

Religious values of physicians affect their clinical practice

A meta-analysis of individual participant data from 7 countries

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Abstract

Background: Observational studies indicate that religious values of physicians influence clinical practice. The aim of this study was to test prior hypotheses of prevalence of this influence using a meta-analysis design.

Methods: Based on a systematic literature search we performed individual participant data meta-analysis (IPDMA) on data based on 2 preselected questionnaires. Ten samples from 7 countries remained after exclusion (n=3342). IPDMA was performed using a random-effects model with 2 summary measures: the mean value of the scale “Religiosity of Health Professionals”; and a dichotomized value of the question “My religious beliefs influence my practice of medicine.” Also, a sensitivity analysis was performed using a mixed-models design controlling for confounders.

Results: Mean score of religiosity (95% confidence interval [CI]) was significantly lower in the European subgroup (8.46 [6.96–9.96]) compared with the Asian samples India (10.46 [9.82–10.21]) and Indonesia (12.52 [12.19–12.84]), whereas Brazil (9.76 [9.54–9.99]) and USA (10.02 [9.82–10.21]) were placed in between. The proportion of the European physicians who agreed to the statement “My religious beliefs influence my practice of medicine” (95% CI) was 42% (26%–59%) compared with Brazil (36% [29%–43%]), USA (57% [54%–60%]), India (58% [52%–63%]), and Indonesia (91% [84%–95%]).

Conclusions: Although large cross-cultural variations existed in the samples, 50% of physicians reported to be influenced by their religious beliefs. Religiosity and influence of religious beliefs were most pronounced in India, Indonesia, and a European faith-based hospital. Education regimes of current and future physicians should encompass this influence, and help physicians learn how their personal values influence their clinical practice.

Abbreviations: CI = confidence interval, HP = health professional, IPDMA = individual participant data meta-analysis, NERSH = Network for Research in Spirituality and Health, R/S = religiosity and/or spirituality, RSMPP = Religion and Spirituality in Medicine: Physicians’ Perspectives.

Keywords: medical ethics, meta-analysis, physicians, religion, value neutrality

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1. Introduction

Research studies across the globe have shown that attitudes of health professionals (HPs) toward religion and spirituality influence their interaction with patients. Religious physicians are more likely to discuss issues regarding religiosity or spirituality (R/S) with their patients,^[1] less likely to refer their patients to a mental health facility,^[2] more likely to accept clergy and pastoral professionals in the care of their patients,^[3] less likely to report that doctors must disclose information about, or refer patients for, medical procedures to which the physician objected on moral grounds,^[4] and more often have religious objections against physician-assisted suicide, terminal sedation, and withdrawal of life support.^[5] Conversely, religious and spiritual values have been found to enhance empathy, altruism, and motivation.^[6–8]

With the increase in published articles on this clinically important topic, we find it is time to reassess findings of the last 15 years in a further robust study design. Our first research question is: “How prevalent is religiosity among physicians?” and secondly “Does physicians’ religiosity influence their clinical practice?”.

Identifying these potential influences in physicians’ decision-making is not only of importance for how physicians understand themselves. If influence of personal values is part of the patient–physician encounter, we need to be able to reflect on it and talk about it openly. We must learn to distinguish between situations where patient autonomy must be protected by deliberately setting aside these personal values, and situations where the positive impact of the same personal values can be realized in a fruitful and professional way.

1.1. Background

Starting with the large national survey of 1144 American physicians in 2002 based on the questionnaire “Religion and Spirituality in Medicine: Physicians’ Perspectives” (RSMPP)^[9] researchers from around the world formed the “Network for Research in Spirituality and Health” (NERSH.org). Within the years 2009 to 2016, the original questionnaire developed into the NERSH Questionnaire, and research teams from around the world gathered additional local samples.^[10–16] These data from culturally distinct countries are optimal for testing our hypothesis of influence of religious values on clinical practice.

Until now, only samples from Indonesia and India,^[17] and Brazil, Indonesia, and India have been compared.^[18] Ramakrishnan et al^[17] found support for a bidirectional influence of religiosity and influence of clinical experience, and expressed a need for further cross-cultural comparison studies. Lucchetti et al compared demographics including religious affiliation and created 5 subscales based directly on question batteries from the survey. No tests for unidimensionality were performed, limiting the validity of the measures. Lucchetti et al^[18] found different attitudes on spirituality and religiosity in the 3 studies and argued that ethnicity and culture probably were important moderators.

2. Methods and materials

In 2016, NERSH collaborators were queried by e-mail for samples based on the RSMPP or NERSH questionnaire. In April, 2016, we (first author and last author) performed a citations

search in Web of Science and also a systematic literature search in Medline, Embase, PsycInfo, Web of Science, and Google Scholar. We searched for RSMPP or NERSH surveys not known within our professional network (for search strings and further details of this review, please see Hvidt et al^[19]).

The searches yielded 316 and 1572 items, respectively, and identified 2 additional samples by Tomasso et al^[10] and Al-Yousefi.^[11] Both research groups were invited to join the collaboration, and both agreed.

All participating research groups signed agreements to share their original questionnaire data. Data from all surveys were sent to the first author as data manager of the NERSH Data Pool. 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 e-mail, and asked to supply details about sampling criteria, response rate, any data management tasks performed on the raw data, and the questionnaire used.

