


# Spiritual and religious aspects influence mental health and viral load: a quantitative study among young people living with HIV in Zimbabwe

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## ABSTRACT

**Introduction** The role of religion and spirituality as social determinants of health has been widely discussed. Studies among people living with HIV describe positive and negative influences of religion and spirituality on health outcomes. With a HIV prevalence of 14.8% for females and 8.6% for males, and 22 000 AIDS-related deaths in 2020, HIV infection remains a life-threatening condition in Zimbabwe, especially in young people. The aim of this research was to measure the influence of religion and spirituality on the health outcomes of young people living with HIV in Zimbabwe.

**Methods** A quantitative questionnaire with three different validated measures of religion and spirituality (Belief into Action Scale, Brief Religious Coping Index, Religious and Spiritual Struggles Scale), demographic, cultural, behavioural and health questions was administered to 804 young Zvandiri programme clients in rural, urban and peri-urban Zimbabwe between July and October 2021. Regression analysis established significant relations between the result of the three different measures and mental health and viral load results.

**Results** Religious coping significantly reduced the probability of common mental disorder, while high religious activity increased the risk. The Religious and Spiritual Struggles Scale proved to be a reliable indicator of higher viral loads, risk for treatment failure and the probability of common mental disorder.

**Conclusions** All three measures of religion and spirituality related to health outcomes. More research is needed to generalise and further explore these findings. Because the Religious and Spiritual Struggles Scale was a strong indicator for both, higher viral loads and common mental disorder, we suggest that it should be used and validated in other sub-Saharan contexts. It could serve as a new diagnostic tool for the early detection and prevention of treatment failure as well as of common mental disorder.

## INTRODUCTION

In 1984 the 37th World Health Assembly passed a resolution asking to include ‘The spiritual dimension in the Global Strategy for

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Numerous studies have shown positive and negative influences of religion and spirituality on health.

## WHAT THIS STUDY ADDS

⇒ To our knowledge, this was the first time, the Belief into Action Scale, the Brief Religious Coping Index and the Religious and Spiritual Struggles Scale were used and validated in the sub-Saharan African context.

⇒ It is also for the first time that a significant association between the results of the Religious and Spiritual Struggles Scale and current viral load results has been established.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The Religious and Spiritual Struggles Scale can be used as diagnostic tool to identify risk of treatment failure and common mental disorder.

⇒ The subdomains of the scale provide insight on the nature of the religious and spiritual struggles, that can inform new, relevant measures of care and support.

Health for All by the Year 2000’.<sup>1</sup> The delegates were convinced that spiritual well-being should be considered as the fourth dimension of well-being. Prior to this meeting, the director general had written some reflections to facilitate the discussion on this resolution. These reflections begin with the definition of the term spiritual: ‘a phenomenon that is not material in nature but belongs to the realm of ideas that have arisen in the minds of human beings, particularly ennobling ideas’.<sup>2</sup> The reflections further state that philosophical, religious, moral or political ideologies influence the physical, mental and social well-being of people and that such ideologies and values also constituted the moral basis of the Global



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Strategy for Health for All. It points out that the target of a socially productive life has a non-material connotation and stresses the importance of people having an awareness of the different factors affecting their health and their health-seeking behaviour.<sup>2</sup> Winiger and Peng-Keller recently conducted a research project on the 'spiritual dimension' of health as discussed in the WHO. They suggest that the WHO should continue to interact with religious stakeholders.<sup>3</sup>

Increasingly, epidemiologist recognises religion as a social determinant of health.<sup>4</sup> Hence, empirical studies about the influence of religion/spirituality (R/S) on health are gaining importance.<sup>5</sup> In 1999 the Fetzer Institute published *The Brief Multidimensional Measurement of Religiousness/Spirituality for Use in Health Research (BMMRS)*. The BMMRS assesses 12 key dimensions of R/S identified as relating to health outcomes: daily spiritual experiences, meaning, values, beliefs, forgiveness, private religious practices, religious/spiritual coping, religious support, religious/spiritual history, commitment, organisational religiousness and religious preference.<sup>6</sup> Since then, many different R/S measurements have been developed that assess one or more of these dimensions. A growing number of studies, including those with study populations of people living with HIV (PLHIV), have shown that R/S can influence health in positive and negative ways. Kendrick published a systematic literature review of studies among PLHIV in the USA. Of the 33 empirical studies included, 24 studies found at least one measure of R/S associated with better adherence and clinical health outcomes, 12 studies found at least one measure of R/S associated with poorer adherence and clinical health outcomes and 7 studies found at least one measure of R/S to have no significant association with outcomes.<sup>7</sup> However, there was little consistency in regard to the measurement of R/S. In 2018, Doolittle *et al* also published a systematic review of literature about the relationship between R/S and HIV clinical outcomes. They found 10 studies reporting a positive association of R/S with a measurable clinical outcome, 2 studies reported neutral associations and 1 study that identified aspects of R/S that had both negative and positive associations.<sup>8</sup> In our own literature review about the importance of considering religious and spiritual ontologies in the care of PLHIV in Zimbabwe, we concluded that R/S (including traditional practice) plays an important role in the life of PLHIV in Zimbabwe, influencing the health, well-being and access to care in positive and negative ways.<sup>9</sup> We therefore believe that R/S aspects and actors should be included in the comprehensive care of PLHIV.

