

RELIGION AND MEDICINE I: HISTORICAL BACKGROUND AND REASONS FOR SEPARATION

HAROLD G. KOENIG, M.D.

Duke University Medical Center, Durham, North Carolina

ABSTRACT

Religion and medicine have a long, intertwined, tumultuous history, going back thousands of years. Only within the past 200–300 years (less than 5 percent of recorded history) have these twin healing traditions been clearly separate. This series on religion and medicine begins with a historical review, proceeding from prehistoric times through ancient Egypt, Greece, and early Christianity through the Middle Ages, the Renaissance, and the Age of Enlightenment, when the split between religion and medicine became final and complete. Among the many reasons for the continued separation is that religion may either be simply irrelevant to health or, worse, that it may have a number of negative health effects. I review here both opinion and research supporting this claim.

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A hot debate exists today over whether religion has positive or negative effects on health, and whether physicians should or should not address religious issues in clinical practice [1, 2]. Understanding the relationship between religion and health is important for clinicians seeking to provide the best possible care for their patients. Whether physicians believe religion is relevant to health or not, it is likely

that their patients do. Gallup polls indicate that 96 percent of Americans believe in God, over 90 percent pray, 69 percent are church members, and 43 percent have attended religious services within the past week [3]. In fact, an index of leading religious indicators suggests that religious interest was higher in 1998 than it had been for the previous 13 years [4]. Religion is particularly important to certain subgroups of the population, such as ethnic minorities (African Americans, Hispanics, etc.), women, the elderly, and those with physical health problems. In 1999, while 95 percent of white Americans believed in God, 100 percent of African Americans did and 86 percent indicated that religion was very important in their lives [5].

It should not be surprising, then, that many patients utilize religious beliefs and practices in some way to help them understand or cope with the frightening experience of illness—illness that threatens who they are, who they will become, and for some, whether they will live or die. In a study of 372 consecutive medical patients admitted to a secular university teaching hospital in North Carolina, subjects were asked what the most important factor was that enabled them to cope with the stress [6]. More than 4 out of 10 (42 percent) spontaneously volunteered that it was religious faith. When asked a more direct question about the extent to which religion was used to cope with stress, nearly 90 percent indicated at least a moderate extent. While these figures may vary in different parts of the country, the differences are not as great as one might imagine. In another national survey conducted by the Gallup organization in the 1980s, Americans were asked whether they received personal comfort and support from religion [7]. The percentage of persons indicating comfort and support from religion varied by area of the country: 83 percent in the South, 83 percent in the Midwest, 72 percent in the East, and 70 percent in the West. Thus, the use of religion to help cope with medical illness—particularly when it is serious and out of the person's control—is probably widespread regardless of geographic location—at least in the United States.

Tremendous gains by medical science have allowed the stabilization or cure of many, many illnesses, and yet there continue to be many diseases for which relatively little can be done. Physicians are not well-prepared to deal with the patient's psychological experience of illness, particularly in situations where medical treatments are not working and both doctor and patient feel helpless against the relentless advance of disease. It is in such situations that religion has provided comfort and hope for millennia.

HISTORICAL REVIEW

Religion and medicine are no strangers. Throughout most of recorded history, the two have been strongly linked, only recently having separated. Until several hundred years ago, physical disease was understood largely in religious or spiritual terms. Artifacts from the prehistoric period in Egypt (6000–5000 BC) indicate that

mental and physical illnesses were not distinguished from one another, and both were believed to be caused by evil spirits, demon possession, or other spiritual forces [8]. Mesopotamian medicine between 3200–1025 BC involved a mixture of supernaturalistic and naturalistic paradigms, with treatments sometimes applied through spiritual practices and at other times through natural methods involving plant leaves, roots, and mixtures of animal parts [9]. In the Indus Valley civilization (2300–1700 BC), the early Hindu priest performed rituals of dancing, recited incantations, and used amulets in order to cure the patient. Herbs, liquid potions, and cow by-products were also administered as healing medicinals [9].

While Hippocratic medicine in early Greece (350 BC and thereafter) focused on achieving a balance of bodily fluids or humors, Platonic medicine mixed science with mystical elements and Asclepian medicine treated illness by means of astrology, magic, and herbs [8]. Private physicians attended the wealthy, while most of the common people sought cures through miraculous healing, relied on folk remedies, or after 400 AD, sought help from clergy with medical skills.

Prior to the Christian era, there were no hospitals for care of the sick in the general population. During Greek and Roman times, persons unable to afford a private physician or treatment in an Asclepian temple, were either cared for by their families or left to die unattended [10]. The first major hospital in western civilization was built in Asia Minor around 370 AD at the insistence of St. Basil, bishop of Caesarea—following the Biblical injunction to clothe the poor and heal the sick [11]. The first permanent hospital in China was founded in 491 AD by Hsiao Tzu-Liang, a Buddhist prince [9].

Most physicians throughout the Middle Ages from 400 AD through 1400 were monks or priests [11] and care of the poor and sick was provided primarily by the church [12]. In the 6th century, mentally ill persons were cared for in monasteries run by the church, and after the 12th century, mental patients were even brought into people's homes and included in family life (Gheel, Belgium) [13]. For almost 1000 years, the church was primarily responsible for operating hospitals and granting licenses to physicians to practice medicine; after 1400 with the beginning of the Renaissance period, however, certification of doctors became a responsibility of the state—heralding a growing separation between medicine and religion [11, 14].

Nevertheless, the church continued to be active in caring for the sick, including the mentally ill. Institutions for treatment of the mentally ill operated by clergy were established in Spain in the early 1400s, providing exemplary care that was unmatched by any state institution for the next several centuries. In 1817, following the example of William Tuke in England, the Quakers established one of the first mental hospitals in the United States in Philadelphia, applying “moral treatment” with remarkable success. In the late 17th century, the Daughters of Charity of St. Vincent de Paul organized Catholic nuns to serve both religious and secular hospitals (the first “nurses”). By 1789 there were 426 hospitals run by the Daughters of Charity in France alone [15]. Nevertheless, erosion of the church's

control over the medical profession escalated during the Enlightenment period with the spectacular scientific discoveries of the 18th century. The separation of medicine from religion was nearly complete by 1802, the end of the French Revolution [16].

Medicine and religion were to remain clearly and distinctly separate for the next 200 years—until the past decade when there have been inklings of change. In 1990, there were fewer than five medical schools in the United States that taught students about the role that religion played in the lives of sick patients. Today, nearly 70 of 126 U.S. medical schools have either required or elective courses on religion, spirituality, and medicine. Are we now seeing a rapprochement in the long-divided healing traditions of medicine and religion, and more important, is there any scientific basis for such reconciliation? Let us first examine some of the negative effects that religion can have on health that support a continued separation of religion from medicine.

RELIGION'S NEGATIVE EFFECTS ON HEALTH

A sizable group of reputable health professionals argue that religious beliefs and practices have little effect, no effect, or even adverse effects on mental health and, in some instances, on physical health as well.

Negative Effects on Mental Health

Among those questioning religion's benefits was Sigmund Freud. Freud—a brilliant thinker and masterful writer—presented his views on religion and mental health clearly and persistently. In one of his first papers, *Obsessive Acts and Religious Practices* [17] Freud compared prayer and religious ritual to the obsessive acts of the neurotic (“I am certainly not the first to be struck by the resemblance between what are called obsessive acts in neurotics and those religious observances by means of which the faithful give expression to their piety”) [17, p. 25]. Freud's greatest and best-known work on religion, however, was *Future of an Illusion* [18]. It is here that he fully unveils his argument against religion and predicts its future demise as human civilization progresses—“Our God, Logos [reason], will fulfill whichever of these wishes nature outside us allows, but will do it very gradually, only in the unforeseeable future, and for a new generation of man . . . On the way to this distant goal your religious doctrines will have to be discarded, no matter whether the first attempts fail, or whether the first substitutes prove untenable” [18, p. 54].

Freud's view has been supported in recent years by psychologist Albert Ellis [19-21] (founder and president of the Rational Emotive Therapy Institute in New York City), by psychiatrist Wendell Watters [22] (professor at McMaster University in Hamilton, Ontario), and others. These health professionals believe

that religious involvement lies at the root of emotional disturbance, low self-esteem, depression, and possibly even schizophrenia.

There are many reasons why mental health professionals connect religion with mental illness. One is that mental disorders like schizophrenia, acute mania, or psychotic depression often present with bizarre religious beliefs. The person with acute mania believes that he or she is God or some other divine being with unusual powers. The person with schizophrenia hears voices from divine or demonic sources telling him or her to perform tasks or behave in a certain matter. The psychotic depressive, overcome by religious guilt, is convinced that he or she has committed the unpardonable sin and is doomed for all eternity. The obsessive-compulsive repeatedly performs detailed, time-consuming religious rituals to obtain absolution from real or imagined transgressions. Even the textbook of psychiatric nomenclature and categorization—the Diagnostic and Statistical Manual of Mental Disorders—used religious examples for years to illustrate cases of serious mental illness [23].

Sensing a hostile attitude from mental health professionals, some religious groups have distanced themselves from psychology and psychiatry. These groups see religious belief and activity as necessary and possibly sufficient for mental healing. Some may advocate complete avoidance of contact with the mental health profession. Perhaps best known for their aggressive stance toward psychiatry is the Church of Scientology, which has a *Citizen's Commission on Human Rights* [24] “dedicated to exposing and eradicating criminal acts and human rights abuses by psychiatry.” This group has spoken out against the use of psychiatric drugs such as Prozac and is often seen picketing at the American Psychiatric Association's annual meetings.

Popular Christian writers Martin and Diedre Bobgan and Jay Adams advocate the avoidance of all forms of secular psychotherapy, although are less opposed to the use of psychotropic medication for severe mental disorders. Books such as *Prophets of Psychoheresy I and II* [25-27] make their case, encouraging people to choose either “the psychological way” or “the spiritual way,” but not combine the two. Such negative attitudes toward the mental health profession can delay or prevent necessary psychiatric care. Systematic research, however, has yet to document how often religious beliefs delay psychiatric care or the negative consequences that result.

Negative Effects on Physical Health

Religious beliefs can also adversely affect physical health. As with mental health, there is concern that religious practices may be used to replace medical care. For example, the religious zealot may stop life-saving medications in order to prove their faith. There are cases of diabetics discontinuing their insulin, hypothyroid patients stopping their thyroid hormone, asthmatics throwing away their bronchodilators, and epileptics discarding anti-seizure medications—all in

order to prove their faith—and often with dire consequences [28-29]. Seeking miraculous faith cures instead of timely medical care can delay accurate diagnosis and enable treatable diseases to advance out of control.

Lannin and colleagues [30] examining differences in breast cancer mortality between African-American and Caucasian women, studied 540 patients with newly diagnosed breast cancer and 414 matched controls. Outcome was breast cancer stage at diagnosis. “Cultural beliefs” were a significant predictor of *late* stage (III or IV) at diagnosis. These included religious beliefs such as “The devil can cause a person to get cancer” and “If a person prays about cancer, God will heal it without medical treatments.” Investigators concluded that both socioeconomic and cultural beliefs accounted for the delay in diagnosis among African-American women. Investigators did not, however, report the independent effects of religious beliefs on stage of diagnosis *after* race, education, and socioeconomic factors were taken into account. Religious beliefs are much more common among African Americans, the uneducated, and the poor—all potent risk factors for late stage at diagnosis. At least one qualitative study of breast cancer diagnosis did not find that religious beliefs of African-American women “constrained or prohibited the evaluation and treatment of breast symptoms” [31].

In fact, involvement in certain religious groups appears to *increase* the likelihood of early breast cancer diagnosis. Zollinger and colleagues [32] followed 282 Seventh-Day Adventist and 1675 non-Adventist breast cancer patients for 10 years. Investigators found that the probability of not dying during the study period was 60.8 percent for Seventh-Day Adventists and 48.3 percent for non-Adventists. The difference in survival disappeared, however, when stage at diagnosis was taken into account, since Adventist women had their breast cancers diagnosed at a much earlier stage.

