The Influence of Religion on Sexual HIV Risk

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Abstract This systematic review examines the relationship between religion and sexual HIV risk behavior. It focuses primarily on how studies have conceptualized and defined religion, methodologies, and sexual risk outcomes. We also describe regions where studies were conducted and mechanisms by which religion may be associated with sexual risk. We included 137 studies in this review, classifying them as measuring: (1) only religious affiliation ($n = 57$), (2) only religiosity ($n = 48$), and (3) both religious affiliation and religiosity ($n = 32$). A number of studies identified lower levels of sexual HIV risk among Muslims, although many of these examined HIV prevalence rather than specific behavioral risk outcomes. Most studies identified increased religiosity to be associated with lower levels of sexual HIV risk. This finding persists but is weaker when the outcome considered is condom use. The paper reviews ways in which religion may contribute to increase and reduction in sexual HIV risk, gaps in research, and implications for future research on religion and HIV.

Keywords Religion · HIV/AIDS · Sexual risk · Religiosity

Introduction

Religion influences various health outcomes including mortality, depression, and drug use [1–3] as a key factor that shapes behavior within many communities [4]. Early

in the HIV epidemic, religion was considered detrimental to prevention efforts, as some religious communities considered AIDS to be a punishment for sin and opposed the public promotion of condom use and forms of sex education [5–7]. More recently, theologies of harm reduction have emerged within some religious groups [8] and religious organizations have become major HIV intervention partners in multiple countries [5].

Research on religion and HIV emphasizes the role of religion as a resource for people living with HIV, and suggests that religion is useful in helping individuals cope and find meaning [9, 10]. Less research is available on pathways through which religion may influence HIV risk behavior. Previous research that suggests religious tenets and practices impact HIV risk has focused on differences in HIV transmission across religious affiliations [11]. A number of studies have examined religious affiliation and HIV in Africa [11, 12], but none have examined associations between religious affiliation or religiosity and HIV risk worldwide. The limited emphasis on how religion may be a risk or protective factor, as well as an avenue for HIV prevention, may be related to contentions between religion and HIV preventative approaches described above. This may be shifting; however, as prevention efforts increasingly incorporate the importance of structural influences on risk, including gender inequalities, stigma, community networks, and behavioral norms, which may be influenced by religion. Attention to structural influences on risk highlights cultural, political, economic, and religious factors that may be related to risk behaviors, and emphasizes the importance of understanding unique risk contexts [13, 14]. Innovative approaches to HIV prevention that draw from local contexts through utilizing religious venues, partnerships, and frameworks (including, for example, an emphasis on specific values such as destiny, compassion,

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and purity) have demonstrated promise in reducing HIV risks [15].

A review of research to date is needed to consider how religion may be associated with HIV risk and protection and pathways by which religion may influence risk. This systematic review considers studies published on religion and sexual HIV risk since 1988. For the purposes of this paper religion is defined as including two primary components: (1) religious affiliation, and (2) a level of adherence to, participation in, influence of, or identification with a set of beliefs, referred to as “religiosity.” The review examines study methodologies, definitions and conceptualizations of religion, locations in which studies were conducted, and sexual risk outcomes associated with religion. We also discuss mechanisms that explain these associations and gaps in research on the relationship between religion and sexual HIV risk.

Methods

The 137 studies included in this review were published between 1988 and 2012. Most studies employed cross-sectional designs ($n = 113$, 82.5 %). Twenty-two were longitudinal studies and two were randomized controlled trials.

Four studies (2.9 %) included mixed methods or a qualitative component. Nearly one fourth ($n = 33$, 24.1 %) of the studies included national samples. Sample size varied from 33 to 216,000 individuals, with a mean of 4,714 and a median of 880. Four studies considered countries as the unit of analysis rather than individuals. Nearly equal numbers focused on adult populations only ($n = 52$, 38.0 %) and youth or young adults only ($n = 53$, 38.7 %); the latter included research with secondary school and college students. Another 23.4 % ($n = 32$) of studies considered mixed samples, including youth and adults, or a participant age range beginning below and exceeding 18. When age was not specified, the sample was considered to include only adults. Most studies were conducted with both women and men ($n = 85$, 62.0 %), while 28 studies (20.4 %) reported results solely for women and 24 (17.5 %) only included men.

Results

Study Methodologies

The 137 studies included in this review were published between 1988 and 2012. Most studies employed cross-sectional designs ($n = 113$, 82.5 %). Twenty-two were

Fig. 1 Article selection

longitudinal studies and two were randomized controlled trials. Four studies (2.9 %) included mixed methods or a qualitative component. Nearly one fourth ($n = 33$, 24.1 %) of the studies included national samples. Sample size varied from 33 to 216,000 individuals, with a mean of 4,714 and a median of 880. Four studies considered countries as the unit of analysis rather than individuals. Nearly equal numbers focused on adult populations only ($n = 52$, 38.0 %) and youth or young adults only ($n = 53$, 38.7 %); the latter included research with secondary school and college students. Another 23.4 % ($n = 32$) of studies considered mixed samples, including youth and adults, or a participant age range beginning below and exceeding 18. When age was not specified, the sample was considered to include only adults. Most studies were conducted with both women and men ($n = 85$, 62.0 %), while 28 studies (20.4 %) reported results solely for women and 24 (17.5 %) only included men.

Definition of Religion

Religion was conceptualized differently across studies. Most studies only examined religious affiliation ($n = 57$). Another group of studies ($n = 48$) only measured participant religiosity, without describing the religious affiliation of the sample. Finally, 32 studies measured both religious affiliation and religiosity.

Study Locations

Most studies were conducted in Africa ($n = 61$, 44.5 %), and North and South America ($n = 53$, 38.7 %), with 47 of the latter (34.3 %) conducted in the United States (US). Less commonly considered regions included Europe ($n = 8$, 5.8 %), the Western Pacific ($n = 7$, 5.1 %), South-East Asia ($n = 4$, 2.9 %), and the Middle East ($n = 2$, 1.5 %). Two studies were conducted in multiple regions (1.5 %).

Sexual Outcomes Associated with Religion

Because of differences in how religion and religiosity were presented, risk outcomes are detailed according to studies which describe: (1) religious affiliation only ($n = 57$), (2) religiosity only ($n = 48$), and (3) both religiosity and religious affiliation ($n = 32$).

Religious Affiliation and Sexual HIV Risk ($n = 57$ Studies)

Studies that only compared participants by religious affiliation differed from those that included religiosity in multiple ways. For example, the former were more likely to be conducted outside the US, with 61.1 % of articles

conducted outside the US only measuring religious affiliation, as compared to only 4.2 % of studies conducted within the US ($p < .001$). Most studies conducted in Africa only compared outcomes of participants according to religious affiliation ($n = 44$, 72.1 %). Each of the four articles that considered countries rather than individuals as the unit of analysis described countries by their predominant religious denomination and did not describe religiosity.