According to UNICEF, adolescents and young people represent a growing share of PLHIV worldwide.<sup>10</sup> Zimbabwe has a HIV prevalence of 14.8% for females and 8.6% for men.<sup>11</sup> With 22 000 AIDS-related deaths in 2020,<sup>12</sup> HIV infection remains a life-threatening condition, especially for young people. Fortunately, with the development of highly active antiretroviral therapy, HIV suppression rates have increased. The participants of this

study were all Zvandiri beneficiaries. Zvandiri is a private voluntary organisation that connects and supports children and young PLHIV with peer counsellors, so called Community Adolescent Treatment Supporters (CATS).<sup>13</sup> Zvandiri beneficiaries' viral load suppression has increased from 77% in 2018 to 88% in 2020<sup>14</sup> (at that time Zimbabwean's Ministry of Health and Child Care (MoHCC) defined suppression as below 1000 copies/mL). Fifteen years ago, Ironson and Kremer showed that an increase in religiousness/spirituality from before to after finding out that one was HIV positive was significantly related to a positive change in viral load results over 4 years.<sup>15</sup> Today, with improved treatment, can we still find an effect of R/S on the viral load of PLHIV? Have R/S become neglectable factors for young PLHIV? The aim of this study was to measure the impact of R/S aspects on the clinical outcome (viral load and mental health status) of adolescents and young (aged 14–24 years) PLHIV in Zimbabwe.

### Measuring religion

How can R/S be defined, or more so, be scientifically measured? Religious expression, practice and beliefs are dynamic. Definitions vary from organised to unorganised, from personal to group, from theistic to non-theistic, from intrinsic to extrinsic and so on. In this paper, the term 'religion' refers to organised and/or shared faith practice or belief and the term 'spirituality' refers to the way people relate to the transcendent, including traditional practices. The participants of this study come from a highly religious society. The majority identifies with the Christian belief. However, in the Zimbabwean context, Christianity and traditional belief practices exist alongside and are sometimes practiced simultaneously. This is especially true when it comes to health issues. Shoko explains that in the Shona understanding most conceive and practice healing holistically, embracing not only the physical conditions, but also the spiritual, psychoemotional, social and ecological dimensions.<sup>16</sup>

Hill and Pargament suggest to use several measures to assess religious and spiritual aspects.<sup>17</sup> Thus, we decided to use three measures that together cover most BMMRS key dimensions and have been widely used in different cultural and religious contexts. The Belief into Action Scale (BIAC)<sup>18</sup> measures the importance of religion in a person's life. It has been validated in diverse cultural and religious contexts such as in Portugal,<sup>19</sup> China<sup>20</sup> or among Arab-speaking Muslims.<sup>21</sup> Doolittle found eight studies that explicitly evaluated religious involvement and spirituality with HIV viral load and Cluster of Differentiation 4 (CD4) cell count. Most of them showed a positive association between high religious involvement and clinical outcome.<sup>8</sup> However, in our own research we found that conforming to the teachings of some religious faith community can have a negative impact on health (eg, banning of contraceptives or Western medicine).<sup>9</sup> The Brief Religious Coping Index (Brief RCOPE)<sup>22</sup> measures positive and negative religious coping. It is the most

widely used religious measure and has been validated in very diverse cultural and religious contexts, such as among Chinese in Singapore<sup>23</sup> or recently among African athletes from three African countries (Benin, Ghana and Nigeria).<sup>24</sup> Most studies link positive religious coping with better health, like Kremer *et al* who relate spiritual coping with a prediction of CD4-cell preservation and undetectable viral load over 4 years.<sup>25</sup> In a recent study from Brazil, resilience among PLHIV was significantly and positively correlated with positive religious coping and negatively correlated with negative religious coping.<sup>26</sup> In regard to R/S struggles, Wilt *et al* recently pointed out that while more intense R/S struggles normally associate with increased and diverse efforts to cope, R/S strugglers may be hesitant to rely on God.<sup>27</sup> In other words, they might use secular techniques of coping or self-centred coping (corresponding to below negative coping item 'trying to make sense of the situation without relying on God/spiritual force as partners'). The Religious and Spiritual Struggles (RSS)<sup>28</sup> Scale measures the prevalence of religious and spiritual struggles in a person's life. The RSS Scale has been validated in countries like Brazil,<sup>29</sup> Iran,<sup>30</sup> Poland,<sup>31</sup> Israel<sup>32</sup> and in the Czech Republic.<sup>33</sup> In 2010, Trevino *et al* showed that spiritual struggle was associated with a detectable viral load as well as more HIV-related symptoms.<sup>34</sup>

## METHODS

This study is part of a larger mixed-methods study entitled 'Impact of religion/spirituality (R/S) on HIV therapy in different health settings in rural and urban Zimbabwe with a special focus on adolescent and young people and the current COVID-19 pandemic' among Zvandiri's cohort of adolescents living with HIV. The primary researcher and initiator of the study is affiliated with the National Institute of Health Research and licenced by the Research Council of Zimbabwe. Further information about this collaboration can be found in the author reflexivity statement in the online supplemental appendix. The study conforms to the principles embodied in the Declaration of Helsinki. Ethical approval was provided by the Medical Research Council Zimbabwe (MRCZ/A/2701). Informed consent was obtained from all adult participants and caregivers in case of minors. Minors assented to the study.

