

Considering religion and spirituality in precision medicine

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Abstract

The emerging era of precision medicine (PM) holds great promise for patient care by considering individual, environmental, and lifestyle factors to optimize treatment. Context is centrally important to PM, yet, to date, little attention has been given to the unique context of religion and spirituality (R/S) and their applicability to PM. R/S can support and reinforce health beliefs and behaviors that affect health outcomes. The purpose of this article is to discuss how R/S can be considered in PM at multiple levels of context and recommend strategies for integrating R/S in PM. We conducted a descriptive, integrative literature review of R/S at the individual, institutional, and societal levels, with the aim of focusing on R/S factors with a high level of salience to PM. We discuss the utility of considering R/S in the suitability and uptake of PM prevention and treatment strategies by providing specific examples of how R/S influences health beliefs and practices at each level. We also propose future directions in research and practice to foster greater understanding and integration of R/S to enhance the acceptability and patient responsiveness of PM research approaches and clinical practices. Elucidating the context of R/S and its value to PM can advance efforts toward a more whole-person and patient-centered approach to improve individual and population health.

Keywords

Religiosity, Spiritual, Faith, Tailoring, Health, Treatment

INTRODUCTION

Precision medicine (PM), taking an individual's characteristics into account to tailor medical treatments to optimize health outcomes [1–3], represents the next stage in the evolution of patient care. In contrast to one-size-fits-all approaches that can result in under- or overtreatment with higher human and economic costs [1,2,4], PM identifies subgroups of patients who are at risk for developing specific diseases and who may respond differently to treatments [5]. Historically, PM treatments were driven by genomic sequencing that revealed information about patients' biological characteristics [6,7]. As PM approaches garnered more attention, additional behavioral, psychosocial, and environmental factors emerged as key factors in advancing PM [5–7]. Socioecological context is increasingly recognized as an important component to consider in PM in general, and especially for fostering health equity in PM [8]. One important

Implications

Practice: Health care providers should consider the religious and spiritual beliefs and practices of their patients.

Policy: Policymakers may consider supporting research funding that examines diverse factors associated with health outcomes, such as the All of Us Program.

Research: Religion and spirituality are important multilevel contextual factors to consider in future PM research.

contextual factor that may advance PM efforts is religion and spirituality (R/S).

Socioecological context takes into account individual variation in environmental factors (e.g., social, economic, physical) at various levels of the ecological model. Individual-level contextual factors (e.g., gender, socioeconomic status), organization-level contextual factors (e.g., workplace, place of worship), and the broader societal context (e.g., culture, political climate) uniquely shape individual health. Integrating socioecological context also facilitates a holistic perspective of the patient by considering the multiple contexts in which the patient is embedded that serve to constrain or facilitate health behaviors. R/S is an important contextual factor that can be considered at multiple levels (individual, organizational, societal) in PM efforts.

Patients' faith is already recognized as a relevant clinical practice consideration to provide more salient and efficacious treatment, particularly in the areas of mental health [9–11], end-of-life care [12], and organ donation [13,14]. Patients often perceive their spiritual needs as being met in part through their interactions with their health care providers [15]. Likewise, the faith beliefs of the health care provider have been identified as a factor to be considered in patient treatment [10,16]. Taking into account R/S beliefs and practices at both the patient and provider levels may facilitate a greater degree

of PM that can result in more effective treatment [9–11,17]. For example, the large body of literature documenting significant associations between R/S and psychiatric outcomes [18,19] has led to the creation of spiritual history tools and practice guidelines for psychiatrists to integrate patient R/S beliefs with a personalized treatment plan [20,21]. Demonstrations of meaningful relationships between R/S and physical health [10,18,19,22] have also precipitated research about the use of screening spiritual histories and educational interventions for physicians to consider patient R/S beliefs and values in care, particularly in faith-based health care systems [21,23,24].

For the purposes of this article and in line with prior research, spirituality will be defined as one's experiences with the sacred, whereas religion refers to one's involvement in an organized system of beliefs and behaviors related to one's experiences with the sacred [18]. Although religion and spirituality can be considered distinct in some ways, they are closely related, and because health-related research tends to use a variety of measures of religion and spirituality that are conceptually and operationally overlapping, many researchers in the field adopt the term R/S to refer to these intertwined constructs.