Sample locations varied from single facility surveys (Saudi Arabia, Brazilian nurses and teachers, Brazilian physicians, Indonesia, Congo, Germany Munich Transplantation and Austria), multiple facilities (India), and regional or nationwide surveys (Denmark, New Zealand, Germany Munich Perinatal, Germany Munich Turkish, Germany Freiburg, and USA). The total NERSH Data Pool encompassed 5724 participants at the time of analysis.

Some local researchers used only a part of the original questionnaire, and others added further questions to their survey. Samples were acquired by traditional self-administered questionnaires except for the Brazilian physician study where face-to-face interviews were used.

2.1. Meta-analysis design

Based on the above described systematic literature search we performed individual participant data meta-analysis (IPDMA). IPDMA carries several advantages over traditional meta-analysis of aggregated data. Utilizing the original data of the surveys, we were able to enforce strict inclusion criteria, equal handling of missing values across samples, and extraction of only physicians for subgroup analyses. Likewise, we are able to include previously unpublished data.^[20]

2.2. Outcome measures

2.2.1. Religiosity of health professionals. We first included a measure for religiosity of the physicians using the previously validated unidimensional scale “Religiosity of Health Professionals” included in the NERSH data pool.^[21] The scale is composed of 4 items: The first item “*To what extent do you consider yourself a religious person?*” with 4 possible answers ranging from “not religious at all” to “very religious”; and the other 3 items “*My religious beliefs influence my practice of medicine,*” “*I try hard to carry my religious beliefs over into all my other dealings in life,*” and “*My whole approach to life is based on my religion*” with 4 possible answers ranging from “strongly disagree” to “strongly agree” The scale thus primarily measures religiosity within the *being* and *doing* dimensions of religiosity,^[22] and also embeds an indirect measure of influence through the second and third items. Physicians were given a total score from 4 to 16. Meta-analysis was performed on the mean score value.

A 2-step approach was applied, first computing outcome measures and error statistics for each sample. Second, a meta-analysis was performed using a weighted random-effects model,

and forest plots generated. Due to cultural similarities the 6 European samples were also analyzed in a separate meta-analysis. Confidence intervals (CIs) are reported study-wise, and also for each complete meta-analysis. Heterogeneity was assessed using measures of I^2 . Study-wise sensitivity analyses were performed to examine the potential influence of age and sex. In a regression model with age and sex as covariates, coefficients and effect sizes (R^2) were used to examine the potential confounders.

2.2.2. My religious beliefs influence my practice of medicine.

A second summary measure was included in the design as a more specific measure of self-experienced influence of own religiosity. The single item “My religious beliefs influence my practice of medicine” from the scale was selected for this purpose. The response items were dichotomized into Agree and Disagree values, and meta-analysis was performed on the proportion of respondents agreeing to the statement.

Meta-analysis for the second outcome measure was performed using the *metaprop* command in Stata. Because several proportions came close to 1 in some studies, we enabled the Freeman-Tukey double arcsine transformation to avoid exclusion from the analysis leading to a biased pooled estimate.^[2,3]

2.3. Exclusion criteria

Sex identification was mandatory, which also functioned as a way to identify the nonresponses included in some of the original data files. Also, an age requirement of at least 18 years was enforced, removing a couple of students and a few observations due to mistyping. We filtered out all data relating to nonphysician participants in the pooled studies (n=1841). Three samples (Saudi Arabia, n=225; New Zealand, n=112; and Congo, n=112) did not include any of the outcome parameters and were excluded from the meta-analysis. Based on our missing data analysis we chose to keep only observations completing at least 2 of the 4 items in the “Religiosity of Health Professionals”—instrument (Fig. 1).

2.4. Missing data analysis

At the time of analysis 451 physicians had not answered all 4 items in the instrument. Forty-six physicians did not supply any of the 4 variables, and 46 physicians answered a single question. In all, 154 physicians answered 2 out of the 4 questions, and 205 physicians answered 3 out of the 4 questions. Participants with incomplete scores did not differ to other respondents regarding