Fifty-seven studies examined how sexual HIV risk varied according to religious affiliation, without measuring religiosity. As observed in Table 1, of 57 studies, 42 included participants who were designated as Muslims, 32 as Christians (including 3 as Orthodox), 27 as Catholics, 24 as Protestants, and 13 as ‘Traditional’ [11] or ‘Indigenous’ (two), all of which were conducted in Africa. Forty-one had designations beyond these categories, primarily ‘other’ or ‘other and none’ but nine studies identified other Christian faiths, five included the Hindu religion, three included Judaism, and Buddhist, Animist, and Agnostic affiliations were included in one study each. This review will compare studies according to the affiliations described.

Study outcomes included an examination of how affiliation is associated with condom use ($n = 24$), HIV positive status or prevalence ($n = 19$), having multiple partners or a partner outside of the primary relationship ($n = 17$), sexual initiation ($n = 10$), having sex with a commercial sex worker ($n = 9$), sexual experience ($n = 6$), STI prevalence or symptoms ($n = 4$), and other outcomes ($n = 9$), including general risk indicators. Over half of the studies in this group measured multiple sexual risk outcomes ($n = 29$, 52.7 %).

Fifty-one of the 57 studies found a particular religious affiliation to be associated with reduced sexual risk ($n = 31$), increased risk ($n = 10$), or both reduced and increased risk (through different pathways) ($n = 10$) for acquiring HIV. Six studies found no association between affiliation and sexual HIV risk (see Table 1). Protective effects were found within the following affiliations: Muslim ($n = 16$), Christian ($n = 4$), Protestant ($n = 3$), Catholic ($n = 2$), Muslim and Hindu ($n = 2$), Muslim and Christian ($n = 1$), Muslim and Traditional ($n = 1$), Evangelical ($n = 1$), and among those with any affiliation ($n = 1$). The remaining articles found risk associated with the Muslim ($n = 4$), Christian ($n = 3$), ‘Traditional’ ($n = 2$), or Catholic ($n = 1$) affiliations.

Of the ten studies reporting both protection and sexual risk as associated with a religious affiliation, five described an association of sexual risk and protection with being Muslim, four with being Christian, and one described protection as associated with Christianity and risk as associated with any affiliation. Of these ten studies, five reported that affiliation was protective in regards to some outcomes but was associated with lower rates of condom

Table 1 Religious affiliation only ($n = 57$)

First author	Location	Sample	N	Muslim	Christian	Catholic	Protestant	Traditional	Other
Oyediran [41]	Nigeria	M [15–24]; C ^a	827	×	×			×	
Mberu [18]	Nigeria	F/M (15–24, never married); C	48,000	×	×	×	×	×	×
Banandur [42]	India	F/M [15–49]; C	13,026	×					×
Hunter [43]	Haiti	F [15–49]; C	10,159			×			×
James [44]	Canada	F/M (unmarried, university students); C	666	×	×	×			×
Muula [27]	Malawi	F (ever married); C	1,664	×	×	×	×		×
Dubois-Arber [45]	Switzerland	M (18–70, at medical outpatient clinics); C	1,431	×		×	×		×
Wand [46]	South Africa	F; C	5,753		×				
Noden [47]	Mozambique	F/M (12–28, unmarried); C	522	×		×	×		×
Maticka-Tyndale [48]	Kenya	F/M (grade 6/7, sexually experienced); C	3,645			×	×		×
Gyimah [49]	Ghana	M [15–49]; C	5,015	×	×			×	
Sambisa [50]	Zimbabwe	F/M (15–24, never married); C	5,103		×			×	×
Lazarus [51]	Europe	F/M [15]; C	28,306		×	×			
Noden [25]	Mozambique	F/M (15–49, ever married); C	847	×		×	×		×
Thomas [52]	India	M (who have sex with men); C	210	×	×				×
Nattrass [26]	Africa	Countries; C		×			×		
Hubbard [53]	Guyana	F/M [15–49]; C	4,300	×	×				×
Frank [54]	South Africa	F/M (grade 10); C	805		×			×	
Gerber [55]	Russia	F/M; L	6,517	×	×				×
Ehon [30]	Nigeria	F/M (18–30, University students); C	200	×	×			×	×
Koffi [19]	Cote d'Ivoire	F/M (15–24, never married); C	3,014	×	×	×	×		×
Carter [56]	Botswana	F/M [15–49]; C	807		×			×	×
Hallett [57]	Zimbabwe	F/M; C	9,086			×		×	×
Nishimura [39]	Mauritius	F/M [15–24]; C	1,200	×	×				×
Talukdar [58]	India	M (18–49, homeless); C	485	×					×
Kobori [29]	Thailand	F/M [15–54]; C	566		×				×
Soldan [59]	Malawi	M [20–44]; C	715	×	×				×
Velayati [12]	Africa	Countries; C	40	×					×
Lawal [60]	Nigeria	M (alcohol drinkers); C	239	×	×				
Agha [61]	Zambia	F [13–20]; L	5,534		×	×	×		×
Drain [62]	Global	Countries; C	118	×	×				
Kongnyuy [63]	Cameroon	M (15–59, sexually active); C	4,409	×			×		×
Mitsunaga [64]	Nigeria	M/F; C	1,153	×		×	×	×	×
Langeni [65]	Botswana	M [15–64]; C	216,000		×				
Mekonnen [66]	Ethiopia	Factory workers; C	1,679	×	×	×	×		×
Lagarde [67]	Burkina Faso	F [15–24], M [20–34]; C	2,364	×	×				×

Table 1 continued

First author	Location	Sample	N	Muslim	Christian	Catholic	Protestant	Traditional	Other
Gray [11]	Africa	Countries; C	38	×					×
Hill [68]	Brazil	M [15–59]; C	1,667			×			×
Takyi [69]	Ghana	F; C	4,843	×	×	×	×	×	×
Abebe [70]	Ethiopia	M (army recruits); C	72,000	×	×	×			
Kapiga [71]	Tanzania	F [15–49], M [15–59]; L	7,027	×	×	×	×		×
Hawken [72]	Kenya	F/M [15–49]; C	1,497	×	×				×
Todd [73]	Tanzania	F/M [15–54]; I	12,586	×		×	×	×	
Takyi [74]	Ghana	M; C	1,546	×		×	×	×	×
Mbulaitaye [23]	Uganda	F/M (sexually active); C	2,374	×	×				
Bailey [75]	Uganda	M; C	368	×		×	×		
Rakwar [76]	Kenya	Trucking company employees; C	752	×		×	×		×
Lugoe [77]	Tanzania	F/M (secondary school students); C	852	×		×	×		×
Cooksey [78]	US	F [10–19]; L	8,000			×	×		×
Mnyika [79]	Tanzania	F; C	567	×	×				
Buga [80]	South Africa	F (adolescents); C	1,072			×	×		
Shabbir [81]	Ethiopia	M; C	561	×	×		×		×
Nunn [82]	Uganda	F/M (13+); C	5,278	×		×			×
Malamba [83]	Uganda	F*M; L	293	×					×
Duncan [84]	Ethiopia	F (attending family planning clinics); C	1,831	×	×				
Isiugo-Abanihe [33]	Nigeria	M (<60, currently married), plus wives; C	5,000	×		×	×	×	×
Flaskerud [85]	California	F (WIC client); C	712			×	×		×
First author	Condom use	Positive status/prevalence	Extra/multiple partner	Sexual initiation	Commercial sex	Sexual experience	STI/symptoms	Other	Finding
Oyediran [41]	×			×		×			Muslim-protective and risk (later sexual debut, more activity once started, lower condom use)
Mberu [18]				×					Muslim-protective (less likely to have premarital sex)
Banandur [42]		×			×				Muslim-protective among men (lower prevalence than non-Muslims) and risk among men (more likely to have paid for sex). Risk among women (higher prevalence).
Hunter [43]	×		×						Catholic-risk (higher rates of extra-union encounters)
James [44]	×						×		Muslims/Eastern religion-protective (less likely to have had unprotected sex)
Muula [27]	×	×	×						No association