Religion has influenced lifestyle choices since the beginning of recorded history [25]. Through the ages, religious proscriptions have guided health-related behavior across cultures. A predominant religious theme is an emphasis on caring for the physical body and abstaining from behaviors that may be harmful [10]. For example, sacred texts of major religions proscribe premarital and extramarital sex [26], and many texts—including the Christian Bible (Leviticus 11, Deuteronomy 14), Jewish Torah (Vayikra or Leviticus 11, Devarim or Deuteronomy 14), and Islamic Qur'an (Qur'an 5:3; 6:145)—denounce the pig as unclean and unsuitable for consumption. Additional guidelines pertain to behaviors, such as fasting (which has implications for timing pharmaceutical intake [27]) food preparation and consumption, alcohol use, and tobacco use. Evidence suggests dietary and other behaviors are strongly influenced by religious proscriptions [28], underscoring a need to more systematically integrate religious considerations into health care.

Despite declining levels of religious beliefs and practices in recent years [29], the USA remains a highly religious country at both the institutional and individual levels. Data from the Pew Research Center's 2014 Religious Landscape Study reported that 89% of U.S. adults believe in God, 75% reported being religiously affiliated, and 55% reported daily prayer. Half of U.S. adults reported attending religious services at least monthly and 53% of U.S. adults rated religion as being "very important" to them [29]. Data also suggest that levels of spirituality in the U.S. population are increasing [29].

Given the increasing relevance of PM and the influence of R/S in the lives of many U.S. citizens, this article will describe how different levels of R/S (individual, institutional, societal) can be practically considered in PM. Specific recommendations for considering R/S in PM will also be delineated. We also provide cautions that not all types of R/S may be helpful and that R/S considerations may be more or less relevant for different individuals and groups [30–33].

CONSIDERATION OF R/S AT THE INDIVIDUAL LEVEL IN PM

Substantial literature has documented R/S's significant relationship with individual-level variables, including biological factors, health behaviors, psychosocial variables, and research participation. Although the majority of the studies reviewed in this section demonstrated salutary associations between some R/S factors and health, many studies yielded mixed or null results. R/S is a multifaceted construct with complex relationships with health [18,34,35]. Although we recognize that R/S can serve as a mediator or moderator in relationships involving health outcomes [35–38], we provide a general overview of the direct relationships between R/S and health here to clearly convey R/S links to PM; readers are referred to the original sources for more detailed findings on these complex issues.

R/S and biological factors

Systematic literature reviews and meta-analyses have linked R/S to multiple physiological processes, including cardiovascular and neuroendocrine function [39]. Higher levels of R/S have been associated with better lipid profiles (i.e., lower low-density lipoprotein and higher high-density lipoprotein cholesterol) and R/S practices (e.g., meditation, spiritual relaxation) have been associated with lower cholesterol and stress hormone (e.g., cortisol) levels [39–41]. A review [10] concluded that among 27 studies of the relationship between R/S and immune function, 15 (56%) reported beneficial relationships or positive effects in response to an R/S intervention. Of the 14 studies with the highest quality ratings, 10 (71%) reported significant positive associations or increased immune functioning in response to an R/S intervention.

The literature regarding R/S and gene expression is more limited. In a randomized controlled trial designed to test the effect of mindfulness meditation on depressive symptoms and pro-inflammatory gene signaling in younger (<50 years old) breast cancer survivors, the treatment group had a decline in pro-inflammatory gene expression compared to the control group [42]. Similarly, a spiritual intervention that included meditation demonstrated a reduction in a dopamine gene receptor (DRD1-5) among breast cancer patients of Muslim faith compared to the control group [43]. Some evidence in the alcohol literature suggests that

R/S can serve as a protective factor against alcohol abuse through moderating the genetic variation of neuroticism and disinhibition [44]. Although the current literature in R/S and genetics is limited, future PM strategies may consider R/S when targeting specific changes in gene signaling and expression.