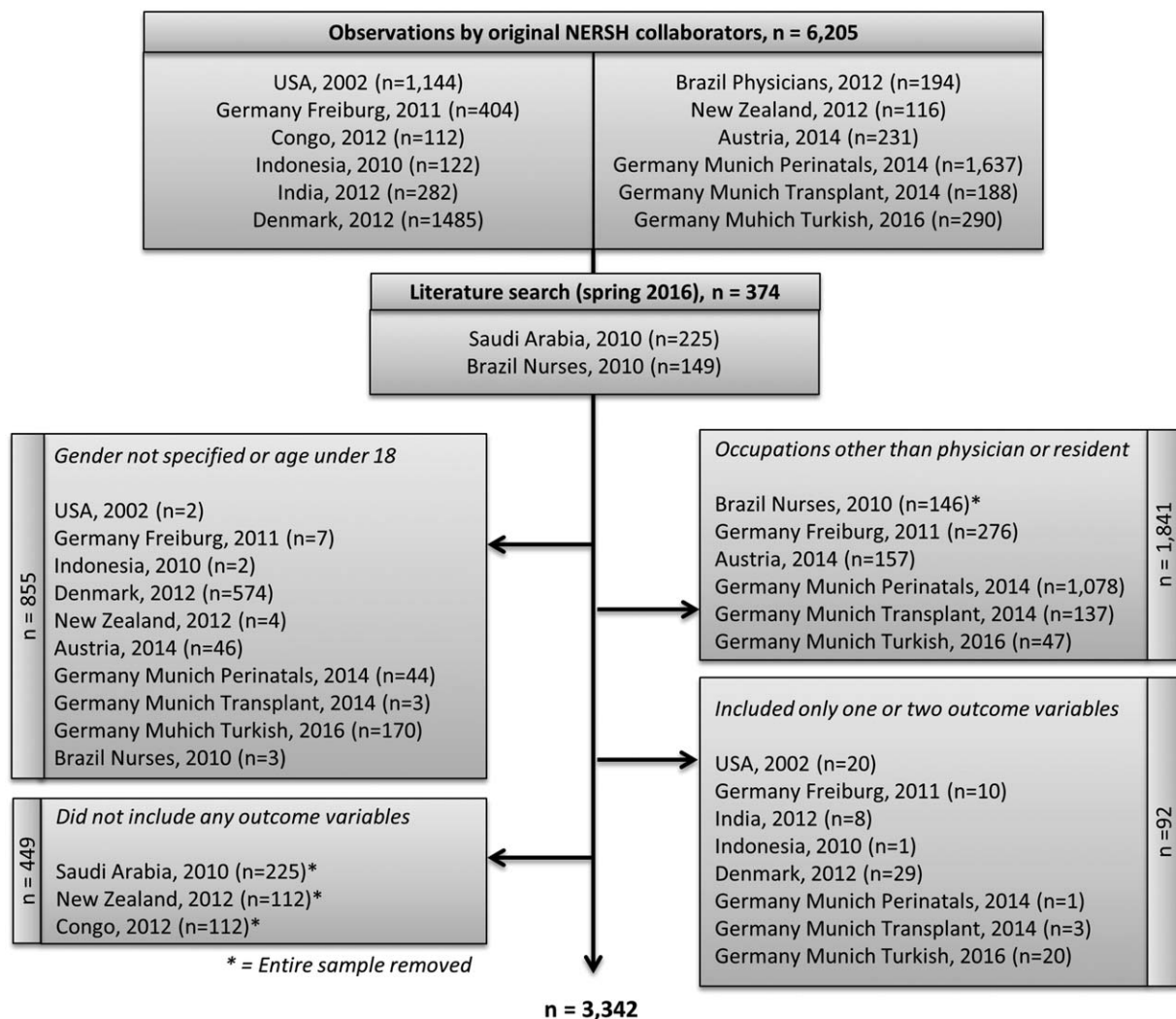


Figure 1. Inclusion and exclusion criteria.

Table 1
Characteristics of physicians included in the meta-analysis.

Study name	n	Male %	Mean age (SD)	Median age	Response rate %	Invitation	Scope	Religious institution	Region
USA, 2002	1122	0.74	49.0 (8.34)	49	0.63	Random Only physicians	Nationwide	No	North America
Indonesia, 2010	119	0.46	29.1 (3.78)	28	0.99	All physicians	Single facility Dr. Soetomo General Hospital, Surabaya, East Java	No	South-east Asia
Germany Freiburg, 2011	111	0.55	38.8 (8.06)	37	0.24	Random Mixed occupations within psychiatry	Nationwide	No	Europe
India, 2012	274	0.43	32.6 (10.83)	27	0.50	All physicians	Multiple facilities	No	South Asia
Denmark, 2012	882	0.57	48.8 (12.51)	49	0.61	All physicians	Region of Southern Denmark	No	Europe
Brazil, 2012	194	0.75	37.7 (11.07)	34	0.95	All physicians	Single facility Marília University Hospital	No	South America
Austria, 2014	28	0.57	41.6 (10.46)	43	0.52	Mixed occupations	Single facility Brothers of Mercy hospital	Catholic	Europe
Germany Munich Perinatal, 2014	514	0.34	37.9 (8.86)	36	0.82	Mixed occupation within perinatal care	Nationwide	No	Europe
Germany Munich Transplant, 2014	45	0.60	38.5 (9.95)	38	0.64	Mixed occupation within organ transplantation	Single facility University Hospital Munich	No	Europe
Germany Munich Turkish, 2016	53	0.47	34.6 (8.25)	33	0.22	All physicians with Turkish background working in Germany*	Nationwide	No	Europe

*Duration of stay in Germany was not an inclusion criterion.

age or sex in a separate analysis (not reported here, but available upon request). The pattern of the missing values was analyzed and recognized as missing completely at random. Due to the unidimensionality of the “Religiosity of Health Professionals”—instrument, we accepted observations responding to at least half of the instrument (ie, 2 out of 4 items). Missing values were imputed with mean values of the remaining observations.

In all, 3342 physicians from 10 samples were included in the final analysis (Table 1). All statistics were made with Stata 13.1.^[24]

3. Results

A total of 1888 articles were assessed for eligibility yielding 2 additional studies based on the RSMPP questionnaire. Out of 5353 health professionals from 14 surveys, data of 3342 physicians from 10 surveys met the inclusion criteria and were

included in the meta-analysis. Individual participant data were retrieved from all 10 surveys. Data integrity was assessed by the first author, and any doubts in interpretation of the data were resolved by direct correspondence with the local researchers (see Kørup et al for a methodological description of the process of ensuring data integrity and comparability between samples in the data pool).

