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by Alex Kappel Korup

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Article

The International NERSH Data Pool— A Methodological Description of a Data Pool of Religious and Spiritual Values of Health Professionals from Six Continents

Alex Kappel Kørup ^{1,2,*}, René dePont Christensen ¹, Connie Thurøe Nielsen ²,
Jens Søndergaard ¹, Nada A Alyousefi ³, Giancarlo Lucchetti ⁴, Klaus Baumann ⁵,
Eunmi Lee ⁵, Azimatul Karimah ⁶, Parameshwaran Ramakrishnan ^{7,8}, Eckhard Frick ^{9,10},
Arndt Büssing ^{11,12}, Esther Schouten ¹³ and Niels Christian Hvidt ^{1,12}

- ¹ Research Unit of General Practice, Institute of Public Health, University of Southern Denmark, Odense C 5000, Denmark; rechristensen@health.sdu.dk (R.d.C.); jsoendergaard@health.sdu.dk (J.S.); nchvidt@health.sdu.dk (N.C.H.)
 - ² Department of Mental Health Kolding-Vejle, University of Southern Denmark, Vejle 7100, Denmark; connie.thuroe.nielsen@rsyd.dk
 - ³ College of Medicine, King Saud University (KSU), Riyadh 11461, Saudi Arabia; nalyousefi@ksu.edu.sa
 - ⁴ Department of Medicine, Federal University of Juiz de Fora, Avenida Eugênio de Nascimento s/n-Aeroporto, Juiz de Fora 36038330, MG, Brazil; g.lucchetti@yahoo.com.br
 - ⁵ Caritas Science and Christian Social Work, Faculty of Theology, Albert-Ludwig-University, D-79085 Freiburg, Germany; Klaus.baumann@theol.uni-freiburg.de (K.B.); Eunmi.lee@theol.uni-freiburg.de (E.L.)
 - ⁶ Department of Psychiatry, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Hospital, Surabaya 60226, East Java, Indonesia; azimatul.karimah@fk.unair.ac.id
 - ⁷ Harvard Divinity School, Harvard University, Cambridge, MA 02138, USA; par469@mail.harvard.edu
 - ⁸ AdiBhat Foundation, New Delhi 110048, India
 - ⁹ Research Centre Spiritual Care, Department of Psychosomatic Medicine and Psychotherapy, The University Hospital, Klinikum rechts der Isar, Langerstr. 3, Munich 81675, Germany; Eckhard.Frick@tum.de
 - ¹⁰ Munich School of Philosophy, Kaulbachstr. 31, Munich 80539, Germany
 - ¹¹ Institute of Integrative Medicine, Faculty of Medicine, Witten/Herdecke University, Gerhard-Kienle-Weg 4, Herdecke D-58313, Germany; Arndt.Buessing@uni-wh.de
 - ¹² Academy of Geriatric Cancer Research (AgeCare), Odense University Hospital, 5000 Odense C, Denmark
 - ¹³ Medical Faculty, Ludwig Maximilian University of Munich, München 81377, Germany; esther.schouten@med.uni-muenchen.de
- * Correspondence: akorup@health.sdu.dk; Tel.: +45-2390-1011

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Abstract: Collaboration within the recently established Network for Research on Spirituality and Health (NERSH) has made it possible to pool data from 14 different surveys from six continents. All surveys are largely based on the questionnaire by Curlin “Religion and Spirituality in Medicine, Perspectives of Physicians” (RSMPP). This article is a methodological description of the process of building the International NERSH Data Pool. The larger contours of the data are described using frequency statistics. Five subscales in the data pool (including the already established DUREL scale) were tested using Cronbach’s alpha and Principal Component Analysis (PCA) in an Exploratory Factor Analysis (EFA). 5724 individuals were included, of which 57% were female and the mean age was 41.5 years with a 95% confidence interval (CI) ranging from 41.2 to 41.8. Most respondents were physicians ($n = 3883$), nurses ($n = 1189$), and midwives ($n = 286$); but also psychologists ($n = 50$), therapists ($n = 44$), chaplains ($n = 5$), and students ($n = 10$) were included. The DUREL scale was assessed with Cronbach’s alpha ($\alpha = 0.92$) and PCA confirmed its reliability and unidimensionality.