Table 1 continued

First author	Condom use	Positive status/prevalence	Extra/multiple partner	Sexual initiation	Commercial sex	Sexual experience	STI/symptoms	Other	Finding
Dubois-Arber [45]	×		×						Having affiliation-protective
Wand [46]		×							Christian-risk
Noden [47]	×			×				×	Christian/African Independent Church-mixed among men (later sexual debut, less likely to use condoms)
Maticka-Tyndale [48]	×								Catholic-protective among men
Gyimah [49]			×		×				Muslim/traditional-protective (less risky sexual behavior)
Sambisa [50]	×		×	×					Christian-protective among men, Christian/Apostolic-protective among women (more likely to abstain)
Lazarus [51]	×								Catholic-protective (more likely to use condoms)
Noden [25]	×		×				×		Catholic and Protestant-risk (more casual sex when compared to other Christians), Protestant-protective (higher condom use with non-regular partners)
Thomas [52]	×	×							No association
Nattrass [26]		×							Muslim-protective
Hubbard [53]			×	×					Hindu-protective, Muslim-protective (Both more likely to be faithful. Hindus more likely than Christians to abstain)
Frank [54]								×	Christian-protective
Gerber [55]	×								Muslim-risk among women (less likely to use condoms)
Ehon [30]	×							×	No association
Koffi [19]				×		×			Christian and Muslim-protective (more likely to abstain)
Carter [56]			×						Christian-protective
Hallett [57]				×				×	Traditional-risk (higher likelihood of having had sexual initiation)
Nishimura [39]									Hindu/Muslim-protective (less sexual experience)
Talukdar [58]		×	×		×	×			Muslim-protective and risk (higher rates of multiple partners, visits to sex workers, but prevalence higher among Hindus)
Kobori [29]			×		×				Christian-risk (more likely to have had premarital sex)
Soldan [59]	×		×		×				Muslim-risk (higher number of sex partners)
Velayati [12]		×							Muslim-protective

Table 1 continued

First author	Condom use	Positive status/prevalence	Extra/multiple partner	Sexual initiation	Commercial sex	Sexual experience	STI/symptoms	Other	Finding
Lawal [60]	×				×				No association
Agha [61]	×			×					Seventh day Adventist/Jehovah's Witness-protective and risk (later sexual debut, less likely to have used condoms during first sex)
Drain [62]		×							Muslim-protective
Kongnyuy [63]	×		×		×				Muslim-protective and risk (later sexual initiation, fewer partners, more likely to have paid for sex)
Mitsunaga [64]			×						Muslim-protective among men (less likely to have had extramarital sex)
Langeni [65]							×		Christian-protective
Mekonnen [66]		×							Orthodox Christian-risk
Lagarde [67]		×							Muslim-protective among women
Gray [11]		×							Muslim-protective
Hill [68]	×		×						Evangelical-protective among men (less likely to have had extramarital sex, fewer partners, higher condom use)
Takyi [69]	×		×					×	Christian (including Protestants and Catholics)-protective. Having affiliation-risk (lower condom use)
Abebe [70]		×							Muslim-protective
Kapiga [71]								×	Muslim-risk
Hawken [72]	×	×				×			Muslim-protective
Todd [73]							×		other/Traditional-risk among men (higher prevalence)
Takyi [74]	×							×	Protestant-protective
Mbulaiteye [23]		×							Muslim-protective
Bailey [75]	×								Muslim-protective and risk (later sexual debut, fewer extramarital partners, less likely to use condoms)
Rakwar [76]		×			×				Muslim-protective
Lugoe [77]						×			Muslim-protective (less likely to be sexually active)
Cooksey [78]				×					Protestant-protective (later sexual debut)
Mnyika [79]		×	×	×					No association
Buga [80]								×	No association
Shabbir [81]	×				×				Muslim-risk, among farmers
Nunn [82]		×							Muslim-protective
Malamba [83]		×							Muslim-protective

Table 1 continued

First author	Condom use	Positive status/prevalence	Extra/multiple partner	Sexual initiation	Commercial sex	Sexual experience	STI/symptoms	Other	Finding
Duncan [84]		×					×		Muslim-protective (lower STD prevalence)
Isiugo-Abanihe [33]			×						Protestant and Pentecostal-protective among men, Catholic and Indigenous-risk among men
Flaskerud [85]								×	Protestant-protective (positive practices)

^a C cross sectional, L longitudinal, I intervention study

use. Among the other five, two found affiliation to be associated with lower prevalence but higher risk, one found the same affiliation to be associated with later sexual initiation and fewer sexual partners but a higher likelihood of paying for sex, and two identified some affiliations to be associated with lower risks and others with higher risks. One study also identified Islam to be associated with a lower prevalence among men but higher prevalence among women (see Table 1).

Religiosity and Sexual HIV Risk ($n = 48$ Studies)

Articles exploring differences in sexual risk by religiosity without specifying the religious affiliation of the sample were predominantly conducted in the US, with 72.9 % ($n = 35$) of studies conducted in the US only examining religiosity. Studies with youth or young adults only were also more likely to only consider religiosity ($p < .001$) and to be conducted in the US ($p < .01$) when compared to studies with mixed or adult only samples.

Forty-eight papers examined how sexual risk for HIV varied according to religiosity without describing the religious affiliation of the sample. Religiosity was defined in various ways. The most frequently used marker of religiosity was attendance or participation in religious services ($n = 28$). Other commonly used indicators included the importance of religion in respondent's lives ($n = 11$), how religious they were ($n = 7$), how religion played a role in their upbringing or childhood ($n = 4$), and the influence of religion on their behavior ($n = 4$). Other indicators were also common ($n = 19$), with nine using religiosity scales adapted or obtained from various sources. Two of the nine articles cited the same scale [152]. More than half of the studies in this group included more than one indicator of religiosity ($n = 35$). A few also reported measuring religion but did not specify the name of the affiliation, or referred to a denomination without specifying that the sample identified with this affiliation.

Sexual HIV risk outcomes analyzed in studies focused on religiosity included condom use ($n = 21$), having multiple partners ($n = 14$), sexual initiation ($n = 9$), a general sexual risk indicator or composite ($n = 15$), and other outcomes ($n = 14$), with 20 studies considering multiple of these outcomes. Of those in the 'other' category, two included accessing commercial sex, one considered HIV seropositive status, and no studies considered STI status or symptoms.

