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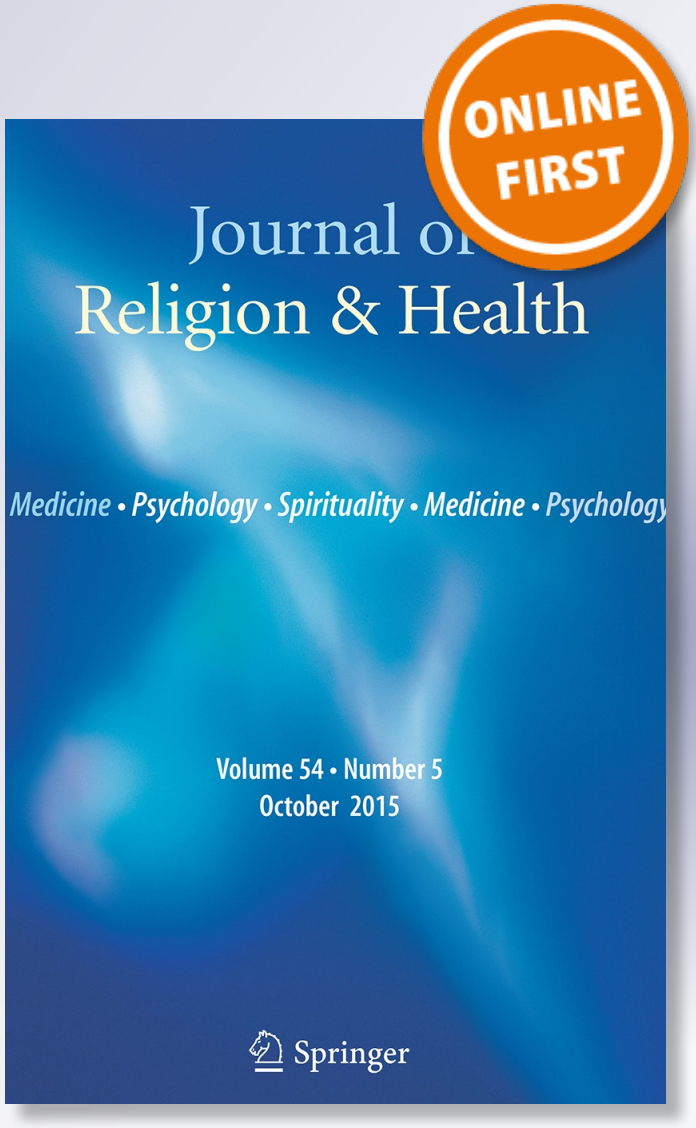

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ORIGINAL PAPER

Effect of a Faith-Based Education Program on Self-Assessed Physical, Mental and Spiritual (Religious) Health Parameters

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Abstract The aim of the study was to determine the effect of attending a faith-based education program (FBEP) on self-assessed physical, mental and spiritual health parameters. The study was designed as a prospective, observational, cohort study of individuals attending a 5-day FBEP. Out of 2650 sequential online registrants, those previously unexposed to the FBEP received automated invitations to complete 5 sequential Self-Assessment Questionnaire's (SAQ's) containing: (1) Duke University Religion Index (DUREL); (2) Negative Religious Coping (N-RCOPE); (3) Perceived Stress Scale (PSS); (4) Center for Epidemiology and Statistics-Depression Scale (CES-D); (5) Brief Illness Perception Questionnaire (BIPQ); and the (6) State Trait Anxiety Inventory (STAI). Pre-attendance SAQ (S1) was repeated immediately post-FBEP (S2), at 30 days (S3), 90 days (S4) and after 1 year (S5). Of 655 invited, 274 (42 %) succeeded, 242 (37 %) failed and 139 (21 %) declined to complete S1. Of the 274, 37 (14 %) were excluded at on-site interview; 26 (9 %) never attended the FBEP (i.e., controls: 5♂; 21♀; 27–76 years); and 211 (77 %) participated (i.e., cases: 105♂; 106♀; 18–84 years) and were analyzed over time: 211 (S1); 192 (S2); 99 (S3); 52 (S4); 51 (S5). IRB approval was via the Human Research Ethics Committee of Stellenbosch University. DUREL showed significant,

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sustained changes in Intrinsic Religiosity. N-RCOPE showed significant, lasting improvement. In others, median values dropped significantly immediately after the FBEP (S1:S2) for STAI-State $p < 0.0001$; PSS $p < 0.0001$; BIPQ $p < 0.0001$; and CES-D $p < 0.0001$; and at 1 month (S1:S3) for STAI-Trait $p < 0.001$; all changes were sustained (S3 through S5). This FBEP produced statistically and clinically significant changes; these lasted in those followed up >1 year.

Keywords Religion · Mental health · Spirituality · Religion and Medicine · Religion and Psychology

Introduction

Faith, religiosity and spirituality (F–R–S) play a significant role in the perception, prevention and treatment of disease (Stanley et al. 2011). Collectively, they have *indirect* effects by influencing people's understanding of the nature and etiology of disease; by favoring or prohibiting particular methods of disease management; by influencing utilization of healthcare resources; by affecting patient compliance and satisfaction; and by supporting or impairing recovery (Borras et al. 2007; Grossoehme et al. 2008; Kemppainen et al. 2008; Koenig 2007; Kremer et al. 2009; Lyon et al. 2011; Mellins et al. 2009; Parsons et al. 2006; Stewart and Yuen 2011). They may also have *direct* effects by being constituent parts of the therapeutic process, e.g., prayer. As a result, F–R–S and health research tends to fall into two broad categories: (1) *correlation studies* that typically explore psychosocial and behavioral elements of faith and attempt to identify potential mediators, factors and physiological mechanisms through which the positive or negative health effects may be explained; and (2) *intervention studies* that examine the effect of a specific F–R–S variable and an associated objective health outcome.

This study examined both of these components: In this first paper, we report the outcome of an *intervention*—a standardized faith-based education program (FBEP)—on a set of outcome measures. In a subsequent paper, we will examine the outcome data as *correlates* of morbidity and mortality. Therefore, the chosen outcome measures were all previously validated Self-Assessment Questionnaires (SAQ's), some of which have extensive normative data for comparison.

Justification for the study lay in the present paucity of scientific outcome data on health-oriented faith-based instruction on physical, mental and spiritual (religious) health parameters. While many faith-based organizations address health issues at some level, few offer standardized interventions that would permit the analysis of outcomes. Even fewer consider the durability of the results or the possible detrimental effects. Therefore, the objective of this paper was to report the outcomes of a standardized FBEP intervention: Were there effects; were they positive or negative; and did they last?

