



Praying for People You Know Predicts Survival over 17 Years Among People Living with HIV in the U.S.

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Abstract

Most studies predicting the effects of prayer on health have examined intercessory prayer (prayers by others who often don't know you), yet most people pray for their own health and the health of others who they know. Our study, conducted in Miami, USA, differentiated praying for self, known others, and unknown others in people living with HIV, a virus with clearly defined biological markers of progression, enabling control for initial CD4-count and viral load. Only praying for known others predicted greater survival. People with HIV who prayed for known others were twice as likely to survive over 17 years compared to those who did not.

Keywords Prayer · Religion · Spirituality · Survival · HIV · Mortality · Health · USA

Introduction

According to Pew research center's Religious Landscape studies (Pew, 2015), 77% of US adults say that religion is very (53%) or somewhat (24%) important in their lives, and 55% of Americans say that they pray daily (Pew, 2016). Individuals often turn to religion in times of crises; during the COVID-19 pandemic, around 24% of US adults stated that their faith had become stronger, and online searches for the word "prayer" were at their highest level in over 90 countries (Bentzen, 2021). The benefits of religion and spirituality (R/S) on physical and mental health have been studied extensively over the last few decades (Koenig, 1998; Koenig et al., 2001, 2012). In general, greater involvement with R/S—such as via attendance, adherence, and the importance of R/S for an individual—is associated with better health in the social (e.g., social support), emotional (e.g., depression), behavioral (e.g.,

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substance use), and physical (e.g., cardiovascular disease progression) domains. Koenig and colleagues' (1998; 2001; 2012) work reveals that, among other qualities, R/S is associated with comfort, meaning, hope, optimism, and community, while also being negatively associated with maladaptive behaviors such as suicidality and substance use. R/S is also associated with fewer depressive symptoms in individuals with chronic medical conditions (Lucette et al., 2016). In addition, R/S predicts mortality in initially healthy individuals (Chida et al., 2009) as well as those with illnesses/viruses, such as congestive heart failure (Park et al., 2016) and HIV (Ironson et al., 2016). However, not as much work has been done specifically in the area of prayers and survival, something we assess in this study among individuals with HIV.

There are many ways to analyze involvement with R/S, and prayer is one of the main behavioral components of R/S. A few taxonomies have successfully differentiated helpful and unhelpful aspects of this complex and individualized phenomenon. For example, Poloma and Pendelton (1991) identified four types of prayers (colloquial, petitionary, ritual, and meditative), Laird et al. (2004) identified five (adoration, confession, reception, supplication, and thanksgiving), and Foster (1992) identified three directions of prayer (inward, upward, and outward), which Ladd and Spilka (2002) have developed a measure to assess. In addition to these taxonomies, much work has been done on how frequency of prayer and intercessory prayer (i.e., praying for the health or wellbeing of others) may relate to improvements in subjective and objective well-being (Masters & Spielmans, 2007; Masters et al., 2006; McCullough & Larson, 1999). Importantly, prayer is a widely used coping mechanism for individuals struggling with health difficulties, particularly when the issue is unresponsive to other treatments (McCullough & Larson, 1999), or is severe, chronic, or highly stigmatized (e.g., in HIV [Dalmida et al., 2015]). Barnes et al. (2002) found that prayer for oneself (43%) and for others (24.4%) was the most commonly used "alternative medicine," and McCaffrey et al. (2004) found that 35% of respondents in a national survey used prayer for health concerns. This adds to the difficulty in investigating the effects of prayer on mental and physical health outcomes, as it is unclear which came first, and studies often lack longitudinal designs or fail to control for relevant confounds (Masters & Spielmans, 2007).

Studies of how petitionary prayer (i.e., asking God to grant requests for oneself or others) affects health often show negative associations with health status (Masters & Spielmans, 2007; McCullough & Larson, 1999). Experts (Masters & Spielmans, 2007; Masters et al., 2006; McCullough & Larson, 1999) argue that these negative associations may be due to artifacts in the data; those with health difficulties may just be more likely to pray in order to cope. Although some systematic reviews (Simão et al., 2016; Vasigh et al., 2018) argue that prayer (including intercessory prayer) can be a useful adjunct to medical and psychological treatments for improving health and pain status, Masters and colleagues (2006; 2007) have demonstrated via meta-analysis that there is no discernible effect of intercessory prayer on the recipient of the prayers. Such mixed results between types of prayer and health show that greater nuance in investigating these relationships is warranted. One aspect of prayer that warrants more attention in research is who one prays for. Studies of intercessory prayer exclusively focus on the recipient of the prayers, and little research has been dedicated to investigating the health effects associated with praying for

others. To our knowledge, no study has compared the health benefits of praying for someone individuals know vs. someone they do not know.