Analysis of the religious affiliations of the physicians showed a large degree of heterogeneity between the samples. In 5 out of the 10 samples about a quarter of the physicians reported no religious affiliation or reported to be atheists or agnostics (Germany Freiburg, Germany Munich Perinatal, Germany Munich Transplant, Germany Munich Turkish, and Denmark; Table 2).

Both Spearman rho and Kendall tau-b correlations were run to determine the relationship between the 2 summary measures: score on the “Religiosity of HPs” instrument; and self-reported

Table 2
Religious affiliations of physicians*.

	No affiliation (%)†	Buddhist (%)	Hindu (%)	Jewish (%)	Mormon (%)	Muslim (%)	Protestant (%)	Catholic (%)	Orthodox (%)	Other Christian (%)	Other (%)	Do not want to answer (%)	Total
USA, 2002	110 (9.9)	12 (1.1)	52 (4.7)	180 (16.1)	17 (1.5)	33 (3.0)	374 (33.5)	244 (21.9)	16 (1.4)	0 (0)	78 (7.0)	0 (0)	1116
Indonesia, 2010	0 (0)	0 (0)	2 (1.7)	0 (0)	0 (0)	102 (85.7)	6 (5.0)	7 (5.9)	2 (1.7)	0 (0)	0 (0)	0 (0)	119
Germany Freiburg, 2011	31 (27.9)	1 (0.9)	0 (0)	0 (0)	0 (0)	1 (0.9)	40 (36.0)	34 (30.6)	0 (0)	0 (0)	4 (3.6)	0 (0)	111
India, 2012	8 (3.0)	1 (0.4)	191 (70.7)	0 (0)	0 (0)	36 (13.3)	34 (12.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	270
Denmark, 2012	179 (22.4)	2 (0.2)	1 (0.1)	0 (0)	0 (0)	5 (0.6)	631 (71.9)	30 (3.4)	11 (1.3)	0 (0)	17 (2.0)	2 (0.2)	878
Brazil, 2012	9 (4.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (8.2)	147 (75.8)	0 (0)	0 (0)	22 (11.3)	0 (0)	194
Austria, 2014	2 (7.1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (7.1)	24 (85.7)	0 (0)	0 (0)	0 (0)	0 (0)	28
Germany Munich Perinatal, 2014	121 (23.6)	1 (0.2)	0 (0)	1 (0.2)	0 (0)	4 (0.8)	167 (32.6)	207 (40.3)	5 (1.0)	6 (1.2)	1 (0.2)	0 (0)	513
Germany Munich Transplant, 2014	10 (22.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	10 (22.7)	22 (50.0)	0 (0)	0 (0)	2 (4.6)	0 (0)	44
Germany Munich Turkish, 2016	13 (24.5)	0 (0)	0 (0)	0 (0)	0 (0)	39 (73.6)	0 (0)	1 (1.9)	0 (0)	0 (0)	0 (0)	0 (0)	53

* Some physicians did not answer this question, thus totals differ from Table 1.

† “No affiliation” includes physicians identifying as atheist or agnostic.

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influence of religious beliefs on practice of medicine. As expected from a unidimensional instrument, we found a very strong, positive correlation between the religiosity measure and self-perceived influence of religiosity on medical practice, which was statistically significant ($\rho=0.892, P<.0001$; and $\tau b=0.796, P<.0001$). Because the single item itself is part of the scale, we also ran analysis on the rest scores with the item subtracted from the scale, which was also significant ($\rho=0.797, P<.0001$; and $\tau b=0.695, P<.0001$).

3.1. Religiosity of health professionals, mean score

The meta-analysis performed using a random-effects inverse-variance model with DerSimonian-Laird estimate of tau showed a total mean religiosity score (95% CI) of 9.5 (8.31–10.68). The Danish sample and 4 of the German samples had scores lower than the overall mean. The largest difference in mean religiosity score was between the samples from Denmark (6.55 [6.36–6.75]) and Indonesia (12.57 [12.25 to 12.90]; Fig. 2). Between-study variance was high (overall $I^2=99.3%$) explaining almost all of the total variance. Cochran Q was 1322.69 ($P<.0005$).

In a separate analysis of European samples the mean religiosity score was 8.65 (7.47–9.83) compared with 10.68 (9.61–11.75) for Non-European countries. The Austrian sample had the highest mean score of the European samples (10.46 [9.24–11.69]). I^2 was 97.7% for the 6 European samples, indicating high degree of heterogeneity between samples (Supplemental Fig. 1, <http://links.lww.com/MD/D247>).

We also performed a sensitivity analysis where age and sex were fitted into a mixed model design, using study-wise linear regression models. This analysis was able to explain only 0% to 9% of the variation observed based on adjusted R^2 values (Supplemental Table 1, <http://links.lww.com/MD/D247>).

3.2. My religious beliefs influence my practice of medicine

The overall summary measure of proportion agreeing to the statement “My religious beliefs influence my practice of medicine” was 0.50 (95% CI 0.36–0.65), indicating that half of the included physicians from all surveys reported to be influenced by their own religious belief. Between-sample heterogeneity was high ($I^2=98.42$) (Fig. 3).