R/S and health behaviors

Several reviews have reported significant associations between increased R/S and health behaviors including lower cigarette smoking, lower substance abuse, and less high-risk sexual behavior along with greater consumption of a healthier diet and higher levels of physical activity [10,19]. However, recent studies have reported mixed findings [45], including negative aspects of R/S (e.g., spiritual struggle) associated with deleterious health behavior practices (e.g., problem drinking) [46]. Other research suggests R/S beliefs can adversely influence receptivity to cervical cancer prevention via human papillomavirus (HPV) vaccination in Muslim immigrant women in Canada and screening via Pap testing among the Hmong hilltribe women in Thailand [47,48], necessitating other testing options, such as self-sampling for HPV [49]. In contrast, studies have also demonstrated that R/S may positively influence cancer screening behaviors, such as mammography, Pap testing, and colonoscopy [50–52]. Relationships between R/S and limited involvement in health-risk behaviors are likely a consequence of the social sanctions some religious institutions have against certain behaviors, such as smoking, substance abuse, and high-risk sexual behavior [10]. Furthermore, religious institutions may provide access to health-related activities and resources [51]. R/S beliefs about the body's sacredness [10,53–55], beliefs about the origins of health and illness [56], or religious doctrine (e.g., Seventh-Day Adventists' promotion of a vegetarian diet [57]) may also promote health behaviors, such as healthy dietary intake and physical activity. The social support and networks R/S provides may also facilitate positive health behaviors and their maintenance [10]. Given that marginalized individuals report higher R/S levels, R/S may provide the underserved with effective tools of a meaningful belief system reinforced by a supportive community to counteract the impact of social marginalization [10].

PM efforts may consider assessing certain aspects of R/S beliefs in targeting treatments designed to change health behaviors. R/S beliefs regarding sacredness of the body and meaning specific to health behaviors may be incorporated in future assessments to ascertain if incorporating such aspects would be appropriate in PM treatments targeting religious adherents. For example, Mahoney's Perceived Sacredness of the Body Scale [58] could be incorporated in PM assessments.

R/S and psychosocial variables

A substantial body of literature has reported the relationship between R/S and psychosocial variables, such as stress and coping. A literature review of 147 independent investigations concluded that R/S attenuates the impact of stressful events on mental health [59]. R/S may reduce the deleterious effects of stress on health by enabling adherents to generate meaning amidst stressful events and find greater purpose in life [60]. R/S thoughts and reactions may also attenuate the negative impact of stressful events by engendering hope and optimism [59,61]. The social support received through one's peers in a religious congregation may also provide a venue for the congregant to reduce perceived stress [62–64]. However, more research is needed [65–67]. The potential for R/S to alleviate the impact of stressful events appears to depend on characteristics of the person, the stressor, and the context [45]. PM efforts to improve mental health may consider assessing R/S beliefs regarding meaning, hope, and optimism, tailoring interventions based on these R/S beliefs to maximize mental health promotion, and the possible usefulness of an individual's faith community as a resource.

R/S coping has been identified as an important resource for adherents experiencing adversity, particularly among cancer patients and survivors [68]. Common R/S coping behaviors among cancer patients and survivors are prayer, meditation, religious service attendance, and consultation with spiritual leaders [69]. Qualitative studies consistently report that people with cancer spontaneously report using R/S coping to process their diagnosis [70]. Use of R/S coping is hypothesized to increase perceived self-awareness, effective adjustment with stress, enhanced relationships and connectedness with others, a greater sense of empowerment and confidence, and promotion of meaning and hope [71]. However, quantitative studies report mixed results regarding R/S coping's effect on psychological well-being among people with cancer, perhaps due to methodological limitations [72]. Incorporation of R/S coping has been found to be associated with cancer patients' satisfaction with their cancer care [69]. Thus, PM strategies for cancer survivors of faith and spirituality may draw from the R/S coping literature to emphasize specific salient messages to include in patient care and intervention delivery.

R/S and research participation

R/S beliefs may influence the extent to which individuals are willing to participate in clinical trials. For example, beliefs regarding whether God determines who lives or dies from cancer may deter African Americans from participating in cancer clinical trials [73,74]. Other studies have reported that among cancer patients with advanced cancer, R/S is not associated with clinical trial enrollment [68].

In addition, the novelty, unknown, and uncertainty of genetic studies can also be difficult to reconcile with some R/S beliefs, which may make participation in studies requiring biospecimens challenging. For example, beliefs of God being in control may deter religious adherents from participating in genetic research [75].

Advancing PM requires research to ascertain how individual-level factors can inform treatment. To improve the health of all people, PM research must include data from underrepresented and underserved populations [76]. To mitigate potential R/S barriers to research participation from marginalized populations, partnering with faith communities using a community-based participatory research approach can be instrumental [77]. Collaborating with faith partners to create and disseminate information regarding the importance of research participation can facilitate enrollment, particularly in underserved communities [77]. Faith community members have reported that their religious community may be a safe and trusted environment for people to learn about health [78]. Further, clergy interviewed about their thoughts on the intersection of religion and genetics responded positively regarding research-relevant resources they could distribute to their parishioners, suggesting they may be key allies in broadening research participation [79].