Findings are reported in Table 2. Most studies found religiosity to be protective, with participants who were more religious experiencing lower levels of sexual risk ($n = 30$). Another eight studies found religiosity to have no association with risk, five found religiosity to be associated with increased sexual HIV risk, and three cited

Table 2 Religiosity Only (*n* = 48)

First author	Location	Sample, study type	N	How religious?	Importance	Attend/participate	Upbringing	Influence on behavior
Dowshen [35]	US	F (16–25, transgender); C ^a	92			×		
Udell [38]	US	F (adolescents, in psychiatric care, sexually active, plus caregivers); L	80		×	×		
Stulhofer [86]	Croatia	F/M (college freshman); L	1,355				×	
Boyd-Starke [87]	US	F/M (students, African American); C	256			×		
Wuoth [88]	US	F/M (50+, African American); C	33					
Voetsch [89]	US	F (18–29, black); C	2,705	×		×		
Golub [90]	US	F (transgender); C	75					
Tung [37]	Taiwan	F/M (college students); C	996	×				
Agardh [91]	Uganda	F/M (college students); C	980				×	
Wagner [92]	Uganda	F/M (HIV+); L	272			×		
Washington [93]	US	M (college freshman, historically black schools); C	1,865		×			
Bakare [94]	Nigeria	F/M (adolescents, bipolar); L	46			×		
Stulhofer [95]	Croatia	F/M [18–24]; C	1,093			×	×	
Voisin [96]	US	F/M (youth, incarcerated); C	559			×		
Weiss [97]	US	F/M (heroin injectors); C	600	×		×		×
Obiaja [20]	US	F/M (18–39, single, minority); C	1,966	×		×		
Nnedu [98]	Jamaica	F/M (attending STI clinic); C	212					
Villarruel [99]	US	F/M (adolescents, Latino); I	233			×		
Broman [100]	US	F/M (adolescents, black); L	1,044			×		
Margolis [36]	US	M (18–29, incarcerated); C	550			×		
Lewis [101]	US	F/M (10–14, heterosexual, African American and Latino); L	220					
Dodge [102]	US & the Netherlands	M (college students); C	369		×			
Raffaelli [103]	US	F (college students, Cuban American); C	61	×		×		
Ross [16]	US	M (18–26, homosexual); C	100					
Elifson [104]	US	F (adults); C	250			×		×
Wayment [105]	US	F (white); C	260			×		×
Avants [106]	US	F/M (patients on methadone); C	34	×				
Bachanas [107]	US	F (12–19, minority); C	164	×		×		
Jemmott [108]	US	F/M (college students, Latino); C	199			×		
Fierros-Gonzales [109]	US	F/M (college students, Mexican-American); C	316			×		
Abdullah [110]	Hong Kong	F/M (attending STD clinic); C	448					
Paradise [17]	US	F (14+, attending urban adolescent clinic); C	197					

Table 2 continued

First author	Location	Sample, study type	N	How religious?	Importance	Attend/participate	Upbringing	Influence on behavior
Braithwaite [111]	US & Jamaica	F (college students, African American and Caribbean); C	132					
Langer [112]	US	F/M (college students); C	338		×			
Whitaker [113]	US & Puerto Rico	F/M [14–16]; C	907		×	×		
Paul [114]	New Zealand	F/M [21]; L	926			×		
Simeon [115]	Jamaica	M [15–50]; C	2,580	×		×		
Hines [116]	US	F (African American); L	533		×			
Lugoe [117]	Tanzania	F/M (secondary students, sexually active); C	528		×			
Reitman [118]	US	F/M (12–19, African American); C	312			×		
Lugoe [119]	Tanzania	F/M (15–19, secondary students); C	657			×		
Neff [120]	US	F/M (adults, who drink alcohol); L	1,392			×		×
Caetano [121]	US	F/M (adults); C	1,919		×			
Murstein [122]	US	F/M (students); L	246				×	
Dunne [123]	Australia	F/M (college students); C	374		×			
Seidman [124]	US	F [15–44]; L	8,450			×		
Langer [125]	US	F/M (10th grade students); L	2,649		×	×		
Baldwin [126]	US	F/M (college students, sexually active); C	513			×		
First author	Other	Condom use	Extra/multiple partner	Sexual initiation	Sexual risk	Other	Finding	
Dowshen [35]	×	×	×			×	Protective	
Udell [38]	×	×	×				Protective (mother's attendance associated with condom use among adolescents)	
Stulhofer [86]	×	×	×	×		×	Both (among women, and men in 1998 only, religious upbringing associated with lower likelihood of sexual initiation. Personal religiosity associated with lower sexual literacy)	
Boyd-Starke [87]	×				×		Protective	
Wutoh [88]	×				×		Protective	
Voetsch [89]						×	Protective (less likely to have had sex with a bisexual man)	
Golub [90]	×	×					Risk (religious behaviors/beliefs associated with unprotected anal sex)	
Tung [37]		×					Protective (more likely to use condoms)	

Table 2 continued

First author	Other	Condom use	Extra/multiple partner	Sexual initiation	Sexual risk	Other	Finding
Agardh [91]			×	×			Both (among men with low trust, higher religiosity associated with higher likelihood of having had sex. Among women, higher religiosity associated with lower number of partners)
Wagner [92]		×					Protective
Washington [93]		×					Protective (more likely to always use condoms)
Bakare [94]					×		Protective
Stulhofer [95]	×				×		None
Voisin [96]	×				×	×	None
Weiss [97]		×				×	None
Obiaja [20]		×	×	×		×	Both (more frequent attendance associated with a higher likelihood of abstaining. Among sexually active, more frequent attendance associated with lower likelihood of using condoms and being tested for HIV)
Nnedu [98]	×	×					Risk (belonging to a religious organization associated with a lower likelihood of using condoms during last sex)
Villarruel [99]		×					Protective (among women, more likely to have used condoms in past 3 months)
Broman [100]				×			None
Margolis [36]		×	×				Protective (less likely to report unprotected sex with multiple partners)
Lewis [101]	×					×	Protective (spirituality associated with a lower likelihood of engaging in individual sexual possibility situations, family prayer associated with lower likelihood of oral, anal, or vaginal sex)
Dodge [102]		×				×	Risk (less likely to use condoms, more likely to unintentionally impregnate)
Raffaelli [103]					×		Protective (less likely to be sexually active and engage in risky sexual behavior)
Ross [16]	×	×					Significant (when one's religion was seen as viewing gay sex negatively, less likely to engaged in unprotected anal sex)