We used the Strengthening the Reporting of Observational Studies in Epidemiology cohort reporting guidelines.<sup>35</sup>

### Study population

The 804 participants (aged 14–24) for the quantitative study part were beneficiaries of Zvandiri's peer support programme in Zimbabwe.<sup>36</sup> Participants were selected from MoHCC facilities in seven districts. The seven districts were allocated by MoHCC and represented the two major ethnic groups (Shona and Ndebele). Within these districts, we chose the facilities according to their

dominant religious environment (main churches, traditional religions, apostolic sects), their location (urban, peri-urban, rural) and their user fees. The aim was to get a good balance of all these criteria so that the study sample was representative of Zimbabwe. Participants needed to have a current viral load result not older than 6 months.

### Sample size

The RSS Scale has a Likert Scale ranging from 1 to 5. We hypothesised that a mean of 3 in the RSS Scale could be considered as considerable/intense religious struggles. Based on the literature review, we expected 20% of patients to have considerable/intense religious struggles. We further hypothesised that patients with considerable/intense religious struggles have a 5%–10% point difference in prevalence of viral non-suppression. At the time 85% of Zvandiri's beneficiaries had an undetectable viral load according to the MoHCC guidelines. Thus, calculating with alpha 0.05, beta 0.2 and power 0.8 and in consideration of missing viral load results because of the COVID-19, we aimed at 800 participants.<sup>37</sup>

### Questionnaire

Besides the BIAC,<sup>18</sup> Brief RCOPE<sup>22</sup> and RSS Scale,<sup>28</sup> the questionnaire for the mother study contained the following baseline data: religious affiliation, beliefs regarding God, beliefs about spirits, opinions about the origin of HIV, types of healers and types of traditional medicines and practices involved in patients' life, experience of violence and other confounding variables and possible effect modifiers (demographic factors like age, location, education, civil status, income). The primary endpoint was the result of the mental health Shona Symptom Questionnaire (SSQ-14).<sup>38</sup> The secondary endpoint was the viral load result. The entire questionnaire was translated into the two major local languages: Shona and Ndebele. The data collection team was recruited by Zvandiri among their CATS. After intensive training of all data collectors and a successful pilot in May 2021, the quantitative data collection with the Open Data Kit Questionnaire in Shona, Ndebele and English took place from July to October 2021. Due to the COVID-19 pandemic, most questionnaires had to be administered by phone, or were self-administered by an online public link. There was a daily check for answers indicating personal risk, with immediate referral of respective participants to the Zvandiri counsellor team. There was no loss to follow-up.

### Measures of R/S

#### Belief into Action Scale

The basis for the content of the BIAC is the importance of religion in a person's life. It inquires how individuals spend their time, talents and financial resources, what individuals say is important in their life, and to what degree they conform to the religious teachings of their faith. The BIAC questions assess organisational and non-organisational religious activities, as well as degree

of personal (intrinsic) devotion or commitment to one's religious faith. Nine questions have answers on a 10-point Likert Scale (1 being the lowest 'never', 'not at all', 'nothing' and 10 the highest). The score of the first question is either 10 (when the relationship with God is chosen as priority in life) or one for all other priorities.

#### Brief Religious Coping Index

We used the adapted version included in the BMMRS. Respondents are asked to think about how they try to understand and deal with major problems in their life. Three items assess positive religious coping, defined as 'reflective of benevolent religious methods of understanding and dealing with life stressors'<sup>39</sup> and three items assess negative religious coping reflecting underlying spiritual tensions and struggles.<sup>22</sup> On a Likert Scale from 1 to 4 (1=a great deal, 2=quite a bit, 3=somewhat, 4=not at all), participants mark to what extent each of the following is involved in the way they cope: I think about how my life is part of a larger spiritual force. I work together with God/spiritual force as partners. I look to God/spiritual force for strength, support, guidance. I feel that stressful situations are God's (or spiritual force's) way of punishing me for my sins or lack of spirituality. I wonder whether God/spiritual force has abandoned me. I try to make sense of the situation and decide what to do without relying on God/spiritual force.<sup>6</sup>

#### Religious and Spiritual Struggles Scale

The twenty-six-item RSS scale measures six domains: divine (negative emotion centred on beliefs about God or a perceived relationship with God), demonic (concern that the devil or evil spirits are attacking an individual or causing negative events), interpersonal (concern about negative experiences with religious people or institutions; interpersonal conflict around religious issues), moral (wrestling with attempts to follow moral principles; worry or guilt about perceived offences by the self), doubt (feeling troubled by doubts or questions about one's R/S beliefs) and ultimate meaning (concern about not perceiving deep meaning in one's life).<sup>28</sup> Participants answer on a Likert Scale from 1 to 5 (1=not at all/does not apply, 2=a little bit, 3=somewhat, 4=quite a bit, 5=a great deal).