Like the summary measure of the religiosity score, Denmark and Indonesia represented the outer ends of the samples, with 17% of physicians from Denmark reporting to be influenced by own religious beliefs, compared with 91% of Indonesian physicians.

Among Brazilian physicians, 36% agreed to the statement, which was surprisingly low, because the mean religiosity score of the physicians in the first meta-analysis was just above the overall mean score of religiosity. The Brazilian score of religiosity on the “Religiosity of Health Professionals”—instrument must therefore, in part, be explained by relative high religiosity within the 3 other items in the full instrument.

The Austrian sample was noticeable as the European sample with the highest proportion of physicians agreeing to the statement (0.61 [0.42–0.76]). The wide CI is explained by the small sample size. This equals the findings on the religiosity score.

Due to the large cultural overlap we also ran the meta-analysis separately for only European samples showing a grouped proportion of 42% (26%–59%; Supplemental Fig. 2, <http://links.lww.com/MD/D247>).

4. Discussion

4.1. Measuring religiosity

Quantitative measures of phenomena as complex as religiosity introduce significant caveats. Using the specific measure of the self-reported influence of one’s own religious beliefs in the

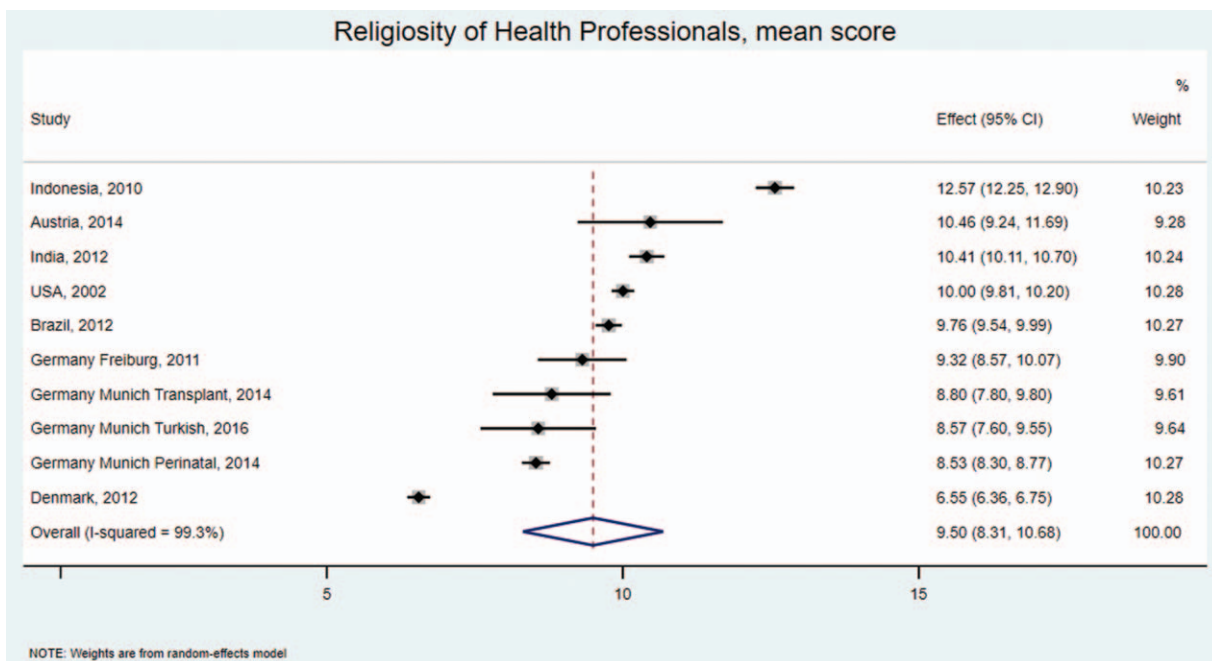


Figure 2. Religiosity of health professionals, mean score.