Table 2 continued

First author	Other	Condom use	Extra/multiple partner	Sexual initiation	Sexual risk	Other	Finding
Elifson [104]		×			×		Protective
Wayment [105]		×					Risk (more likely to feel condoms are ineffective, which related to unintended pregnancy)
Avants [106]	×				×		Protective
Bachanas [107]			×		×	×	Protective among older teens (fewer partners)
Jemmott [108]		×					Protective (more likely to intend to use condoms and report condom use at most recent anal sex)
Fierros-Gonzales [109]	×	×					None (more likely to feel premarital sex is a sin, but doesn't affect behavior)
Abdullah [110]	×					×	Protective (those with religious beliefs less likely report casual sex)
Paradise [17]	×					×	Meaningful for some, especially among those who had never had sex
Braithwaite [111]	×				×		Protective (more likely to have positive HIV attitudes and sexual communication)
Langer [112]							Protective
Whitaker [113]			×	×	×		Protective (more likely to expect to delay sexual activity)
Paul [114]				×			Protective (among men, less likely to have sex at an early age)
Simeon [115]			×				None
Hines [116]			×		×		Risk (more likely to have multiple partners)
Lugoe [117]		×			×	×	Protective
Reitman [118]		×					None
Lugoe [119]					×		Protective
Neff [120]	×				×		Protective
Caetano [121]			×				Protective
Murstein [122]	×			×			Protective (more likely to have never had sex)
Dunne [123]		×	×	×			Protective (less likely to report having had sex)

Table 2 continued

First author	Other	Condom use	Extra/multiple partner	Sexual initiation	Sexual risk	Other	Finding
Seidman [124]			×				Protective (never married whites: having affiliation associated with fewer partners. Divorced/separated blacks: attending associated with fewer partners)
Langer [125]	×			×		×	Protective (more likely to have positive attitudes regarding own sexuality, lower likelihood of having had sex)
Baldwin [126]		×	×			×	None

^a C cross sectional, L longitudinal, I intervention study

religiosity as being associated with both an increase and decrease in risk. Of the three that found both risk and protective results, one found religiosity to be associated with risk for some men and protection for women; another found attendance to be associated with abstinence, but among sexually active participants, attendance was associated with lower levels of condom use; and the third found a religious upbringing to be associated with a lower likelihood of sexual initiation as well as lower sexual literacy. Four of the five studies that identified religiosity as a risk factor found religiosity to be associated with lower levels of condom use. Two studies did not fit this framework of religiosity relating to risk or protection: one reported an association between ‘what one’s religion says about gay sex’ and risk behavior [16] and another described increased relevance of religion among participants who had not had sex [17].

Both Religiosity and Affiliation (n = 32 Studies)

Thirty-two studies included measures of both religious affiliation and religiosity. As presented in Table 3, 19 studies presented results regarding participants who were Catholic. An equal number included Muslim ($n = 13$) and Protestant ($n = 13$) participants, and nine included Christian participants. Most studies ($n = 25$) included other categories as well, such as ‘none’ or no religion ($n = 10$), ‘other’ ($n = 9$), other Christian denominations ($n = 8$), Jewish ($n = 4$), Buddhist ($n = 2$), ‘African traditional’ ($n = 1$), and Animist ($n = 1$).

Religiosity was measured by frequency of attendance or participation in religious services ($n = 17$), the importance of religion in participants’ lives ($n = 8$), how religious they considered themselves to be ($n = 6$), the influence of religion on their behavior ($n = 6$), and the role of religion in their upbringing ($n = 2$). Many studies ($n = 15$) considered other indicators, and 17 included more than one measure of religiosity. Five included different measures used by other researchers.

Sexual risk behaviors considered in these studies included condom use ($n = 13$), sexual initiation ($n = 10$), having multiple or extra partners ($n = 8$), a general sexual risk indicator ($n = 4$), or another indicator ($n = 13$). Thirteen studies included more than one indicator.

Most studies in this group described findings related to religiosity ($n = 31$), and ten also reported differences according to religious affiliation. Religiosity was found to be associated with lower levels of sexual HIV risk in 22 studies, associated with higher risk in three, associated with both increased and decreased risk in one, and was not significant in five studies. Results on the influence of religious affiliation were mixed, with reduced levels of sexual risk associated with being Catholic ($n = 2$), non-Catholic

Table 3 Religiosity and Affiliation ($n = 32$)

First author	Location	Sample coded	N	Muslim	Catholic	Protestant	Christian	Other	How religious?	Importance
Feldman [127]	Israel	F/M (18–25, defense force discharges); L	13, 988					×		
Scorgie [28]	South Africa	F; C	867		×	×	×	×		
Alavi [22]	Iran	M (attending infectious disease clinic); C	1,199	×						
Muula [128]	Malawi	F; C	1,157		×		×			
Gillum [129]	US	F/M [15–44]; C	9,837		×	×	×			×
Coleman [31]	US	M (HIV + African American); C ^a	130				×	×		×
Aniebue [130]	Nigeria	M (long-distance truck drivers); C	116	×			×		not included	
Kabiru [131]	Kenya	F/M (high school students); C	3,556	×	×	×	×			×
Shirazi [32]	Iran	F/M (college students); C	200	×						
Sharkshall [132]	Israel	F/M (high school students); C	4,609					×		
Tavares [133]	Cape Verde	F/M [13–17]; C	768		×			×		
Trinitapoli [134]	Malawi	F/M [15–29] and F (15–49, ever married, and their husbands); L	3,386	×	×	×				
Belza [135]	Spain	M [18–29]; C	5,153		×					
Gilbert [21]	Senegal	F/M (college students); C	234	×						
Cerqueira-Santos [136]	Brazil	F/M [12–24]; C	1,013		×	×	×			×
Iyaniwura [137]	Nigeria	F/M (in mandatory post-tertiary national service program); C	376	×			×	×		
Manji [138]	Nicaragua	F/M (adolescents); C	246		×					
Galvan [139]	US	F/M (In HIV treatment); C	1,421		×		×	×		×
Odimegwu [140]	Nigeria	F/M (10–24, campus based); C	1,153	×			×	×		×
Hasnain [141]	US	F/M (active IDUs); C	880	×			×	×		×
Lefkowitz [142]	US	F/M (college students); C	205	×	×	×	×	×		
Allain [143]	Ghana	F/M (donors); C	299	×			×	×		
McCree [144]	US	F (adolescent, African American); C	522	×	×	×	×	×		
Koniak-Griffin [34]	US	F (adolescent mothers, minority); L	572		×			×		
Miller [145]	US	F (adolescent); L	3,356				×			
Campbell [24]	South Africa	F/M [13–60]; C	1,211			×		×		
Grunseit [146]	Australia	F/M (15–24, college students); C	4,055		×	×	×			×
Lagarde [67]	Senegal	F/M [15–59]; C	858	×	×	×	×			×
Shapiro [147]	US	F/M (college students); C	319		×	×	×		×	
Davis [148]	New Zealand	F/M [18–54]; C	2,361		×	×	×			

Table 3 continued

First author	Location	Sample coded	N	Muslim	Catholic	Protestant	Christian	Other	How religious?	Importance
Lacson [149]	Philippines	F/M (college students); C	1,355	×	×	×	×	×	×	×
Anderson [150]	US	F [15–44]; L	8,450	×	×	×	×	×	×	×
First author	Attend/ participate	Upbringing	Influence on behavior	Other	Condom use	Extra/ multiple partner	Sexual Initiation	Sexual risk	Other	Findings
Feldman [127]				×	×					Protective (more likely to use condoms consistently)
Scorgie [28]								×		Protective (less likely to use harmful vaginal practices)
Alavi [22]				×				×		Protective (those respecting religious rites have lower odds of having urethritis)
Muula [128]	×			×	×			×		None
Gillum [129]	×	×						×		Protective (among women, attending associated with lower risk. Having affiliation-protective among women. Mainline Christian-protective among men.
Coleman [31]				×						Protective (more likely to have higher condom use self-efficacy)
Aniebue [130]					×					Risk (reason cited by some for not using condoms)
Kabiru [131]	×							×		Protective (among men, less likely to report sexual activity)
Shirazi [32]					×			×		Protective (higher religious score associated with less sexual contact, greater self-efficacy, more positive attitude towards delaying sex until marriage)
Shtarkshall [132]		×						×		Traditional family background-mixed (girls had less sex, boys had more, when compared to secular)
Tavares [133]	×						×			None. Non-Catholic-protective among boys.