The new scales covering the dimensions of “Religiosity of Health Professionals (HPs)” ($\alpha = 0.89$), “Willingness of Physicians to Interact with Patients Regarding R/S Issues” ($\alpha = 0.79$), “Religious Objections to Controversial Issues in Medicine” ($\alpha = 0.78$), and “R/S as a Calling” ($\alpha = 0.82$), also proved unidimensional in the PCAs. We argue that the proposed scales are relevant and reliable measures of religious dimensions within the data pool. Finally, we outline future studies already planned based on the data pool, and invite interested researchers to join the NERSH collaboration.

Keywords: religion; spirituality; health professionals; international; data pool

1. Introduction

Through more than a decade researchers from around the world have studied the religious and spiritual (R/S) values of health professionals (HP), a process catalyzed by the questionnaire “Religion and Spirituality in Medicine: Physicians’ Perspectives” (RSMPP) developed by Farr. A. Curlin in 2002 [1]. He and research teams after him have shown how physicians and HPs’ attitudes towards religion and spirituality influence their interaction with patients. Religious physicians are more likely to address R/S issues with their patients, less likely to refer patients to a mental health facility, more likely to evaluate the effect of R/S on their patients as positive, and they tend to defend physicians that abstain from clinical practices based on religious objections [2–6].

When personal values of HPs influence patients, it has both practical and ethical implications. How is treatment affected? Is there a need for physicians to openly state their attitudes regarding R/S in order for patients to choose a physician with compatible beliefs? How does the influence of R/S affect the autonomy of the patient? Can the influence, in the end, be beneficial from the patient’s perspective, and therefore perhaps justifiable? Before any such questions can be addressed, we need to establish a better and more detailed understanding of the personal values of HPs. Degree of religiosity is one parameter we must take into account, but other dimensions like willingness to interact with patients regarding R/S in clinical settings, use of one’s health profession as a (religious) vocation, and religious attitudes toward ethical topics in medicine, are equally important. To address this need and to strengthen the research field on R/S, a global Network for Research in Spirituality and Health has been established (NERSH.org) bringing together several research teams from six continents. At NERSH, we are continuously collecting and pooling data on HP values from independent studies conducted by research teams around the world. Data from 14 samples available by August 2016 were synchronized into the first version of the NERSH data pool, and four scales were developed to cover the religious dimensions mentioned above. In addition to these four new scales the Duke University Religion Index (DUREL) was already supported by four of the included surveys.

This new data pool enables us to analyze, on a global scale, how personal beliefs and values influence HPs in health care, how national and regional differences impact such beliefs, and how previous local findings compare to results from other countries. The purpose of this article is to (1) describe the process of building the data pool including decisions on compatibility, (2) outline the content available for interested researchers, and (3) describe the five available subscales of religious dimensions included in the data pool. The reliability of the scales is tested with Chronbach’s alpha and Principal Component Analysis (PCA).

2. Background

Curlin developed his questionnaire (RSMPP) in 2002 and collected the first data in 2003 leading to several publications [1–5,7–11]. Since its development, the RSMPP was translated into seven languages and research teams from around the world published their national findings in the following decade [6,12–18]. Most research teams added and subtracted items to study needs. Changes to the original RSMPP questionnaire continued when the NERSH collaboration was founded in 2013, and

over two meetings NERSH researchers revised the original RSMPP questionnaire adding new items and removing obsolete ones based on a decade of experience with the questionnaire worldwide. After revision, the updated questionnaire now targeted all health professionals in all medical specialties, and the changes were considered substantial enough that the name of questionnaire was changed to “Questionnaire of the NERSH-Religiosity/Spirituality in Health Professions” or simply “NERSH Questionnaire”. For a rich description of the development of the NERSH questionnaire as a research tool see Hvidt, Kørup, et al. 2016 [19].