The FBEP intervention is a 5-day program called For My Life™ (4ML), presented by Be in Health Inc (BiH), an international, NFP Christian ministry specializing in faith-based teaching on spiritual, psychological and physical health issues. BiH has developed a wide range of Biblically based educational materials, ministry approaches and training programs aimed specifically at bio-psycho-socio-spiritual health and disease prevention. The 40-h 4ML program offers the initial, intensive, systematic teaching and ministry components and introduces a framework for ongoing discipleship from a Christian, Biblical perspective. It is estimated that approximately 30,000 people have attended the 4ML program since its

inception. A central part of the program is the so-called 8 R's, also called "the walk-out" which includes *recognition, responsibility, repentance, renunciation, removal, resistance, rejoicing* and *restoring* in response to negative life experiences, thoughts and emotions. There is a significant amount—approximately 20 h—of Biblically referenced teaching on sickness and health; pathways of disease and "spiritual roots" of disease; as well as the importance of forgiveness, resolving negative religious coping and becoming reconciled with God, others and themselves. Great emphasis is also placed on the effects of fear, stress and anxiety on health. Various opportunities for relational restoration and reconciliation with God, self and others are offered throughout the program—in the form of collective prayers of confession and repentance—to facilitate resolving unforgiveness and receiving God's love. The program concludes with a final 30-min individual "wrap-up" ministry session at the end to deal with any residual or outstanding issues. Negative Religious Coping and disempowerment issues are dealt with specifically throughout the program. Negative spiritual and emotional influences are externalized and objectified for the purpose of ensuring a functional internal *locus* of control in partnership with God and self. The negative influences and thoughts are categorized by means of descriptive names, like 'bitterness', 'accusation', 'envy & jealousy', 'rejection', 'unloving', and 'fear', to allow the participants to more readily identify them; to take authority over their impact on their lives and relationships; and to constructively pursue and manifest positive emotions, behavior and relational skills in return (analogous to Cognitive Behavioral Training). The emphasis is on empowering individuals to accept responsibility for their lives and to realize that reconciliation with God and others is the primary objective. This, in turn, will facilitate removal of existing barriers to spiritual, mental and physical health recovery. The goal, therefore, is not primarily healing but relational restoration; healing is presented as the by-product of restored relationships.

Methods

Study Design

The study was designed as a prospective, observational, cohort study of individuals attending a 5-day FBEP called "For My Life ™" (4ML) with IRB approval. The FBEP was presented by Be in Health Inc (www.beinhealth.com), a 501(c)3 organization in Thomaston, GA. During FBEP online registration, all individuals who indicated their age as ≥18 years and had no prior exposure to the FBEP (or its associated materials) received

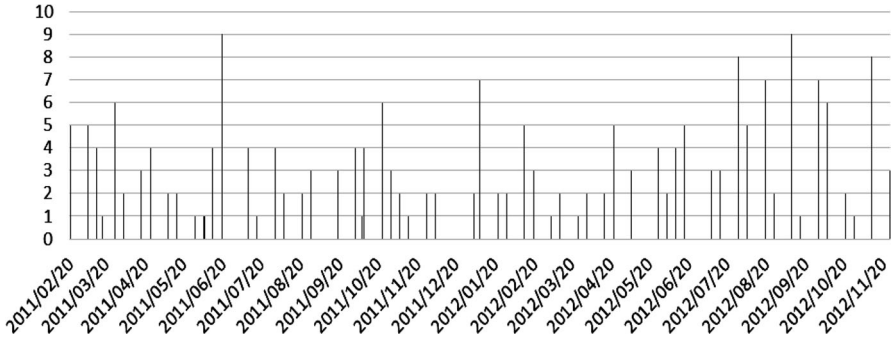

Fig. 1 Subject enrollment over 21-month study period and 63 consecutive FBEPs

an automated online invitation to participate in the study; no other methods of solicitation were employed, and no other subjects were recruited. The only incentive to participate was a complimentary book related to the program material; there were no other benefits to participating. Sample size calculations were performed using Stata/IC 10.1 for Windows (StataCorp LP, 4905 Lakeway Drive, College Station, TX 77845, USA). The study required 44 cases for a power of 0.9 and an alpha of 0.05. To allow for on-site exclusion and attrition over time, a target of 250 subjects was selected. Enrollment was from February 1, 2011, to November 21, 2012 (21 months). Between 1 and 9 subjects (out of a class of 16–95 attendees; average 41) enrolled over 63 consecutive 4ML programs (see Fig. 1).

The FBEP director and teachers were blinded to who the subjects were. Apart from the initial, brief on-site eligibility interview with the on-site research coordinator, contact with subjects was limited to e-mailed instructions to complete the follow-up SAQ's. Long-term follow-up continued until January 15, 2014. The 91-item SAQ was offered online via Survey Monkey (www.surveymonkey) using a personal e-mailed link. All data were entered directly into the survey. The results were de-identified and exported for analysis with subject numbers allocated to permit collation. No alterations were made to the data entries. All incomplete surveys were excluded from analysis. Scoring and reverse scoring configurations were verified meticulously to assure validity of the SAQ results. The SAQ was completed once before and four times after the FBEP: SAQ 1 (S1) was taken during FBEP online registration; SAQ 2 (S2) was immediately after the FBEP (with a 7-day cutoff period); SAQ 3 (S3) was at 30 days after S2; SAQ 4 (S4) was at 60 days after S3; and SAQ 5 (S5) was taken at the end of the study period, more than 1 year after S1. Participants received two e-mail prompts, 7 days apart, to complete SAQ's S2, S3, S4. If they failed to respond within 7 days of the second e-mail, they were excluded from further surveys other than S5, which all subjects (cases and controls) were again invited to complete. See Fig. 2. A brief telephone interview was performed within 30 days of S4 to determine whether the participants had participated in any alternative interventions and to obtain qualitative

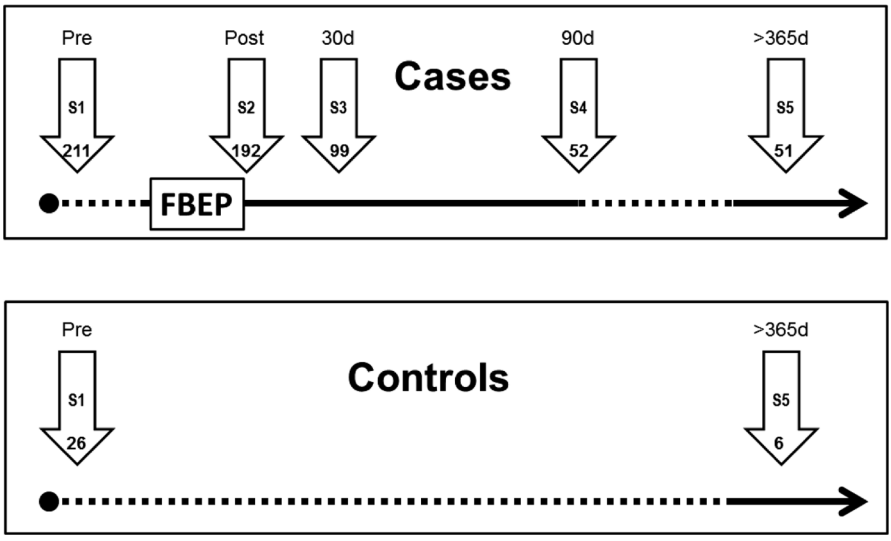

Fig. 2 Study timeline for cases and controls

information about their experiences during and following the program. The S5 questionnaire was also accompanied by an introductory set of questions to determine whether participants had received any interventions between S4 and S5. No participants reported any additional interventions other than routine religious involvement and medical care.