Religious groups vary widely in how strongly they encourage religious healing practices over traditional medical care. Christian Scientists advocate treating even serious conditions like leukemia, club feet, spinal meningitis, bone fracture, or diphtheria with prayer alone, claiming successes with this method. To evaluate such claims more carefully, Simpson [33] examined the longevity of 2,630 male and 2,938 female Christian Scientist graduates of Principia College in Illinois between 1934 and 1982. This group was compared with 17,743 male and 12,105 female graduates from the College of Liberal Arts and Sciences at the University of Kansas during the same period. Higher death rates were found in male Christian Scientists ($p = .042$) and female Christian Scientists ($p = .003$), supporting the earlier findings of Wilson who reported the death rate from cancer among Christian Scientists was double the national average [34].

Refusing blood transfusions is common among Jehovah’s Witnesses and may lead to premature death. According to their religious teachings, God (Jehovah) will turn his back on anyone who accepts blood transfusions. It is not surprising, then, that devout Jehovah’s Witnesses avoid blood transfusions for themselves and

their children, fearing that allowing such procedures will risk eternal salvation. For adults, such refusals are accepted on the grounds that transfusions represent an invasion of privacy and violation of the freedom of religious practice. Refusal of blood transfusions for children, on the other hand, has been more controversial. While Jehovah Witnesses have appeared before the U.S. Supreme Court more than 50 times to establish religious freedoms, they typically lose cases involving children [35].

Failure to vaccinate children on religious grounds may also have serious consequences. Rodgers and colleagues [36] reported high case fatality rates during a measles outbreak among children of religious groups refusing vaccination. Etkind and colleague [37] and Novotny and colleagues [38] reported pertussis (whooping cough) outbreaks in children of groups claiming exemptions to vaccination based on religious grounds. Outbreaks of rubella have also been reported among the Old Order Amish in Pennsylvania and elsewhere in the United States [39]. More recently, Conyn-van Spaendonck and colleagues [40] surveyed 2,400 children ages 5–14 and 3,000 adults ages 40–64 as part of a population-based study of a poliovirus epidemic in the Netherlands. Crude excretion rate for wild poliovirus type 3 was much higher among members of the Reformed church and the Orthodox Reformed church compared to members of the traditional Dutch Reformed church. Investigators concluded that the poliomyelitis outbreak was due to rejection of vaccination by religious subgroups.

Refusal of prenatal care may also lead to high mortality for both infants and mothers. Kaunitz and colleagues [41] studied perinatal and maternal mortality in members of the religious sect Faith Assembly in Indiana. Women in this religious group practice out-of-hospital birthing without medical assistance or prenatal care. Investigators found that perinatal mortality was three times higher and maternal mortality nearly 100 times higher among Faith Assembly members compared to women in the general population. After this study was published, the Indiana General Assembly passed a law requiring health professionals to report acts involving the withholding of medical care for religious reasons. After this law passed, perinatal mortality declined by nearly one-half and maternal mortality was nearly eliminated [42].

More recently, Asser and Swan [43] reported 172 child deaths between 1975 and 1995 from what they believed was parental withholding of medical care on religious grounds. Investigators reported graphic examples of children dying from food aspiration, childhood cancer, pneumonia, meningitis, diabetes, asthma, and other childhood illnesses. Over 80 percent of all fatalities came from five religious groups: Faith Assembly in Indiana, Faith Tabernacle in Pennsylvania, Church of the First Born in Oklahoma and Colorado, End Time Ministries in South Dakota, and Christian Scientists nationwide. Most cases, however, were collected over a 20-year period from newspaper articles, public documents, trial records, and personal communications, obtained primarily from the files of CHILD, an advocacy group directed by one of the study's authors.

Religious beliefs are not only linked to the withholding of medical care, but also to other forms of child abuse as well. Bottoms and colleagues [44] conducted a national survey of 19,272 mental health professionals to gather information about experiences with religion-related abuse. First, a post-card survey was sent to identify child abuse allegations involving ritualistic, ceremonial, supernatural, religious, or mystical practices. A total of 6,939 health professionals returned postcards, with 2,136 indicating an encounter with at least one religion-related abuse at some time in their careers. Detailed surveys were sent to all 2,136 respondents, with 797 returning them. Of these, 720 were deemed valid and provided details on a total of 1,652 self-reported ritualistic or religion-related child abuse cases reported by either adult survivors or child clients. Of those, 417 were religion-related cases (medical neglect, ridding of evil, or clergy abuse). Corroborative evidence of abuse or harm was present in less than 50 percent of the 417 cases, and corroborative evidence of religion-related case elements was present in about two-thirds of that 50 percent. In only 5 percent of medical neglect, 9 percent of ridding of evil, and 9 percent of clergy abuse cases was the evidence strong enough to lead to a conviction (including cases of religious-abuse by psychotic patients). Based on this study, one might conclude that religion-related child abuse is actually quite rare—less than 200 cases identified and corroborated out of 19,272 potential informers looking back over their entire careers.

Probably more common than religion-related child abuse are more subtle forms of social coercion and threat of alienation that occur within religious groups. While membership in such groups enhances social support for those who abide by the group's norms, individuals who deviate from expected behavior may be judged and socially isolated. For example, Sorensen and colleagues [45] found significantly higher rates of depression among more religiously active unmarried adolescent mothers. By withdrawal of community support from those not conforming to social standards, religion can foster feelings of guilt and shame, thereby eroding feelings of competence and self-worth.

Another negative emotion that religion may promote is excessive guilt. If a religious person becomes physically ill, the person's religious group may pray for healing. If the person is healed, this affirms the religious belief system of the group and increases group cohesion. If the person is not healed, however, this creates a problem. Failure to be healed cannot be God's fault, if the group believes that God wishes to heal and has the power to do so. More likely, then, it must be the sick person's fault or lack of faith. Worse still, there may be hidden sin in the person's life. If these issues are raised by well-being church members, the physically ill person may begin to doubt their own faith or feel like God is punishing them. Such thoughts may give rise to discouragement, hopelessness, and alienation, as the sick person becomes victimized by religious peers and is no longer able to draw comfort and support from personal faith or faith community.

A problem with much of the information presented above on the negative effects of religion on health is that it relies heavily on opinion, experience with the

mentally ill, or anecdotal case reports from a population base that is poorly defined. Attitudes within a profession are often reinforced in work and social settings, and may strongly influence views toward and feelings about religion (whether positive or negative). This is particularly true when systematic research is lacking, when there is limited access to research that has been done, or when such research is purposefully ignored.

Research Reporting Negative Health Effects

A number of studies, however, *have* reported negative associations between religion and *mental health*. Rokeach [46] surveyed two samples of college students ($n = 202$ and $n = 207$), finding that non-believers were less anxious than religious students who complained more of working under tension, sleeping fitfully, and experiencing other distressing symptoms. Dunn [47] likewise reported that religious persons were more perfectionistic, withdrawn, insecure, depressed, worried, and inept. Bateman and Jensen [48] discovered that persons with extensive religious training were more likely to turn anger in on themselves rather than express it outward. Wright [49] found students who were less certain about religion tended to be better adjusted. Cowen [50] reported a significant negative association between orthodox religious belief and self-esteem. Research in the 1950s and 1960s, then, was sending a clear and consistent message to mental health professionals.

More recently, Neeleman and Lewis [51] found a link between greater religiosity and psychotic disorders. Comparing religious beliefs and attitudes of psychiatric patients with those of orthopedic patients in London, England, investigators found that psychotic schizophrenics and depressed patients were more likely to report personal religious experiences than orthopedic controls (48 percent vs. 38 percent vs. 17 percent, respectively, $p = .05$). Schizophrenic patients were also more likely to hold religious beliefs and receive comfort from religion than controls. These differences persisted after taking into account race, age, and other factors. The cross-sectional nature of this study, however, prevented investigators from determining whether religiousness led to the psychotic condition or whether the psychotic condition led to greater religiousness (e.g., religion was turned to in order to cope with the illness).

Religious beliefs and practices may have different health effects depending on the particular population studied and type of stress experienced. Strawbridge and associates [52] reported that religiosity reduces the effects of some life stressors, but worsens the effects of others. In a cross-sectional analysis of data from 2537 adult participants in the Alameda County Study, these investigators found that religiosity buffered the effects of financial and health stressors, but was associated with worse distress among those facing family crises. Religious coping was seen as most helpful for problems resulting from sources *outside* the individual (like poor health or financial problems). For family stressors that might be

attributed to personal or spiritual shortcomings, religious resources were less helpful they concluded.

A number of cross-sectional studies have also found an association between religious or spiritual activity and poorer *physical health*. Anson and colleagues [53] studying 639 retirees in Israel found that those who observed religious rituals had more complaints of pain and physical dysfunction than did those not observing rituals. Likewise, in a survey of 165 adults aged 60 to 100+ years old, Courtenay and associates [54] found that religious activities (attendance at services, prayer, Bible study) were positively related to a number of chronic health conditions. Again, investigators hypothesized that religion was being used to cope with health problems.

Another research group in England has reported two prospective studies that found worse health outcomes six to nine months later among medical patients scoring higher on spiritual beliefs at baseline [55, 56]. These studies, however, used a broad definition of spiritual beliefs (which were distinguished from traditional religious involvement and activity) and excluded subjects with no religious or spiritual beliefs (over 20 percent of subjects in both studies). Finally, earlier studies by Janoff-Bulman and Marshall [57] and by Levin and Markides [58] found greater mortality and higher rates of hypertension, respectively, among older adults who reported being more religious.

In summary, a number of reputable health professionals view religion as having a negative influence on mental health, physical health, or both. There is good evidence that people with mental illness often present with bizarre and distorted religious ideas and use religion in pathological ways. Religious persons may also have high expectations and condemn themselves or others for having family problems or difficulties they think religious people shouldn't have. Religious persons may judge harshly and alienate those who believe or behaved differently than they do.

Religious beliefs can also interfere with timely seeking of medical care, delaying necessary diagnosis and treatment. Likewise, refusing potentially life-saving blood transfusions, prenatal care, childhood vaccinations, or other standard treatments or prevention measures, may lead to worse health outcomes. While many forms of religious abuse have also been reported, these claims tend to come from isolated case reports or highly selected case series—rather than from population-based systematic research. Finally, some cross-sectional and longitudinal studies find a positive relationship between religious activities or spiritual beliefs and worse physical health.

There is little doubt, then, that there is a body of systematic research showing either no relationship between religion and health or a negative one. Many of these reports, however, are older studies of college students and adolescents, involve subjects selected on the basis of convenience, are cross-sectional in design (without the ability to determine if religion leads to worse health, or vice versa), fail to take into account relevant covariates, or have serious methodological

problems. What remains largely unknown from this review is whether traditional religious beliefs and practices—those engaged in by the majority of mature adults in the United States and around the world—impair health or foster illness. If religion is responsible for poorer mental or physical health, it is important to determine how often this actually occurs and whether the health benefits of religious practice outweigh the risks.

More information about the history of the relationship between religion, medicine, and science, as well as about the negative effects of religion on health can be found in the *Handbook of Religion and Health* [59]. In next issue's *Medicine and Religion II*, I will take a closer look at research that has examined the relationships among religion, mental health, and health behaviors.

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Direct reprint requests to:

Harold G. Koenig, M.D.
Box 3400
Duke University Medical Center
Durham, NC 27710

RELIGION AND MEDICINE II: RELIGION, MENTAL HEALTH, AND RELATED BEHAVIORS

HAROLD G. KOENIG, M.D.

*Duke University Medical Center, and
GRECC, Veterans Administration Medical Center
Durham, North Carolina*

ABSTRACT

In this second in a series of articles on religion and medicine, I focus on the relationship between religion and mental health. This discussion is based on a comprehensive and systematic review of a century of research examining religion's relationship to mental health, social support, substance abuse, and other behaviors affecting mental or social functioning. This review includes over 630 separate data-based reports that focus on religion and well-being, hope and optimism, meaning and purpose, depression, suicide, anxiety, psychosis, social support and marital stability, alcohol and drug abuse, cigarette smoking, extra-marital sexual behaviors, and delinquency. Reasons for the associations found are discussed and conclusions drawn in light of the findings.

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Key Words: religion, spirituality, psychology, social support, addiction

In the first article of this series, I examined how religion may adversely affect mental health in a number of ways [1]. Religious abuses of the mentally ill during the Renaissance period resulted in hundreds of persons being persecuted as witches or demon-possessed and executed by the Inquisition [2]. Not only have well-respected mental health professionals expressed concerns about the neurotic

or emotionally destabilizing influences of religion [3, 4], but a number of research studies also report associations between religious involvement and psychiatric illnesses like schizophrenia and depression [5, 6].