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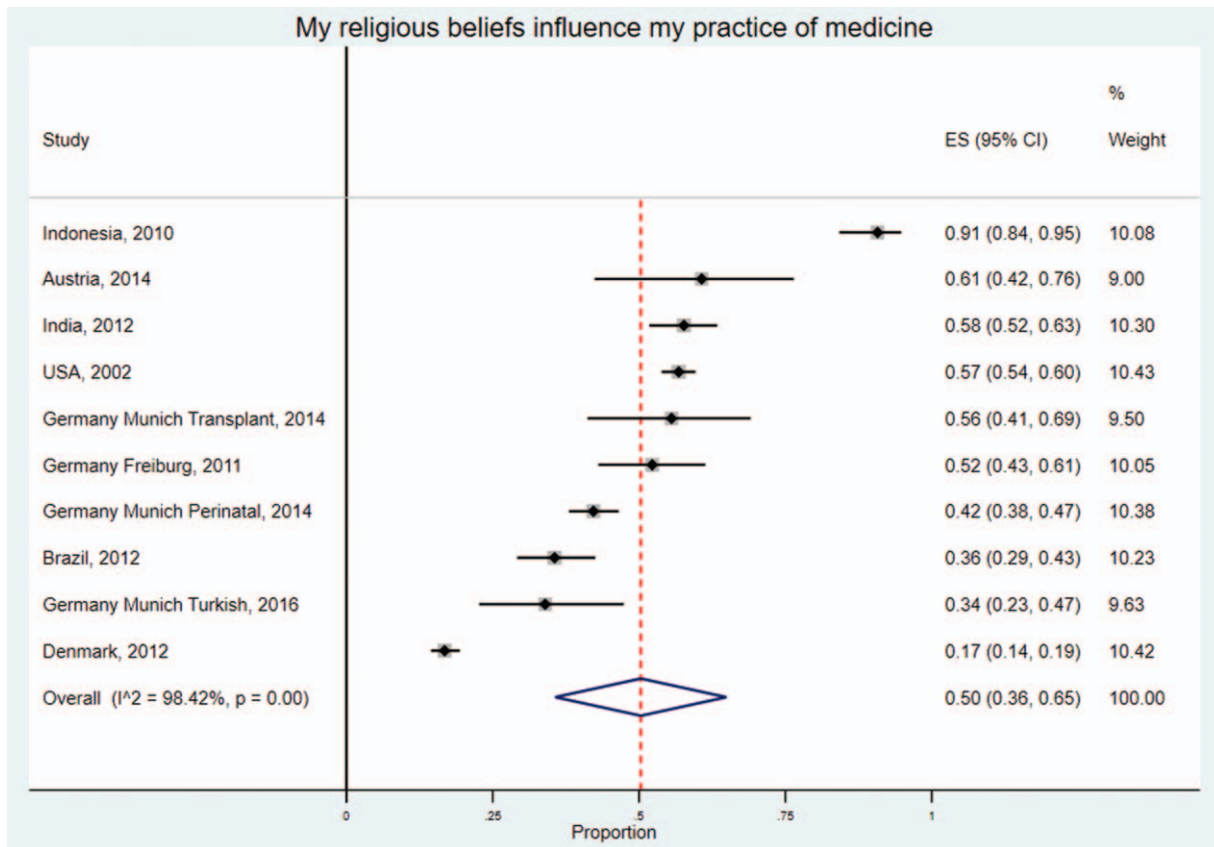


Figure 3. My religious beliefs influence my practice of medicine.

practice of medicine, we have presented a specific and clear indicator of how physicians consciously evaluate their openness to the utilization of religious beliefs and values in the treatment of their patients. Even though the phenomenological nature of religious experience will probably never be fully quantifiable to us, we are able to measure the presence of the experience, and potentially also of the behavior derived thereof. Our measure of the presence of the influence of religious beliefs correlates with the degree of religiosity positively in the unidimensional instrument. The correlation of degree of religiosity and affected behavior was also reported by Curlin et al, Lee et al, and Lucchetti et al who performed primary work on local samples in the data pool.^[2,4,15,18,25]

The Austrian sample of physicians had the highest religiosity score of the European samples. The Brothers Mercy Hospital (Barmherzige Brüder) is an establishment of the Catholic church, and 86% of the Austrian physicians declared Catholic affiliation, 7% Protestant, and 7% no affiliation. The values of the hospital places great importance in the altruistic teachings of the gospels, and the self-conception of the institution describes on the hospital website that “*evangelisation always stands in the foreground of efforts regardless of different social and political factors.*”^[26] The religious priorities of this institution do not necessarily represent those of other hospital physicians or general practitioners in Austria, and we thus cannot expect the sample to be a representative one of the Austrian population, and neither of the remaining samples from nonreligious institutions. Contrary to common expectation, physician attitudes toward influence of

R/S on patient health did not differ between university hospitals and faith-based clinics in a study by Lee et al,^[14] and differences between these types of institutions may be subject to prejudices.

Brazilian physicians scored lower on the specific measure of “influence on medical practice” relative to their mean score on religiosity. This interesting difference could be explained by higher scores on the 3 other items focusing on intrinsic religiosity and identity of self as a religious individual, rather than on the utilization of personal religious values in patient care.

An interesting point was made by Ramakrishnan,^[17] proposing a potential bidirectional influence of R/S on clinical practice, where clinical practice also has an influence on the religiosity of the physician. It is not difficult to imagine that physicians are personally affected by the many existential crises they witness patients go through. The treatment of patients and their relatives in difficult times stimulates the empathic and compassionate character traits of physicians. Attempts to find or interpret meaning in these potentially devastating personal crises can be a burdening and highly personal task, and physicians may, in turn, find themselves asking existential questions of their own. Nevertheless, physicians’ emotional stress may eventually cause negative coping strategies like depersonalization defined as “an impersonal, negative, and cynical attitude” towards patients,^[27] or Cool Down strategies where clinicians emotionally distances themselves from their patients to maintain their “functionality” in their job^[28]; and this strategy may later on lead to a greater degree of frustration because physicians notice that their acting conflicts with their own professional standards.

4.2. Other kinds of religiousness

Physicians were questioned directly about the presence and influence of religious belief, and whether they see themselves as a religious person. Interpretation of the terms “religious belief” and “religion” may vary. Those who see themselves as mainly spiritual and not affiliated with organized religion can easily have read “religious” as “spiritual” in the questions making the topic much more applicable to their own situation. Others may have exercised a stricter interpretation, and thus scored low on religiosity, although high on spirituality.

