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**World Journal of Diabetes**

Monthly Volume 12 Number 5 May 15, 2021

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WJD mainly publishes articles reporting research results and findings obtained in the field of diabetes and covering a wide range of topics including risk factors for diabetes, diabetes complications, experimental diabetes mellitus, type 1 diabetes mellitus, type 2 diabetes mellitus, gestational diabetes, diabetic angiopathies, diabetic cardiomyopathies, diabetic coma, diabetic ketoacidosis, diabetic nephropathies, diabetic neuropathies, Donohue syndrome, lethal macromelia, and prediabetic state.

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The WJD is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Current Contents/Clinical Medicine, Journal Citation Reports/Science Edition, PubMed, and PubMed Central. The 2020 Edition of Journal Citation Reports® cites the 2019 impact factor (IF) for WJD as 3.247; IF without journal self cites: 3.222; Ranking: 70 among 143 journals in endocrinology and metabolism; and Quartile category: Q2.

RESPONSIBLE EDITORS FOR THIS ISSUE
Production Editor: Yu-Jie Ma; Production Department Director: Xiang Li; Editorial Office Director: Jia-Ping Yan.

NAME OF JOURNAL
World Journal of Diabetes

ISSN
ISSN 1948-9358 (online)

LAUNCH DATE
June 15, 2010

FREQUENCY
Monthly

EDITORS-IN-CHIEF
Timothy Koch

EDITORIAL BOARD MEMBERS

PUBLICATION DATE
May 15, 2021

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ONLINE SUBMISSION
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E-mail: bpgoffice@wjgnet.com https://www.wjgnet.com

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Impact of spiritual beliefs and faith-based interventions on diabetes management

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Author contributions: Onyishi CN, Ilechukwu LC, Victor-Aigbodion V, and Eseadi C were responsible for the conception of the study; Onyishi CN, Ilechukwu LC, Victor-Aigbodion V, and Eseadi C were responsible for the study design, literature review, analysis, drafting, editing, and approval of the final version.

Conflict-of-interest statement: The authors declare that they have no personal interests.

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Abstract

Management of diabetes constitutes significant social and economic burdens worldwide. There is a shortage of empirical studies on the management of diabetes and the associated mental health issues through spiritual beliefs and faith-based interventions (FBIs). It is not also clear how spiritual beliefs and FBIs account for the effective management of diabetic conditions. This article discusses the impact of spiritual beliefs and FBIs in the management of diabetes, from relationship and efficacy studies that report outcomes from experimental procedures of related interventions. The majority of the relationship studies showed positive relationships, while efficacy studies showed a high efficacy of interventions in faith-based approaches. However, none of the studies clearly reported the mechanisms of change or modality of operation in a FBI that can serve as a model across culture and context. Possible mechanisms of change were discussed for further development of a standard faith-based model, and finally, suggestions for future research were also highlighted by the authors.

Key Words: Comorbid health conditions; Diabetes; Faith-based interventions; Diabetes management; Spirituality; Coping strategies

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INTRODUCTION

Diabetes is among the chronic diseases that plague the victims throughout their lives. Diabetic conditions have been linked to comorbid health conditions such as blindness, kidney failure, and non-traumatic lower limb amputations[1,2]. The worldwide prevalence of the lifelong disease has continuously increased from 422 million in 2014 to 463 million people in 2019, and causes about 10% of United States annual expenditures on the adult population[1,2]. About 1.6 million children and adolescents are also living with chronic illness[1]. Diabetes is among the top 10 causes of global mortality[3,4]. Diabetes accounts for increased mortality from comorbid diseases such as cardiovascular disease, stroke, chronic kidney disease, chronic liver disease, and cancer[3]. The rising global prevalence of deaths and disability-adjusted life-years due to diabetes is estimated to be about 22.9 million. Hence, about 1 in 10 persons worldwide is suffering from one type of the three diabetes including type 1 diabetes, type 2 diabetes mellitus, and gestational diabetes mellitus[5].