#### Validity check

The three measures were checked for reliability and validity using Cronbach's alpha. Construct validity was assessed using the Mokken Scale Analysis<sup>40</sup> and exploratory factor analysis for the RSS scale.<sup>41</sup>

#### The Shona Symptom Questionnaire (SSQ-14)

The SSQ-14 is an indigenous measure of common mental disorders in the Shona language. The 14 items represent a mixture of emic and etic phenomena.<sup>38</sup> The questions have binary answers (1=yes, 0=no). The SSQ-14 is widely used. With a cut-off of >9, the sensitivity and specificity for the SSQ-14 against a diagnosis of either depression and/or general anxiety are 84% and 73% respectively.<sup>42</sup>

As mentioned earlier, the result of the SSQ-14 was the primary endpoint for this study.

#### Analysis of survey data and primary and secondary outcome

The data were analysed using the statistical software STATA V.17.0 (Stata Corp, College Station, Texas, USA).

We present descriptive statistics showing the sociodemographic characteristics of participants. The primary outcome variable was the mental health status. Average  $\geq 8$  in the 14 items SSQ-14<sup>38</sup> indicate that there is a probability of common mental disorder.

The secondary outcome was the current viral load result. The variables were defined according to the European AIDS Clinical Society's guidelines.<sup>43</sup>

Viral load: 1 $\leq$ 50 copies/mL, 2>50 copies/mL $\leq$ 200 copies/mL, 3>200 copies/mL.

Target non-detectable (TND): 1 $\leq$ 50 copies/mL, 0>50 copies/mL.

Failure: 1>200 copies/mL, 0<200 copies/mL.

We used multilevel mixed-effects ordered logistic regression (meologit) and multilevel mixed-effects logistic (melogit) regression to measure the association between viral load and mental health status results and the outcomes of BIAC, Brief RCOPE and RSS Scale variables. Krause *et al* suggest that socioeconomic status is associated with spiritual struggles. They tested following core hypotheses: '(1) individuals with lower levels of educational attainment are more likely to encounter chronic economic difficulties; (2) people who experience ongoing financial strain are more likely to live in rundown neighbourhoods; (3) people who live in dilapidated neighbourhoods will be more angry than their well-to-do counterparts; (4) people who are more angry will, in turn, be more likely to experience spiritual struggles; and (5) greater spiritual struggles will be associated with more symptoms of physical illness'.<sup>44</sup> Besides controlling for age, gender and education, we also controlled for location (= health-facility) in our regression. We did not control for income, as almost all our participants are poor.

#### Patient and public involvement

The content of the questionnaire was a result of discussions with local researchers and experts from the medical, theological, traditional and social science field. The data collection team consisting of Zvandiri's senior research coordinator and former and current CATS were involved in editing and testing the questionnaire. This included assessment of the possible psychological burden for data collectors and respondents, defining 'red flag answers' and referral procedures, confidentiality issues and logistical and financial constraints (connectivity, access to phones, reimbursement of air-time costs) and the time required to participate in the research. During the analysing process, CATS were asked to comment on the results. Did the results reflect the impression the CATS had while conducting the data collection? CATS are peers of the participants of this study and their work includes

the following-up and support of young PLHIV to increase retention in care, and to link them to relevant services.<sup>45</sup>

## RESULTS

Only two participants had missing viral load results and were excluded. All other 802 participants had no missing variables and were included in the analysis.

Chronbach's alpha and Mokken Scale Analysis were used to ensure the validity of the three measurements in our context with young PLHIV in Zimbabwe.

### Validity check of BIAC, Brief RCOPE and RSS

**BIAC:** Mokken analysis identified one scale with six items. We created a standardised variable 'religious frequency' with alpha of the six items identified by the Mokken analysis. Out of the six items in the 'religious frequency' variable, two items relate to public practice and four items to private practice. Cronbach's alpha for the new standardised Frequency variable was 0.7.

Following four items of the BIAC were excluded by the Mokken analysis: What has the highest priority in your life now/what is most important? To what extent have you decided to place your life under God's direction? What percentage of your income do you give to your religious institution, faith group or to other R/S causes? To what extent have you decided to conform your life to the teachings of your religious faith? Out of these four items, we kept 'Life Priority' (binary: 10=God, 1=everything else), 'God\_commitment' (to place life under God's direction) and 'Religious\_commitment' (to conform life to religious teaching) as separate variables and eliminated 'church offerings', as we think, this item is not relevant in our context of extreme poverty.