Participants

Out of 2650 sequential online registrants during the enrollment period, 655 indicated they were of eligible age and had no prior exposure; these were invited to participate. Of these, 274 (42 %) were successful in submitting S1; 242 (37 %) were unsuccessful; and 139 (21 %) were unwilling to participate. Of the 274, 26 never attended the FBEP (i.e., controls: 5♂; 21♀; 27–76 years); 211 met the eligibility criteria (i.e., cases: 105♂; 106♀; 18–84 years); and 37 were excluded during the on-site interview. Reasons for exclusion were: age <18 years; any prior exposure to the program or its material before the first day of the FBEP; not personally completing the SAQ's; and lack of English and basic computer proficiency for proper comprehension of the FBEP material and valid completion of the questionnaires. The derivation of the study sample is depicted in Fig. 3.

Age and gender distribution are shown in Fig. 4 in 5-year intervals. All the participants were US citizens, thereby permitting comparison to US normative data.

Research Instruments

The 91-item SAQ was made up of 6 components: (1) Duke University Religion Index (DUREL); (2) Negative Religious Coping (N-RCOPE); (3) Perceived Stress Scale (PSS); (4) Center for Epidemiology and Statistics-Depression Scale (CES-D); (5) Brief Illness Perception Questionnaire (BIPQ); and (6) State Trait Anxiety Inventory (STAI).

The *DUREL* is a 5-item questionnaire that measures Organizational and Non-Organizational Religious Activity (i.e., ORA and NORA—also classified collectively as Extrinsic Religiosity); and private or Intrinsic Religiosity (IR) (Harold G. Koenig and Büssing 2010). The higher the score the greater the involvement in religious activities. The

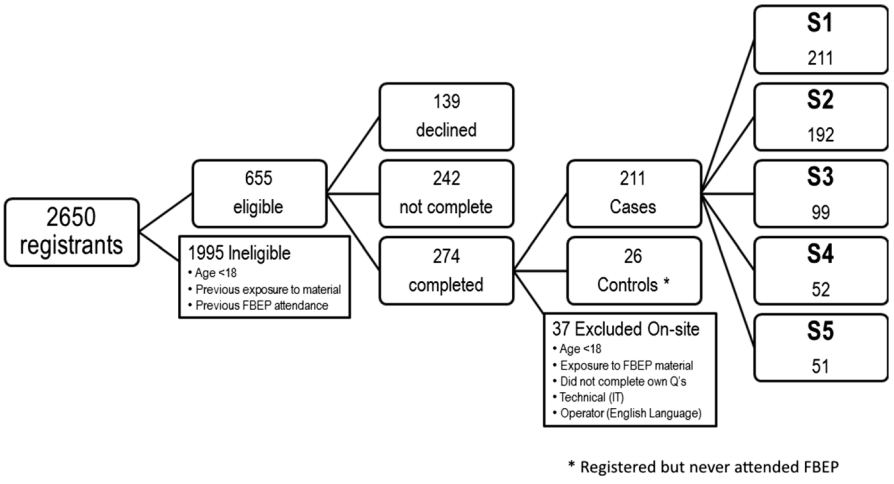

Fig. 3 Derivation of the study sample

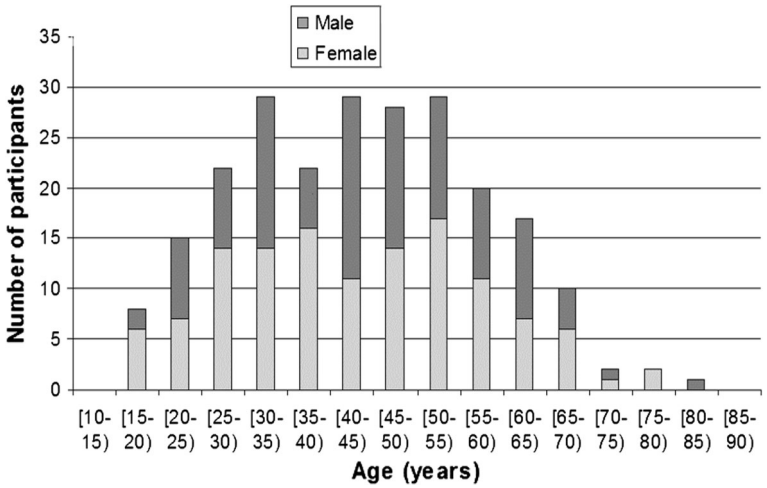

Fig. 4 Age and gender distribution of subjects—in 5-year increments

questionnaire has been used extensively in regression analyses linking religious activity and health outcomes. It has good test–retest reliability (Koenig and Büssing 2010; Storch et al. 2004).

The *N-RCOPE* is a 7-item questionnaire. It assesses spiritual discontent, perceived spiritual punishment and harmful spiritual influences related to illness (Pargament et al. 2000). Scores are from 0 to 21. The higher the score the greater the ability to cope in a positive religious way to life's stressors. The questionnaire has good test–retest reliability and identifies important negative religious factors that have been associated with poor mental and physical health outcomes (Pargament et al. 2011).

The *PSS* is a 10-item questionnaire that assesses perceived stress (Cohen 1983; Cohen et al. 1995). Scores range from 0 to 40. It measures the extent to which a person perceives that life's demands exceed their ability to cope. The higher the number the greater perceived stress in the individual's life. The PSS has established associations with physical symptoms and abnormal health parameters (Burns et al. 2002; Carpenter et al. 2004; Cohen et al. 1993; Cruess et al. 1999; Culhane et al. 2001; Ebrecht et al. 2004; Epel et al. 2004; Holzel et al. 2010; Kramer et al. 2000; Leon et al. 2007; Malarkey et al. 1995; McAlonan et al. 2007; Stone et al. 1999).

The *CES-D* is a 20-item questionnaire that assesses depressive symptoms in the past week (Radloff 1977). It is well recognized in depression research for a general population (Choi et al. 2014; Radloff 1977; Schein and Koenig 1997). Scores range from 0 to 60. The higher the score the more depression there is. It also correlates with abnormal EEG findings associated with depression (Diego et al. 2001).

The *BIPQ* is an 8-item questionnaire that offers high-yield information on perception of an individual's illness as a threat (Broadbent et al. 2006; Leventhal 1984). Scores range from 0 to 80. A higher score indicates a more threatening view of illness. It has been validated over a large spectrum of illnesses relevant to the study population (Broadbent et al. 2008).