The same can be argued for those living according to atheistic world views. Modern medicine has largely parted ways from its religious and philosophical roots over the past 500 years. Many health care environments today idealize and promote reasoning not derived from religious thought. This secularization is probably 1 of the main reasons why we today measure a gap between the religiosity of physicians compared with that of the background population.^[9,29] While most agnostics and atheists do not publicly preach the ideas and arguments behind their nonbelief, we must acknowledge a potential influence of what can best be described as atheistic evangelism in clinical practice. In the NERSH Data Pool agnostics, atheists and others not affiliated with organized religion are grouped together in a “no affiliation” category (n=483). Two physicians declared they did not want to answer the question, and the rest declared affiliation with a religion (n=2.841). The religiosity scores of those 3 groups (not affiliated, affiliated, and unanswered) were tested in a separate analysis, showing means, respectively, 5.80 (5.59 to 6.02), 9.49 (9.33 to 9.57), and 5.50 (−13.56 to 24.56) on the HP Religiosity scale from 4 to 16. Based on these data we are not able to discard the possibility that atheistic or agnostic values may impact clinical practice, although only recently the subject of growing research attention,^[30] such atheistic and agnostic values, may, in themselves, cover a multitude of orientations and convictions, but are probably not experienced by most physicians as something religious.

4.3. Influence of culture

Not surprisingly, physicians from Indonesia, being the world’s most populous Muslim-country with 204 million adherents in 2010,^[31] were mainly affiliated with Islam. Likewise, Indonesia was the only sample where none of the physicians reported no religious affiliation or being atheist or agnostic.

The Munich study of physicians in Germany with Turkish background also showed predominant Muslim affiliations, which may indicate a cultural trait not dependent on geography. Interestingly, 1 out of 5 of the Turkish physicians who had moved to Germany denoted no religious affiliation. This indication of a secular shift has also been described by Kuseyri,^[32] who found the migrated Turkish physicians less religious on a number of religiosity measures compared to their compatriots born in Germany. One possible explanation could be that the personal values of the physicians were influenced by German culture (including religious freedom) after migration. Unfortunately, we had no records of the religiosity of these physicians before their migration, and thus we were not able to control for potential changes in religiosity.

4.4. Limitations

Respondents were primarily from developed western countries. Additional surveys from developing countries would enrich the data pool and improve future cross-cultural comparisons.

Several of the samples had low response rates, introducing the risk of sampling bias, Munich Turkish (22%), Freiburg (24%), India (50%), and Austria (52%). We acknowledge the inherent risk for biased responses in these samples, but atheistic/agnostic respondents could be equally eager to express opinions on belief, thus potentially balancing the influence. The respondents in the NERSH Data Pool are anonymized, and we are not able to contact nonresponders for a nonresponder analysis.

Sample sites vary not only culturally but also in country-wise context. No restrictions on physician specialty or working conditions were enforced other than those applied by the local researchers. The Austrian sample was from a faith-based institution unlike the other samples in the data pool, thus less comparative.

Although 80% of the data were gathered in the period 2009 to 2016, the entire data pool was collected over 14 years. The religious landscape in America has changed significantly since.^[33] All of the studies are cross-sectional and have not collected second samples, hence we cannot control for any changes in religiosity over time.

5. Conclusions

Physicians differ in various ways including in tendencies to express religious values and experiences.^[34] Research points toward an increase in the number of people affiliated with organized religion in the future, also when taking overall population increase into account.^[35] We postulate elsewhere that the influence of religious values in clinical practice is here to stay,^[36] and with the current study further proposes that the size of this influence, in a global perspective, has a weight that significantly alters patients’ health outcomes, and therefore merits due attention. We believe that education regimes of current and future physicians should encompass this knowledge, and help physicians learn how and when these values support professional and patient-centered care, and when they do not.