Alterations made to existing items and/or options threatened compatibility between the samples, addition of new items raised questions about whether to include the new items to the NERSH data pool; and removal of original RSMPP items in the later questionnaires weakened the power of the items for later comparisons in the data pool. Overall these many alterations to the original questionnaire have made the NERSH data samples deviate in larger or lesser degrees from the data originally collected by Curlin in 2003, thus intensifying the need for thorough and careful synchronization of the data.

3. Building the NERSH Data Pool

3.1. Data Collection

The current NERSH study is comprised of data from 14 independent studies conducted in nine countries spanning six continents using 12 versions of the RSMPP questionnaire.

Curlin’s original data collection using the RSMPP was sent to a sample of 2000 practicing U.S. Physicians (Nationwide, random sample) [1]. The first translated version of the RSMPP was translated into German by Lee and Baumann at Freiburg, Germany in 2008. AlYousefi translated the RSMPP into Arabic in 2009–2010 although in an abbreviated form (single facility, Riyadh, Saudi Arabia, King Abdul-Aziz Medical City, all physicians) [12]. In 2010, Tomasso et al. surveyed 148 Brazilian nurses and their teaching professors (single facility, nurses and professors) [16]. 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) [15], and the Indian sample was collected from 2010 to 2012 by Ramakrishnan (multiple facilities, mixed HPs) [14,15,17]. The Danish version was translated in 2009 and data were collected in the years 2011–2012 (Region of Southern Denmark, all physicians) (not published yet). 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) [6,13]. In 2012, samples were collected in New Zealand (nationwide, all psychiatrists) [20], Congo (single facility, University Hospital of Kinshasa, all physicians), and Brazil (single facility, Marília University Hospital, all physicians) [18]. 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) [21], as well as the Austrian sample of hospital workers in Salzburg (single facility, Brothers of Mercy hospital, mixed HPs) [21]. The most recent included data stems from a study in 2016 of Turkish physicians working in Germany (one facility, physicians with Turkish background) (Doctoral thesis, not published yet). Data from a Swiss study of HPs working outside the hospital and a recent study from South Korea did not meet the deadline for the data pool, but they are scheduled to be included in the future.

Data were synchronized by their comparability using a matched intersection design based on the original RSMPP questionnaire. The original RSMPP [1] covers 110 unique variables. Often, local editions of the questionnaire omitted a fair amount of the original items, and several studies have added significantly 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. See the Supplemental Material for a complete list of variables in each of the included samples. Some of the German and Austrian studies also included

aspects of spirituality (ASP, 26 items), benefit-scale (6 items), and brief multidimensional life satisfaction scale (BMLSS, 11 items) all developed by Büssing [22–24].

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 ($M = 106.5$; $SD = 50.1$). In total, 511 distinct variables have been identified and compared for compatibility across the 12 local questionnaires. Some variables were only used by a single survey and thus not candidates for the data pool. Significant changes to existing questions or in the available options were interpreted as a new item and hence not compatible. Any doubts about the effect of minor changes to existing items were resolved in conference with Hvidt. In a few cases where complete consensus could not be reached, the items were not accepted as compatible.

3.2. Ensuring Option Compatibility

To enable compatibility of altered item options, a new standard had to be developed in order to encompass the versions used in the included datasets. All new standards of option complexes were double-checked for validity in conference with Hvidt and Søndergaard.

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 which is not a measure for directional influence as asked in the RSMPP, hence not compatible. Also, in the Freiburg questionnaire 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?” the questions were 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.

3.2.1. 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.

3.2.2. Religious Affiliation

Religious affiliation was collected at various levels in the questionnaires, some not including all major religions, some not distinguishing 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 (see Table 1). We did not have information on Muslim or Jewish diversities.