Table 1 Comparison of mean scores of the study population and general population norms for PSS, CES-D and STAI over time

Scale	Norms	S1			S2			S3			S4			S5		
	M (SD)	M (SD)	MD	*p*	M (SD)	MD	*p*	M (SD)	MD	*p*	M (SD)	MD	*p*	M (SD)	MD	*p*
PSS (women) (Cohen and Janicki-Deverts 2012)	16.14 (7.56)	25.07 (8.16)	+8.9	<0.001*	16.56 (9.29)	+0.4	0.89	13.80 (6.27)	−2.3	<0.01#	14.30 (6.44)	−1.8	0.14	15.87 (8.84)	−0.3	0.61
PSS (men) (Cohen and Janicki-Deverts 2012)	15.52 (7.44)	20.87 (8.57)	+5.4	<0.001*	14.16 (8.60)	−1.4	0.06	10.22 (6.31)	−5.3	<0.001#	10.28 (5.93)	−5.2	<0.001#	13.82 (9.15)	−1.7	0.10
CES-D (Crawford et al. 2011)	10.24 (9.67)	23.87 (15.95)	+13.6	<0.001*	12.54 (11.89)	+2.3	0.79	8.91 (8.31)	−1.3	<0.01#	9.13 (10.98)	−1.1	<0.05#	9.80 (12.86)	−0.4	0.14
CES-D (Radloff 1977)	9.25 (8.58)	23.87 (15.95)	+14.6	<0.001*	12.54 (11.89)	+3.3	0.11	8.91 (8.31)	−0.3	0.07	9.13 (10.98)	−0.1	0.09	9.80 (12.86)	+0.6	0.26
STAI-S (women) (Spielberger 1983)	35.20 (10.61)	50.79 (16.29)	+15.6	<0.001*	31.31 (11.24)	−3.9	<0.001#	33.61 (10.22)	−1.6	0.13	34.48 (14.89)	−0.7	0.26	35.96 (17.26)	+0.8	0.43
STAI-S (men) (Spielberger 1983)	35.72 (10.40)	44.53 (16.62)	+8.8	<0.001*	32.75 (13.85)	−3.0	<0.01#	29.52 (11.29)	−6.2	<0.001#	28.72 (10.79)	−7.0	<0.01#	32.57 (13.07)	−3.2	0.08
STAI-T (women) (Spielberger 1983)	34.79 (9.22)	51.77 (15.02)	+17.0	<0.001*	39.94 (13.17)	+5.2	<0.001*	37.12 (10.81)	+2.3	0.19	38.26 (13.75)	+3.5	0.48	37.52 (16.91)	+2.7	0.98
STAI-T (men) (Spielberger 1983)	34.89 (9.19)	46.77 (15.25)	+11.88	<0.001*	37.35 (13.14)	+2.5	<0.01*	31.60 (11.35)	−3.3	<0.001#	31.17 (11.71)	−3.7	<0.01#	34.29 (13.01)	−0.6	0.08

* Significantly higher than population mean

Significantly lower than population mean

The *STAI* has 40 items and is made up of 2 parts (Bergua et al. 2012; Kvaal et al. 2005; Oei et al. 1990; Tenenbaum et al. 1985): Part One (State Anxiety or STAI-S) has 20 items measuring current anxiety; the higher the number the more anxious the individual feels *right now* (Spielberger 1983). Part Two (Trait Anxiety or STAI-T) has 20 items measuring long-term anxiety; the higher the number the more anxious the person feels *generally* (Spielberger 1983). Both parts have scores ranging from 20 to 80.

At the conclusion of the study period, all valid SAQ's were analyzed: (1) *cases* **S1**: 211; **S2**: 192; **S3**: 99; **S4**: 52; and **S5**: 51; (2) *controls* **S1**: 26; **S5**: 6 (female only). Twenty cases completed all 5 SAQ's; then, to increase the number of S5′s a second invitation was sent to the remaining 218 participants. Cases who did not complete all 5 surveys were categorized as lost to follow-up (LTFU) as opposed to those cases who completed (CMPL) all of them; these two groups were compared at baseline (S1) and immediately after the FBEP (S2) to assess bias and possible predictors of attrition (Fewtrell et al. 2008)—see Table 2.

Biostatistics

Statistical analyses were performed using STATGRAPHICS® Sigma Express for Microsoft Excel® (Statpoint Technologies, Inc, USA; www.statgraphics.com). Wilcoxon rank-sum tests were performed to determine the level of significance between the means of the subscales of the respective SAQ's. Kruskal–Wallis rank tests were used for determining differences in medians. The reference groups were derived from the original scale publications or from the most appropriate recent population data available online (Cohen and Janicki-Deverts 2012; Crawford et al. 2011; Radloff 1977; Spielberger 1983); *p*-values in Table 1 were obtained using the Wilcoxon signed-rank test; and for Table 2. Fischer's exact test was used after confirming equal variances.

Table 2 Attrition analysis—comparison between those completing all 5 surveys (completers or CMPL; $n = 30$) and those with less than 5 surveys (lost to follow-up or LTFU; $n = 181$)

Metrics	LTFU ($n = 181$)	CMPL ($n = 30$)	p value
Comparison at baseline (S1)—mean (±SD)			
Age	43.0 (±14.1)	43.8 (±13.1)	0.767
Gender (male/female)	88/93	17/13	0.4373
N-RCOPE	16.42 (±4.18)	17.33 (±4.32)	0.258
BIPQ	41.91 (±17.39)	44.43 (±15.67)	0.457
PSS	23.24 (±8.56)	21.4 (±8.90)	0.28
CES-D	24.05 (±15.66)	22.8 (±17.82)	0.692
STAI-S	47.94 (±16.66)	46.1 (±17.27)	0.578
STAI-T	49.67 (±15.16)	46.93 (±16.24)	0.365
Comparison of changes S1 vs. S2 [mean (SD)]			
N-RCOPE	0.975 (±3.61)	0.3 (±3.075)	0.337
BIPQ	−13.37 (±17.0)	−23.767 (±17.9)	0.003*
PSS	−7.05 (±8.5)	−8.6 (±10.3)	0.376
CES-D	−10.66 (±10.7)	−12.87 (±12.64)	0.414
STAI-S	−14.31 (±15.8)	−19.83 (±16.6)	0.082
STAI-T	−9.82 (±5.1)	−13.133 (±14.10)	0.266

* Significantly greater improvement in CMPL

Results

Of the 211 cases, 190 (90 %) attended the FBEP within 1 month and 134 (64 %) attended within 2 weeks (range 1–213 days), of completing S1. Compliance with the time-sensitive points for S2, S3 and S4 was excellent (see Fig. 5) with minor variability due to response time to the e-mail prompts. Personal qualitative telephone interviews were scheduled within 30 days of completing S4; none of the participants reported receiving any additional interventions of a medical, psychiatric, counseling or faith-based nature, other than routine follow-up and religious activities since attending the FBEP. Responses to specific introductory questions on S5 confirmed no additional interventions between S4 and S5.