Interestingly, although only a few investigators have looked into this, praying for others has shown to be uniquely associated with benefits for the individual who is praying (i.e., the petitioner), and this is theoretically in line with Foster's (1992) taxonomy of praying inward (for oneself) vs. outward (for others) or upward (seeking intimacy with the divine). In one study of intercessory prayer, O'Laoire (1997) found that those who prayed for strangers whose photos they were given—more than the recipients of their prayers—experienced improvements in self-esteem, anxiety, and depression. Krause's (2003) study of Black and White individuals aged 66 and over found that praying for others was beneficial for self-rated physical health status in an interaction with financial strain—only those with high levels of strain experienced this benefit. And Krause et al. (2016) found that individuals exposed to lifetime trauma who prayed for others had lower levels of C-reactive protein (CRP)—a key marker of inflammation. The studies by Krause and colleagues (2003; 2016) were conducted at single time points and assessed prayer for others by asking participants one Likert-based question: When you are by yourself, do you pray for others? As such, little work has been done that compares whether praying for those an individual knows versus those an individual does not know objectively predicts health over time.

Krause (2017) suggests that praying for others is a form of social support, as it draws attention away from the self, breeds feelings that one is part of a group, and increases the likelihood of receiving support. In line with this, Pérez et al. (2011) found that social support partially mediated the relationship between praying for others and depression in 179 cancer patients. Masters and Spielman (2007) suggest that praying for others may be universally beneficial due to its links to volunteerism. Indeed, in a sample of healthy older adults (aged 65 and above), Brown et al. (2003) found that giving support (vs. receiving support) was predictive of survival over 5 years. Although research assessing the physical health benefits of praying for others—and survival in particular—is scarce, existing work suggests a positive relationship, with social support being a potential explanatory variable in this relationship. The aforementioned studies (Krause, 2003; Krause et al., 2016; Perez et al., 2011) used one- or two-item rating scales of the content of prayers. Therefore, research that uses open-ended questions related to who individuals pray for, and how that relates to their subjective and objective wellbeing, is warranted.

Human immunodeficiency virus (HIV) is a chronic and severe virus that is highly stigmatized (Dalmida et al., 2015; Mahajan et al., 2008). Notably, HIV provides a unique opportunity to study the relationship between prayer and health due to objective and easily obtainable biomarkers of the virus (CD4 count and viral load [VL]) that can be used to control for viral stage at study entry. Although life expectancy among people living with HIV (PLWH) was previously 20 months after receiving diagnosis (Lifson et al., 1992), a more recent study (Nakagawa et al., 2013) shows that this has dramatically increased due to the presence of antiretroviral therapy (ART) and the potential for timely diagnosis, with life expectancy now being closer to those with HIV-negative status (with adequate care). Despite much progress being made, the development of age-specific HIV treatment and management are still needed (Nakagawa et al., 2013), and research among older cohorts with HIV is

also warranted due to the relative recency of the virus. PLWH often report poorer health-related quality of life (HRQoL) than the general population (Tsevat et al., 2009), likely due to the physiological, psychological, and social stressors associated with the virus (Dalmida et al., 2015). Minorities are disproportionately affected by HIV (CDC, 2019), and HIV stigma contributes to poorer health care access and lower levels of ART adherence (Sayles et al., 2009). Interventions to reduce HIV stigma show small effects in reducing negative attitudes or improving HIV knowledge, with them being more effective after multiple sessions, in community settings, and among professionals (Mak et al., 2017).

PLWH often turn to R/S to cope with the stressful effects of the virus (Dalmida et al., 2015; Ironson et al., 2006; Pargament et al., 2004), with Ironson et al. (2006) even showing that those who increased in R/S after diagnosis demonstrated slower virus progression over four years. In another study, Ironson et al. (2016) showed that using spirituality to cope predicted greater survival over 17 years in people with HIV. Trevino et al.'s (2010) 12–18 month longitudinal study found that spiritual struggle (i.e., being angry at God) was associated with baseline viral load (but not viral load over time) and lower CD4 counts over time in PLWH. Although positive religious coping (i.e., beneficent appraisals of God, prayer in times of difficulties) did not predict either change in VL or CD4 count in the Trevino et al. (2010) study, in another study, positive View of God did predict slower HIV progression over 4 years (Ironson et al., 2011). Conversely, a negative view of God predicted faster virus progression. Much work has focused on how greater R/S involvement may improve HRQoL in PLWH (for a review, see Dalmida et al., 2015), yet longitudinal studies that account for virus progression (such as those just described) are extremely rare.