On the other hand, even Freud [7] noted that religion could provide a worldview that gives meaning to life: “. . . only religion can answer the question of the purpose of life. One can hardly be wrong in concluding that the idea of life having a purpose stands and falls with the religious system.” Furthermore, in a letter to Oskar Pfister [8] and again in an address to the Vienna Psychoanalytic Society [9], he even remarked that religious faith may help to stifle neuroses. Freud saw religion as one of the most convenient and comfortable methods for sublimating the instinctual drives, going so far as to suggest that there had been an “extraordinary increase in neuroses since the power of religions has waned” [10]. Thus, even in the mind of one of religion’s greatest critics, there was a realization that religious faith might have mental health benefits for some persons.

In order to address this question of whether religion has negative or positive effects on mental health, let us turn to research on that subject. Three decades ago, a comprehensive review of research on religion and mental health published in the *American Journal of Psychiatry* by Victor Sanua, a professor in the Department of Social and Psychological Foundations at the City University of New York, seemed to answer that question:

The contention that religion as an institution has been instrumental in fostering general well-being, creativity, honesty, liberalism, and other qualities is not supported by empirical data. Both Scott (55) and Godin (22) point out that there are no scientific studies which show that religion is capable of serving mental health [11].

My colleagues and I have recently completed a comprehensive and systematic review of research on religion and mental health during the 20th century [12]. This was accomplished by employing a combination of three strategies. First, we performed computer searches of the literature (Medline, Current Contents, Psychlit, Soclit, HealthStar, Cancerlit, CINAHL, and others) to identify quantitative studies that had examined the religion-mental health relationship. Second, since the computer searches went back only as far as the middle 1960s, we consulted the footnotes and references of articles retrieved by the search to identify other relevant studies. After retrieving these studies, the process was repeated again until no new studies could be found. Third, in order to identify studies not located by the previous two methods, we reviewed articles and books that examined the topic. Proceeding in this manner, over 630 reports were discovered.

Many of the studies finding a negative relationship between religion and mental health were reviewed in the first article of this series [1]. Studies reporting a positive relationship, however, far outnumber those finding either no association or a negative relationship. Because of limited space, I summarize the main findings of the review, providing details only on exemplary studies or studies

whose results deviate from the norm. More information about investigations not discussed here may be found in the original review [12].

PSYCHOLOGICAL WELL-BEING

Religious beliefs and practices are consistently related to greater life satisfaction, happiness, positive affect, morale, and other indicators of well being. Of the 100 studies located that examined this association, nearly 80 percent ($n = 79$) reported only significant positive correlations between these constructs. Of the ten cohort studies that employed a prospective analysis of associations, nine reported that religious characteristics at baseline predicted greater well-being over time. While the correlations reported by many studies were modest, they often equaled or exceeded those between well-being and other psychosocial variables like marital status, income, and social support. Of the 100 studies, 13 found no association between religious involvement and well-being, seven reported mixed or complex relationships, and one study found only a significant negative relationship [13]. The latter investigation was a cross-sectional survey involving two small student samples ($n = 109$ and $n = 96$) that did not control for covariates, and the only consistent finding in the two populations was a correlation between poor mental health and two of eight religious measures—ritualism and superstition.

HOPE AND OPTIMISM

Of the 15 studies examining a relationship between religiousness and hope or optimism, 12 reported significant positive associations and two found no association. No studies found that religious persons were less optimistic than the non-religious. The three studies with the best methodologies (in terms of sampling method and study design) all found positive relationships [14-18].

PURPOSE AND MEANING

Sixteen studies that examined the relationship between religious involvement and purpose or meaning were found. Of those studies, 15 reported a significant positive association and one found no association. The only study not finding an association was Burbank's [19] cross-sectional survey of 57 older participants in a senior center program in Rhode Island. A single open-ended question assessed meaning: "Is there something or things so important to you in your life that they give your life meaning?" Respondents listed 60 items that gave life meaning; the most common were relationships (73 percent) and religion (13 percent). When these categories were correlated with fulfillment of meaning (assessed using a standardized 12-item scale), subjects in the religion category did not score differently on meaning than other groups. Even in this study, however, religion was an important source of meaning for a number of participants.

DEPRESSION

A total of 101 studies were located that examined the relationship between level of religious involvement and depression, including eight clinical trials. Of 93 observational studies, 59 reported only lower rates of depressive disorder or fewer depressive symptoms among those with greater religious involvement. Of the remaining 33 studies, 13 reported no association, four reported only greater depression among the more religious [5, 20-22], and 16 studies reported mixed findings (significant positive correlations with some religious variables and significant negative correlations with others).

Of the 22 prospective cohort studies, 15 found that greater religious involvement at baseline predicted lower rates of depression on follow-up. Two studies identified depressed subjects and followed them over time; in both of these studies, depression resolved quicker among subjects who were more religious [23, 24]. Of the eight clinical trials, five showed that depressed patients receiving religious interventions recovered faster than subjects receiving only a secular intervention or those in control groups [25-29]. Studies examining religiousness and suicide were also reviewed. Of 68 studies that examined suicide rates or attitudes by level of religious involvement, 57 found less suicide or more negative attitudes toward suicide among the more religious. Of the remaining 11 studies, nine showed no relationship and two reported mixed results.

ANXIETY

A total of 76 studies were located which examined the religion-anxiety relationship: seven clinical trials and 69 observational studies. Of the observational studies, 35 found only lower levels of anxiety or less fear among the more religious, 17 reported no association, seven reported mixed or complex results, and 10 reported greater anxiety among the more religious. Of the latter 10 studies finding greater anxiety, two examined religious affiliation only, three examined prayer or religious coping in cross-sectional analyses (where anxious persons may have turned to prayer or religion *because* of their anxiety), and three studies were conducted among clinical populations (HIV-positive patients and psychiatric patients) or religiously unstable persons (those who had suddenly converted to a different religious faith). More important, of the seven clinical trials, six reported significant benefit in terms of anxiety relief from religious interventions. In summary, the majority of the studies found less anxiety and fear among the more religious, including four of five prospective cohort studies [30-33] and six of seven clinical trials [29, 34-38].

PSYCHOTIC SYMPTOMS AND DISORDERS

At least 16 studies have examined the relationship of religion to psychotic symptoms or disorders. Of these studies, 13 measured religiousness and three

examined differences across religious denominations. Among the studies examining religiousness, one was a prospective cohort study and two were clinical trials. Of the remaining 10 cross-sectional studies, four found fewer psychotic tendencies, symptoms, or disorders among the more religious, three found no association, two reported mixed findings, and one found a positive relationship between religion and psychotic disorder. The latter study, as discussed in the first paper of this series, found that religious beliefs, practices, and experiences were more common among 73 depressed or schizophrenic psychiatric inpatients in a London hospital compared to 26 control patients from the orthopedic service [5]. The only prospective study to examine the relationship between religion and psychotic disorder involved a two-year follow-up of 386 schizophrenic patients treated in outpatient clinics in Madras and Vellore, India [39]. Patients who reported a *decrease* in religious activities at the baseline evaluation had significantly poorer outcomes ($p < .001$).

The three denominational studies each examined different religious groups. In a study conducted in New York City, Jews were found to have more depression, Catholics more personality and adjustment disorders, and Protestants more schizophrenia [40]. In a study from Australia, Jehovah Witnesses were more likely to have schizophrenia than other members of the Australian population [41]. A third study from Israel reported that compared to Jews or Catholics, Bahai and Hari Krishna were more likely to have a history of psychotic episodes requiring hospitalization [42].

The remaining two studies involved clinical trials where a religious intervention was utilized as a treatment modality among patients with chronic psychoses. The first study administered a psycho-educational program to help patients (two-thirds with schizophrenia) utilize spiritual beliefs to foster healthy self-esteem [43]. No changes in either depressive symptoms or self-esteem were observed following the intervention. The second study involved 20 schizophrenic patients receiving student nurse interventions that involved weekly prayer and scripture reading [44]. Subjects demonstrated notable improvements in several aspects of mental functioning following the intervention, although no statistical comparisons were made. In neither study above did religious interventions cause worsening of the psychotic illness. With the exception of one study, it appears that religious involvement (particularly within mainstream religious groups) is either unrelated or negatively related to psychosis.

SOCIAL SUPPORT

Of 20 studies located that quantitatively assessed the relationship between religious involvement and social support, 19 found only statistically significant positive associations between an indicator of religious involvement and social support. Five of these studies involved random samples of community-dwelling adults that ranged in size from 2956 to 4522 subjects [45-49].

In the only non-significant study, Walls and Zarit [50] examined the friendship networks of 98 older subjects recruited from African-American churches in urban areas of Pennsylvania. Investigators found that 50 percent indicated their closest friends were family members and 40 percent indicated their closest friends were members of their church. Not surprisingly, family members were significantly more likely than church members to provide emotional and functional support. Nevertheless, church members still provided a lot of support for these aging African Americans. Church-related social support appears to be particularly important for older adults, regardless of race. In a study of 106 predominantly Caucasian geriatric patients attending a family medicine clinic in Springfield, Illinois, the majority indicated their closest friends were church members (52 percent indicated that 80 percent or more of their closest friends came from their churches) [51].

With regard to marital support, 35 of 38 studies found greater marital happiness or stability among the more religious or those with similar religious backgrounds (denominational homogamy). One study found no association between marital stability and denominational homogamy, and the remaining two studies reported mixed results—both examining domestic abuse. Included among the positive reports was Strawbridge and colleagues' 28-year study of 5,286 participants in the Alameda County Study in California, which found that persons who attended religious services at least once weekly were 80 percent more likely than others to stay married during the follow-up period [52].

SUBSTANCE USE

Alcohol Use/Abuse

At least 95 studies have quantitatively examined the religion-alcohol relationship (including nine studies comparing denominations). Of the 86 studies that have examined level of religiousness, 76 (88 percent) reported significantly less alcohol use/abuse among religious subjects (including eight of nine prospective cohort studies). Note that 40 of the 76 studies finding less alcohol use/abuse among the religious involved adolescents or college students. Of the 10 studies that did not find an inverse relationship with alcohol use/abuse, six studies found no association, two reported mixed results, and two found only positive relationships between alcohol use/abuse and religion [53, 54]. With regard to the latter two studies, Waisberg and Porter [53] conducted a clinical trial that examined two interventions for alcoholism: Treatment A, a multi-modal approach that *included a spiritual component*, and Treatment B, an approach that was entirely spiritual. Subjects receiving Treatment A had better outcomes than those receiving Treatment B. Subjects in each treatment group, however, were not equally matched; patients receiving Treatment A were older, had higher incomes, and were less likely to have legal problems.

In the second study, Zucker and associates [54] followed 61 male alcoholics from an inpatient alcohol treatment program in the Bronx, New York. Method of assessing religiosity was not specified, but was reported to be correlated with religious attendance. Religious patients had more anti-alcohol attitudes on admission, but when changes in attitudes toward alcohol were examined four weeks later, those who were least religious experienced greater changes toward anti-alcohol attitudes. The least religious patients, however, started from a lower baseline and had greater room for change in attitude. Furthermore, religious patients had more prior admissions for detoxification and rehabilitation, so were probably a more treatment resistant group. Finally, persons with strong religious attitudes who continue to drink excessively are probably a rather select group of individuals.

Drug Use

Religiousness is also associated with less recreational drug use, again especially in younger persons. At least 56 studies have quantitatively tested this relationship. Of those studies, 52 examined the relationship between religiousness and drug use (four compared drug use among members of different religious groups). As with alcohol use/abuse, most studies (48 out of 52) found less drug use among the more religious; two studies reported no association, one study reported mixed results, and one study greater drug use. The latter was a cross-sectional survey of 90 undergraduates and 58 health professionals at University of Nevada in Reno, which found that the variable “personal spiritual experiences” (experience of God, belief in God, sense of spiritual awakening, prayer to God) was positively related to greater drug use ($r = .32, p < .001$), a correlation the investigators found “puzzling” [55]. Forty-two of 48 studies that found a relationship between greater religiousness and lower drug use involved samples of adolescents or college students.