**Brief RCOPE:** Cronbach's alpha for all six items was 0.7. Mokken analysis identified the two dimensions of the original scale—positive Coping with three items and negative coping with three items.

**RSS Scale:** Cronbach's alpha of all 26 items was 0.9. Mokken analysis of the RSS Scale resulted in four subgroups different to the original. Thus, we conducted an exploratory factor analysis (EFA) which also resulted in four subgroups, partly corresponding to the Mokken subgroups. The EFA subgroups were coherent, culturally relevant and were used for further analysis by creating four

new binary variables: Alienation, Confusion, Conflict/Doubt and Religious Zeal. A detailed explanation of the RSS validation and the resulting new subgroups/variables is available in our previous publication.<sup>41</sup>

### Participants' sociodemographic data

The sociodemographic data of our participants are summarised as follows (table 1).

#### Participants' religious affiliations

The majority of our participants belonged to a Christian church. Percentage of TND, treatment failure and probability of common mental disorder were differentiated according to the religious association (table 2). The role of religious affiliation as predictors of current viral load results has been described in a paper that is in review.<sup>46</sup>

### Participants' health parameters (primary and secondary outcome variables)

**Primary outcome:** mental health was checked with the SSQ-14. The mean of the SSQ-14 in our study sample was 3.24 (with a SD of 3.48). Average of more than 8 in the SSQ-14 indicates a probability of common mental disorder.<sup>38</sup> About 9.2% of our participants had an average of more than eight in the SSQ-14. However, this was not significantly related to viral load results.

**Secondary outcome:** the viral load result was described with three different variables—viral load for overall results with three categories according to the European AIDS Clinical Society's guidelines, 'TND' for undetectable viral loads and 'Failure' for viral load results indicating treatment failure (see table 3).

### Participants' BIAC, Brief RCOPE, RSS Scale results Belief into Action Scale

As explained earlier BIAC had following variables:

**Frequency standardised (std):** participants were asked 'On average, how much time do you spend for a religious activity?' Alpha of six items with Likert 1–10 (1=never/10=>5 hours) standardised (std)—mean:  $-5.54e-09$ /SD:0.67.

**Life Priority:** binary with 10=relationship with God and 1=everything else as priority.

**God Commitment:** participants were asked 'To what extent have you decided to place your life under God's

**Table 1** Participants' sociodemographic data

Variable	Category 1	Category 2	Category 3
Age	14–15 years: 15%	16–17 years: 45%	18–24 years: 40%
Gender	Females: 61.3%	Males: 38.4%	Other: 0.3%
Location	Urban: 49%	Peri-urban: 13%	Rural: 38%
Earning per month (>18 years)	Less than US\$25: 86%		More than US\$150: 3%
Education completed	<Grade 7: 7.1%	Grade 7: 20%	Secondary: 65.4% A-Level: 5% Tertiary: 2.5%
Relationship status	Single: 65.4%	Partner/married: 33.4%	Divorced/widowed: 1.2%

**Table 2** Participants religious affiliations (multiple answers were possible) and corresponding percentage of TND, treatment failure and probability of common mental disorder

Personal religion	Affiliation per cent	TND per cent	Failure per cent	Mental health risk per cent
Other	19	75.82	15.03	2.61
Traditional	4	89.66	10.34	10.34
Apostolic	24	69.74	21.54	6.67
Catholic	7	79.63	7.41	5.56
Pentecostal	19	75.48	10.32	8.39
Anglican	3	76.19	19.05	4.76
Baptist	2	61.54	23.08	0
Methodist	8	71.21	16.67	6.06
Muslim	1	80	20	20
None	10	69.14	20.99	2.47
More than one	3	91.3	0	4.35

TND, target non-detectable.

direction?’ (Likert 1–10, one being lowest)—mean: 2.2/SD: 3.

*Religious Commitment:* participants were asked ‘To what extent have you decided to conform your life to the teachings of your religious faith?’ (Likert 1–10, one being lowest)—mean: 7.7/SD: 2.4 (see table 4).

*Correlations between BIAC variables:* God commitment and religious commitment were moderately negatively correlated (0.5). Other correlations between the different variables were below 0.2.

**Brief Religious Coping Index**

*Positive Coping:* 3 items (Likert Scale 1 A great deal, 2 Quite a bit, 3 Somewhat, 4 not at all). Mean: 2/SD: 0.8.

*Negative Coping:* 3 items (Likert Scale 1 A great deal, 2 Quite a bit, 3 Somewhat, 4 not at all). Mean: 2.7/SD: 0.9

Participants were further asked: ‘To what extent is your religion/belief involved in understanding or dealing with stressful situations in any way?’ (Likert Scale 1 very involved, 2 Somewhat involved, 3 Not very involved, 4 Not involved). Mean: 2.3/SD: 1 (see table 4).