Changes in the DUREL scale are depicted in Fig. 6: Because the FBEP included ORA, NORA and IR activities, changes between S1 and S2 would be expected to reflect the *content* of the FBEP program relative to the individual's baseline religiosity: There was no statistically significant change between median ORA scores at S1 vs. S4 ($p = 0.06$) or S1 vs. S5 ($p = 0.09$). Median and mean NORA scores did increase statistically between S1 vs. S3, S4 and S5 ($p < 0.001$ for each, respectively), whereas S3, S4 and S5 did not differ statistically. Median and mean IR scores also increased significantly between S1 vs. S3, S4 and S5 ($p < 0.001$, respectively) without statistically significant differences between S3, S4 and S5.

The median N-RCOPE scores improved after the FBEP (see Fig. 7); differences between S1 vs. S2, S3, S4 were all significant ($p < 0.0001$, respectively); S3 was also statistically higher than S2 ($p < 0.001$), whereas S3, S4 and S5 did not differ statistically from each other. Confidence intervals did not overlap between S1 and S2 and narrowed over 3 years, with homogenization of the group.

The CES-D changes are depicted in Fig. 8. The initial values showed a wide distribution from S2 onwards, with an homogenization of values; the changes were preserved over the remainder of the study period. The median and 95 % confidence intervals of S2, S3, S4 and S5 did not overlap with S1.

Based on epidemiological studies, CES-D scores were grouped as follows: low (<15); mild-to-moderate depression (16–21); and possible major depressive illness (>21) (Radloff 1977; Schein and Koenig 1997; Stansbury et al. 2006). Using these criteria, there was a significant redistribution of the possible major toward low-grade depression (see Fig. 9)

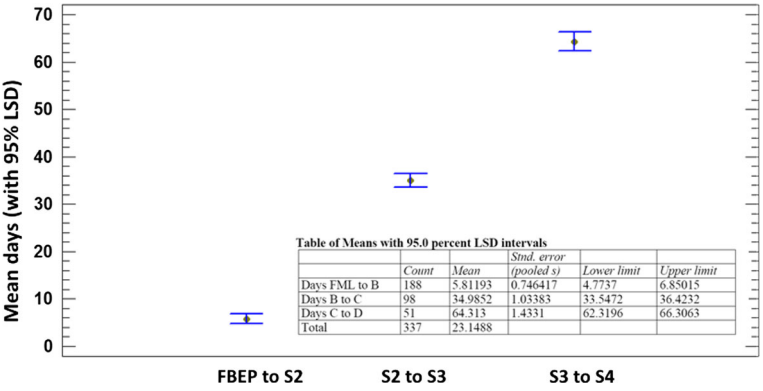

Fig. 5 Period between FBEP and time-sensitive SAQ's (S2, S3 and S4)

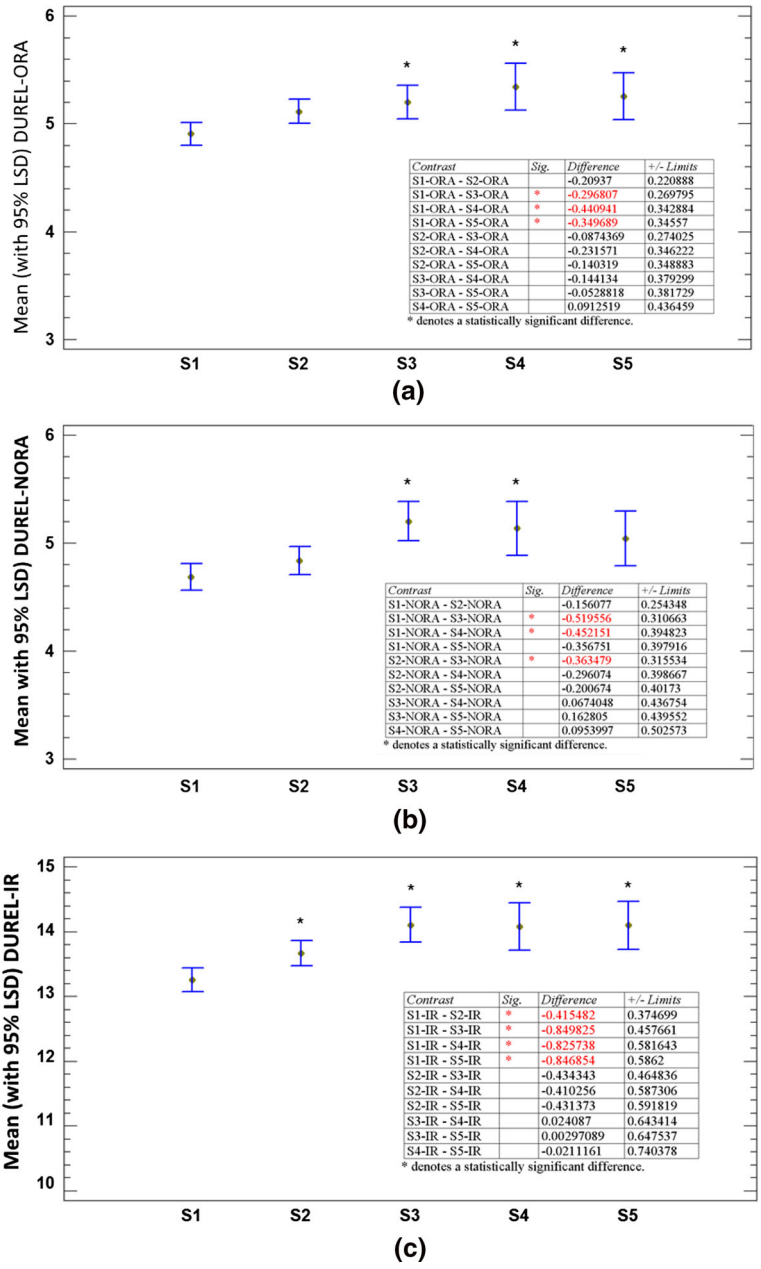

Fig. 6 DUREL score changes over time. **a** Organizational Religious Activity (ORA). **b** Non-Organizational Religious Activity (NORA). **c** Intrinsic Religiosity (IR). In these figures, the embedded tables show the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level

($p < 0.0001$). The ratio between low-grade and major depression continued to improve between S1 vs. S3 ($p < 0.0001$), and the relative proportions were maintained through S5.

The BIPQ scores dropped significantly after the FBEP with a decrease in median and mean values between S1 vs. S2 ($p < 0.0001$); a gradual homogenization of the population; and no statistically significant difference between S2, S3, S4 and S5. See Fig. 10.

Median and mean PSS scores also dropped with statistical significance between S1 vs. S2 ($p < 0.0001$) and S2 vs. S3 ($p < 0.001$) with no further significant changes from S3 through S5. See Fig. 11.

State Anxiety (STAI-S) median and mean scores showed a prompt drop at S2 ($p < 0.0001$) and no further significant changes between S2 through S5—see Fig. 12.