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

Church attendance	Religious affiliation	Occupation
Never	No affiliation (None, atheist or agnostic)	Physician
Twice a year or less	Buddhist	Resident
Several times a year	Hindu	Intern
1–3 times a month	Jewish	Midwife
Weekly	Mormon	Nursing care
Several times a week	Muslim	Psychologist
	Protestant	Other therapist
	Catholic	Chaplain
	Orthodox Christian	Teacher
	Other Christian	Student
	Other	Other
	Unanswered	

3.2.3. Medical Specialties

There is no clear worldwide consensus on 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. An aggregated grouping variable is also included to distinguish medical specialties, surgical specialties, general practitioners, obstetrics and gynecology, pediatrics, psychiatry, paraclinical specialties, and others. Overview of specialties and their grouping are presented in Table 2.

Table 2. Included options for ‘Medical specialties’, and aggregation used for groups.

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

3.2.4. Occupation

Originally, the RSMPP was a measure of physician values only, but has later been used to study other HPs as well including nurses, students, chaplains, and psychologists; in accordance a standard for available occupations of the respondents has been developed to cover all options. The term 'physician' is not used exclusively for doctors who have completed specialty training, but in some studies also includes interns, MD-residents undergoing specialty training, and also MDs of traditional, complementary, and alternative medicine. This is expressed in an additional variable included in the NERSH dataset, where a terminologically very broad definition of physician is used that includes all MDs working in the facility.

3.3. Exclusion Criteria

We excluded 745 non-responders without any user input at all. Also, observations without information on gender were excluded ($n = 117$), 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. We also excluded observations with age below 18 years ($n = 7$), of which some were students and a few due to mistyping.

3.4. Selection of Variables for The Data Pool

The variables to be included in the NERSH data pool were systematically selected by criteria defined to create a data pool as large and substantial as possible without including variables only sparsely supported by the included studies. A 50 percent cut off was agreed upon by the authors determining that variables available in at least half of the 14 studies were automatically included in the data pool. Variables used by fewer studies were included only if they were measured by at least half of the total observations in the entire pool. A single exception to this rule exists in the item "In my life, I experience the presence of the Divine (i.e., God)", which is one of the five items in the DUREL-scale of religiosity. This measure of intrinsic religiosity was only represented in 6 out of 14 samples, and answered by 12.7% of the total respondents ($n = 725$), but by consensus was weighed in to support the DUREL score.

In conclusion 77 variables, 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 NERSH 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.

3.5. Data Management

Once the final items were selected to be included in the NERSH data pool, a standard codebook was developed documenting the data type, scope, and constraints of each variable ensuring a high standard for data integrity. Original datasets sent to us by the participants of the NERSH collaboration were never altered but reside with us in their original form, although datasets in SPSS and Excel format were converted directly to Stata version 13.1 datasets (.dta).

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 Figure 1. All scripts (.do-files) are made available in the toolbox at NERSH.org.

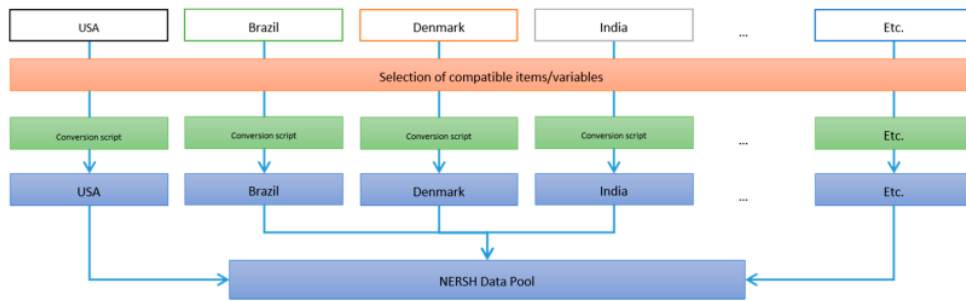


Figure 1. Overview of data conversion strategy.