Thus, most studies use frequency of prayer, religious attendance, or level of R/S to study the relationship between spirituality and health in general, and to our knowledge, none have explored the relationships between who one prays for and survival, particularly among PLWH. Assessing who one prays for provides nuance that may not be captured in single- or double-item Likert scales. Thus, the purpose of our study was to assess who PLWH prayed for, and to examine the association of the directionality of their prayers with survival over 17 years. We differentiated between self-prayer, prayer for known others, prayer for unknown others, and prayer for God or a higher being. We also assessed CD4, viral load, and social support at baseline to determine whether the relationships between the directionality of prayers and survival 17 years later were significant after controlling for potentially salient covariates.

In sum, prayer is a major component of R/S involvement, yet most of the research assessing prayer and its effects on health has looked at frequency of prayer (especially intercessory prayer), with few investigating whether praying for others is associated with physical health benefits (e.g., survival) for the petitioner, and none simultaneously investigating whether the recipients of prayers were known or unknown to the individuals who were praying. Even among studies that have assessed directionality of prayer and health, the majority have used single- or double-item self-report Likert scales, longitudinal designs are lacking, and studies do not adequately control for objective measures of disease severity. The purpose of this study was

to investigate whether who individuals pray for predicts survival 17 years later in people living with HIV. This study used interviewer and transcript-rated content of prayer, and controlled for social support, CD4, and viral load to address some of the gaps in the prayer and health literature, particularly among PLWH.

Methods

Participants

This was a substudy within a larger longitudinal study which focused on stress, coping, and virus progression in people living with HIV (Ironson et al., 2005, 2015). Of note, participants for the parent study were selected who were in the mid-range of HIV progression (CD4 counts at entry to the study were between 150 and 500, CD4 count had never been below 75 cells/mm, no prior AIDS-defining symptoms) because that is where we felt psychological factors may have the greatest impact. Exclusion criteria included people with dementia, active drug dependence, and/or psychosis (based on the SCID, DSM-III-R). This substudy focused on religion and spirituality. This took our final number of participants to 102. All participants gave informed consent, and all procedures were approved by the University of Miami's Institutional Review Board. Participants were compensated (\$50/visit) for their involvement.

See Table 1 for participant demographic characteristics. Participants were 37.76 years old ($SD=8.23$) on average at study entry. Our sample was diverse with respect to race/ethnicity (39% African American, 29% Hispanic, 29% non-Hispanic White), education (43% high school or less, 31% some college, 27% college graduate or graduate degree), gender (37% female), and sexual orientation (55% gay or bisexual). Many participants had a low income (62% earned below \$10,000/year). Among our participants, 14% were raised Protestant, 31% as Catholic, 4% as Jewish, 8% described the religion they were raised in as “None,” 40% described it as “Other,” and 2% did not report their religion. Baptist was not an option here but emerged as a category in a later version of this study (at 22% of the sample). The mean CD4 count of participants was 309 ($SD=84$), reflecting the mid-range of HIV nature in our sample. Many (80%) were taking antiretroviral medication at study entry, although it should be noted that the CD4 level at which medication was recommended changed during the course of the study (Tseng et al., 2015), which began in 1997. Also, of note, the study was conducted entirely during the time that effective medications (i.e., protease inhibitors) for HIV became available.