CONSIDERATION OF R/S AT THE ORGANIZATIONAL LEVEL IN PM

The roles of structure, principles, values, practices, and socialization within religious organizations have proven relevant in some aspects of health promotion research and practice [80,81], and thus, potentially influential in health behaviors and health outcomes [82]. Faith-based health promotion interventions, in particular, exemplify prevention, control efforts, and health support services among several populations [83–86], and may be leveraged to influence health behavior, gene expression, and subsequently, health outcomes. For example, documented in the literature are associations of religious factors with health outcomes and health care engagement [82] for several religions, such as Judaism [87,88] and the Church of Jesus Christ of Latter-day Saints (Mormons) [89–92]. A comprehensive examination of all world religions is beyond the scope of this review. However, below we offer examples of how R/S may influence health in three types of faith communities. These communities were chosen because there is a substantial literature documenting the role of organizational-level R/S of these communities on health. For example, Seventh-Day Adventists have a substantial body of health-focused research, in part because of their dietary proscriptions [93–96].

African American faith communities

Historically, the African American church has served as the spiritual, political, and social hub for many African American communities [97,98]. In addition to food programs, prison ministries, and homeless shelters [97], health care information and medical services are frequently provided through many African American churches [56,99–106]. Health ministries are fairly prevalent within African American churches, with as many as 64% of African American churches having an active health ministry [107]. Health ministries can provide information (e.g., through bulletin boards, flyers, announcements, health fairs) and resources (e.g., increased access to health care) and can assist members in making changes (e.g., structured lifestyle change programs) to live a healthy lifestyle [107,108]. Faith leaders may promote health from the pulpit, encourage health ministries, and advocate for health care equity and access [109,110].

African American churches have been successfully engaged to promote health behavior change, which suggests the importance of health to some churches. These interventions, some of which have been delivered through health ministries, have largely targeted diabetes, nutrition, weight loss, exercise, and sexual behaviors; overall, many have been shown to be effective [111–115].

An example of the potential influence of African American churches on health can be found in the area of mental health. Compared to African Americans with lower religious involvement, African Americans with greater religious involvement have lower racism-related distress [116], depression [117,118], and suicidality [119]. Through providing a regular place of worship with like-minded others, social support, and beliefs related to the church member's relationship to God, the church may provide coping strategies to buffer the effect of racism on stress. One study found that prevalence rates of major depression were lowest among those attending church at least once a week and a few times per month [118]. Further, these regular attenders, as well as those whose coping strategy was to "Look to God for strength," were less likely to have major depressive disorder compared to those who attended less than once a year [118]. Religious involvement and looking to God for strength, comfort, and guidance were also inversely associated with suicidal ideation and attempts [119]. Thus, the African American church may serve as a buffer between the stressful environment and biologic stress-response to lessen potentially deleterious mental health outcomes.

Asian American faith communities

Similar to other racial/ethnic communities, some Asian American faith communities play a unique role in influencing physical and mental health among

their members. Unique, however, to the Asian faith communities is the diversity of religious groups and cultural groups represented within these faith communities. This religious diversity is due largely to the fact that Asia leads the world as the most religiously diverse continent [120,121]. As such, Asian faith communities often represent multiple religions, including Christianity, Buddhism, Hinduism, and Islam.

Some Asian faith communities play a large role in promoting the health and social needs of their congregations [122,123]. This effort to promote health may be due in part to the high numbers of immigrant communities within these faith community settings [123–125], which are often the only source of social and practical support. Due perhaps to this focus on assisting with their congregants' medical needs as well as the high level of health needs reported among these Asian religious communities [122], effects of Asian faith communities on physical and mental health behaviors are largely positive.

Many Asian American faith communities have positive influences on health outcomes by promoting engagement in healthy behaviors and providing direct health care resources [123,126]. For example, Asian faith communities influence health behavior through their ability to raise awareness and encourage acknowledgment and discussion of health issues that would otherwise be neglected in Asian communities [123]. Some Asian Buddhist faith communities have integrated religious concepts with HIV prevention messages to increase the likelihood of acceptance of these messages as relevant [126]. Strategies to implement PM treatments in Asian communities may benefit from partnering with Asian faith communities to craft educational messages that are consistent with relevant R/S beliefs to maximize salience and receptiveness to treatments.