Patients living with diabetes experience socio-economic challenges such as loss of a job, dependence on medical and nursing care, reduced social and family interactions and changes in lifestyle[4,6]. This is because, unlike other disease conditions, where only medication is required to manage/cure, diabetes presents more complicated physiological, psychological and social conditions that make the management very difficult[7-9]. Though, diabetes may be managed through medication and lifestyle modifications such as weight loss, diet, and exercise[10,11], there is also a high need for spiritual and psychological management[8,9].

This is because amputation and other disabilities and discomfort due to diabetes account for an array of disruptions in the patients’ physical, mental, and spiritual lives[12]. The spiritual health of diabetic patients can synchronize the physical, mental and social dimensions of their lives, and is necessary for coping with and management of the disease[7]. Physical disabilities imposed by diabetes such as organ amputation tends to make the patients, mentally and spiritually disabled, exposing them to elevated stress[13]. Thus, such patients seek different approaches to cope with and adapt to life.

There have been noteworthy arguments as to whether spirituality/religiosity directly affects diabetes outcomes and well-being globally. Spirituality can be a powerful coping strategy for persons with debilitating health conditions such as diabetes[14]. Several studies indicate that increased religiosity is associated with better outcomes in clinical and general populations. Religion/spirituality generates a positive attitude towards life and life experiences, making the patient dominant against ill-fated life events including disease conditions (such as diabetes) and improving life with motivation and energy[6]. This increases the tolerance and acceptance of unchangeable situations, especially when science is unable to help a patient[15]. When disease condition becomes chronic and defiles medical interventions (as is typical of diabetes), patients and physicians tend to resort to praying and spiritual approaches. Furthermore, medical researchers have acknowledged the importance of medical procedures, as well as of traditional and complementary therapies such as prayer to treating the diseases[15]. Studies also suggest that in caring for patients, medical personnel should not underscore the patients’ religious beliefs[16]. This is because, people’s belief about the cause, prognosis and mortality of their disease conditions affect their responses to treatment and intervention[17].
Since diabetes is a chronic and terminal condition, which needs the mental and physical involvement of the patients for management, it is necessary to consider management approaches linked to spirituality and faith. Studies have shown that spirituality and faith-based interventions (FBIs) are viable management strategies for diabetes[18-20]. Religion and spirituality are frequently engaged as coping mechanisms for diabetes and other psychologically threatening conditions and have been shown to effectively improve acceptance of diabetes and self-care behavior[18]. Another study on coping and glycemic control in couples with type 2 diabetes showed that religion and faith could help in glycemic control[21].

The importance of spiritual beliefs in therapeutic practice has been demonstrated by various professional organizations in social work, psychology, and counseling, such as the Council for Social Work Education, which added it to their central aspect of human behavior interventions[22]. However, very few articles have deeply addressed the issue of spirituality and FBIs in diabetes management.

This paper adds to the quality of information available in this area. This paper examines the impact of spiritual beliefs and FBIs in diabetes management.

**SPiritual Beliefs and Diabetes Management**

Spiritual beliefs are invaluable in the management of diabetes and other chronic health conditions. Spirituality refers to the meaning or purpose in one’s life, a search for wholeness, and a relationship with a spiritual being or reality. Spirituality involves the search for meaning and purpose through which one establishes his/her relationship with time, oneself, others, and God[23]. Individual’s spiritual beliefs may be expressed through religion or religious involvement, involving participation in an organized system of beliefs, rituals, and cumulative traditions[24]. Spiritual beliefs and activities can impact the management of chronic conditions through two different pathways. First, it can assist in coping with chronic illnesses by providing support, confidence, and hope, and second, it can interfere with coping resources, especially when patients neglect self-care activities and rely on prayer and/or meditation to manage their illness[25]. Empirical evidence demonstrates the relationship between spirituality and self-management of chronic diseases like hypertension[26] and diabetes[24].

Research has shown significant relationships between spiritual and religious beliefs and practices and general diet in patients with diabetes[20]. This suggests that personal adaptations of diet and other health practices such as self-care practices are linked to spiritual beliefs. Given the importance of self-care practices such as healthy food adaptation, adequate physical activity, proper medication practices, and regular glucose monitoring[27,28], the significant link between spiritual beliefs and such self-care practices suggests that spiritual beliefs impact the choice of management strategies and can make a difference in efficacy of management.

