by using the complete questionnaire or subsets thereof.

The data pool contains five subscales of reliable measures of dimensions of religiosity including the already established DUREL scale.

Invitation to Collaborate

Please contact last author (NCH) if you are interested in joining the NERSH collaboration.

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Author contributions Alex Kappel Kørup wrote the article, conceived, designed, and performed the synchronization of the local data collections and conducted statistical analysis including reliability tests and factor analysis. Jens Søndergaard hosts the NERSH-database, contributed to research oversight, and contributed to critical manuscript revision. Nada A. AlYousefi conceived, designed, performed the survey in Saudi Arabian, and contributed to critical manuscript revision. Giancarlo Lucchetti conceived, designed, and performed the Brazilian surveys (physicians, medical residents and nurses) and contributed to critical manuscript revision. Klaus Baumann conceived, designed, performed a German survey in Freiburg, was co-founder of the NERSH-Network, and contributed to critical manuscript revision. With Klaus Baumann, Eunmi Lee conceived, designed, and performed a German survey in Freiburg and South Korea, and contributed to critical manuscript revision. Azimatul Karimah conceived, designed, performed the Indonesian survey and contributed to critical manuscript revision. Parameshwaran Ramakrishnan conceived, designed, and performed the Indian survey and contributed to critical manuscript revision; Eckhard Frick, co-founded the NERSH-Network, conceived, designed, performed a local survey as well as contributed to critical manuscript revision. Arndt Büssing co-founded of the NERSH-Network,

contributed to critical manuscript revision, and performed reliability analyses in the first evaluation round. René Hefti conceived, designed and performed the Swiss survey, and contributed to critical manuscript revision. Wyatt Butcher conceived, designed and performed the New Zealand survey, and contributed to critical manuscript revision. Niels Christian Hvidt is responsible for project conception, is a co-founder and coordinator of the NERSH-Network, and contributed to critical manuscript revision.

Compliance with ethical standards

Conflicts of interest The authors declare no conflict of interest.


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