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. The data pool can be made available upon request. As the data pool is currently under jurisdiction of the Danish Data Protection Agency, all applications for exchange of the data must be approved by the agency before the data can leave our secure server. After potential delivery, the receiver is alone responsible for applying local standards of data protection according to local law. Contact Kørup (akorup@health.sdu.dk) for further information on how to apply for access to the data pool.

4. The Contents of the Data Pool

After exclusion, the final data pool comprises 5724 observations, including 3251 females and 2473 males. Mean age of the observations is 41.5 (95% CI 41.2–41.8), Table 3. Response rates range 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 59% for all currently included studies in the NERSH data pool [19].

Table 3. Basic description of the observations.

Observations, n	5724
Age, mean (CI 95%)	41.5 (41.2–41.8)
Female, n (%)	3251 (56.8%)
Male, n (%)	2473 (43.2%)

A total of 3883 physicians, 1189 nurses, and 286 midwives were included. Other HPs such as psychologists, therapists, chaplains, and students are represented in smaller numbers (Table 4). Medical specialties are presented in Table 5 grouped by study. The single largest group is obstetrics and gynecology with 1768 participants mainly from the German sample of HPs within perinatal care, 911 from Internal Medicine, 707 psychiatrists, 658 general physicians, 436 surgeons, 219 pediatricians, and 143 from paraclinical specialties.

Table 4. Distribution of occupations in the studies.

Study \ nr	Physician *	Midwife	Nursing care	Psychologist	Other therapist	Chaplain	Student	Other	Total
USA (RSMPP)	1142	0	0	0	0	0	0	0	1142
Germany, Perinatal	515	286	636	18	1	0	0	46	1502
Germany, Turkish	73	0	9	0	2	0	10	9	103
Germany, Transplant.	48	0	125	0	0	5	0	6	184
Austria	28	0	113	0	0	0	0	28	169
Denmark	911	0	0	0	0	0	0	0	911
Germany, Freiburg	121	0	160	32	41	0	0	32	386
Saudi Arabia	225	0	0	0	0	0	0	0	225
Brazil, Nurses	0	0	146	0	0	0	0	0	146
New Zealand	112	0	0	0	0	0	0	0	112
India	282	0	0	0	0	0	0	0	282
Indonesia	120	0	0	0	0	0	0	0	120
Congo	112	0	0	0	0	0	0	0	112
Brazil	194	0	0	0	0	0	0	0	194
Total	3883	286	1189	50	44	5	10	121	5588

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

Table 5. Distribution of grouped medical specialties in the studies *.

Study \ nr	Medical	GP	Obs/gyn	Surgical	Para-clinical	Pediatric	Psychiatry	Other	Total
USA (RSMPP)	314	304	80	118	45	147	100	34	1142
Germany, Perinatal	0	0	1593	0	0	0	0	0	1593
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	146	0	10	26	0	12	0	0	194
Total	911	658	1768	436	143	219	707	212	5054

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

5. Reliability Tests

In addition to the DUREL we have sought to construct four additional scales of meaningful dimensions of the HPs values on religion and spirituality. The scales were based on the included items, and assessed across the entire NERSH data pool. The reliability of all scales was measured using Cronbach's α with case-wise deletion [25]. A sample size of 25 observations was set as a minimum, removing four Austrian observations that completed the scale of "Willingness". A PCA (i.e., exploratory factor analysis) was performed for each scale using unrotated 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.

5.1. DUREL

The DUREL scale developed by Koenig is an established instrument for measuring religiosity in epidemiological surveys [26]. 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."

Four studies in the NERSH data pool support 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 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 to 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.

Sample wise measurements of Cronbach's α ranged from 0.72 to 0.93 as presented in Table 6. The combined 684 observations yielded a Cronbach's α of 0.92. Factor loadings were 0.7939, 0.8320, 0.8850, 0.9170, and 0.9118. The primary factor had an Eigenvalue of 3.78 (76%), strongly indicating unidimensionality, and the scree plot confirmed the one-factor solution as optimal. In conclusion, we find DUREL a very good and reliable scale of religiosity in the data pool.