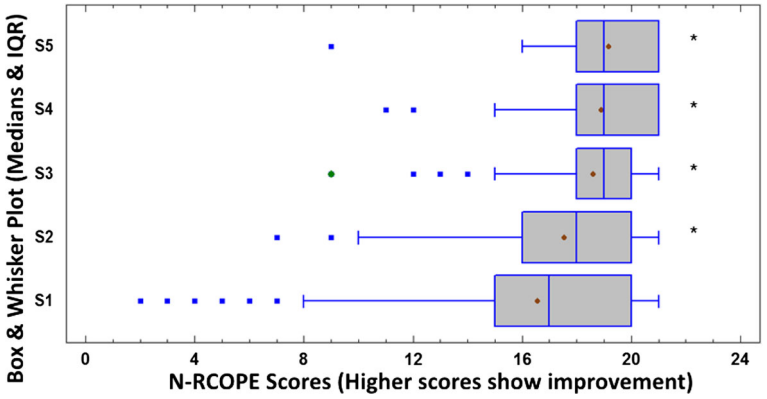

Fig. 7 Negative RCOPE changes over time

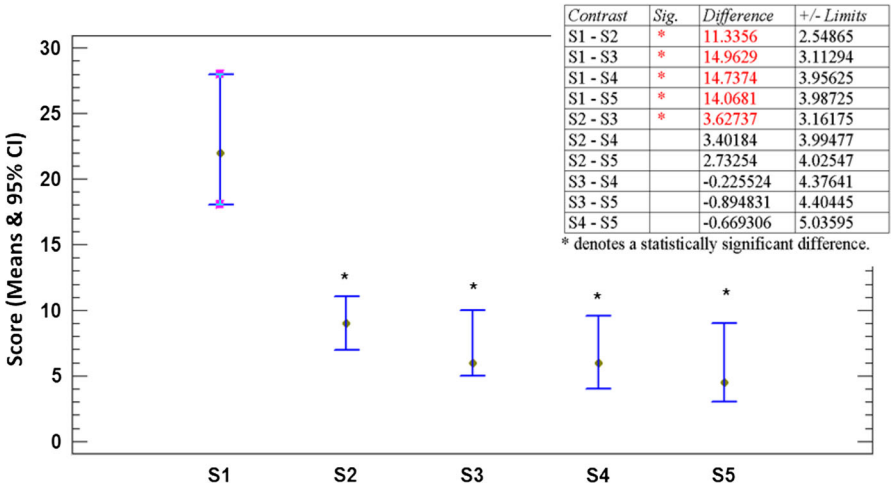

Fig. 8 CES-D changes over time. In this figure, the embedded table shows the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level

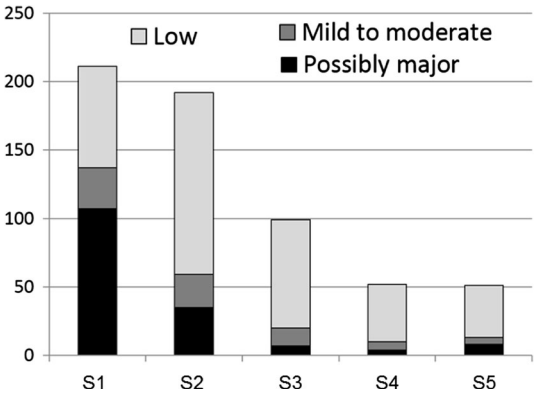

Fig. 9 CES-D changes over time—by category. The *bar graph* shows the CES-D scores for all cases grouped as low (<15); mild to moderate (15–21); and possibly major (>21) depression

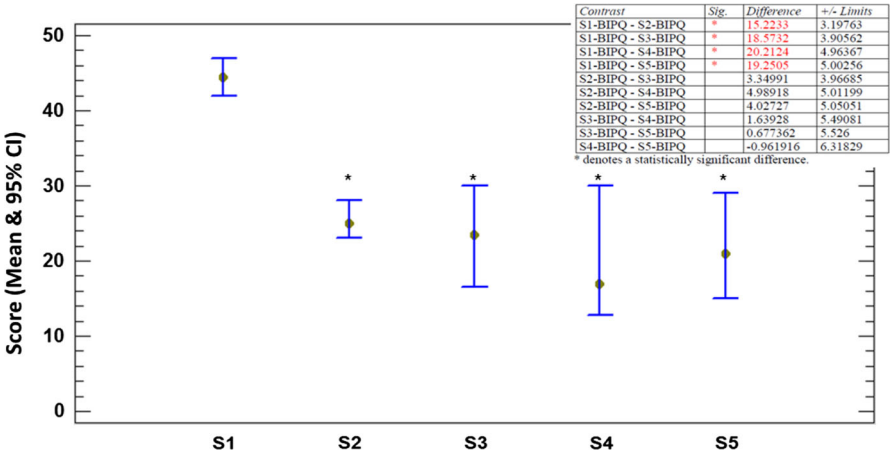

Fig. 10 BIPQ changes over time. In this figure, the embedded table shows the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level

Lastly, as would be expected, STAI-T dropped more slowly than STAI-S; as such, significant statistical differences were recorded between median and mean values for S1 vs. S2 and between S2 and S3 ($p < 0.002$). There was no statistical difference between S3, S4 and S5—see Fig. 13a. The box and whisker plot shows a homogenization of the population—Fig. 13b.

Discussion

The vast majority (90 %) of the subjects attended the FBEP within a month of online registration. As such, the changes immediately following the program are more likely to be the result of the FBEP than a time-based deviation towards the mean. This is also supported by the fact that the measures did not revert to the baseline values over time.

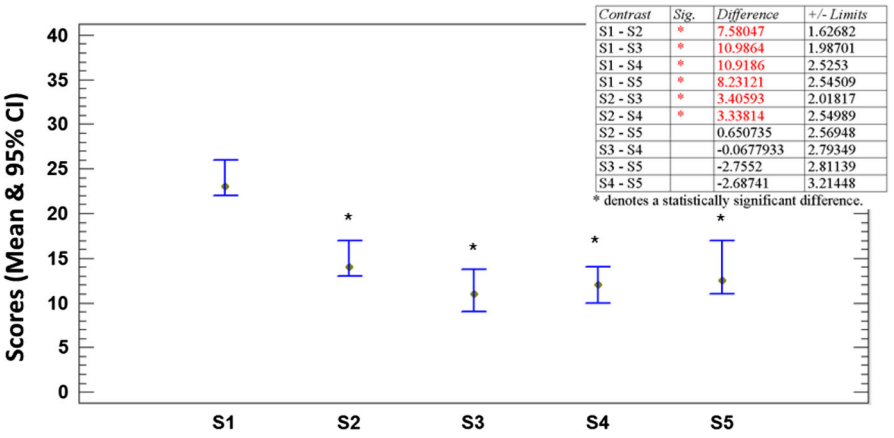

Fig. 11 PSS changes over time. In this figure, the embedded table shows the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level

To reflect the changes in more absolute terms, the CES-D, PSS and STAI data from the sample were compared to population norms (see Table 1). The study population scored significantly *higher* at baseline (S1): PSS women ≈ 1 SD, PSS men ≈ 1.5 SD; CES-D ≈ 1.5 SD; STAI-S women ≈ 1.5 SD; STAI-S men ≈ 1 SD; STAI-T women ≈ 2 SD; and STAI-T men ≈ 1 SD. This suggests poorer mental health on entry into the study (Cohen and Janicki-Deverts 2012; Radloff 1977; Spielberger 1983). Immediately after the FBEP program, S2 scores were reduced by ≥1 SD on all scales. PSS and CES-D scores were now comparable with population means, whereas STAI-S scores were significantly below population means. STAI-T also underwent a highly significant change at S2, relative to S1, but was still significantly above population norms. By 90 days (S3) the STAI-T for males approached population norms; for women it was still slightly above normal mean scores.