Measures

As part of the substudy on religion and spirituality, participants were asked how often they prayed and an open-ended question on who they prayed for when they prayed. Frequency of prayer was classified in these ranges: do not pray (=0); few (1–9) times/month (=1); often (10–19) times/month (=2); many (20–29) times/

Table 1 Participant demographic characteristics ($N = 102$)

Variable	<i>n</i>	%
Male	64	63%
<i>Race/Ethnicity</i>		
African American	40	39%
Hispanic	29	28%
Non-Hispanic white	29	28%
<i>Education</i>		
High school or less	44	43%
Some college	31	30%
College graduate or graduate degree	27	26%
<i>Sexual orientation</i>		
Straight	46	45%
Gay or bisexual	56	55%
<i>Religion^a</i>		
Protestant	14	14%
Catholic	31	30%
Jewish	4	4%
None	8	8%
Other	40	39%
Variable	<i>M</i>	<i>SD</i>
CD4	309	84
Age	37.76	8.23

^aBaptist was selected as religion among 22% of participants in a follow-up study using this sample

month (=3); daily (30 or 31 times/month=4); more often than once daily (=5). Who they prayed for was classified into self-prayer, known others, unknown others, and prayers upward. “Known others” included family, loved ones, friends, the pastor, congregation, coworkers and neighbors. “Unknown others” included generic references such as everyone, the world in general, the sick, homeless, seniors, babies, children, leaders, the government. Prayers for the Lord, Jesus, and God were categorized as “prayers upward.” Classifications were made by the first author and independently confirmed by the second author, with only one disagreement (“enemies,” noted by one individual and not included in analyses). Recipients of the prayers were not mutually exclusive; participants could report that they prayed for themselves as well as for others they knew or did not know.

Covariates

Biomedical covariates included CD4-cells/mm³ (determined by whole-blood 4-color direct immunofluorescence using a XL-MCL flow cytometer [Beckman/Coulter, Miami, FL]), age at baseline, and prescribed antiretroviral medication (no medication, combination therapy [antiretrovirals but not including a protease inhibitor],

or highly active antiretroviral therapy [HAART; Tseng et al., 2015]). Sociodemographic covariates included education (dichotomized between high-school or lower=0, some college or trade school or higher=1), sex (1= male, 2=female), and race (not African American/Black=0, African American/Black=1). Measures used in subsequent analyses included adherence measured by the ACTG (Chesney et al., 2000) as the percentage of missed antiretroviral medication doses over three pre-assessment days. In order to obtain a reliable measure, adherence was averaged over the first four time points (during which time the threshold for beginning medication was the same). Substance use (alcohol) disorder at entry to the study, as well as relapse to dependence within 3 years since study entry, was measured by the interviewer administered Structured Clinical Interview Diagnostic and Statistical Manual-III-R. Social support was measured by the ENRICH Social Support Instrument (Mitchell et al., 2003).

Survival status was determined using the Death Master File which is updated weekly and includes deaths reported to the Social Security Administration (SSA, 2021). In addition, searches were conducted on the internet to identify additional deaths that may have gone unreported to the SSA. Analyses include all deaths occurring before April 30, 2014.

Statistical Analysis

Cox proportional hazards regression (using SPSS version 26) was used to determine whether who one prayed for predicted survival over 17 years. First, biomedical variables (baseline VL, baseline CD4-cells/mm³, age, and prescribed antiretroviral medication) were adjusted for in block 1. Sociodemographic variables (sex, education, and race) were adjusted for in block 2. Who one prayed for (self, known others, unknown others) were individually entered separately into block 3. As only 6 participants endorsed upward prayers (for God, Lord, Jesus) and this did not meet the common definition of upward prayers by Foster and Ladd and Spilka (seeking intimacy with the divine), this variable was not included in our analyses. Cox regression was also used to generate survival curves for those who prayed for known others vs. those who did not, adjusting for biomedical and sociodemographic variables. Finally, in order to test whether results would hold after potential confounds, an additional set of analyses were performed, entering substance use, medication adherence, or social support after the two covariate blocks, and then entering praying for others in block 4.

Results

The modal amount of prayer was daily (37.4%). Over half of the sample reported praying either daily or more often (37.4% plus 18.2%). Among our sample, 16% reported that they did not pray. The rest of the sample (28.3%) prayed between 1 and 29 times per month: few (1–9/month)=17.2%; often (10–19/month)=7.1%; many (20–29/month)=4.0%. The most frequently endorsed directionality of

Table 2 Results of cox regression with prayer predicting mortality/survival adjusting for biomedical and sociodemographic variables in a cohort of 102 participants living with HIV