5.2. Religiosity of HPs

As DUREL was only supported by four samples in the pool, we needed to develop an additional religiosity scale for broader coverage of this important measure. This scale includes a question on the influence of R/S in clinical settings, and is thus a religiosity scale with a narrower scope than the DUREL score. Two of the included items are also used in the DUREL scale, the other items stem from the original RSMPP. The original scale was initially tested as a seven-item scale, but after sample wise testing in the data pool the scale proved more reliable as a four-item standardized scale. The scale ranges from 4 to 16 and is based on the items (1) "To what extent do you consider yourself a religious person?"; (2) "To what extent do you agree with the following statement? My religious beliefs influence my practice of medicine"; (3) "To what extent do you agree with the following statement? I try hard to carry my religious beliefs over into all my other dealings in life."; and finally (4) "To what extent do you agree with the following statement? My whole approach to life is based on my religion."

The scale yielded a Cronbach's alpha of 0.89 when tested on 4107 observations across eight studies. Sample wise tests are presented in Table 6 and range from 0.69 to 0.93. Factor loadings were 0.8172,

0.8805, 0.8747, and 0.8857. The primary factor had an Eigenvalue of 2.99 (75%) strongly indicating unidimensionality, and the scree plot confirmed the one-factor solution as optimal. We find it a good and reliable scale of degree of religiosity of HPs in the data pool.

5.3. Willingness of Physicians to Interact with Patients Regarding R/S Issues

Previous work by NERSH collaborators has 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 [9]. To further examine 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 0.79 for all six samples supporting the scale. Sample wise α tests are presented in Table 6 and ranges from 0.64 to 0.85. Factor loadings were 0.7302, 0.7217, 0.7331, 0.7634, and 0.7471. The primary factor had an Eigenvalue of 2.73 (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.

Table 6. 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)	
	r*	α	r*	α	r*	α	r*	α	r*	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 sample	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	-	-	0.46	0.78	-	-	0.03	0.57	0.11	0.83
Brazil, Nurses	0.34	0.72	-	-	-	-	-	-	-	-
Total	0.69	0.92	0.66	0.89	0.43	0.79	0.08	0.78	0.45	0.82
N _{total}	684		4107		1649		3834		4197	
Factor analysis **										
Eigenvalue (%)	3.78 (0.76)		2.99 (0.75)		2.73 (0.55)		2.67 (0.53)		2.63 (0.65)	
Factor loadings	0.7939		0.8172		0.7302		0.7914		0.5421	
	0.8320		0.8805		0.7217		0.6372		0.8912	
	0.8850		0.8747		0.7331		0.6259		0.8739	
	0.9170		0.8857		0.7634		0.7826		0.8835	
	0.9118				0.7471		0.7984			

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

5.4. Religious Objections to Controversial Issues in Medicine

The NERSH questionnaire assesses HPs attitudes toward controversial issues in medicine, primarily regarding decisions on life vs. 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 participants were first confronted with five life-death scenarios with possible answers of “No objection”, “Religious objections”, “Non-religious objections”, or “Both religious and non-religious objections”. A measure of religious objections was created by assigning a positive value on answers to either religious or both religious and non-religious objections, thus creating a five-item 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 to 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 3834 observations from nine samples in the data pool, and similar α -values on sample wise testing, although the sample of Brazil only yields an α value of 0.57. The discrepancy between the sample of Brazilian physicians and the remaining samples may likely be skewed due to sampling and procedures. Brazilian participants 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. Factor loadings were 0.7914, 0.6372, 0.6259, 0.7826, and 0.7984. The primary factor had an Eigenvalue of 2.67 (53%) indicating unidimensionality, and a one-factor solution was optimal according to the scree plot.