Compared to Asian non-faith communities, Asian faith communities have also been reported to have higher access to mental health services [127]. Whereas seeking help for mental health concerns is a challenging process due to cultural stigma among most Asian groups, many people from Asian communities report using prayer or visits to temples and churches to gain access to mental health care [127]. Thus, acknowledging beliefs about specific health behaviors may facilitate PM research and implementation among individuals attending Asian faith communities. For example, PM research on potential mental health treatments to mitigate genetic susceptibility to certain mental illnesses (e.g., depression) may be more accepted within some Asian faith communities if the cultural stigma against mental health is acknowledged and addressed through appropriate R/S messages.

On the basis of these findings, it is evident that access to health ministries with prior records of success for improving health outcomes—such as the HIV engagement programs within Buddhist faith communities previously mentioned [126], promotion of

healthy behaviors and provision of access to health care resources [126,128], and offering prayer and other methods to access mental health services [127]—may be critical to improving health outcomes among Asian American faith community members.

Seventh-Day Adventist churches

The organizational structure of the Seventh-Day Adventist Church is designed to implement health and wellness activities based on national health and wellness guidelines. Health ministries at the organizational level are run by local Adventist leaders but are extensions of national initiatives, such as NEWSTART (Nutrition, Exercise, Water, Sunlight, Temperance, Air, Rest and Trust in God) [93]. This national program, a health and wellness initiative launched in 1978, is a core part of Seventh-Day Adventist health ministry activities and was most recently relaunched as NEWSTART Global. Evidence of this and other programs (Wellness Challenge Program) [94] speak to prevalence of health ministries in Adventist churches throughout the country and the promotion of beneficial health behaviors on national and global basis. Among many Seventh-Day Adventists, protective diets positively impact health outcomes [95] and prevalence of chronic illness is substantially lower compared to other populations. Vegetarianism is promulgated within Adventist organizations that encourage congregants to adopt healthy lifestyles and to follow strict diets and regimens that align with their spiritual beliefs. A study among vegan or vegetarian and nonvegetarian black Adventists, for instance, demonstrated that cardiovascular risk factors were much lower among vegan and vegetarian Adventists [96]. Adventist theological beliefs also promote a tobacco-free lifestyle [129] and abstinence from alcohol [130]. These are among a core set of lifestyle behaviors that the Seventh-Day Adventist Church promotes as the standard of living for Adventists (Christian Behavior). Considering the R/S context of Seventh-Day Adventists can include the recognition of theological prescriptions for healthy behaviors and proscriptions against unhealthy behaviors, and engagement of such R/S beliefs can be used to create PM health promotion messages and strategies for adherents of this faith.

CONSIDERATION OF R/S AT THE SOCIETAL LEVEL IN PM

R/S have played an essential role in shaping societal values and beliefs [128,131]. Morality is commonly the cornerstone of many R/S beliefs, and societies propagate ethical values of community, trust, integrity, social responsibility, and self-restraint [132]. As a result, societal rules and regulations often reflect the R/S of its members [131]. Indeed, R/S have influenced societal rules and public policy decisions regarding health care delivery, family planning, contraception, HIV prevention, and mental health services [133–137]. A key example is women's reproductive health in the

USA, where R/S beliefs have historically and presently divided opinions regarding contraceptives and abortions [135,137–139]. R/S influences on women's sexuality are also evidenced in other countries, such as Mexico [136] and the Philippines [140]. Better understanding the role of R/S in informing and shaping the culture of large segments of the population can provide guidance in crafting PM treatments. For example, R/S beliefs about sexuality can inform PM strategies designed to increase HPV vaccination uptake, particularly among communities of faith that may associate HPV with inappropriate sexual behavior. Better understanding how R/S defines morality can also facilitate the development of PM research that engages R/S beliefs to encourage research participation for the societal good [141].

Another important consideration when discussing the role of R/S at a societal level in PM is the possible effect of R/S discrimination on health. For example, the Islamic community in the USA is currently facing a high level of suspicion and discrimination. According to a Pew survey conducted in July 2017, 75% of American Muslims believe there is a high level of discrimination against Islamic communities in the USA [142]. More than 50% reported that being Muslim has been increasingly difficult over the last few years and a similar proportion reported they had experienced at least one instance of R/S discrimination during the previous year [142]. Although research on the health consequences of this increasingly hostile climate on the mental and physical health of American Muslims is limited, a study conducted in the aftermath of the 9/11 terrorist attacks found that perceived abuse and discrimination were associated with increased psychological distress, reduced levels of happiness, and worse self-reported health status [143]. Possible mechanisms by which Islamophobia could negatively influence American Muslims' health include increased stress reactivity, poor social relationships, and increasing health disparities in access to health care [144]. Interestingly, similar associations between perceived discrimination and worse self-reported health have been observed in other R/S minorities [145].