Cigarette Smoking

Of the 25 studies that quantitatively examined the relationship between religiousness and smoking, 24 (96 percent) reported less smoking among the more religious. Of the 24 studies that found an inverse relationship between religion and smoking, 12 were in adolescents or college students. This relationship between cigarette smoking and religious involvement during adolescence and young adulthood is particularly important because it is during these early years that the habit of cigarette smoking typically begins. In their study of almost 4000 older adults, Koenig and colleagues [56] found that the reason why religiously active subjects smoked less than non-religious subjects was because the former were *less likely to ever start smoking* (rather than being more likely to quit). Thus, if religiousness can help prevent the onset of cigarette smoking in youth, then the health benefits of avoiding this habit may accumulate over a lifetime. Nearly 21 percent of coronary

heart disease deaths, 30 percent of cancer deaths, and almost all deaths from chronic bronchitis and emphysema could be prevented if Americans never started to smoke [57].

OTHER BEHAVIORS

In this section, I examine other behaviors affecting mental and social functioning that religious beliefs and practices might be expected to influence.

Extra-Marital Sexual Activity

Most studies suggest that religious involvement is inversely related to pre-marital and extra-marital sexual attitudes and activity, number of sexual partners, high-risk sexual practices, and likelihood of developing a sexually transmitted disease. Of the 38 quantitative studies located, 37 (97 percent) found that the religious had significantly lower rates or more negative attitudes toward non-marital sex than non-religious subjects. The vast majority of these studies ($n = 32$) were again conducted in adolescents or college students.

Delinquency and Crime

Of 36 studies that examined the relationship between religious involvement and delinquency or crime, 28 (78 percent) found significantly lower rates of these activities among the more religious. Of the other eight studies, six found no association, one reported mixed results, and one found a positive relationship between religion and delinquency. In one of the largest and best-designed studies on the topic, Stark [58] analyzed data on religion and delinquency from a national random sample of 11,995 high school seniors. He found that students who attended religious services more regularly were significantly less likely to get into trouble with the law, a finding that held true for all areas of the country except the Pacific Northwest. Other studies involving random samples of 12,000-21,000 high school students have reported similar findings [59, 60].

Most recently, Wallace and Forman [61] analyzed data on religious involvement, delinquency, substance use, and health behaviors in a random sample of 5000 students from 135 high schools across the United States as part of University of Michigan's Monitoring the Future Project. Unintentional and intentional injury behaviors (carrying a weapon to school, engaging in interpersonal violence, low seat belt use, drinking while driving, riding while drinking), substance use (cigarette smoking, binge drinking, marijuana use), and lifestyle factors (diet, exercise, and sleep) were examined. Importance of religion was inversely related to carrying a weapon to school, interpersonal violence, driving while drinking, riding while drinking, and low seat belt use, as was cigarette smoking, binge drinking, and marijuana use.

Frequency of religious attendance was even more strongly related to less substance use and fewer intentional and unintentional injury behaviors. In addition, students who indicated that religion was very important to them or who frequently attended religious services were significantly more likely to engage in regular exercise, eat healthy, and have more regular sleep patterns. The findings remained significant after adjusting for multiple demographic variables, and appeared to persist over time based on time-trend analyses.

REASONS FOR THE ASSOCIATION

Why is religious involvement often associated with improved coping, less emotional disorder, greater social support, greater marital stability, less substance abuse, and fewer behaviors that adversely affect human relationships and health? First, religious belief provides a positive worldview that gives experiences—whether positive or negative—*meaning*. Meaning, in turn, provides a sense of purpose and direction in life, and a more hopeful and optimistic attitude. Difficult circumstances—adjustment problems in youth, financial difficulties, loss of loved ones, impaired health, and functional disability—are appraised in a more positive light when seen from a religious worldview, compared to a viewpoint that sees these events and circumstances as resulting from random chance or bad luck. Furthermore, many religions portray the universe as personal and friendly, with order and direction that benefits humans and, perhaps, was created *for* humans. The alternative worldview sees humans as simply chance happenings in a vast, cold, merciless, threatening universe.

Second, religious beliefs and practices may evoke positive emotions—joy, wonder or awe, thankfulness—during deep states of meditation, prayer, or communal worship. These positive emotions may counteract or provide relief from the stresses of daily life, and provide alternative sources of pleasure that rival habits and activities destructive to self or human relationships.

Third, religion provides rituals that ease and sanctify major life transitions—adolescence, marriage, and death—rallying those in the community to support each other through such changes. Religious beliefs also prescribe support and care for others, encouraging character traits such as altruism, kindness, generosity, forgiveness, and love for neighbor—even in circumstances where the neighbor cannot return such favors. These behaviors, in turn, promote harmony within communities and build “social capital.” Religious beliefs and practices also promote family and marital bonds and facilitate the building of extended social networks of non-family ties that can provide both emotional and physical assistance in time of need.

Fourth, as an agent of social control, religious beliefs provide guidance on and structure for the kinds of behaviors that are acceptable and conform to social norms. Most religions have proscriptions against excessive alcohol use, drug use, extra-marital sexual activity, delinquency, lying, cheating, and other behaviors

that negatively affect the person or their social environment. Among the religious, such proscriptions tend to be reinforced by family and peer groups. When followed, such proscriptions often lead to better decision-making and reduce the likelihood of negative life events that create stress and unhappiness.

CONCLUSIONS

I summarize here the results of a systematic review of research examining the relationship between religion and mental health over the past century. The vast majority of studies that have examined relationships between religion, mental health, social support, and other behaviors linked with mental health and social functioning, report positive connections. This is not to say that all religions or any single religion always promotes positive human emotions, satisfying relationships, or healthy lifestyles. As noted in the first paper of this series, religion can be used to induce guilt, shame, and fear or justify anger and aggression. It can promote social isolation, particularly for those failing to conform to religious standards. As an agent of social control, religion may be over-restrictive and limiting. In general, however, most mainline religions with well-established traditions and accountable leadership tend to promote positive rather than negative human experiences.

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Direct reprint requests to:

Harold G. Koenig, M.D.
 Box 3400
 Duke University Medical Center
 Durham, NC 27710

RELIGION AND MEDICINE III: DEVELOPING A THEORETICAL MODEL

HAROLD G. KOENIG, M.D.

Duke University Medical Center

GRECC, Veterans Administration Medical Center

Durham, North Carolina

Abstract

In this third of a four-article series on religion and medicine, I describe a theoretical model to illustrate the complex pathways by which religion may influence physical health. Genetic factors, childhood training, psychological and social influences, health behaviors, and healthcare practices are discussed as part of this model. Considerable space is given to recent advances in psychoneuroimmunology and to stress-induced cardiovascular changes that demonstrate physiological pathways by which cognitive, emotional, and behavioral processes may influence susceptibility to disease and disease course. I also discuss research illustrating the important role that social support plays in moderating the physiological effects of stress and improving health outcomes. If religious beliefs and practices improve coping, reduce stress, prevent or facilitate the resolution of depression, improve social support, promote healthy behaviors, and prevent alcohol and drug abuse, then a plausible mechanism exists by which physical health may be affected.

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Key Words: religion, psychoneuroimmunology, immunology, social support, health behaviors, substance abuse

In the first article of this *Religion and Medicine* series, I examined the historical background of these twin healing traditions and the reasons for their separation, including the possible negative effects of religion on health. In the second article, I

presented a comprehensive and systematic review of research examining the relationship between religion, mental health, social support, and other behaviors related to mental and social functioning. In this third article in the series, I develop a theoretical model to help explain how religion might impact not only mental health and social functioning, but physical health as well. Models assist in developing research questions, in choosing the appropriate study designs to answer those questions, in understanding and interpreting findings, in organizing a body of knowledge for communication with scientists from different disciplines and for purposes of general education. The model described here (see Figure 1) focuses on known psychological, social, behavioral, and physiological mechanisms by which religion may influence the development and course of various diseases. This model considers five major areas: genetic factors, childhood training, psychological and social influences, health behaviors, and healthcare seeking practices.

GENETIC FACTORS

Heredity has an enormous influence on the onset and course of virtually every disease. If a religious group promotes inbreeding, then certain diseases may cluster in that group. For example, Jewish women have higher rates of familial ovarian cancer [1] and higher rates of familial breast cancer [2]. Likewise, cardiovascular disease is particularly high among Ashkenazi and non-Mizrahi Sephardi Jews [3], and Tay-Sachs disease is more common among Ashkenazi Jews than in the general population [4].

Religion may also influence and be influenced by genetic makeup in ways that appear to operate against the principle of natural selection. Because of religious involvement, people who are physically or mentally “less fit” may be enabled to survive and pass on their genes. For example, if religious beliefs and practices help to prevent depression and suicide, reduce substance abuse, and discourage self-destructive health behaviors associated with early mortality, then religion will provide a force counter to nature’s attempts to weed out the mentally weak from the population. Furthermore, if a physically feeble individual is surrounded by a supportive, caring faith community, then this will increase that person’s ability to survive and reproduce. In these ways, devout religious beliefs and practices could lead to a population that is more susceptible to both mental and physical disease because of the protection that it offers to those who are more vulnerable.

Forgiving or showing mercy to one’s enemies, rather than annihilating them, also appears to go completely against the force of evolution with its rule of survival of the fittest. One would think that such generous practices would lead to the extinction of the group that maintained them. On the other hand, sharing resources and resolving conflict may help bind communities together and enable them to cooperate to achieve goals conducive to propagation of the species. This would

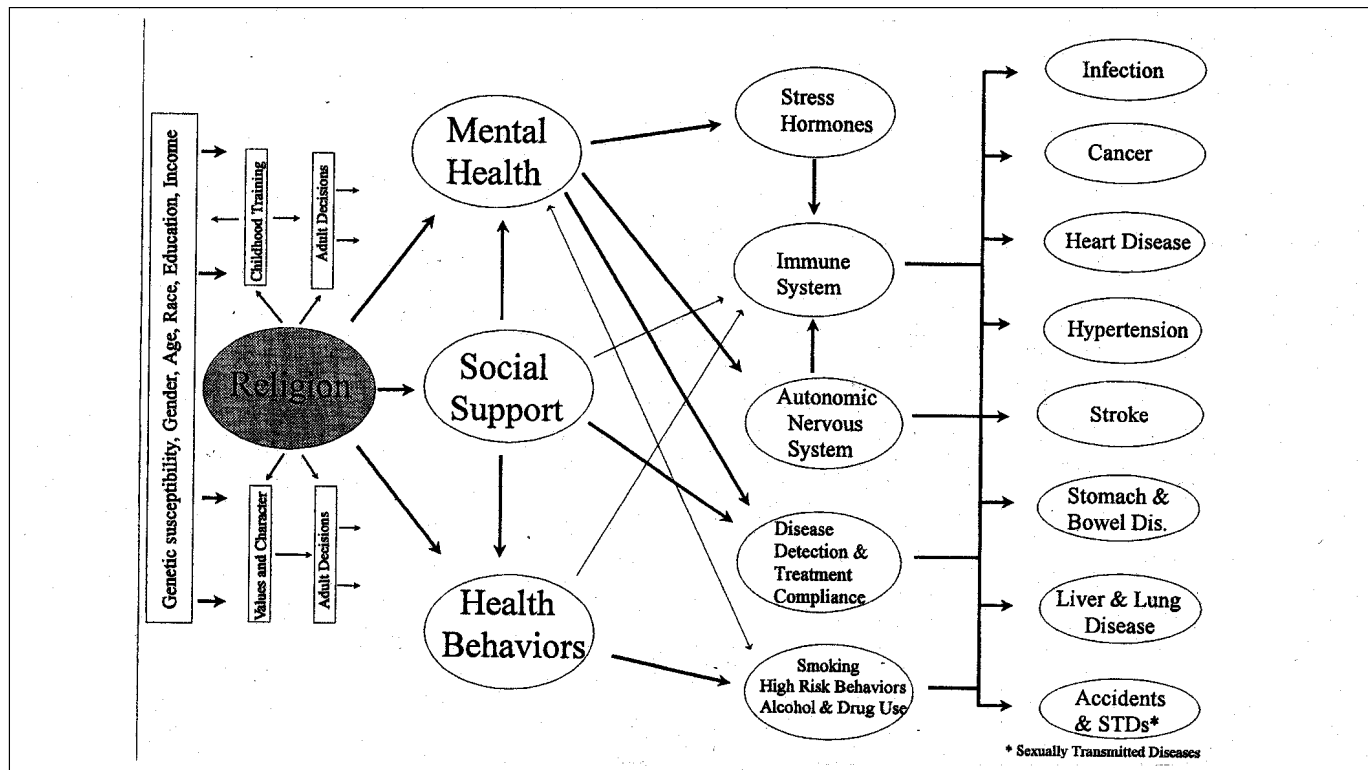


Figure 1. Theoretical model describing how religion affects physical health. From *Handbook of Religion and Health* by Harold Koenig et al., copyright 2001 by Harold Koenig et al. Used by permission of Oxford University Press.

also allow new genetic material to come into the gene pool, increasing genetic variability and resistance to disease. Likewise, if religious involvement increases the stability of families, reduces substance abuse during youth, facilitates other healthy lifestyle practices, and instills values that improve decision-making, then religious persons may be more likely to survive to mate successfully and successfully raise children of their own that become productive members of society.