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References

- Curlin FA, Chin MH, Sellergren SA, et al. The Association of Physicians' Religious Characteristics with their attitudes and self-reported behaviors regarding religion and spirituality in the clinical encounter. *Med Care* 2006;44:446–53.
- Curlin FA, Odell SV, Lawrence RE, et al. The relationship between psychiatry and religion among U.S. physicians. *Psychiatr Serv* 2007; 58:1193–8.
- Daaleman TP, Frey B. Prevalence and patterns of physician referral to clergy and pastoral care providers. *Arch Family Med* 1998;7:548.
- Curlin FA, Lawrence RE, Chin MH, et al. Religion, conscience, and controversial clinical practices. *N Engl J Med* 2007;356:593–600.
- Curlin FA, Nwodim C, Vance JL, et al. To die, to sleep: US physicians' religious and other objections to physician-assisted suicide, terminal sedation, and withdrawal of life support. *Am J Hosp Palliat Care* 2008;25:112–20.
- Clark PA, Drain M, Malone MP. Addressing patients' emotional and spiritual needs. *Jt Comm J Qual Saf* 2003;29:659–70.
- Puchalski CM. Physicians and patients' spirituality: ethical concerns and boundaries in spirituality and health. *Virtual Mentor* 2009;11:805–15.
- Shepherd AM, Schnitker SS, Leffel GM, et al. Developing the good physician: spirituality affects the development of virtues and moral intuitions in medical students. *J Positive Psychol* 2017;1–2.
- Curlin FA, Lantos JD, Roach CJ, et al. Religious characteristics of U.S. physicians: a national survey. *J Gen Intern Med* 2005;20:629–34.
- Tomasso CD, Beltrame IL, Lucchetti G. Knowledge and attitudes of nursing professors and students concerning the interface between spirituality, religiosity and health. *Rev Lat Am Enfermagem* 2011; 19:1205–13.
- Al-Yousefi NA. Observations of Muslim physicians regarding the influence of religion on health and their clinical approach. *J Relig Health* 2012;51:269–80.
- Ramakrishnan P, Dias A, Rane A, et al. Perspectives of Indian traditional and allopathic professionals on religion/spirituality and its role in medicine: basis for developing an integrative medicine program. *J Relig Health* 2014;53:1161–75.
- Lee E, Zahn A, Baumann K. "Religion in psychiatry and psychotherapy?" A pilot study: the meaning of religiosity/spirituality from staff's perspective in psychiatry and psychotherapy. *Religions* 2011;2: 525–35.
- Lee E, Baumann K. German psychiatrists' observation and interpretation of religiosity/spirituality. *Evid Based Complement Alternat Med* 2013; 2013:8.
- Lee E, Zahn A, Baumann K. Religiosity/spirituality and mental health: psychiatric staff's attitudes and behaviors. *Open J Soc Sci* 2014;2:7.
- Schouten E. Viewpoints and motives on religion and spirituality of professionals in perinatal medicine. [Dissertation, LMU Munich]; 2016.
- Ramakrishnan P, Karimah A, Kuntaman K, et al. Religious/spiritual characteristics of Indian and Indonesian physicians and their acceptance of spirituality in health care: a cross-cultural comparison. *J Relig Health* 2014;649–69.
- Lucchetti G, Ramakrishnan P, Karimah A, et al. Spirituality, religiosity, and health: a comparison of physicians' attitudes in Brazil, India, and Indonesia. *Int J Behav Med* 2016;23:63–70.
- Hvidt NC, Kørup AK, Curlin FA, et al. The NERSH International Collaboration on values, spirituality and religion in medicine: development of questionnaire, description of data pool, and overview of pool publications. *Religions* 2016;7:107.
- Riley RD, Lambert PC, Abo-Zaid G. Meta-analysis of individual participant data: rationale, conduct, and reporting. *BMJ* 2010;340:
- Kørup AK, Nielsen CT, Søndergaard J, et al. The International NERSH Data Pool: a methodological description of a data pool of religious and spiritual values of health professionals from six continents. *Religions* 2017;8:24.
- la Cour P, Hvidt NC. Research on meaning-making and health in secular society: secular, spiritual and religious existential orientations. *Soc Sci Med* 2010;71:1292–9.
- Nyaga VN, Arbyn M, Aerts M. Metaprop: a Stata command to perform meta-analysis of binomial data. *Arch Public Health* 2014; 72:39.
- StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP. [computer program]. See <https://www.stata.com/support/faqs/resources/citingsoftware-documentation-faqs/>
- Lee E, Zahn A, Baumann K. How do psychiatric staffs approach religiosity/spirituality in clinical practice? Differing perceptions among psychiatric staff members and clinical chaplains. *Religions* 2015;6: 930–47.
- Barmherzige Brüder. The Austrian order province –one of the 20 order provinces in the world. 2018. <https://www.barmherzige-brueder.at/site/oesterreich/sprachen/en/theaustrianprovince>. [Accessed September 2018]
- Schaufeli WB, Buunk BP. Burnout: An Overview of 25 Years of Research and Theorizing. In Schabracq MJ, Winnubst JA, Cooper CL. (eds). *The Handbook of Work and Health Psychology*. doi:10.1002/0470013400.ch19.
- Büssing A, Falkenberg Z, Schoppe C, et al. Work stress associated cool down reactions among nurses and hospital physicians and their relation to burnout symptoms. *BMC Health Serv Res* 2017;17:551.
- Robinson KA, Cheng M-R, Hansen PD, et al. Religious and spiritual beliefs of physicians. *J Relig Health* 2017;56:205–25.
- Brewster ME, Robinson MA, Sandil R, et al. Arrantly absent: atheism in psychological science from 2001 to 2012 ψ . *Counsel Psychol* 2014; 42:628–63.
- Published report from PewResearchCenter. The Future Global Muslim Population: Projections for 2010–2030. 2011. Retrieved from <http://assets.pewresearch.org/wp-content/uploads/sites/11/2011/01/FutureGlobalMuslimPopulation-WebPDF-Feb10.pdf>
- Kuseyri C. Spiritualität und Religiosität unter dem türkischstämmigen Medizinpersonal in Deutschland. University: Medizinischen Fakultät der Ludwig-Maximilians-Universität zu München; 2016.
- Published report from PewResearchCenter. (2015). America's Changing Religious Landscape, 2015. Retrieved from <https://www.pewforum.org/wpcontent/uploads/sites/7/2015/05/RLS-08-26-full-report.pdf>.
- Curlin F, Burck RR. Patient counseling and matters of conscience. *Virtual Mentor* 2005;7.
- Published report from PewResearch Center. (2017). The Changing Global Religious Landscape, 2017. Retrieved from <https://www.pewforum.org/>.
- Kørup AK, Søndergaard J, Christensen RD, et al. Religious values in clinical practice are here to stay. *J Relig Health* 2018;doi: 10.1007/s10943-018-0715-y [Epub ahead of print].