Additionally, spirituality is an imperative resource for emotional support[29,30]. In this regard, God is perceived as central in providing strength to deal with daily challenges; God is often called upon for help in controlling diabetes; and a strong belief in God, prayer, meditation, and support from church members were all sources of support. Literature shows that humans develop an increased tendency towards spirituality and religion, especially when they experience stress or chronic illnesses[31,32]. Spirituality assists in the management of patients’ health by yielding positive mental effects[32]. Spirituality has also been identified as one of the important factors that affect the quality of life, quality of care, and satisfaction of patients with diabetes[33].

Hence, intervention using spiritual beliefs for the management of diabetes conditions involves utilizing any spiritual aspect in life, such as belief in a divine being, as a control to enhance self-management[34]. Some spiritual belief-related interventions are prayer, meditation, fasting, and mindful attention. Thus in a study in Black women with type 2 diabetes, religion and spirituality were related to glycemic control[35]. Furthermore, an exploratory study on the role of spirituality in diabetes management found minimal to profound impact; all participants appeared comfortable discussing spirituality within the context of strength and hope. A study conducted to explore the relationship of religiosity and/or spirituality to the self-care of diabetes[24] showed religion or spirituality as coping methods and social support. Studies have indicated that religious involvement is associated with better adaptation to chronic diabetes by improving attendance at scheduled medical appointments, and better compliance with medication[36]. Table 1 shows the results of previous studies on spiritual beliefs and diabetes management[37-41].
Table 1 Empirical results on the impact of spiritual beliefs on diabetes management

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<td>To evaluate the impact of spirituality/religiosity on T2DM management and to summarize the evidence regarding T2DM outcomes, as they are related to religiosity or spirituality of people with diabetes</td>
<td>A qualitative study (cross-sectional)</td>
<td>The results showed a positive relationship between religiosity/spirituality and improved T2DM management. It also suggests that participation in church and spiritual beliefs had ameliorating effects on stress levels and thus, on glycemic control of these patients with diabetes</td>
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<td>Inajpour et al[20]</td>
<td>To explore the spiritual aspects of care for chronic Muslim patients</td>
<td>A qualitative-descriptive exploratory study was conducted in Isfahan, Iran, on a purposive sample of 25 participants, including patients, caregivers, nurses, physicians, psychologists, social workers, and religious counselors</td>
<td>The spiritual aspects of care for chronic Muslim patients fell into four main themes. Among the four major themes was the religious aspect, including doing religious rituals, attention to religious values, and providing the possibility of performing religious practices. The second theme is the pastoral aspect, which consisted of giving consultation for finding the meaning of life/death, achieving intellectual transcendence, and improving the patient’s communication with herself/himself and others</td>
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<td>Amadi et al[37]</td>
<td>To assess the association between religiosity, religious coping in depression and diabetes mellitus, and selected socio-demographic variables (age, gender and occupational status)</td>
<td>Cross-sectional study (simple random sampling)</td>
<td>Participants in this study varied in their use of religion to cope with the stress of living with diabetes mellitus or depression according to their socio-demographic profile. Younger people with depression and diabetes used religious resources and religious coping methods to the same extent</td>
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<td>Adejumo et al[38]</td>
<td>This study aimed to relate the psychosocial effects of religion and culture with the awareness, knowledge and attitude of Nigerians regarding diabetes prevention and care</td>
<td>Cross-sectional study (multi-centered random sampling)</td>
<td>Neglecting diabetes: 42% thought that if diabetes was neglected it could lead to kidney failure, and 23% thought it could lead to heart failure. Only 0.3% thought that neglecting diabetes could result in limb amputation 49% of patients would consult a doctor if they were ill, 43% would talk to family members, and 5% to their religious leaders. There were 7% who said they would comply with religious leaders in the management of diabetes. In terms of disease prevention, 7% of the participants would value their religious leaders</td>
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<td>Heidarzadeh et al[39]</td>
<td>To explore the spiritual growth and its dimensions in the patients with type II diabetes mellitus</td>
<td>A qualitative study was conducted on adult patients with a history of at least one year of type II diabetes mellitus</td>
<td>The data analysis led to the emergence of 237 codes, three main themes, and seven subthemes. The primary themes included a tendency to spirituality, God-centeredness, and moral growth</td>
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<td>Watkins et al[40]</td>
<td>To investigate the relationship among spiritual and religious beliefs and practices, social support, and diabetes self-care activities in African Americans with type 2 diabetes, hypothesizing that there would be a positive association</td>
<td>A cross-sectional design that focused on baseline data from a larger randomized control trial in132 participants: most were women, middle-aged, obese, single, high school educated, and not employed</td>
<td>Significant relationships between spiritual and religious beliefs and practices and general diet. Additional significant relationships were found for social support with general diet, specific diet, and foot care</td>
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<td>Martinez et al[41]</td>
<td>To examined client opinions about, and experiences with religious interventions in psychotherapy</td>
<td>A sample of 152 clients at a counselling center of a University sponsored by the Church of Jesus Christ of Latter-day Saints completed a survey with ratings of specific religious interventions with regards to appropriateness, helpfulness, and prevalence</td>
<td>Out-of-session religious interventions were considered more appropriate by clients than in-session religious interventions, but in-session interventions were rated as more helpful</td>
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T2DM: Type 2 diabetes mellitus.