	<i>B</i>	<i>SE</i>	$\chi^2\Delta$	<i>Wald</i>	<i>p</i>	HR-mortality (95% CI)	HR-survival (95% CI)
Prayer frequency ^a	-.152	.128	1.427	.232	.627	.859 (.669 – 1.103)	1.16 (0.907 – 1.494)
Self-prayer ^a	.132	.480	.075	.784	.378	1.141 (.445 – 2.922)	0.876 (.342 – 2.247)
Prayer for known others ^a	-.727	.363	4.006	.045*	.531	.483 (.237 – .985)	2.07 (1.015 – 4.219)
Prayer for unknown others ^a	-.176	.297	.349	.555	.457	.839 (.468 – 1.503)	1.19 (0.665 – 2.136)

SE= standard error; *df*= 1; both HR-mortality and HR-survival are included for ease of interpretation

**p* < .05

^a Each entered individually as a continuous predictor, adjusting for biomedical variables (baseline CD4 count, age, and prescribed antiretroviral medication [no medication, combination therapy, or highly active antiretroviral therapy]), and sociodemographic variables (sex, education, and race/ethnicity).

prayers was toward oneself (73.5%). Participants then prayed most for known others (29.4%), followed by unknown others (22.5%), and upward (5.9%). Note that these numbers add to more than 100% as multiple classifications were allowed.

Survival Analysis After seven years of follow-up (2004), 15% of the sample had died. After 13 years of follow-up (2010), 32% of the sample had died, and by 2014 (after 17 years of follow-up), 34% of the sample had died. The results of the Cox regression survival analyses are presented in Table 2. The first section of Table 2 shows that only praying for known others significantly predicted greater survival, adjusting for biomedical variables (CD4 and VL at entry to the study, prescribed antiretrovirals, and age) as well as sociodemographic variables of sex, race, and education. In fact, the Hazard ratio suggests that praying for known others is associated with twice the survival rate of not praying for known others. In contrast, self-prayer and prayer for unknown others did not significantly predict survival. Figure 1 depicts survival curves using Cox regression for those who prayed for known others, adjusting for biomedical and demographic variables, compared to those who did not pray for known others (i.e., for those who did vs. those who did not list any known other e.g., family, friend, etc. when answering the question “Who do you pray for?”). The survival curve is clearly higher for those who reported praying for known others.

Additional analyses were conducted to determine whether the resulting prediction would maintain its significance after adjusting for potentially confounding variables (i.e., those potentially correlated with both praying for others and with survival). We tested three of these: social support, substance use, and adherence to HIV medications. Praying for known others still significantly predicted survival after adjusting for social support (Wald=6.713, *p*=0.01, HR survival=2.67), adherence (Wald=7.167, *p*=0.007, HR survival=3.30), alcohol use disorder (Wald=4.551, *p*=0.033, HR survival=2.25), or relapse (Wald=4.348, *p*=0.037, HR survival=2.38).

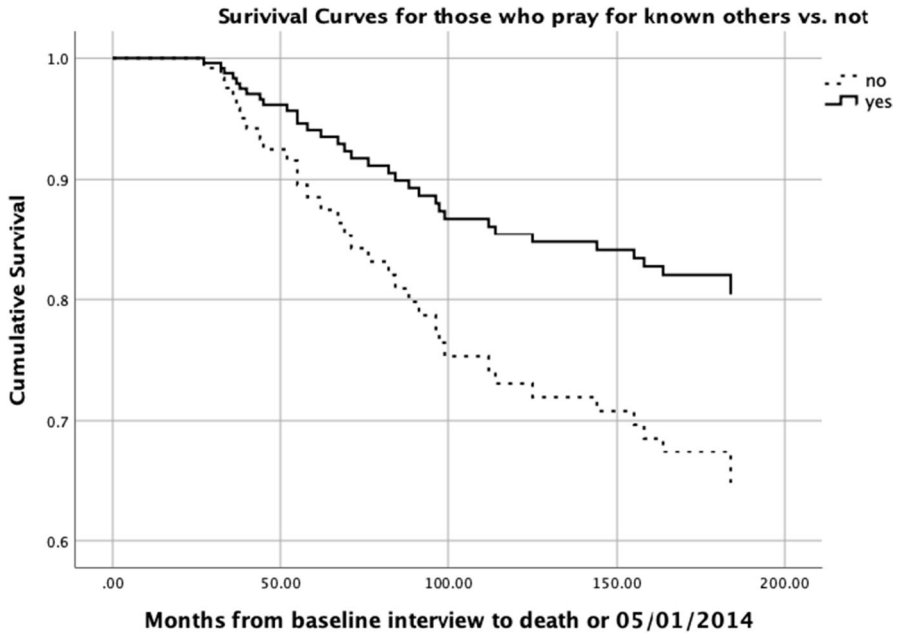


Fig. 1 Survival curves for those who prayed for known others vs. not, controlling for biomedical variables (baseline virus severity (CD-4 Count, VL), age, antiretroviral medications), and sociodemographic variables (gender, education, and race/ethnicity)