**RSS Scale**

The 26 questions of the RSS Scale have a 5-point Likert Scale: 1: not at all/does not apply; 2: a little bit; 3: somewhat; 4: quite a bit; and 5: a great deal. The mean was 2.2

with a SD of 0.8. The cutting point for the experience of considerable/intense R/S struggles was a minimum mean of 3. 16% of participants with average score  $\geq 3$  were considered to experience considerable/intense R/S struggles (see table 4).

**Results of mixed-effects logistic regression BIAC and brief RCOPE variables with results of viral load and mental health status**

Choosing to have the relationship with God as priority in life was linked with a higher probability of common mental disorder but was not significantly related with viral load results (table 5).

Positive religious coping showed a significant association with lower probability of common mental disorder. However, it was also linked with higher viral loads and less TNDs (table 5).

Negative religious coping was significantly related to lower probability of common mental disorder and less treatment failure (table 5). To better understand this relationship, we conducted the same mixed-effects logistic regression with each of the three variables separately. Feeling that stressful situations are God’s (or spiritual force’s) way of punishing for sins or lack of spirituality was significantly linked to less treatment failure (OR: 0.83, 95% CI: 0.7 to 0.98,  $P > |z|$ : 0.03) and lower probability of common mental disorder (OR: 0.7, 95% CI: 0.5 to 0.8,  $P > |z|$ : 0.0). Wondering whether God/spiritual force had abandoned the participant was significantly linked to lower probability of common mental disorder (OR: 0.69, CI: 0.6 to 0.87,  $P > |z|$ : 0.001). Trying to make sense of the situation and deciding what to do without relying on God/spiritual force did not have any significant relation with viral load results or mental health status.

The degree of conforming to the teaching of one’s faith was not related to viral load results or mental health. However, claiming high commitment to place

**Table 3** Viral load results

Variable	Value	Result in per cent
Viral load (overall)	$\leq 50$ copies/mL	74
	$>50$ copies/mL $\leq 200$ copies/mL	10
	$>200$ copies/mL	16
TND	$\leq 50$ copies/mL	74
Failure	$>200$ copies/mL	16

TND, target non-detectable.

**Table 4** Results of BIAC, Brief RCOPE and RSS Scale

Variables	Mean	SD	Result in %
BIAC			
Frequency (std)	-5.54e-09	0.67	
God commitment	2.2	3	
Religious commitment	7.7	2.4	
Life priority, binary			21% had relationship with God as priority
Brief RCOPE			
Positive coping, 3 items	2	0.8	
Negative coping, 3 items	2.7	0.9	
R/S involvement in coping (Likert 1-4)	2.3	1	
RSS Scale			
26 Items (Likert 1-5)	2.2	0.8	
Total struggle, binary (mean≥3 = 1)			16% with considerable/intense R/S struggles

BIAC, Belief into Action Scale; Brief RCOPE, Brief Religious Coping Index; R/S, religion/spirituality; RSS, Religious and Spiritual Struggles.

one's life under God's direction was significantly linked to increased treatment failure (table 5).

More time spent on private and public R/S activities were shown to be linked to a higher chance of TND and it was significantly associated with a higher probability of common mental disorder (table 5).

In conclusion it can be said that lower probability of common mental disorder was significantly linked to both, positive and negative religious coping, while increased time spent on religious activities significantly increased the probability. The risk of treatment failure was significantly reduced with negative religious coping and increased with claiming high commitment to place one's life under God's direction (table 5).

#### Results of mixed-effects logistic regression RSS and RSS subdomains identified by the Mokken analysis with results of viral load and mental health status

Considerable/intense R/S struggles had a significant negative influence on viral load results and mental health. Looking at the different subdomains of R/S struggles identified by Mokken analysis, we found slight variations of the impact on viral load and mental health (table 6).

#### Alienation factor

'The RSS items corresponding to this subdomain reflect feelings of hurt, isolation, misunderstanding and not being happy with the way religious activities are carried out'.<sup>41</sup> In a highly religious environment, low religiosity (lowest church affiliation, lowest God priority) may lead to pressure from family and society. This factor significantly related to higher probability of common mental disorder and higher risk of treatment failure. However, the OR for risk of treatment failure was smaller than the OR of the overall RSS (table 6).

#### Confusion factor

The RSS items under this subdomain express feelings of insecurity, loss of meaning, rejection and anger. People in this subcategory had the highest percentage of multiple religious affiliations and conflicting beliefs about HIV. Most importantly they had the highest percentage of having stopped anti-retroviral treatment for religious reasons.<sup>41</sup> Hence, this factor was significantly associated with higher viral load results. It had the highest OR for high overall viral load and risk for treatment failure. It was also significantly related to higher probability of common mental disorder (table 6).

#### Conflict/doubt Factor

This subdomain describes intellectual engagement with and questioning of religious, traditional and spiritual norms, attitudes and behaviours. In 'a context of religious conformity, questioning and doubting may lead to the experience described by the RSS items belonging to this subdomain. They refer to existential questions, struggle with the numinous and a sense of not belonging'.<sup>41</sup> This was reflected in the highest OR of a significant higher probability of common mental disorder. The conflict/doubt factor was also significantly related to increased viral load and less full suppression (TND) (table 6).