FBI FOR DIABETES MANAGEMENT

Faith-based health promotion interventions and the relationship between dimensions of religion and numerous mental and physical health outcomes have been well researched[42]. An intervention is faith-based if it arises from a church’s health ministry or a special interest group[43]. Four levels or features are used to identify FBIs. The first level requires the church to be used as the recruitment site for the intervention; the second level requires that the intervention be delivered at a church; the third level includes members of local churches in intervention delivery; and the fourth level includes spiritual elements in the health message of the program[44].

FBIs have consistently reported significant health outcomes such as reductions in weight, blood pressure, glycemic, and lipid levels and increases in disease-related knowledge, physical activity, and intake of fruit and vegetables. The literature identified some spirituality issues that form the pathways for the impact of FBI on
Onyishi CN et al. Spiritual beliefs and FBIs on diabetes management

精神健康对糖尿病患者来说，包括寻求赋权、勇气、希望、接受疾病及其相关死亡的痛苦、对神的感召和/或困难，以及反映在欢乐、希望和价值、对照顾者如何应对疾病、对疾病、对疾病和焦虑的担忧，以及对患者自我的不确定。患者对自我的不确定性以及对疾病的表达，困难表达对疾病的感觉，对意义的痛苦、悲伤、恐惧的担忧，以及反思对疾病的担忧。通过这种干预，客户可以学会自我倾听，至少是 cursively 考虑写作和阅读。疗愈技术被定义为“思想的载体，为创造认知-行为变化的机智策略”[56], 瑜伽作为一种介入手段可以为创造认知-行为变化的机智策略。[57]

冥想可以作为一种方法来达到一种平衡的生活方式，以及话题的生活平衡，可以提前引入到临床过程中。通过讨论和关于正念的讨论是否被完成与在会面中，应该送清有关正念练习的指示。在办公室[58]。神圣的写作，也被称为宗教的治疗[59,60]可以被使用时，如果它被确定为价值的，以及在往常写的文章可以以至少是草草写在治疗师的旁边。Miller et al[61]指出，这样的材料对自我帮助、教育、心理社会支持，以及互动。聚焦技术被定义为“思想的、身体的、整体的、对情况的、创造的、精神的体验”Miller et al[61]。通过这种干预，客户可以学会自我倾听，而不要判断。撰写可以是形态的、回忆和专注的分析。其目的是帮助客户感到自由和安全。客户往往学会自我倾听，并了解他们内心的想法和感受，并发现灵感。有效地实施 FBIs, Dodd[62]观察到，至关重要的是要拥有的敏锐和能力，以将精神灵性融入到已有的心理治疗过程，当适当的时候。Lancaster et al[63]观察到，将信仰为基础的组织提供的机会用于交付积极的健康信息和培养健康的期望，对于许多客户的期待是至关重要的。另一种是 FBIs 是仪式。仪式是宗教或世俗的、正式的、被确立的行为模式，以激发特定的感受。它们包括创造一个神圣的空间、为改变视角而接受的灵感、仪式在信仰中的作用和过程。在信仰中，管理糖尿病的过程可以被运用于宗教机构，如教会、犹太教、清真寺、会议、聚会。它们可以被组织为教会、网络、其他崇拜的地方。它们可以被组织为教堂、犹太教、清真寺、会议、聚会，或者独立的组织。