Table 3 continued

First author	Attend/ participate	Upbringing	Influence on behavior	Other	Condom use	Extra/ multiple partner	Sexual Initiation	Sexual risk	Other	Findings
Trinitapoli [134]	×		×	×	×	×	×			Protective (youth attending where church leader privately advises to use condoms, more likely to use condoms and to abstain). Non-Muslim-protective (more likely to abstain, more likely to report being faithful).
Belza [135]				×	×				×	Risk (those practicing religion more likely to pay for sex)
Gilbert [21]			×	×	×	×	×			Protective (higher likelihood of abstaining)
Cerqueira-Santos [136]	×			×	×		×			Protective (less likely to have had sexual debut)
Iyaniwura [137]					×		×			Protective (reason for abstaining, cited by primary and secondary abstiners)
Manji [138]	×		×						×	None
Galvan [139]	×			×	×	×		×		Protective (associated with fewer sexual partners, condom use, and low risk sex). Catholic-protective (fewer partners, higher condom use, less high-risk sex)
Odimegwu [140]	×			×			×		×	Protective (less likely to have initiated sex). Orthodox Christian-protective (less likely to have had sexual debut than Pentecostals)
Hasnain [141]									×	None
Lefkowitz [142]	×		×			×	×			Protective (attendance associated with fewer lifetime partners and less fear about HIV). Catholic-protective (fewer lifetime partners than Protestants)
Allain [143]	×		×						×	Protective (having a formal church role and attending for more than 10 years associated with lower rate of infection). Converting between Christian denominations-associated with increased HIV infection
McCree [144]	×			×	×			×		Protective

Table 3 continued

First author	Attend/ participate	Upbringing	Influence on behavior	Other	Condom use	Extra/ multiple partner	Sexual Initiation	Sexual risk	Other	Findings
Koniak-Griffin [34]	×				×					Risk (attendance associated with higher unprotected sex)
Miller [145]	×			×		×			×	None (devotion and attendance associated with sexual responsibility and anticipation of suffering, but not with sexual activity)
Campbell [24]	×					×				Protective (among men, belonging to a church associated with lower likelihood of having casual partners)
Grunseit [146]	×						×			Protective (those who attended, even once a year or less, likely to commence intercourse later)
Lagarde [67]						×				Both (men considering religion very important less likely to feel at risk of getting HIV, more likely to have heard of condoms. Women less likely to intend to change to protect themselves, more likely to agree condoms are forbidden). Muslim-protective among men (more likely to be or intend to be faithful than Christians)
Shapiro [147]					×	×				Protective
Davis [148]				×			×			Protective (those with affiliation reported sexual events at a later age)
Lacson [149]	×						×			Protective (reason mentioned for remaining abstinent). Non-Catholic-protective among girls (more likely to abstain)
Anderson [150]				×					×	Protective (those with affiliation less likely to report experiencing Gonorrhea)

^a C cross sectional, L longitudinal, I intervention study

Table 4 Mechanisms ($n = 68$)

First author	Study type ^a	Years	Location	N	Finding	Mechanisms
Mberu [18]	1	2011	Nigeria	48,000	Muslim-protective	Behavior norms, sharia law
Banandur [42]	1	2011	India	13,026	Muslim-protective among men. Risk among women	Circumcision
James [44]	1	2011	Canada	666	Muslims/Eastern religion-protective	Beliefs and behavior norms
Muula [27]	1	2011	Malawi	1,664	No association	Behavior norms (similar in promoting condom use)
Dowshen [35]	2	2011	US	92	Protective	Social organization and support
Udell [38]	2	2011	US	80	Protective	Social organization and support
Scorgie [28]	3	2011	South Africa	867	Protective	Beliefs and behavior norms
Maticka-Tyndale [48]	1	2010	Kenya	3,645	Catholic-protective among men	Information, motivation, and behavioral skills, as well as community level influences
Gyimah [49]	1	2010	Ghana	5,015	Muslim/traditional-protective	Beliefs and behavior norms
Noden [47]	1	2010	Mozambique	522	Christian/African Independent Church-mixed among men	Behavior norms
Voetsch [89]	2	2010	US	2,705	Protective	Communication between sex partners regarding risk
Golub [90]	2	2010	US	75	Risk	Social support and behaviors/beliefs
Tung [37]	2	2010	Taiwan	996	Protective	Social organization and behavior norms
Agardh [91]	2	2010	Uganda	980	Both	Gender roles
Alavi [22]	3	2010	Iran	1,199	Protective	Behavior norms
Gillum [129]	3	2010	US	9,837	Protective	Social involvement, class, ethnicity
Coleman [31]	3	2009	US	130	Protective	Beliefs and values
Noden [25]	1	2009	Mozambique	847	Catholic and Protestant-risk, Protestant-protective	Behavior norms
Nattrass [26]	1	2009	Africa		Muslim-protective	Behavior norms. Circumcision may play a role
Hubbard [53]	1	2009	Guyana	4,300	Hindu-protective, Muslim-protective	Social organization maintaining beliefs and values
Shirazi [32]	3	2009	Iran	200	Protective	Beliefs and behavior norms
Tavares [133]	3	2009	Cape Verde	768	Non-Catholic-protective among boys.	Beliefs and values
Trinitapoli [134]	3	2009	Malawi	3,386	Protective. Non-Muslim-protective	Beliefs, messages about AIDS, congregation characteristics
Frank [54]	1	2008	South Africa	805	Christian-protective	Beliefs and behavior norms
Gerber [55]	1	2008	Russia	6,517	Muslim-risk among women	Beliefs and behavior norms
Ehon [30]	1	2008	Nigeria	200	No association	Behavior norms
Koffi [19]	1	2008	Cote d'Ivoire	3,014	Christian and Muslim-protective	Behavior norms
Obiaja [20]	2	2008	US	1,966	Both	Behavior norms, beliefs and values
Nnedu [98]	2	2008	Jamaica	212	Risk	Behavior norms
Gilbert [21]	3	2008	Senegal	234	Protective	Behavior norms
Nishimura [39]	1	2007	Mauritius	1,200	Hindu/Muslim-protective	Social influence, difference in living situation
Talukdar [58]	1	2007	India	485	Muslim-protective and risk	Circumcision
Kobori [29]	1	2007	Thailand	566	Christian-risk	Behavior norms
Soldan [59]	1	2007	Malawi	715	Muslim-risk	Polygamy