At least one study suggests that the propensity to engage in religious beliefs and practices may have some genetic basis. In a survey of 1902 twins, Kendler and colleagues [5] found higher correlations for religious characteristics between monozygotic twins than between dizygotic twins. Religious characteristics measured were personal devotion (importance of religious beliefs, seeking religious comfort, and frequency of private prayer), personal conservatism (belief that God rewards and punishes, literal belief in Bible), and institutional conservatism (based on religious affiliation). Correlations between religious characteristics in monozygotic and dizygotic twin pairs, respectively, were $r = .52$ vs. $r = .40$ for personal devotion, $r = .47$ vs. $r = .43$ for personal conservatism, and $r = .63$ vs. $r = .57$ for institutional conservatism. Using statistical modeling investigators found that for personal devotion, family environment and individual-specific influences explained 24 percent and 47 percent, respectively, of the variance in twin resemblance, with genetic factors accounting for the remaining 29 percent. For personal conservatism, percentages were 45 percent for family environment, 55 percent for individual-specific, and 0 percent for genetic influences. For institutional conservatism, the figures were 51 percent for family environment, 37 percent for individual-specific, and 12 percent for genetic.

CHILDHOOD TRAINING

The religious beliefs and practices of parents often influence how they train their children. Religious training during childhood and adolescence may instill values that promote choices that reduce stress, maintain health, and prevent disease in later life. If such training prevents drug use, alcohol abuse, and delinquency in the teen years, then it may also reduce the disruption of education and career development that these problems cause. Likewise, if religious adolescents engage less frequently in pre-marital sexual activity, then teen pregnancy is less likely to arrest the pursuit of higher education and adversely affect later earning capacity. In this way religious training may increase the chances children have when older to afford timely medical care and to acquire knowledge that enables them to identify early symptoms of disease and take preventive measures. Similarly, if a religious training improves adult decisions, then behaviors that lead to substance abuse, divorce, and crime will be less common and less likely to cause psychological and social stress that ultimately impairs health.

On the other hand, poor education, lack of financial resources, stressful life experiences, and physical illness all increase the likelihood that persons will *turn to* religion for comfort or solace. In cross-sectional studies, such dynamic factors involving stress-induced religious change may conceal the positive effects of childhood religious training on health status unless religious history is taken into account.

PSYCHOLOGICAL AND SOCIAL INFLUENCES ON PHYSICAL HEALTH

Recent discoveries in psychoneuroimmunology and cardiovascular physiology have convinced many of the effects that cognitive, emotional, and social factors can have on physical health. These advances provide biological mechanisms by which stress-reducing religious beliefs and practices might impact health by altering the risk of infection, cardiovascular disease, cancer, or influencing the course of illness. Let us now examine some recent findings on how psychosocial stress impacts physical health.

The Fight-Flight Response

Scientists have known for almost 65 years that emotional stress has physiological consequences [6]. The “fight or flight” response, described by Cannon [7], involves a rapid sequence of physiological changes initiated whenever an experience is appraised as threatening—whether that threat is to the physical body or to the *psychological self*. The following is a highly simplistic description of this response. Once the mind interprets an event as dangerous to physical or emotional well-being, signals are sent to at least two areas of the brain—the locus ceruleus (where the cell bodies of autonomic neurons are concentrated in the floor of the 4th ventricle) and the hypothalamus (where neurons that secrete inhibiting and releasing hormones are located in the ventral wall of the 3rd ventricle). These two brain areas then execute a series of commands to the rest of the body.

Autonomic neurons in the locus ceruleus transmit signals to preganglionic sympathetic neurons traveling down the spinal cord and connecting to postganglionic sympathetic neurons located in ganglia along the spinal column. Postganglionic neurons, then, send sympathetic nerve fibers to synapse with smooth muscle in blood vessels, stomach, intestines, the heart, and other vital organs. In addition to connecting with postganglionic sympathetic neurons, preganglionic sympathetic neurons also extended down to the adrenal medulla. When the adrenals are activated by discharges from these nerves, they release large quantities of epinephrine (and smaller amounts of norepinephrine).

While the locus ceruleus is activating the sympathetic nervous system, the hypothalamus is secreting hormones (in particular, corticotropin releasing hormone or CRH) into blood vessels traveling down the infundibular stalk to the pituitary gland. CRH then stimulates the pituitary to release corticotropin (adrenocorticotrophic hormone or ACTH) into blood vessels that carry it to the adrenal cortex, stimulating the release of glucocorticoids. This pathway is known as the hypothalamic-pituitary-adrenal (HPA) axis.

The purpose of this complex series of physiological changes is to prepare the body to either fight or escape from danger. The end result is that blood is redirected to the heart and large muscles (at the expense of less vital organs) and glucocorticoids are made available to enhance muscle function. Hyperactivity of the sympathetic nervous system and HPA axis during psychological stress results in changes that affect heart rate, blood pressure, and coronary artery tone. In addition, alterations of serum cholesterol and blood lipids occur, along with an increased propensity for platelets to aggregate and blood to clot.

Changes also take place in the immune system as part of the fight-flight response. According to Rabin [8], postganglionic sympathetic nerve fibers terminate in secondary lymphoid tissues such as the spleen, lymph nodes, and lymphoid tissue around mucous membranes. It is in these secondary lymph tissues that T lymphocytes are produced and interact with B lymphocytes. The norepinephrine secreted by these sympathetic nerve fibers may bind to lymphocytes and reduce their functioning, or bind to macrophages that produce chemicals such as nitrous oxide which suppress lymphocyte functioning. Other hormones are also released, including opioids, substance P, neuropeptide Y, vasoactive intestinal peptide, and insulin-like growth factor, substances that can alter maturation and release of lymphocytes from primary lymphoid tissue and further affect migration and function of lymphocytes in secondary lymphoid tissue and other organs. Thus, acute stress can impact both primary and secondary immune responses in order to conserve energy needed for the fight-or-flight response (since immune processes require much energy) [8].

The changes induced by the fight-or-flight response are highly adaptive in terms of survival in the acute setting. If, however, a threatening situation continues for days, weeks, or months—as occurs in chronic stress and depression—then these changes may adversely affect body tissues and homeostatic processes in susceptible individuals. By activating the autonomic nervous system, stress may impair gastrointestinal functioning, leading to peptic ulcer disease, irritable bowel syndrome, and possibly pancreatic dysfunction and diabetes. By impairing immune function over the long-term, chronic stress can weaken the body's primary defense against infection, as well as possibly affect the development or spread of malignancy. A growing body of research, as described below, now supports this theory.

PSYCHOSOCIAL INFLUENCES AND IMMUNE FUNCTION

Psychological stress of even brief duration can induce marked physiological changes. Breier and associates [9] demonstrated that lack of control over even mildly aversive stimuli in 10 healthy human volunteers produced alterations in neuroendocrine and autonomic nervous system functioning (elevated ACTH, higher levels of sympathetic nervous system activity, and higher electrodermal activity). In a study of 22 older women, Cacioppo and colleagues [10] also found that brief psychological stress heightened cardiac activity, elevated plasma catecholamine concentrations, and diminished cellular immune responses.

Interpersonal relationships, in particular, may give rise to stress that powerfully affects neuroendocrine and immune function. Studying 90 newlywed couples, Kiecolt-Glaser and colleagues [11] found that those who displayed more negative or hostile behaviors during a 30-minute discussion of marital problems showed greater decreases in natural killer (NK) cell activity, diminished blastogenic responses to mitogens, weaker proliferative responses to monoclonal antibody, and larger and more sustained increases in blood pressure. Effects were stronger in wives than in husbands. Kiecolt-Glaser's team [12] next examined endocrine and immune correlates of marital conflict in 31 couples who had been married an average of 42 years. Marital satisfaction and escalation of negative behavior during conflict correlated with substantial changes in cortisol, ACTH, and norepinephrine levels. These changes were again more likely to occur in wives than in husbands. Both husbands and wives who engaged in negative behaviors during conflict, however, showed weaker immunological responses as measured by T cell blastogenic responses to mitogen stimulation and antibody titers to latent Epstein-Barr (EB) virus.

Depression

Depressive disorder can result from chronic situational stressors, depending on the biological susceptibility of the individual. Depression, in turn, is associated with a variety of neuroendocrine changes, including the elevation of serum cortisol. Numerous studies have found impaired lymphocyte functioning, including reduced NK cell cytotoxicity, in persons with depressive disorder [13, 14]. Bartrop and associates [15] were the first to report impaired lymphocyte functioning in grieving persons who had recently lost a spouse. By the sixth week after bereavement, lymphocyte responses to phytohemagglutinin and concanavalin A were significantly impaired among bereaved subjects compared to controls. More recently, in a 2-year prospective study of 66 HIV-infected gay men, Leserman and colleagues [16] found that stress and depressive symptoms both independently and in combination predicted decreases in immune function (measured by NK cell subsets and CD8-super (+) T cells).

STRESS-INDUCED IMMUNE CHANGES AND HEALTH STATUS

Demonstrating that psychological stress or depression alters immune function does not necessarily mean that such changes will increase the likelihood of disease or worsen prognosis. A number of studies, however, now suggest that stress-induced immune changes are large enough to affect health.

Infectious Diseases

Psychosocial stress may predispose to or influence the course of viral, bacterial, and fungal infections by down-regulating cellular immunity thereby impairing the body's ability to combat infection [17]. For example, Kiecolt-Glaser and colleagues [18] found that stressed caregivers of dementia patients were significantly more likely than age-matched controls to experience depression that was associated with impairments in immune function and increased susceptibility to infection, especially upper respiratory tract infections. In a second study that compared 32 caregivers with 32 sex, age, and SES-matched controls, Kiecolt-Glaser's group [19] found that caregivers showed poorer antibody response following influenza vaccination. In addition, caregivers had decreased in-vitro virus-specific-induced interleukin-2 and interleukin-1 beta levels. This finding suggested that chronic stress down-regulates immune responses to influenza vaccination in older adults, a finding recently confirmed by others [20].

Negative effects of stress may impair immune responses to viral infections in the young and healthy, as well as the old and sick. Vaccinating 48 second-year medical students on the last day of a three-day examination series, Kiecolt-Glaser and colleagues [21] assessed the effects of academic stress on students' ability to generate an immune response to hepatitis B vaccine. Students who developed an immune response were significantly less stressed and anxious than students who failed to do so. Studying stress-induced susceptibility to viral infection more directly, Cohen and colleagues [22] infected 394 healthy volunteers ages 20–55 with a cold virus and an additional 26 subjects with a placebo. Investigators found that both respiratory infections ($p < .005$) and colds ($p < .05$) increased in an almost linear fashion with increases in psychological stress.

Stress may also alter the course of infections. Evans and colleagues [23] examined the relationship between stressful life events and disease progression in 93 HIV-positive homosexual men, assessing subjects and controls over a 42-month period. HIV-positive men with high life stress ($n = 38$) experienced significantly greater HIV disease progression than those with low life stress. The risk of disease progression doubled for each stressful life event per six-month study interval.

Cancer

There is some indication that psychological distress may increase susceptibility to cancer in relatively healthy persons [24, 25]. The evidence to support a role for immune factors in cancer prognosis, however, is stronger than for cancer etiology [26]. Stress-induced suppression of NK cell activity increases the risk of tumor metastasis [27, 28]. In a three-month prospective study of 75 women with stage I-II breast cancer, Levy and associates [28] found that depressive fatigue-like symptoms correlated with NK cell activity both at baseline and three-month follow-up. Depressive-like symptoms at baseline also tended to predict decreases in NK activity at three months even after controlling for baseline NK cell activity. Levy's group [29] next examined mood and time to death following recurrence of breast cancer in 36 women. Positive affect (joy) predicted longer survival after cancer recurrence, controlling for physician-rated prognosis and number of metastatic sites. Similar findings were reported by Roberts and colleagues [30], examining disease progression in women diagnosed with gynecologic cancer. Depressed affect was an independent predictor of positive nodes on follow-up.