The attrition analysis is shown in Table 2. When comparing those completing less than 5 surveys (lost to follow-up [LFTU]) vs. all 5 surveys (completers [CMPL]), no significant differences were found for age ($p = 0.767$), gender ($p = 0.437$), N-RCOPE ($p = 0.258$), BIPQ ($p = 0.258$), PSS ($p = 0.28$), CES-D ($p = 0.692$), STAI-S ($p = 0.578$) or STAI-T ($p = 0.365$).

Similarly, when comparing LTFU and CMPL according to recorded changes in scores between S1 and S2 (excluding DUREL—as explained previously), only the BIPQ changes were significantly different between the groups; this suggests that cases who experienced positive changes in BIPQ may have been more likely to complete all 5 surveys, whereas changes in the other measures were not significantly associated with attrition.

In general, the FBEP had a remarkably prompt, statistically and clinically significant 'normalizing' and homogenizing effect on the respective parameters by S2. Interestingly, by 30 days (S3), most of the scores were still decreasing from the S2 values with PSS, CES-D and STAI (men) reaching levels significantly below population means. The observed changes were largely maintained by 90 days (S4), with STAI (women) now approaching population means. After a year (S5), all mean scores had returned to population means which, as noted previously, were significantly different from S1 scores: For

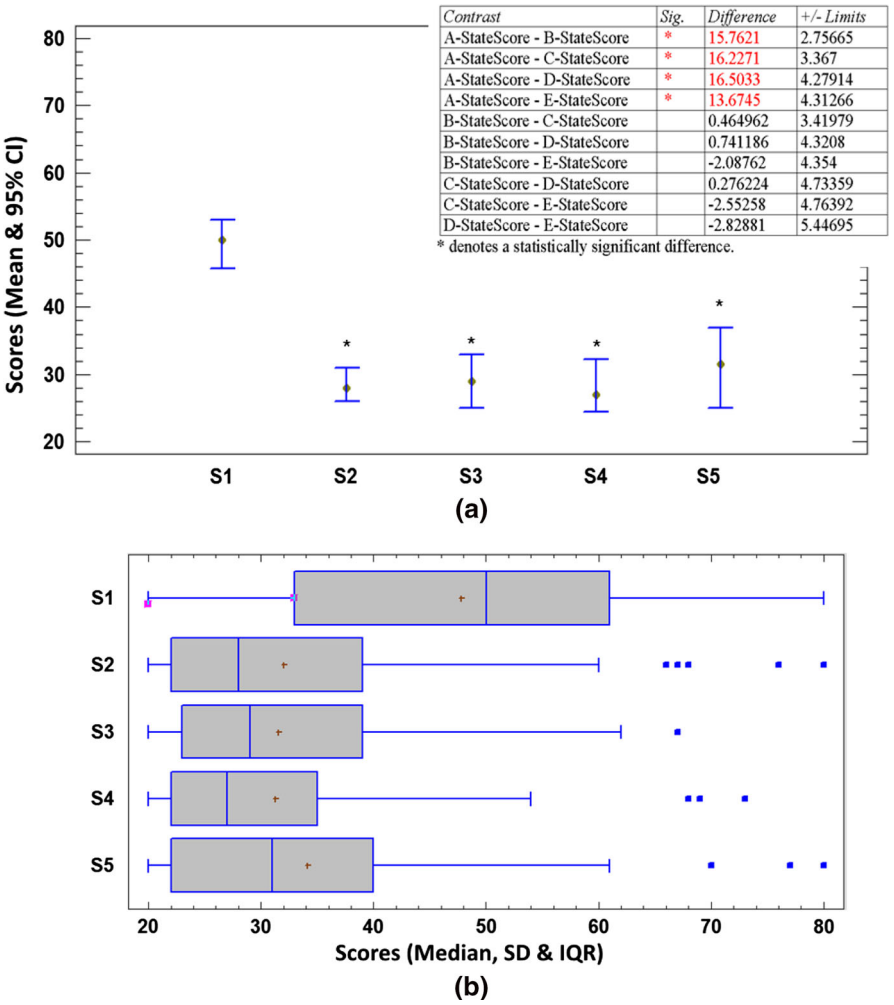

Fig. 12 **a** STAI-S changes over time. In this figure, the embedded table shows the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level. **b** STAI-S changes over time

each index, the difference was ≈ 1 SD below the baseline scores and on par with the general population. Thus, the FBEP appeared to improve the study population's mental health parameters (as measured by these scales and compared to population norms), and this continued to improve in the period of follow-up after the program and was maintained for >1 year.

It is important to state that not everybody benefited equally from program. However: When reviewing the 211 individual scores, some individuals experienced an initial increase in scores (i.e., defined as any increase in score, irrespective of magnitude) between S1 and S2 for N-RCOPE ($n = 81$; 38 %); BIPQ ($n = 34$; 16 %); PSS ($n = 34$; 16 %); CES-D ($n = 33$; 16 %); STAI-S ($n = 24$; 11 %) and STAI-T ($n = 40$; 19 %). However, the vast