Table 4 continued

First author	Study type ^a	Years	Location	N	Finding	Mechanisms
Velayati [12]	1	2007	Africa	40	Muslim-protective	Social influence, behavior norms
Lawal [60]	1	2007	Nigeria	239	No association	Alcohol use
Galvan [139]	3	2007	US	1,421	Protective. Catholic-protective	Concern for others, moral reasoning, conformism
Drain [62]	1	2006	Global	118	Muslim-protective	Circumcision
Margolis [36]	2	2006	US	550	Protective	Social organization and support
Lewis [101]	2	2006	US	220	Protective	Behavior norms
Mitsunaga [64]	1	2005	Nigeria	1,153	Muslim-protective among men	Behavior norms
Dodge [102]	2	2005	US & the Netherlands	369	Risk	Education
Hasnain [141]	3	2005	US	880	None	Beliefs
Hill [68]	1	2004	Brazil	1,667	Evangelical-protective among men	Social image, choice to convert
Ross [16]	2	2004	US	100	Significant	Beliefs and values
Lefkowitz [142]	3	2004	US	205	Protective. Catholic-protective	Behavior norms, negative sanctions, fears about HIV
Allain [143]	3	2004	Ghana	299	Protective. Converting between Christian denominations-associated with increased HIV infection	Social, divine, moral pressures
Takyi [69]	1	2003	Ghana	4,843	Christian-protective. Having affiliation-risk	Social influence, difference in living situation. Beliefs and values. Religiosity may influence feeling of risk
Elifson [104]	2	2003	US	250	Protective	Trusted community initiatives
Avants [106]	2	2003	US	34	Protective	Behavior norms
Koniak-Griffin [34]	3	2003	US	572	Risk	Beliefs and behavior norms
Kapiga [71]	1	2002	Tanzania	7,027	Muslim-risk	Beliefs related to Polygamy, behavior norms
Campbell [24]	3	2002	South Africa	1,211	Protective	Beliefs and behavior norms, confidence
Takyi [74]	1	2001	Ghana	1,546	Protestant-protective	Beliefs and behavior norms
Mbulaiteye [23]	1	2000	Uganda	2,374	Muslim-protective	Behavior norms
Paul [114]	2	2000	New Zealand	926	Protective	Beliefs and values
Lagarde [67]	3	2000	Senegal	858	Both. Muslim-protective among men	Confidence, submission, awareness of AIDS
Bailey [75]	1	1999	Uganda	368	Muslim-protective and risk	Circumcision
Rakwar [76]	1	1999	Kenya	752	Muslim-protective, 'other'-risk	Circumcision
Lugoe [77]	1	1996	Tanzania	852	Muslim-protective	Behavior norms
Mnyika [79]	1	1996	Tanzania	567	No association	Circumcision
Lugoe [119]	2	1995	Tanzania	657	Protective	Behavior norms
Neff [120]	2	1995	US	1,392	Protective	Beliefs and values related to sexuality
Nunn [82]	1	1994	Uganda	5,278	Muslim-protective	Circumcision

Table 4 continued

First author	Study type ^a	Years	Location	N	Finding	Mechanisms
Malamba [83]	1	1994	Uganda	293	Muslim-protective	Circumcision
Duncan [84]	1	1994	Ethiopia	1,831	Muslim-protective	Behavior norms
Isiugo-Abanihe [33]	1	1994	Nigeria	5,000	Protestant and Pentecostal-protective among men, Catholic and Indigenous-risk among men	Beliefs and behavior norms
Seidman [124]	2	1992	US	8,450	Protective	Behavior norms

^a Study type 1 = articles considering religious affiliation only. Study type 2 = articles considering religiosity only. Study type 3 = articles considering religious affiliation and religiosity

($n = 2$), Christian or Orthodox Christian ($n = 2$), Muslim ($n = 1$), and non-Muslim ($n = 1$). Risk was associated with changing Christian denominations in one study, and in another, having a ‘traditional’ Jewish family background was associated with both risk and protection when compared a secular upbringing (see Table 3).

Differences Across Study Categories

Differences were apparent across the three conceptualizations of religion studied (affiliation only, religiosity only, both affiliation and religiosity). Whether a study considered religious affiliation or religiosity was primarily determined by study region. Studies conducted outside the US examined differences in sexual HIV risk outcomes according to religious affiliation, with nearly three quarters of studies in Africa considering participants only by affiliation, compared to less than 5 % of studies in the US. Alternately, a large group of studies ($n = 48$), most of which were conducted in the US, explored religiosity without describing the sample’s religious affiliation.

Among all studies that examined religiosity ($n = 80$), findings varied according to study region, participant age group, and the risk outcome considered. Approximately two thirds of studies reporting results regarding religiosity in Africa ($n = 18$) and the Americas ($n = 46$), and all studies in the Western Pacific ($n = 7$) and the Middle East ($n = 2$) found higher religiosity to be associated only with reduced sexual risk. Of the five studies reporting religiosity results in Europe, only one found higher religiosity to be associated with reduced risk.

Studies with youth were more likely to measure religiosity only and to be conducted within the US, when compared to studies with mixed or adult only samples. Additionally, studies tended to use different sexual risk outcomes according to participant age. Across the 137 studies, sexual initiation was more likely to be included as

a measure of sexual risk among youth and young adult samples (32.1 %, 17 out of 53 studies) when compared to mixed age or adult only samples (14.3 %, 12 out of 84, $p < .05$).

Over half of the studies that included condom use as an outcome found religiosity to be associated with lower levels of sexual risk (57.6 %, or 19 out of 33) while 71.1 % of studies (32 out of 45) that did not include condom use found religiosity to be protective. This difference was not significant as the .05 level ($p = .154$). Most studies that found religiosity to be associated only with increased sexual risk examined condom use as an outcome (77.8 %, or 7 out of 9), with six of these studies identifying an association between religiosity and lower rates of condom use, or feelings that condoms are ineffective.

Mechanisms of Sexual HIV Risk

Half of the studies ($n = 68$) included some description of the mechanisms that link religiosity or religious affiliation to sexual risk. Mechanisms were minimally described, generally without theoretical support. Most commonly, religion and religiosity were described as influencing sexual HIV risk through behavior norms or belief systems related to sexuality and sexual risk (see Table 4). Thirty-five studies described behavioral norms as influencing sexual risk. For example, studies attributed lower rates of sexual risk to an emphasis on premarital virginity or abstinence [18–21], restrictions on alcohol consumption [22, 23], norms of monogamy [24, 25], or to less tolerance of sexual freedom [26]. A few studies that did not find religion to have a protective effect on risk also identified behavioral norms as explaining associations, for example, attributing no association between religion and risk to the promotion of condom use at similar levels across affiliations [27] and citing deterioration in sexual sanctions due to the influx of Christianity (in rural Thailand) [29].

Studies emphasizing the mechanism of belief suggested religion leads to lower levels of sexual risk through decisions to avoid high-risk behaviors [31, 32]. Some studies ascribed risk to disregarding religious beliefs, suggesting that a failure to follow religious teachings led to risky behavior [33], while others pointed to risks of adhering to beliefs, positing that following religious convictions against condom use and planned sexual activity led to unprotected, unplanned sex [34].