Wound Healing

Some of the most exciting research in this area examines psychological stress as a predictor of wound healing, a process dependent on healthy immune function. Kiecolt-Glaser and associates [31] studied 13 elderly female caregivers of demented relatives to determine if the stress of caregiving impaired wound healing in these subjects. Cases and matched controls underwent a 3.5-mm punch biopsy. Wounds in caregivers took significantly longer (24 percent) to heal compared to controls. Similarly, Marucha and colleagues [32] applied two 3.5-mm punch biopsies on the hard palates of 11 dental students. The first wound was made during summer vacation, and the second wound was placed on the opposite side of the palate three days before the first major examination of the term. Students took an average three days longer (40 percent) to heal the wounds during the examination period, compared to wounds made during the summer. In both studies above, peripheral blood leukocytes of stressed subjects produced significantly less interleukin-1 beta mRNA in response to lipopolysaccharide stimulation than did those of control subjects.

Social Support

If social support prevents negative life situations from leading to chronic emotional stress, it may also moderate stress-induced neuroendocrine and immune changes [33]. In one of the first studies supporting this hypothesis, Kiecolt-Glaser's team [34] found reduced immune function in psychiatric patients who complained of feeling lonely compared to those without such feelings. In

another study that assessed the effects of academic stress on medical students' ability to generate an immune response to hepatitis B vaccine [21], these investigators found that students with greater social support had stronger immune responses to the vaccine than those with less support. Cohen and colleagues [35] have now directly demonstrated that social support can increase host resistance to cold virus infection.

Later studies by Kiecolt-Glaser and others have demonstrated a relationship between social support and immune functioning in caregivers. Caregivers of patients with Alzheimer's disease or terminal cancer with low social support experienced greater declines in immune function over time, including NK cell activity, than did those with high support [18, 36, 37]. Similar findings emerge for cancer patients themselves. In Levy and associates' prospective study of women with early breast cancer discussed earlier [28], they found cross-sectional correlations between lack of family support and lower NK cell activity both at baseline and at three-month follow-up. Those who complained about lack of family support at baseline also tended to experience a decrease in NK activity at three months. In another study by this same group involving 66 women with stage I-II breast cancer, they again found that women with higher social support had greater NK cell activity than those with low support [38].

Do interventions that increase social support protect against stress-related decrements in immune functioning, thereby improving clinical outcomes? Spiegel and colleagues [39] conducted a randomized clinical trial to examine the effects of a psychosocial intervention on survival of 86 women with metastatic breast cancer. The one-year intervention consisted of weekly supportive group therapy. At 10-year follow-up, investigators found that subjects in the intervention group survived an average of 36.6 months compared to 18.9 months for controls ($p < .0001$). In a related study, Fawzy and associates [40] randomly assigned patients with malignant melanoma to either a structured group intervention (including stress management and social support) or a control group. Intervention group members experienced significant reductions in psychological stress, increased number of NK cells, increased NK cytotoxic activity, less cancer recurrence and longer survival over six years.

Psychosocial Factors and Cardiovascular Disease

Chronic psychological and social stress may also impact the development and course of cardiovascular disease by adversely affecting serum cholesterol and other blood lipids, increasing the propensity for platelets to aggregate [41], increasing the risk of fatal cardiac arrhythmias [42], and diminishing heart rate variability [43]. Let us now examine a few studies that document a link between psychosocial factors and the most prevalent form of cardiovascular pathology, coronary artery disease (CAD).

Stress, Depression, and CAD

Both psychological stress and depression may impact the development of CAD. For example, Rosengren and colleagues [44] prospectively followed 6,935 middle-aged men for 12 years examining the relationship between psychological stress and the occurrence of myocardial infarction (MI). In men with low stress ratings at baseline, 6 percent experienced a fatal or non-fatal MI compared with 10 percent of men with high stress ratings—a 50 percent increase in risk that remained significant after controlling for relevant covariates. Likewise, in a 13-year study of 1551 subjects *without* history of MI, investigators found that the diagnosis of major depression at baseline increased the risk of MI during follow-up by over 100 percent, independent of other coronary risk factors [45]. Similarly, in a study of 942 middle-aged Finnish men, Everson and associates [46] discovered that those with high levels of despair at baseline experienced a significant 20 percent increase in angiographically-documented atherosclerosis compared to men without despair. Ford and colleagues [47] followed 1190 male medical students at Johns Hopkins between 1948 and 1964, assessing the development of coronary heart disease and risk of MI. While subjects with depression did not differ from non-depressed subjects at baseline on CAD risk factors, they were over twice as likely to develop CAD and twice as likely to have a MI during follow-up. Many other studies document both higher mortality and greater risk of non-fatal cardiac events in depressed patients following acute MI [48-52].

Social Support

There is evidence that social support may counteract the adverse effects that psychosocial stress has on cardiovascular function [53]. Seeman and Syme compared the impact of different types of social support on degree of coronary atherosclerosis in 159 subjects using coronary angiography to assess extent of disease [54]. Quality of social support significantly predicted coronary artery atherosclerosis. Williams and associates [55] studied the effects of social and economic resources on cardiovascular mortality among 1368 patients with CAD undergoing cardiac catheterization. Unmarried patients without a confidant had an unadjusted five-year survival of 50 percent compared with 82 percent among patients who were married, had a confidant, or both. Frasure-Smith [56] randomly assigned 461 men with a prior history of MI to either a social intervention or a control group. Subjects in the intervention group received supportive visits from a nurse during periods when they reported high stress. During the five years of the study, subjects receiving the intervention experienced significantly fewer cardiac events than did those in the control group that did not receive support.

In summary, anything that reduces the responsiveness of the brain to a stressor—through positive cognitive appraisals or increased social support—may decrease the production of stress hormones, decrease sympathetic nervous system

activity, and ameliorate the cardiovascular and immune system alterations that follow. If religious beliefs and practices help to reduce psychological stress, increase social support, prevent depression, or enhance positive emotions like joy, thankfulness, forgiveness, hope, and optimism, then religion may help to moderate or prevent the potentially damaging behavioral and physiological responses to stress described above. On the other hand, religious beliefs that increase psychological stress by instilling fear or arousing guilt may have the opposite effect—stimulating the fight-or-flight response and its long-term negative physiological consequences.

HEALTH BEHAVIORS AND LIFESTYLE CHOICES

Health behaviors have an enormous influence on physical health—particularly those lifelong behaviors practiced since youth. This is especially true for behaviors like cigarette smoking, alcohol or drug abuse, lack of exercise, unhealthy eating habits, or risky sexual practices. Persons under stress are more likely to engage in these negative health behaviors (called the “stress-disinhibition” effect) [57]. Such behaviors may in turn lead to greater stress and poorer quality of life, plunging the person into a downward spiral. Not only do these behaviors lead directly to increased morbidity, they also impair immune responses. Studies in both animals [58] and humans [59] have documented negative effects of alcohol on immunity, particularly cell-mediated immunity. Similarly, cigarette smoking can depress immune functioning [60], whereas smoking cessation can improve it [61]. Drugs like marijuana have also been shown to reduce peripheral blood lymphocytes and impair NK cell activity [62].

If religion can help to prevent the development of unhealthy habits or behaviors in youth and early adulthood, it may have an enormous impact on health over the life span of the individual. A number of reasons exist for the inverse association between religious involvement and negative health behaviors. First, by providing a positive, more optimistic worldview that facilitates coping, religion may lessen the mental stress that sometimes precipitates alcohol abuse, drug use, and other risk-taking behaviors. Second, religious teachings discourage most behaviors that harm the body or control the mind, values that may be instilled early during religious training. Third, religion may reduce negative health behaviors by providing a supportive social network that buffers stress and provides healthier alternatives for coping with stress. On the other hand, if religious beliefs promote unhealthy habits such as neglect of the physical body, overeating, or lack of exercise, then health outcomes will suffer. Similarly, being ostracized from a religious community may drive some individuals to return to a lifestyle of addiction and self-neglect. Finally, rigid religious beliefs may induce or reinforce pathological guilt, which then drives individuals toward self-destructive behaviors to rid themselves of these painful feelings.

HEALTHCARE PRACTICES

Healthcare seeking behaviors influence physical health by at least three pathways: disease prevention, disease detection, and treatment compliance. Religious beliefs and teachings can promote positive healthcare practices in a number of ways. First, religious teachings advocate attention to physical health and respect for health professionals. Christian doctrines prescribe care for the body as the “temple of the Holy Spirit.” Jewish law in early Hebrew times prohibited Jews from living in towns that did not have a physician—underscoring a respect for health care professionals that continues to this day in traditional Jewish communities [63]. Although Islamic holy scriptures (the Qur’an) do not speak specifically of medical treatment, they set a high value on health and the restoration of health [64].

Second, if religious participation increases one’s social network and frequency of social contacts, then this will increase health monitoring. For many, particularly those in minority communities, the church has become an extended family. If a member of one of these close-knit religious communities fails to appear at religious meetings, he or she is likely to be contacted by a member of that community expressing concern. Such support will increase the likelihood that a sick person will be reminded to take their medicine or follow medical advice. Consequently, it is much more difficult for physically ill persons to neglect themselves if they are part of a religious community. Furthermore, being part of a religious community probably improves the likelihood of self-care because there is more reason to do so—perhaps because of the role he or she is playing in the lives of others in that community.

Third, there is some evidence that religious persons may be more compliant in general. Either because they are accustomed to yielding to authority or because of a sense of responsibility to others, religious persons may be more likely to take medication as prescribed [65] and comply with medical appointments [66]. On the other hand, as noted in the first paper of this series, religious beliefs may also prevent the seeking of timely medical care or may promote medication discontinuation, favoring faith-based therapies over medical ones. For the vast majority of persons involved in traditional religious activities, however, such behaviors are rare.

CONCLUSIONS

I have described and discussed a theoretical model that may help explain how religion impacts physical health through *natural* mechanisms. If psychological and social factors influence susceptibility to infection, development and spread of malignancy, speed of wound healing, and risk or course of cardiovascular disorders like hypertension, stroke, and coronary artery disease, then religious factors might also affect these processes. Because religious beliefs impact health

behaviors and lifestyle choices, as well as healthcare practices and compliance with treatment, numerous pathways exist by which physical health may be affected. Whether or not religious involvement is actually associated with better physical health and longer survival is the subject of the final article in this series.

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Direct reprint requests to:

Harold G. Koenig, M.D.
Box 3400
Duke University Medical Center
Durham, NC 27710

RELIGION AND MEDICINE IV: RELIGION, PHYSICAL HEALTH, AND CLINICAL IMPLICATIONS

HAROLD G. KOENIG, M.D.

*Duke University Medical Center and
GRECC, VA Medical Center, Durham, North Carolina*

ABSTRACT

In the fourth and final article of this religion and medicine series, I summarize the results of a comprehensive and systematic review of research examining religion's relationship to physical health and mortality. This review focuses on pain and disability, cardiovascular disease, immune and neuroendocrine function, susceptibility to infection, cancer, and overall mortality. I also explore what these research findings mean for medical practice and suggest patient-centered applications that are sensitive to ethical concerns.

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Key Words: religion, spirituality, pain, disability, immunity, cancer, longevity

In the third article of this series, I presented a theoretical model explaining how religious beliefs and practices might impact physical health. In this final article, I discuss research that has tested the validity of this model. That research was identified during a comprehensive systematic review of the literature over the past century as described in the second article of this series. To summarize, a three-stage process was used to identify relevant studies. First, we performed computer searches of the literature to identify quantitative studies of the religion-physical health relationship. Second, we consulted the footnotes and references of articles retrieved by the search to identify other relevant studies, repeating this process until no new studies could be found. Third, we examined review articles and books

on the topic. Proceeding in this manner, we identified over 225 reports on religion and pain/disability, heart disease, blood pressure, stroke, immune/neuroendocrine function, infectious disease, cancer, and overall mortality. A description of each of the studies referred to in this section can be found elsewhere [1].