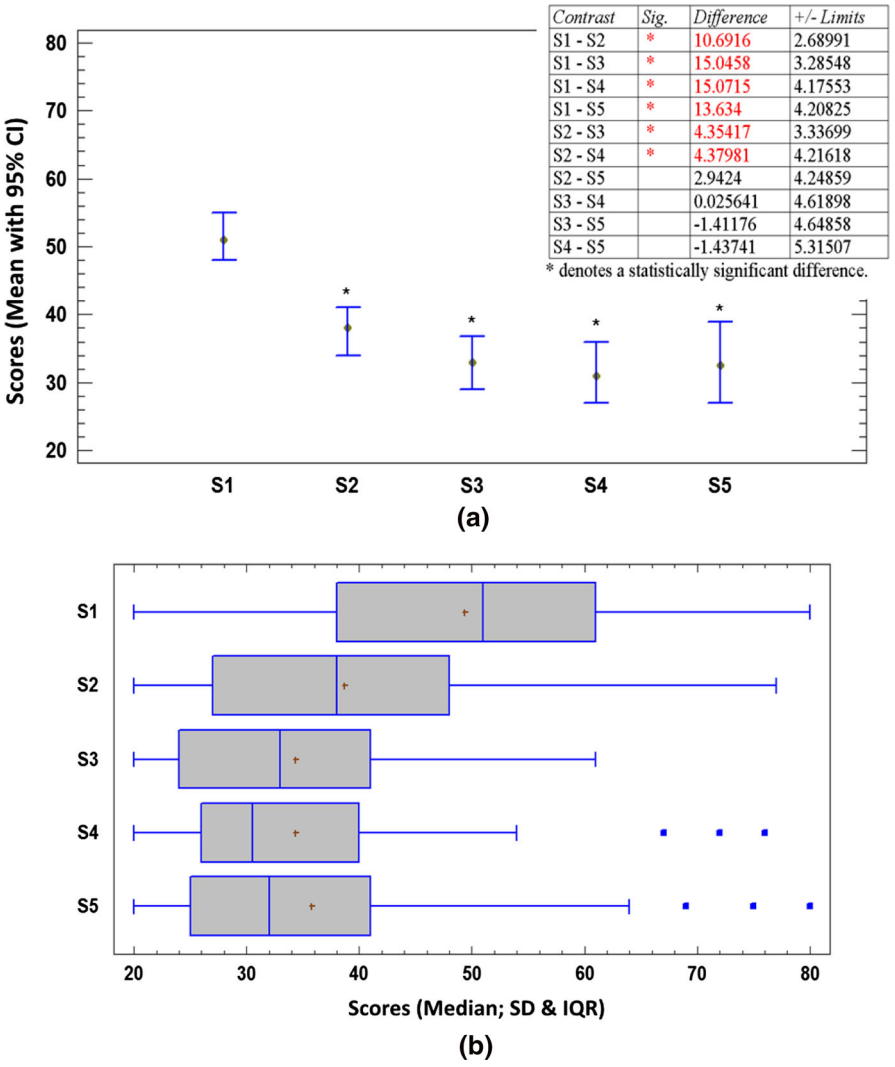

Fig. 13 **a** STAI-T changes over time. In this figure, the embedded table shows the application of a multiple comparison procedure to determine which means are significantly different from which others. The output shows the estimated difference between each pair of means. The *asterisk* indicates statistically significant differences at the 95.0 % confidence level. **b** STAI-T changes over time

majority of these were minor increases. The majority of the participants followed the general trend of significantly lowered scores or improved significantly by S3.

The FBEP improved N-RCOPE scores significantly, suggesting a more constructive religious perspective on the circumstances or the condition that brought participants to the FBEP. The DUREL Extrinsic Religiosity scores were not affected over time, whereas IR scores—which correlate more closely with better health outcomes—did show a significant increase from baseline.

Limitations

As is not unusual for these studies, there was a 75 % attrition over the full study period. With 92 % completing S2, however, the evidence supporting the initial impact of the FBEP is strong. The evidence for enduring effects is weakened by the attrition over time, although those who completed all 5 surveys (CMPL) did show lasting changes. The attrition analysis did show that, with the exception of BIPQ changes from S1 to S2, the LTFU and CMPL groups did not differ significantly from each other (Table 2). However, it is obviously impossible to determine whether the LFTU group ($n = 181$) retained the recorded changes through to S5, even though some did complete S3 ($n = 69$; 38 %) and S4 ($n = 22$; 12 %), respectively, and changes in their respective scores were maintained until their last completed survey.

It is unfortunate that the small number of female-only controls at S5 did not allow for a meaningful case–control analysis. Comparisons between cases and controls at S1 did not show any significant differences, however.

In addition, all the general strengths and weaknesses inherent to SAQ's in assessing health status apply to this study (Smith and Goldman 2011) and specifically for each of the respective SAQ scales employed (Bergua et al. 2012; Broadbent et al. 2006; Choi et al. 2014; Cohen 1983; Cohen et al. 1995; Koenig and Büssing 2010; Kvaal et al. 2005; Leventhal 1984; Oei et al. 1990; Pargament et al. 2000, 2011; Radloff 1977; Schein and Koenig 1997; Tenenbaum et al. 1985).

The following potential biases were also identified, assessed and mitigated where possible. *Volunteer bias*: For various reasons, persons who chose to enroll for the FBEP may have differed from general population, thereby limiting the extent to which the data can be extrapolated. Reassuringly, baseline SAQ data showed significant heterogeneity, whereas demographic data analysis reflected a near-normal distribution by age and gender. *Self-selection bias*: Persons opting to complete the survey may have differed from those who chose not to. However, after the a priori exclusion of underage and previously exposed individuals, only 21 % opted out of the study. As such, the study was able to capture 79 % of the eligible participants during the study period. *Computer-literacy bias*: Thirty-seven percent of the subjects enrolling for the study failed to complete and submit the first SAQ successfully. Recent polls state that more than 50 % of US citizens above the age of 65 years use the internet regularly, whereas more than 75 % under 65 years do. Moreover, it is normative for approximately 97 % of all regular program registrations for the FBEP to be received online. We were therefore surprised by the relatively high "failure" rate; a bias toward higher levels of computer literacy cannot be excluded. *Language bias*: For practical reasons, and to ensure validity of the SAQ's, the study was limited to subjects with English language proficiency. As such, the results cannot be generalized to non-English-speaking subjects. *Vested interest bias*: The primary investigator, co-investigator and two of the co-authors have no organizational affiliations to Be in Health Inc. nor any specific vested interest in the outcome of the study. However, two of the researchers are current employees of Be in Health Inc. As such, every effort was made to minimize vested interest bias by limiting personal interactions with subjects to the initial, brief and carefully scripted on-site interview by the Research Coordinator and by providing online access for direct entry of data by subjects. Further measures included: blinding of the teachers and staff of the FBEP to avoid any differential attention being given to the study participants; limiting all communication to generic, electronic and merely instructional media; and forwarding any program-related enquiries from the

participants directly to the Program Director without any interaction or revealing their participation in the study. *Religious bias*: The FBEP is explicitly Christian in its religious orientation. Gallup polls indicate that 77 % of US citizens identify as Christian (Newport 2012). Nevertheless, the program is more likely to attract individuals with higher levels of F–R–S, and this probability is supported by the participants' high DUREL scores. Accordingly, the response to the program should not be extrapolated to individuals with low levels of religiosity or to other persuasions of faith.

Conclusion

This study is important because it is a *prospective intervention study*. Conceptually, the FBEP represents, as a standardized, short-term, intensive exposure, what might otherwise be addressed within a conventional Faith-Based Community context by means of deliberate and specific emphasis on health and disease, emotional awareness and well-being, relational competence, social support, and trauma- and health-oriented counseling and prayer.

The findings of this study support the conclusion that attendance of this FBEP is associated with prompt, mostly positive, and statistically and clinically significant changes on the assessed spiritual, mental and physical health parameters, within a self-selected group of participants, who were eligible, able and willing to complete all the surveys. For them the changes also appeared to last over the full study period; only limited conclusions are possible for those who did not.

Further analyses are planned to evaluate the differential impact on the various SAQ parameters; to perform projected calculations of lowered morbidity and mortality as a result of the observed changes; and to explore mechanisms for the observed changes. The findings also support the conclusion that self-selected individuals attending the FBEP are more likely to benefit than to be harmed by doing so.

The authors hope that this work will encourage more intervention studies of this nature.

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