#### Religious Zeal

This subdomain is linked to high religiosity, strong conviction in the existence of God and highest percentage of believing in the power of spirits and in the use of herbal supplements. It also had the highest percentage in moralising views of HIV. 'The RSS items belonging to this subdomain express the struggle related to the failure of living up to religious standards. They describe self-questioning and self-condemnation, feelings of strained relationships with others, God and the spiritual world and the loss of ultimate meaning'.<sup>41</sup> Religious zeal was

**Table 5** Individual mixed-effect logistic regression results BIAC, Brief RCOPE, viral load, TND, failure and probability of common mental disorder

Variable <b>Controlling for age, gender, education, by facility</b> 95% CI (OR>1 = positive association) P> z	Viral load 1: ≤50 2: >50≤200 3: >200 In copies/mL	TND 1: ≤50 0: >50 In copies/mL	Failure 1: >200 0: ≤200 In copies/mL	Mental 1: total of SSQ-14>8 0: total of SSQ-14≤8
Life priority (binary)				
CI	0.6–1.4	0.7–1.5	0.45–1.2	0.97–2.9
OR	0.9	1.0	0.74	1.7
P> z	0.66	0.86	0.25	<i>0.062</i>
Positive coping (std) Cronbach’s alpha 0.69				
CI	0.99–1.47	0.68–1.01	0.94–1.51	0.41–0.85
OR	1.2	0.83	1.19	0.59
P> z	<i>0.065</i>	<i>0.064</i>	0.154	<b>0.005</b>
Negative coping (std) Cronbach’s alpha 0.66				
CI	0.75–1.13	0.87–1.32	0.60–0.1	0.43–0.83
OR	0.92	1.07	0.78	0.56
P> z	0.421	0.524	<b>0.049</b>	<b>0.002</b>
Religious commitment (Likert 1–10)				
CI	0.93–1.06	0.94–1.08	0.91–1.07	0.88–1.06
OR	0.99	1.00	0.98	0.97
P> z	0.768	0.893	0.705	0.501
God commitment (Likert 1–10)				
CI	0.99–1.09	0.92–1.02	1.01–1.13	0.92–1.09
OR	1.04	0.97	1.07	1.00
P> z	0.132	0.191	<b>0.024</b>	0.975
Frequency (std) Cronbach’s alpha 0.74				
CI	0.64–1.04	0.99–1.62	0.65–1.16	1.01–2.11
OR	0.82	1.27	0.87	1.46
P> z	0.103	<i>0.057</i>	0.327	<b>0.043</b>

Significant relations= $P>|z| \leq 0.05$  are in bold, important relations= $P>|z| 0.05 < 0.1$  are in italics.

BIAC, Belief into Action Scale; Brief RCOPE, Brief Religious Coping Index; SSQ-14, Shona Symptom Questionnaire; TND, target non-detectable.

significantly associated with higher viral load results, less TNDs, higher risk of treatment failure, and it also significantly related to higher probability of common mental disorder (table 6).

## DISCUSSION

Participants of this study were all part of an HIV programme. The introduction of Highly Active Antiretroviral Therapy has significantly reduced HIV viral load results. However, according to European AIDS Clinical Society’s guidelines, 16% of our participants’ blood results indicated treatment failure. This shows that additional, new and innovative measures of care and support are needed to help these young PLHIV to better comply with the treatment regime. The findings of this study confirm the significant role of R/S as a social determinant of

health for young PLHIV in Zimbabwe. Thus, integrating R/S aspects into the care and support of young PLHIV is not only desirable, but could become a key element for better adherence and treatment success. The findings of this study provide a basis for better identification of risk factors leading to treatment failure and indicate which aspects of R/S either hinder or further the individual health outcomes of young PLHIV.

The role of religious coping remains ambiguous. While positive religious coping was significantly related to lower probability of common mental disorder, it was also related to higher viral load results. This is contrary to other studies that linked religious coping with better health. In the study of Kremer *et al* spiritual coping led to slower HIV disease progression<sup>25</sup> and Ironson *et al* showed that the increased use of religious coping



**Table 6** Individual mixed-effects logistic regression results RSS and RSS subdomains identified by Mokken analysis, viral load and probability of common mental disorder