Discussion

The purpose of this study was to assess whether who one prayed for predicted survival 17 years later in a sample of HIV+ individuals. We asked open-ended questions related to participants' directionality of prayers, and controlled for relevant covariates (such as objective virus markers-CD4 and VL) and confounds (such as social support). Results showed that praying for known others did predict survival 17 years later, whereas praying for oneself or unknown others did not.

To our knowledge, this study is the first to distinguish between praying for known others and unknown others, and assessing how it predicts survival over time (while controlling for baseline health in the context of a chronic virus). Most studies of prayer for others focus on intercessory prayer, or use single- and double-item Likert scales to assess who the recipients of prayers are (i.e., self vs. others). In addition, most studies of intercessory prayer are focused on praying for unknown others. Thus, they do not examine praying for oneself, they do not differentiate between praying for known and unknown others, and they examine results for the recipient of prayers rather than for the petitioner.

There are only a few studies on the effects of prayer for others on the petitioner. These show that praying for others predicts greater improvements in the petitioner's physical and mental health over time than does praying for oneself (Krause, 2003; Pérez et al., 2011). Our study supports this literature and also adds to the nuance in

the study of prayer and health. It distinguishes whether praying for someone individuals know vs. someone they do not know (or themselves) makes a difference in predicting survival, a particularly salient marker of health in PLWH. Our findings may further the study of prayer and health by suggesting the importance of knowing those who one prays for, as opposed to praying for strangers who one would not be as connected with.

There are many potential pathways that may link prayer and survival, ranging from psychosocial factors and health behaviors to biological pathways. The role of social support has been widely cited and has been found to act as a mediator of the relationships between praying for others and depressive symptoms in cancer patients (Pérez et al., 2011), although they did not assess physical health outcomes. Krause (2017) stated that praying for others may lead to individuals spending less time worrying about their own difficulties. However, Pérez et al.'s (2011) study also found that praying for others was not associated with less rumination. Thus, it seems that praying for others may be beneficial due to greater social connection, rather than less rumination. A higher quality of social support—both received and delivered—may provide comfort and meaning, thereby increasing one's resilience when fighting against chronic disease. However, providing targeted (e.g., to an identified individual like an offspring) vs. untargeted (e.g., donating to charities) support has been linked to greater social connection and emotional effectiveness (Inagaki & Ross, 2018), as well as reduced amygdala activity in response to emotional tasks. Compassion has also been found to explain the relationship between intrinsic religiosity and health (Steffen & Masters, 2005). From a behavioral perspective, better health and survival may be enacted via the facilitation of more adaptive coping strategies (e.g., lowered risk of substance use, greater adherence to prescribed medications), although in our dataset prayer predicted survival even after controlling for alcohol use and medication adherence.

From a biological—and specifically a psychoneuroimmunological—perspective, participants who prayed for others may also have had more meaningful relationships with others, reflecting the concept of eudaimonic happiness. Prosocial behavior and other positive psychology constructs (e.g., value engagement), as well as spiritual practices such as Yoga and meditation, have been linked to reduced Conserved Transcriptional Response to Adversity (CTRA) gene expression (i.e., buffering against increased pro-inflammatory gene expression and buffering against decreased antiviral and antibody production [Cole, 2019]). In turn, CTRA gene expression has been linked to cancer and cardiovascular disease (Cole, 2019). Nelson-Coffey et al. (2017) conducted a "random acts of kindness" randomized controlled trial, and results suggested favorable changes in CTRA gene expression for people who performed kind acts for known others, but not for those who performed kind acts for a non-specific other, or kind acts for themselves. Their findings are consistent with our own and suggest a promising avenue of future research on R/S, prayers, and health. As in Nelson-Coffey et al.'s (2017) study of college students performing acts of kindness, in our HIV+ sample it was not praying for oneself or for unknown others, but praying for known others that was predictive of survival 17 years later. Other potential biological mediators for which there is evidence of an association with spirituality, and may be associated with praying for others, include CRP (Ironson et al., 2018),

cardiovascular efficiency (May et al., 2020), cardiovascular reactivity and recovery (Masters et al., 2004, 2020), and oxytocin (Kelsch et al., 2013).