Thirteen studies pointed to the role of social organization and social influence. For example, protective effects of religiosity were attributed to social support and connection that comes through participation and interaction in organized religious activities [35–37], fears of disclosing condemned activities [38], high social control [12], or living in an area with less exposure to alcohol and nightclubs [39].

Nine studies cited circumcision as a factor explaining differences or similarities in risk across affiliations; and an additional nine studies described another mechanism, such as communication between partners, gender roles, polygamy, alcohol use, or education.

Discussion

This systematic review suggests that both religiosity and religious affiliation influence sexual HIV risk in various ways. More than 40 % of studies in this review considered religious affiliation but not measures of religiosity. Approximately one third of studies addressed religiosity but did not report affiliation, and half of the studies reviewed did not examine potential mechanisms. Of those that described mechanisms linking religion and sexual HIV risk, major mechanisms identified included (1) behavior norms, (2) beliefs, and (3) social influence.

Results relating to religious affiliation suggest that engagement in sexual risk may vary according to religious affiliation. Protective effects were found most often among groups of people affiliated with Islam, however, most of these studies utilized HIV prevalence or seropositive status as the sexual risk outcome ($n = 14$), rather than indicating specific sexual risk behaviors. Although this leaves little evidence as to what aspects of religious affiliation may be associated with particular sexual risk behaviors, 35 of the studies that only examined religious affiliation also incorporated discussion on possible mechanisms between affiliation and risk. Most of the studies that found Islam to be protective ascribed this relationship to the role of behavior norms or higher rates of circumcision among Muslim men when compared to those of other affiliations. Studies identifying affiliation to be associated with risks suggested risks resulted from restrictions on behaviors, lower levels

of adherence to teachings, traditions influencing the ability of women to avoid risk, and polygamy.

Studies that only measured religious affiliation were predominantly conducted outside of the US. Researchers may be interested in risk outcomes associated with denominations less commonly found in the US. For example, there may be an interest in studying differences between Muslims and Christians in locations where large groups of people identifying with each affiliation reside, such as in Africa. Without attention to other aspects of religion such as levels of participation and adherence, beliefs, and practices, this research provides only a cursory understanding of how religion influences behavior.

Studies only considering religiosity were conducted primarily in the US. Researchers may be less likely to consider religious affiliation in the US if they assume the reader is aware of the sample's religious affiliation or if they consider affiliation differences to be less relevant in predicting behavior than religiosity. When the sample's affiliation is not measured or described, study findings are limited. The large number of affiliations present in the US may present difficulties for researchers, but these can be addressed through preliminary screening or utilization of measures conducted with similar groups of people. As the research included in this review suggests affiliation is associated with differences in sexual risk outcomes, it is critical to measure and report affiliation in addition to religiosity.

The lower likelihood of observing religiosity to have a protective effect among studies conducted in Europe may suggest that religiosity is less prevalent, or that it has a weaker effect, in different parts of the world. However, study numbers by location are insufficient to reach conclusions about varying levels of religiosity or religiosity's impact.

Studies on sexual risk in the US appear to be more narrowly focused on religiosity among younger samples when compared to studies conducted elsewhere that tended to include adult or mixed age samples and measure only affiliation. Additionally, studies conducted among youth and young adults only were more likely to utilize sexual initiation as a measure of risk, as sexual initiation is a less meaningful indicator of sexual risk for populations of adults who are sexually active.

Studies that found religiosity to be associated with higher rates of sexual HIV risk were most likely to conceptualize risk as lower rates of condom use. Although the smaller number of studies that identified a link between religiosity and risk tended to include condom use as the outcome, most studies that considered condom use as an outcome found religiosity to be protective in regards to sexual HIV risk overall. Some of these studies examined multiple outcomes without reporting findings between

religiosity and condom use. Others described an association between religion and condom use but did not identify potential mechanisms. Of the studies that discussed mechanisms linking religion and condom use, studies that identified a protective effect pointed to positive social influences resulting from religious leaders, a desire to adhere to social norms, and fears about HIV. Studies identifying religiosity to be associated with risk (lower rates of condom use) pointed to opposition from religious groups towards condom sales as well as beliefs linking sexual behavior to punishment. Although the relationship between religiosity and condom use appears to be context specific, additional reporting of findings and research on this topic is needed to identify common pathways between religious influence and condom use.

A limited number of studies examined mechanisms between religion and sexual risk outcomes. Most often these studies attributed the influence of religion on sexual behavior to religious behavior norms, beliefs, and social support. Behavior norms were most often considered the pathway through which religion influenced sexual risk outcomes, suggesting that belonging to a religious community coincides with social expectations and group influence on sexual norms. Studies citing beliefs suggest that an individual's appropriation of religious convictions (i.e. regarding monogamy or abstinence) influenced their individual risk behaviors. The emphasis of other studies on social support pointed to the influence of social control, supports and expectations, communication, networks, and fears of social isolation.

Specific religious practices that may form causal pathways between religion and risk were also cited by some studies (particularly those on affiliation only), including circumcision, polygamy, and alcohol use. Other studies pointed to aspects of religiosity such as a sense of spirituality, divine pressures, moral reasoning, or altruism and a concern for others as potentially influencing risk behaviors. Some suggested tradition and societal expectations were more pertinent than religious influence or that the influence of religion was minimal when compared to other cultural influences such as the media.

While the explanations put forward compose a list of mechanisms that could be understood through various theoretical frames relating to gender and power, social capital, and decision making, additional research is needed to demonstrate pathways through which religion influences risk. Adamczyk and Hayes [40] explored differences in premarital and extramarital sex across religious affiliation in multiple countries and found that the lower rate of premarital sex among married Hindus and Muslims was not explained by an earlier marriage age. Furthermore, lower rates of extramarital sex among nations with a higher percentage of Muslims were not explained by restrictions

on female mobility. Conducting in depth analysis of HIV and religion in Africa, Trinitapoli and Weinreb [151] explore mechanisms between religious affiliation, religiosity, and sexual HIV risks, suggesting (1) abstinence is more common among people who attend religious services more regularly and is primarily explained through attitudes about acceptable sexual behavior, but does not vary by affiliation; (2) monogamy varies by affiliation, is more likely among those who attend regularly, and can be explained by the mechanism of social control or monitoring from religious leaders; and (3) condom use is not strongly effected by affiliation, and religiosity does not impact condom use or attitudes towards condoms. They did find, however, that positive religious leader attitudes towards condoms coincided with higher levels of condom use among adherents. Additional research that considers individual and community level religious influences could help disentangle ways in which religion impacts sexual risk in various contexts.

Implications for Future Research

Future research on religion and sexual HIV risk needs to: (1) incorporate measures of both religious affiliation and religiosity; (2) consider specific sexual risk outcomes in addition to HIV prevalence; (3) determine which measures of religiosity are most relevant to understanding sexual risk contexts for particular groups of people; (4) more thoroughly examine mechanisms by which religion may influence sexual risk behaviors; and (5) conduct qualitative research to further examine how religious affiliation and religiosity are linked to specific sexual risk behaviors.

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