5.5. 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 4197 observations across nine samples, the scale has a Cronbach’s α of 0.82 in the data pool. Factor loadings were 0.5421, 0.8912, 0.8739, and 0.8835. The primary factor had an Eigenvalue of 2.63 (65%) 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. 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.

6. 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. 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. The reliability of the four new proposed scales is only measured with Cronbach's α and exploratory factor analysis. Cronbach's α has its limitations as described by Sijtsma [27]. 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 most strict 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. We did not perform Confirmative Factor Analysis (CFA) on the scales as these measures exceeded the scope and financial frame of this study. Performing CFA on the scales would improve the statistical foundation of the scales.

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

7. 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, can be found at the NERSH.org toolbox and in the supplemental material of this article. 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.

8. Future Articles/Projects

Currently, the following projects based on the NERSH data pool are already planned:

- Characteristics of health professional religiosity and spirituality—descriptive statistics from six continents: Using both descriptive statistics and the scales of religious dimensions in the NERSH data pool, we want to measure the religiosity and spiritual characteristics of Health Professionals in the NERSH data pool.
- Willingness of physicians to interact with patients regarding R/S issues: Using the available scales in the data pool, we will test the hypothesis that willingness of the physicians to interact with patients regarding issues of R/S is correlated with their religiousness.
- How do the religiosity, spirituality, and personal values of psychiatrists differ from other specialties—an international comparative study from six continents: It has previously been found that psychiatrists have a lower degree of religiosity but are still open to addressing religious and spiritual issues in clinical settings. Using the R/S characteristics of the 707 psychiatrists in the data pool, we test previous findings in the now larger data pool comparing R/S characteristics between psychiatry, general practitioners, and other specialties.
- Association between personal belief systems of physicians, their nationality and their approach to controversial issues in medicine—a study from six continents: Analysis of the scale “Religious Objections to Controversial Issues in Medicine” related to religious affiliations and nationality.

- When physicians object to procedures for religious or moral reasons—experiences from six continents: Testing the hypothesis that religious physicians are more likely to legitimate withholding available treatment options for religious or moral reasons, and less likely to have attitudes obliging objecting physicians to refer patients to someone who does not object for the procedure.

9. Invitation to Collaborate

Please contact Niels Christian Hvidt (nchvidt@health.sdu.dk) if you are interested in joining the NERSH collaboration.

Supplementary Materials: The following are available online at www.mdpi.com/2077-1444/8/2/24/s1.

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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. René dePont Christensen performed statistical oversight on final NERSH-database. Connie Thure Nielsen contributed to critical manuscript revision. Jens Søndergaard hosted the NERSH-database, contributed research oversight, and contributed to critical manuscript revision. Nada A. AlYousefi conceived, designed, performed the experiments for the Saudi Arabian study, and contributed to critical manuscript revision. Giancarlo Lucchetti conceived, designed, and performed the experiments for the Brazilian sample and contributed to critical manuscript revision. Klaus Baumann conceived, designed, performed the experiments for a German sample in Freiburg, was co-founder of the NERSH-Network, and contributed to critical manuscript revision. Eunmi Lee conceived, designed, and performed the experiments for a German sample in Freiburg and contributed to critical manuscript revision. Azimatul Karimah conceived, designed, performed the experiments for the Indonesian sample and contributed to critical manuscript revision. Parameshwaran Ramakrishnan conceived, designed, and performed the experiments for the Indian sample and contributed to critical manuscript revision; Eckhard Frick, co-founded the NERSH-Network and conceived, designed, performed the experiments for a local sample as well as contributed to critical manuscript revision. Arndt Büsing co-founded the NERSH-Network, contributed to critical manuscript revision, and performed reliability analyses in the first evaluation round. Niels Christian Hvidt is responsible for project conception, is a co-founder and coordinator of the NERSH-Network, and contributed to critical manuscript revision.

Conflicts of Interest: The authors declare no conflict of interest.

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