Study Limitations

This study has some limitations. There are potential mediators and moderators of the relationships between praying for others and health which we did not assess. These may include the quality and quantity of participants' relationships (including with their religious communities or whether they had caregivers), and the overall health status of participants (e.g., the presence of comorbid illnesses). Although it is possible that individuals who prayed for others were generally less ill than those who prayed for themselves, that we controlled for objective measures of HIV progression provides greater confidence in our results. In addition, because we chose our sample to be in the mid-range of HIV progression (as we hypothesized that is when psychological factors may have the greatest impact), this sample is limited in its generalizability. As such, the findings should be interpreted with caution and further replication among other samples is warranted. Likewise, medication recommendations (both with regard to starting and incorporating newly developed treatments) changed over the course of the study, representing another limitation, although it should be noted that our study was conducted entirely during the time that effective medications (i.e., protease inhibitors) were available. Although we did not cover all of Ladd and Spilka's (2002) types of prayers (which were derived from Foster's taxonomy), our study has some overlap with their assessment of inward (e.g., our "self-prayer") and outward (e.g., our "praying for others") prayers. Upward prayers in their paradigm also refers to rest (such as meditation) and sacraments, which were not specifically asked about by our question (i.e., who do you pray for?). Thus, much of how one prays remains to be studied, and there is no gold standard or one-size-fits-all approach to measuring prayers, complicating research in this area.

Clinical Implications

The study of prayers and health has yielded many findings, yet the clinical and practical implications of those findings have been scarce. Our study suggests that praying for others may be associated with greater chances of survival in individuals with HIV. This pro-social R/S behavior may provide unique health benefits for the petitioner, even after controlling for biomedical and sociodemographic characteristics, social support, medication adherence, and substance use. Praying for others may indicate more meaningful relationships and psychoneuroimmunological effects, but this hypothesis needs testing. Further, pastoral clergy may explore and encourage patients' prosocial habits (in particular, praying for others) as it may activate potential health benefits inherent in such behaviors, and this warrants further clinical and empirical investigation.

Future Directions

Our findings suggest a promising avenue of future research: Because our findings are consistent with those of Nelson-Coffey et al. (2017) related to acts of kindness toward known others, assessing the psychoneuroimmunological effects (including gene expression) of various types of prayers may help disentangle the study of prayers and how they affect us as individuals. Randomized clinical trials may help to determine cause and effect relationships, and findings may guide the practices of pastoral clergy and physical/mental health providers caring for individuals with chronic diseases. Assessing the relationships between types of prayers and mental health over time may also advise spiritually integrated interventions and their effects on physical health. In addition, specifically assessing frequency of prayer for known others, which was not done in this study, is a potential consideration for future research. Though studies of HIV+ individuals are particularly helpful due to the aforementioned reasons, replicating these findings within different chronic disease populations (e.g., cancer, dementia) is warranted. Additionally, due to the diversity of R/S practices across all individuals, assessing for universality and cross-cultural variations in prayer and how it impacts health in multiple groups may lead to a greater understanding of the relationship between R/S and health.

Conclusion

In sum, prayer for known others was predictive of survival 17 years later in our HIV+ sample, whereas prayer for oneself or for unknown others was not. This was true after controlling for multiple covariates (e.g., biomedical, sociodemographic) and confounding variables (i.e., social support, alcohol use, medication adherence). Findings highlight an important but unexplored nuance in the study of prayers and health—prayer for known others—something indicated as beneficial by experts such as Krause, Masters, and Spielmans. Future work should expand upon these findings to determine whether the biomedical and mental health pathways associated with helping known others (e.g., gene expression [Nelson-Coffey et al., 2017], amygdala reactivity [Inagaki & Ross, 2018], cardiovascular reactivity and recovery [Masters et al., 2004; Masters et al., 2020]) are also observed when one prays for known others.

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Authors Contribution GI conceptualized and oversaw the entirety of this project, including data analysis and manuscript writing for this paper. SS Ahmad assisted by writing portions of the manuscript.

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Data Availability Thedata, materials, and code will not be made available

Declarations

Conflict of interest The authors have no conflicts of interest to declare.

Ethical Approval The study was approved by the University of Miami Institutional Review Board (IRB).

Informed Consent Informed consent was obtained from all participants in the study, and no identifiable information is being shared.

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