CONCLUSION AND FUTURE DIRECTIONS FOR RESEARCH AND PRACTICE

This brief review highlights R/S as a relevant multi-level contextual factor for consideration in PM. R/S is an important component for physical and mental health for many people, with several connections across multiple socioecological levels. For example, studies have reported that the better physical health outcomes (e.g. mortality) among those with higher R/S [18] are due in part to better lipid profiles [39], individual health behaviors (e.g. lower rates of smoking) [10], and the institutional culture of some R/S groups (e.g. Seventh-Day Adventists focus on healthy dietary behaviors) [95]. The lower rates of poor mental health outcomes among those with higher R/S [18]

have been reported to be due in part to individual-level R/S attenuating the impact of stressful events on health [59]. Organizational-level factors at the church level have also been hypothesized to promote mental health through serving as a buffer to a stressful environment (e.g. African American churches) [118] that would subsequently reduce the biological stress response [39,40]. However, factors at the societal level may counter R/S' positive impact on mental health, such as societal-level discrimination of some religious groups (e.g. Muslim communities) [142]. These connections at the biological, individual behavioral, organizational or institutional, and society levels provide many points for the personalization of health care, from preventive efforts to assessments and targeted interventions.

To fulfill the goal of the 21st Century Cures Act to bring PM to broad public acceptability, researchers must study the intersection and interaction between biology and environment. To foster a deeper understanding of the link between R/S and disease, discovery science that conceptualizes, measures, and integrates socioecological context including R/S into PM is urgently needed.

Utilization of patients' and doctors' R/S to achieve the goals of PM will require substantial investment on the part of behavioral medicine professionals and investigators to deepen their understanding of R/S in the lives of the individuals and communities they serve and study. This is a daunting task in that doing it well will not only require partnering with faith communities but also greater sophistication in understanding the theological and sociological characteristics of these often-diverse R/S groups. Though there are wide areas of agreement in theology across many religious groups, there are important and stark differences as well. It is, therefore, difficult to imagine how PM can be applied within this context in the absence of specific theological understanding by the professionals involved. However, the task is even more complicated: understanding the formal theology or beliefs of a religious group, though critical, cannot be assumed to be the same as understanding that theology and belief structure for an individual. Historical statements of doctrine or even contemporary pronouncements of faith statements are interpreted by individuals within the nexus of socioecological factors that influence their own frames of reference. PM that incorporates R/S will, at its best, need to engage this level of understanding—a tall yet vital task.

How can we get there from here? Including chaplains, other spiritual professionals, and caregivers may be a critical component to advance future PM efforts, in addition to understanding faith leaders' roles in health promotion. In addition, practitioners who are interested in understanding the role of R/S in health care may become involved in research examining the role of faith in medical decision-making. Health care providers, caregivers, and researchers can also

practice cultural humility with regard to R/S by being cognizant of their own bias and being open to understanding an individual's R/S worldview, which may play a role in her/his health beliefs and behaviors. Cultural sensitivity and competence training may be beneficial as well. Masters and Hooker further discuss the importance of considering R/S within a cultural context and offer several recommendations to promote greater understanding and personalization of R/S in behavioral medicine [146].

Although this article provides guidance for considering R/S in PM, it is not without limitations. The examples provided herein did not cover a broad range of major world religions. Nevertheless, the article can serve as an impetus for future dialogue and reflection about R/S in specific religious contexts as the field of PM evolves.

We hope the present review not only highlights the barriers that behavioral medicine might have in this area but also points toward exciting ways to move forward in examining R/S. In the past, behavioral medicine research on R/S has largely been fragmented and isolated. Bringing together diverse investigators with the common interest of R/S, as was done in producing this article, can galvanize R/S research to build the reservoir of knowledge necessary for PM. Greater numbers of individuals and groups inside as well as outside of academia will need to study these factors across longer periods of time, differing settings, and with diverse populations. Identifying professional development and educational training opportunities in R/S can help to develop this needed expertise. Training and cultivating the next generation of R/S researchers who are equipped to examine the impact of R/S on health outcomes relevant to PM would also be beneficial. Diversity integration in PM science and practice, of course, requires funding and we are hopeful that, given the information provided in this and other articles, funders will demonstrate a larger investment in R/S research leading to improved population PM.

Compliance with Ethical Standards

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