PAIN AND FUNCTIONAL DISABILITY

Ten studies have examined the relationship between religion and pain, with the majority focusing on the relationship between prayer and pain intensity. Four of six cross-sectional studies found that frequent prayer was associated with *greater* pain intensity. These results may be interpreted in at least two ways. First, pain may lead to increased prayer as the person attempts to cope with the pain. Prayer is a response to the pain. Second, prayer may lead to increased pain because it somehow focuses the mind on the pain. Also, if praying fails to bring relief of pain, the person may be so disappointed and discouraged that the pain appears to worsen. Thus, prospective studies and clinical trials are needed to help determine whether prayer increases in response to pain or whether pain increases in response to prayer.

The only true prospective study that has been done found that “praying and hoping” was positively related to greater pain at baseline, as in previous studies. When subjects were assessed over time, however, increased prayer predicted significantly lower pain levels 8 weeks later [2]. Similarly, Kabat-Zinn and colleagues [3] found that prayer/meditation when used as an intervention for treating chronic pain resulted in a significant lowering of pain over time. A third study examined the effects of a standard chaplain intervention on requests for “prn” pain medication following orthopedic surgery. This study found significantly fewer requests by patients receiving the intervention compared to control patients [4]. These three studies suggest that the positive cross-sectional correlations between prayer/religious activities and pain are a likely result of increased praying in response to pain. Prayer over time may either reduce pain level or help the person to cope better with it. This does not mean, however, that prayer always helps to reduce pain or enables people to cope better with it; but in many cases, this does apparently occur.

With regard to functional disability and religious involvement, 12 studies were identified. Idler and Kasl [5-8] have done some of the best work in this area. These investigators report over a decade of research following 2812 older adults participating in the Yale-New Haven EPESE survey. In their latest report, Idler and Kasl [8] found evidence that frequent religious attendance delayed the onset and progression of physical disability in their older sample. More important, given the concern that physical disability may confound the relationship between religious activity and health, physical disability had much less of an effect on preventing religious attendance than did attendance on preventing physical disability.

While religious attendance predicted less future disability, investigators found that personal religiousness or level of comfort derived from religion did not. This relationship, however, may also be a complex one. As physical illness and disability worsen, people often turn to religion for comfort, as noted with increasing pain, possibly disguising some of the long-term benefits that personal religious faith may convey. In fact, there is some evidence that personal religiousness may positively influence the *perception* of disability. Idler [5] discovered that for any given level of chronic illness, men with high levels of private religiousness reported less disability than did men with lower levels of religiousness. In order to explain this association, she conducted another study [9] in which she found that a person's subjective rating of health represents broad conceptions of self in which actual physical health may be de-emphasized and non-physical characteristics—i.e., religious or spiritual self-identities and well-being—are relied on more heavily.

HEART DISEASE

The review identified 32 quantitative studies, 16 examining differences in heart disease across religious denominations and 16 examining level of religiousness and heart disease. Of the 16 studies examining the relationship between *religious denomination* and heart disease, four found higher rates of CAD in Jews compared with non-Jews and one study showed higher rates in Ashkenazi compared with Oriental Jews. The highest rates of CAD were found among secular Jews [10-12].

Of the 16 studies examining *religiousness* and heart disease, 12 (75 percent) found less heart disease or lower cardiovascular mortality among the more religious; 3 studies found no association; 1 study reported mixed findings (but measured parental affiliation only). Two were prospective cohort studies that measured religiousness at baseline and followed subject over time assessing outcomes [12, 13]. Both found greater religiousness predicted lower mortality. Five studies were clinical trials that included a religious/spiritual component as part of a psychosocial-behavioral intervention (including prayer, yoga, or transcendental meditation); all five reported positive effects [14-18].

BLOOD PRESSURE

The review identified 34 studies that examined the relationship between religion and blood pressure. Of those, 16 assessed level of religiousness, 4 compared blood pressures in Seventh-Day Adventists with others, one study compared Protestants, Catholics, and Jews, and 13 studies were clinical trials where a religious or spiritual intervention (usually meditation) was used to treat high blood pressure. No fewer than 14 of 16 studies that assessed the relationship between level of religiousness and blood pressure found lower blood pressure among the more religious. In these studies, *diastolic* blood pressure in particular

was lower in religious compared with non-religious subjects. In *all* studies that correlated *measured* blood pressures with religiousness—including both prospective cohort studies—subjects who were more religious had significantly lower blood pressures. Of the 13 clinical trials, 9 found that a spiritual intervention (7 involving meditation) lowered blood pressure.

STROKE

While six studies were located that quantitatively examined religion and stroke, five of these compared rates of stroke between members of a religious group and the general population. Only one study examined degree of religious involvement as a predictor of future stroke. Colantonio and colleagues [19] followed 2812 older adults, finding that subjects who attended religious services at least once/week were less likely than those attending services less frequently to have a stroke during the six-year follow-up (4.7 percent vs. 7.5 percent, $p < .001$). When religious attendance was categorized as “once or twice/year or more” vs. “never,” the effects of attendance lost statistical significance in a multivariate regression model that included other predictors like hypertension, myocardial infarction, and smoking. It is not surprising, however, that religious attendance lost statistical significance after investigators controlled for the likely *mechanism* of the effect (i.e., perhaps religious attenders experienced fewer strokes because they had lower blood pressures, fewer heart attacks, and were less likely to smoke cigarettes, as other studies have found).

IMMUNE AND NEUROENDOCRINE FUNCTION

The study of religion/spirituality, neuroendocrine, and immune function is in its infancy, and only the most tentative of hypotheses can be forwarded based on existing data. A total of five studies (three published) have examined the relationship between a measure of religious involvement and immune function. In the first study, McClelland [20] found that salivary IgA levels in 70 students watching a religious film were significantly higher than in 62 students watching a war film. In the second study (the first study to examine *religious involvement* and immune function), Koenig and colleagues [21] measured interleukin-6 (IL-6) and other biological indicators of inflammation in 1718 persons aged 65 or older. IL-6 levels were correlated with frequency of religious attendance. Those who attended religious services were 49 percent less likely than non-attenders to have high IL-6 levels (> 5 pg/ml). When age, sex, race, education, chronic illness, and physical functioning were controlled, the effect was reduced from 49 percent to 42 percent but remained significant ($p < .005$). Not long after this report, Lutgendorf [22] examined plasma IL-6 levels in 55 older adults, also finding an inverse correlation with religious or spiritual coping (partial $r = -.26$, $p = .075$ after controlling for stress level).

In the last published study, Woods and colleagues [23] surveyed 106 HIV sero-positive gay men to determine the relationship between religiosity and immune function. Religious activities, such as prayer, religious attendance, spiritual discussions, and reading religious/spiritual literature, were associated with significantly higher CD4+ counts and CD4+ percentages. Religious coping (putting trust in God, seeking God's help, increasing praying, etc.) was related to fewer depressive symptoms ($p < .01$) and less anxiety ($p = .08$), but not to specific immune markers. A fifth study by Schaal and colleagues at Stanford University examined correlations between religious involvement and immune function in 112 women with metastatic breast cancer [24]. Importance of religious or spiritual expression was positively correlated with NK cell numbers ($r = .19$, $p = .02$), T-helper cell counts ($r = .16$, $p = .05$), and total lymphocytes ($r = .15$, $p = .05$). Religious expression was unrelated to delayed-type hypersensitivity.

Religious involvement and *neuroendocrine* function has been examined in at least 11 studies. Nine of these studies assessed the effects of meditation or tai-chi on endocrine function, with seven finding that such practices reduced cortisol and other stress hormones at least temporarily. In the remaining two studies, the first reported that of 30 women awaiting breast biopsies for possible cancer, those who employed prayer and faith to cope tended to have lower cortisol levels than other women [25]. The second study, Schaal's examination of women with metastatic breast cancer [24], found that evening cortisol levels were significantly lower among women who scored higher on religious expression. The results of these immune and neuroendocrine studies, then, are consistent with the hypothesis that religious practices facilitate coping, thereby reducing stress-related hormone levels and improving immunity.

A series of clinical trials and epidemiologic studies are now being conducted at Johns Hopkins University's Center for Health Promotion (supported by NIH), Harvard's Mind-Body Medicine Institute (supported by CDC), and University of Miami (supported by NIH) to better understand the relationship between religious interventions, lifestyles and immune functioning in women with breast cancer, persons with congestive heart failure, the elderly with hypertension, and long-term survivors who are HIV positive or have AIDS.

INFECTIOUS DISEASE

Little research has examined whether religious activity decreases susceptibility to infection, and the studies that have been done only indirectly address this question. Kuemmerer and Comstock [26], studying a population-based sample of 7,787 junior and senior high school students in Washington County, Maryland, compared the characteristics of students with positive and negative TB skin tests. Investigators found that the frequency of large reactions was greater among children whose parents attended church less than once/month than among those whose parents went to church more often. Comstock and colleagues

[27] next matched cases of active TB between 1960 and 1964 against the 1963 Washington County census data to obtain approximate five-year incidence rates. Persons who attended church at least weekly had the lowest five-year rates (57/100,000), those who attended church once/month had intermediate rates (84/100,000), and those who attended only twice a year or less had the highest rate (138/100,000).

Only one study has examined the effects of religion on probability of contracting a sexually transmitted disease (STD). Again reporting from the Washington County (MD) study, Naguib and colleagues [28] conducted a large cytologic screening program involving 4,290 women. Among women claiming to have no religious affiliation and those refusing to answer this question, the prevalence of tests positive for trichomoniasis was 20 percent (significantly higher than 14.5 percent for the group as a whole). Among the 3,962 women designated as "Christians," frequent religious attendance was associated with lower rates of trichomoniasis: among those attending services once/week or more, 12.4 percent had trichomoniasis compared with 18.2 percent for those attending services once/month or less. These analyses did not control for education or income, although doing so would probably increase differences observed since religion tends to be more common among the poor and those with less education (who are also at greater risk for STDs).

CANCER

At least 13 studies have quantitatively examined the relationship between religion and *risk* of cancer. Ten of these compared the risk of cancer by religious denomination. Only three studies examined the effect of degree of religious involvement on cancer risk. Two of these reported lower rates of cervical cancer (or abnormal Pap smears) in the more religious [29, 30], and one found no difference in overall cancer risk [31].

With regard to cancer *mortality*, 36 studies have examined the relationship to religion. Again, most ($n = 28$) compared rates by religious denomination. As with cancer risk, a consistent finding was that Mormons and Seventh-Day Adventists lived longer than people in the general population. Of the remaining eight studies, seven examined the relationship between degree of religiousness and cancer mortality. Five of these found that greater religiousness predicted a lower likelihood of dying from cancer [32-36], and two studies found no effect [37, 38]. The remaining study was a randomized double-blind clinical trial of intercessory prayer conducted with a small sample of children with leukemia; no statistically significant difference in mortality ($p > .05$) was found between those receiving the intervention (two of eight children died or 25 percent) and those in the control group (7 of 10 children died or 70 percent) [39].

MORTALITY

At least 101 studies have quantitatively examined the relationship between religion and mortality (including the 36 cancer mortality studies noted above). Forty-seven studies measured religious affiliation only, 52 assessed level of religiousness, and the remaining two studies were clinical trials. Of studies measuring religiousness, the most common measure was religious attendance (21 of 52 studies); 13 studies examined clergy mortality. The two clinical trials involved one study of transcendental meditation (TM) in elderly nursing home patients (demonstrating longer survival in the TM group) and a second study of intercessory prayer in children with leukemia (finding no association, as noted earlier). A consistent result among denominational studies was lower mortality among the Amish, Seventh-Day Adventists, Mormons, and to a lesser extent, Jews—compared to the general population.

Of the 52 studies that assessed level of religiousness, 39 found longer survival for those who were more religious, 10 found no association, 2 reported complex results, and 1 found shorter survival. Thus, three-quarters of studies found that greater religiousness predicted longer survival. Among clergy studies, 12 of 13 found that clergy survived longer than did comparison groups. The most consistent findings (besides lower clergy mortality) was that frequency of religious attendance predicted longer survival. All six of the six most recent and better designed studies reported such an effect—the size of which was roughly equivalent to not smoking cigarettes (adding as many as seven years to survival) [40-45].