Variable Controlling for age, gender, education by facility 95% CI (OR) P> z	Viral load 1: ≤50 2: >50≤200 3: >200 In copies/mL	TND 1: ≤50 0: >50 In copies/mL	Failure 1: >200 0: ≤200 In copies/mL	Mental 1: total of SSQ-14>8 0: total of SSQ-14<8
Average RSS≥3	1.06–2.42 1.60 <b>0.026</b>	0.43–0.99 0.65 <b>0.045</b>	1.16–2.98 1.86 <b>0.011</b>	2.15–6.33 3.68 <b>0.000</b>
Alienation factor Binary (items' score average ≥3)	0.91–2.01 1.35 0.140	0.53–1.18 0.79 0.256	1.07–2.66 1.69 <b>0.025</b>	1.78–5.24 3.06 <b>0.000</b>
Confusion factor Binary (items' score average ≥3)	1.15–2.42 1.67 <b>0.007</b>	0.42–0.90 0.62 <b>0.012</b>	1.23–2.92 1.90 <b>0.004</b>	1.06–3.07 1.80 <b>0.030</b>
Conflict/doubt factor Binary (items' score average ≥3)	1.04–2.17 1.50 <b>0.029</b>	0.45–0.96 0.66 <b>0.028</b>	0.94–2.27 1.46 0.094	2.08–5.68 3.39 <b>0.000</b>
Religious zeal factor Binary (items' score average ≥3)	1.0–2.01 1.45 <b>0.027</b>	0.51–0.10 0.71 <b>0.047</b>	1.09–2.40 1.62 <b>0.016</b>	1.15–3.07 1.88 <b>0.012</b>

Significant relations= $P>|z|≤0.05$  are in bold.  
RSS, Religious and Spiritual Struggles; SSQ, Shona Symptom Questionnaire; TND, target non-detectable.

after stressful death/divorce was associated with slower increases in viral load.<sup>47</sup> Thus, further studies are needed to find out whether our findings are a case of reversed causality. Is positive religious coping used to cope with poor health? Negative religious coping had a positive influence on mental health and viral load results. Out of the three negative religious coping items, only the two items directly related to negative religious coping were significant. Maybe guilt feelings and/or feelings of being abandoned by God stir up higher efforts or motivation for treatment compliance? Again, our results do not align with those of Kremer *et al*. In their study, participants with negative religious coping had less undetectable viral loads.<sup>25</sup> Ironson *et al* did not include negative religious coping in their study.<sup>47</sup> Hence, further studies are needed to investigate how negative religious coping influences viral load results and mental health outcomes.

For time spent on religious activities, there was a significant higher probability of common mental disorder. Also choosing the relationship with God as priority in life was linked to higher probability of common mental disorder. This is contrary to the findings of most other studies, that link religiousness (often measured by church attendance and private religious practice) to better mental health. One of the biggest of these studies is Chen and VanderWeele's study with longitudinal data of more than 7000 adolescents. They found that 'compared with no attendance, at least weekly attendance of religious services was associated with greater life satisfaction and positive affect, a number of character strengths, lower probabilities of marijuana use and early sexual initiation and

fewer lifetime sexual partners'.<sup>48</sup> Why this was different in the Zimbabwean context, might partly be explained by the gendered and spiritualised ideas about blame, transmission and treatment of HIV, illustrated by O'Brien and Broom.<sup>49</sup> They describe how in Zimbabwe, HIV might be understood as a death sentence, as the result of promiscuity, as punishment from God and as being influenced by ancestors or spirits. Often HIV is associated with women.<sup>49</sup> This aligns with our own findings, reported in another publication under review where we show how religious and traditional beliefs and practices significantly influenced the health of young PLHIV in Zimbabwe.<sup>46</sup> Pfeifer explains that R/S beliefs, norms and attitudes influence the way life events (=stress, illness) are interpreted. The event might be given a spiritual meaning, or in other words, be spiritualised. This in turn, influences the psychosomatic mind–body interaction.<sup>50</sup> Our findings show variation in viral load results and mental health between different religious affiliations. Kawachi points out that some aspects of regular service attendance might be detrimental to health. Considering the different religious teachings in different faith communities, the health effects of religious involvement may depend on the practices, teaching/preaching that person is exposed to.<sup>5</sup> Thus, in a religious context of blame, shame and stigma, the spiritualising of HIV will mainly be negative, potentially leading to poorer mental health. This is one explanation. But causal relations are not always clear. Another explanation could be that increased religiousness is a coping mechanism for poor mental health. As our 'religious frequency' variable

included more items related to private religious practice than public religious practice, we suggest that private religious practice (like meditation, prayer, serving, getting religious input (books, radio, TV etc)) might be the way of coping for young PLHIV.

Another ambiguous finding was that a high degree of placing one's life under God's direction increased the risk of treatment failure. Again, this might be explained by harmful religious teaching (only rely on God and not medicine), or on the other hand, the desire to place one's life under God's direction could have originated in the belief that this would help to get out of a poor health condition.

The findings of this study show that considerable/intense R/S struggles seem to be an important and reliable indicator of poorer mental and physical health for young PLHIV among Zvandiri beneficiaries. While the SSQ-14 identified 9.2% of participants with a probability of common mental disorder, the RSS seemed to be more sensitive, identifying 16% of respondents with considerable/intense R/S struggles. Furthermore, in contrast to the SSQ-14 scores, the results of the RSS were significantly associated with viral load results. The four subcategories of the RSS provided useful information and descriptions of R/S struggles that were potentially harmful. This information could now be used to develop more holistic and

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