In summary, the vast majority of studies—with notable exceptions [46]—tend to support the theoretical model presented in the third article of this series. In other words, religious beliefs and practices that are rooted within major religious traditions may impact physical health through a number of well-established psychological, social, and behavioral mechanisms.

IMPLICATIONS FOR MEDICAL PRACTICE

Spiritual Needs of Patients

If over 40 percent of medical patients in some areas of the country utilize religious beliefs as their primary way of coping with medical illness and another 50 percent use it in a secondary way, this underscores the importance and prevalence of spiritual needs during medical illness [47]. Such needs are found not only among patients in North Carolina. Kaldjian and colleagues [48] surveyed 90 HIV-positive patients at Yale–New Haven Hospital, finding that 98 percent believed in a divine being called “God,” 84 percent expressed a personal relationship with God, and 82 percent said that their belief in God

helped when thinking about death. In addition, however, 44 percent felt guilty about their HIV infection and 26 percent felt their disease was a form of punishment (17 percent a punishment from God). Only 30 percent, however, had spoken with a hospital chaplain.

Spiritual needs are also found among psychiatric patients, a group to whom clergy have traditionally had limited access. Fitchett and colleagues [49] at Chicago's Rush-Presbyterian Medical Center discovered that 88 percent of psychiatric inpatients had three or more current religious needs. Despite this, over three-quarters of these patients had *not* spoken with a clergyperson during their hospital stay. This figure contrasted sharply with only 19 percent of medical inpatients who had not spoken with clergy.

Wishes of Patients

As we debate the positive and negative effects of religion on mental and physical health, it is necessary to consider how *patients feel* about health care professionals addressing religious issues. While we do not always grant patients their wishes, health professionals should at least consider the wishes of patients in matters having to do with their health. If religion is how many patients cope with health problems and patients wish health providers to address spiritual needs, then this may be an important reason for doing so. If patients do not want physicians or other health providers to address spiritual or religious needs, then perhaps all such needs should be referred to clergy. Surveys indicate that physicians and patients have quite different views about this.

When Koenig and colleagues [50] asked a random sample of 160 Illinois physicians whether older patients during severe stress or near death would like their physicians to pray with them, 63 percent said that patients would *not* want this. In a separate study of 72 geriatric medical patients and senior center participants from the same geographical area [51], these investigators asked how subjects would feel about their physician praying with them during times of extreme physical or emotional distress. Over half of the patients (51 percent) indicated "yes, very much" and 27 percent indicated "yes, somewhat." Less than 20 percent indicated mixed feelings about physicians praying with them and only 5 percent were definitely opposed.

King and Bushwick [52] examined the religious beliefs and preferences of 120 patients admitted to Pitt Memorial Hospital in eastern North Carolina and 83 patients admitted to York Hospital in Pennsylvania. Ninety-eight percent of patients believed in God, 58 percent indicated their belief was "very strong," and 73 percent prayed daily or more often. When asked about whether or not they would like their physicians to pray with them, 48 percent said that they would (54 percent in the North Carolina sample and 40 percent in the Pennsylvania sample). Seventy-seven percent indicated that the physician should consider their

patients' spiritual needs, and 37 percent wanted physicians to discuss religious issues more often with them. Not surprisingly, 80 percent said that their physicians had never or only rarely discussed religious beliefs with them.

Oyama and Koenig [53] interviewed 380 family medicine outpatients in Texas and North Carolina, finding that 43 percent were interested in knowing the religious beliefs of their doctors, 73 percent felt that patients should share their religious beliefs with doctors, and 67 percent felt that in certain circumstances they would like their physicians to pray with them. The religiosity of the patient was a clear predictor of whether he or she wanted to know about the religious beliefs of the physician or share their own religious beliefs with the physician. Note also that Kaldjian and colleagues [48] found that 56 percent of 90 HIV-positive patients at Yale-New Haven Hospital believed that it was important to discuss spiritual needs with their physicians and 46 percent thought it would be helpful to pray with their physicians.

While physicians are not accustomed to addressing spiritual issues in clinical practice, many are at least open to addressing the religious needs of patients in certain circumstances. In a probability sample of 160 Illinois physicians, 92 percent felt that it was appropriate for the physician to address religious issues with patients under certain circumstances—88 percent when the patient requested it, 82 percent if a request was implied, and 66 percent even if no request was made by the patient [50]. Less than one-third (31 percent) felt that the religious needs of patients should be left entirely up to the clergy. Comparable data are not available for psychiatrists or psychiatric patients.

Role of the Physician

There is little if any research that examines how physicians can appropriately and sensitively address religious/spiritual issues in medical or psychiatric practice. Thus, the recommendations below are largely based upon informal discussions between the author and colleagues on how a prudent clinician might proceed. These recommendations take into account that physicians in today's managed-care environment are unlikely to have much time to devote to religious or spiritual issues. Furthermore, these recommendations acknowledge that most physicians are unlikely to have the skills necessary to address religious or spiritual issues in any depth. The role of most physicians, then, lies primarily in assessment and orchestration of resources. Physicians who have training in this area may decide to go further than assessment and orchestration, although there are limits to how far physicians can or should go. Whatever action the physician takes must *always* be patient-centered. Finally, psychiatrists may need to proceed even more consciously than primary care physicians in addressing these issues, given boundary concerns with psychiatric patients [54].

Assessment

Physicians should consider taking a religious history on all patients with serious medical illness, which can be done as part of the social history. Such a history may be quite brief, particularly if the patient indicates that he or she is not religious; remember that many medical patients do not wish physicians to address religious issues. For most religious patients, however, taking such a history will be appreciated. A consensus panel of the American College of Physicians and Society of General Internal Medicine [55] recently suggested four questions that physicians might ask seriously ill patients:

- “Is faith (religion, spirituality) important to you in this illness?”
- “Has faith been important to you at other times in your life?”
- “Do you have someone to talk to about religious matters?”
- “Would you like to explore religious matters with someone?”

The physician should also ask whether religious concerns have been a source of stress or struggle for the patient.

Orchestrator of Resources

Having determined the patient’s religious background and spiritual needs, the physician may now orchestrate resources to meet those needs as the patient directs. This may involve requesting that the nurse call the chaplain, the patient’s minister, or some other religious leader or church friend, with the patient’s permission. It may involve ensuring that religious reading materials are available, that there is access to religious TV programs, or that there is an opportunity to participate in religious services. In the busy hospital setting, the physician may need to ensure that the patient has uninterrupted time to pray with family, friends, or clergy. While all these activities may be delegated to others, the physician as orchestrator must ensure that they happen.

Supporter of Patient Beliefs

Considering interventions that the physician may choose to implement, the least invasive is simply to identify and support the religious or spiritual beliefs that the patient finds comforting. It is important to emphasize that the physician is supporting what the patient already finds helpful, not introducing new beliefs. By supporting the patient’s religious beliefs and coping behaviors, the physician will reinforce such behaviors and perhaps increase their effectiveness in relieving anxiety and distress. Of course, discretion is always needed. If the patient’s religious beliefs are bizarre or obviously conflicting with medical care, then the physician should neither support nor discourage such beliefs—but obtained assistance from a religious professional—preferably the patient’s clergyperson.

Psychiatrists should explore the meaning of the beliefs and how such beliefs are used defensively. This exploration, however, can be done in a supportive manner.

Participator in Religious Practices

If the physician has the same religious background as the patient and if the patient requests, then he or she may decide to participate in a religious activity like prayer with the patient. Psychiatrists need to be more cautious than primary care physicians in this regard. Prayer with the patient is the most likely religious activity that a physician will be asked to participate in. To ensure that this activity remains patient-centered, it is safest to encourage the patient to do the praying and the physician to participate silently, adding perhaps an “amen” at the end. If the physician believes it will comfort the patient, especially when the patient requests, the physician may decide to pray for the patient quietly on his or her own time, and inform the patient that he or she will be doing this. Knowing, for example, that one’s surgeon will be praying for direction and success during an operation may help to relieve a religious patient’s pre-surgical anxiety.

In some cases, the physician may wish to initiate a spoken prayer with the patient if the physician knows that this will bring comfort. Physician-initiated prayer, however, is more controversial because this introduces the risk that a religious activity may become physician-centered. For example, it may be quite difficult for a patient who does not wish to pray with a physician (a significant proportion of patients) to stop the physician if the latter initiates a prayer. Patients want to please their physician, particularly in this era of managed-care where patients may not have a choice of provider. The physician may control access to treatments and procedures that the patient desperately needs or wants. Thus, the patient may not feel free to refuse religious activities suggested by the physician for fear of offending him or her. It is essential that the physician be aware of the patient’s religious background (to provide some sense of whether the patient would want this) and not proceed until explicit, uncoerced permission is obtained. For permission to be uncoerced, the patient must be completely free to refuse the activity without fear of negative repercussions. Knowing the patient’s religious background well enough so as to be quite sure of their likely consent, then, is important.

Prescriber

If religious beliefs and activities are shown to maintain or improve mental or physical health, perhaps physicians should consider prescribing such activities to non-religious patients—just as they would prescribe cessation of smoking, regular exercise, or a balanced diet. In most cases, however, prescribing religious activities probably goes beyond the role of the physician. Furthermore, it is likely that if religious activities are chosen solely in order to benefit health, then they may not end up having that effect. Most of the research has shown that religious persons

tend to have better mental and physical health than those not involved in such activities. Subjects in such studies, however, are generally involved in religious activities for religious reasons. The research does not show that becoming religious for health reasons alone will maintain health or cure disease.

On the other hand, there may be some circumstances—infrequent and carefully chosen—where the physician may encourage religious activities in an already religious patient. Take, for example, an older adult who at one point in life had been an avid churchgoer but who is now becoming increasingly socially isolated. Perhaps difficulties getting to church (because of physical disability, lack of transportation, etc.) or other barriers (unresolved problems with a church member or minister) have led to a decrease in attendance. If the physician knows that the patient would be receptive to a suggestion to increase religious participation, he or she may gently and sensitively suggest that the patient consider attending services more often—but not persist if any resistance is encountered. If the patient is receptive to such a suggestion, the physician may help the patient develop strategies to overcome barriers to religious participation. In general, however, such prescriptions for religious activity are risky and best avoided in non-religious patients or patients whose religious backgrounds are not thoroughly known by the physician.

Referral

Most physicians are not sufficiently trained to go much beyond taking a religious history, directing resources, and perhaps supporting patients' religious beliefs and practices. When spiritual needs are evident, it is probably best to refer patients to a clergy person who is competently trained to meet those needs. Health professionals are often unaware of the extensive training that chaplains today receive. To become a certified chaplain in the Association of Professional Chaplains, an individual must graduate from college, complete three years of divinity school (for a Masters of Divinity), complete one to four years of clinical pastoral education (equivalent to an internship/residency), and pass both written and oral examinations. Chaplains, then, are the true professionals in this area.

Finally, most patients do not wish their physician to “trade” time spent dealing with necessary medical problems with time spent dealing with spiritual issues. If physicians address spiritual issues, they must be certain that medical issues and concerns are also competently and thoroughly addressed. Addressing spiritual issues, then, is something done “in addition to” addressing medical issues and may require an extra commitment of time.

CONCLUSION

There is little doubt that religion may in certain circumstances have adverse effects on health—particularly if beliefs are used to justify negative health

behaviors or religious practices are substituted for traditional medical care. While more research and better designed studies are needed, the vast majority of research completed to date indicates that religious beliefs and practices are associated with better mental and physical health. These associations are as consistent and robust as associations between health status and other psychosocial variables (like social support, marital status, and certain health behaviors). Plausible psychological, social, and behavioral mechanisms exist by which religion can and should have a positive influence on health. Further research is needed to both replicate existing findings and more clearly define the mechanisms by which religion influences health and vice-versa. In particular, research is needed to help determine how to best apply these findings to clinical practice. Clinical applications have been suggested, although remain tentative until more evidence has accumulated. One thing is certain, however. Many of our patients are religious, use religious beliefs to cope with the stress of medical and psychiatric illness, and often have unmet religious or spiritual needs when they become physically or mentally ill. It would be sad indeed if clinicians ignored what might be a readily available, inexpensive, and powerful resource of comfort and healing.

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Direct reprint requests to:

Harold G. Koenig, M.D.
Box 3040
Duke University Medical Center
Durham, NC 27710