FBI PROCEDURE

FBIs 被批评因为缺乏方法学的严谨性在许多效力/有效率的试验中[30-52]。它们一般利用特定的精神模式，如祈祷、冥想、自愿的节食、宗教的写作、正式的仪式和奉献。[33,53-56]。祈祷作为一种介入手段可以作为一种手段，为创造认知变化[56]。治疗师可以鼓励客户在适合时，为创造认知变化的祈祷。[57]。冥想可以作为一种方法来达到一种平衡的生活方式，以及话题的生活平衡，可以提前引入到临床过程中。通过讨论和关于正念的讨论是否被完成与在会面中，应该送清有关正念练习的指示。在办公室[58]。神圣的写作，也被称为宗教的治疗[59,60]可以被使用时，如果它被确定为价值的，以及在往常写的文章可以以至少是草草写在治疗师的旁边。Miller et al[61]指出，这样的材料对自我帮助、教育、心理社会支持，以及互动。聚焦技术被定义为“思想的、身体的、整体的、对情况的、创造的、精神的体验”Miller et al[61]。通过这种干预，客户可以学会自我倾听，而不要判断。撰写可以是形态的、回忆和专注的分析。其目的是帮助客户感到自由和安全。客户往往学会自我倾听，并了解他们内心的想法和感受，并发现灵感。有效地实施 FBIs, Dodd[62]观察到，至关重要的是要拥有的敏锐和能力，以将精神灵性融入到已有的心理治疗过程，当适当的时候。Lancaster et al[63]观察到，将信仰为基础的组织提供的机会用于交付积极的健康信息和培养健康的期望，对于许多客户的期待是至关重要的。另一种是 FBIs 是仪式。仪式是宗教或世俗的正式化行为模式，揭示了某些感受。它们包括创造一个神圣的空间、为改变视角而接受的灵感、仪式在信仰中的作用和过程。在信仰中，管理糖尿病的过程可以被运用于宗教机构，如教会、犹太教、清真寺、会议、聚会。它们可以被组织为教会、网络、其他崇拜的地方。它们可以被组织为教堂、犹太教、清真寺、会议、聚会，或者独立的组织。
In a systematic review, Lancaster et al.[63] notes that FBIs targeting changes at both the church and individual levels would have a greater impact on weight loss and related behaviors than interventions targeting a single level; interventions involving lay health advisors (LHAs) would be more successful in facilitating behavior change than investigator-led interventions. When LHAs facilitate the implementation of health programs faith-based organizations their relationships and familiarity with key church personnel, procedures and members can help facilitate outcomes[63]. The research further showed that FBIs that include religious or spiritual components (e.g., scripture, biblical concepts) would lead to greater improvements in outcomes than faith-placed interventions based on surface-level characteristics (e.g., race, commonly eaten foods), including conducting programs in culturally appropriate settings[63]. Hence the model of the process of FBIs is based on cultural background, spiritual perspective, and relationships, all of which are embedded in social-cognitive modalities.

**IMPACT OF FBI ON DIABETES**

Faith-based therapeutic interventions have been widely applied in managing diabetes and related variables across the world. An FBI on a multi-component curriculum including Scripture readings, prayer, goal-setting, a community resource guide, and walking competitions showed a decreased systolic blood pressure by 12.5 mmHg among intervention participants and only 1.5 mmHg among controls (P = 0.007)[47]. In a preliminary study[64], presented the results of “faith on the move”, a randomized pilot study of a faith-based weight loss program for black women. The study’s goals were to estimate the effects of a 12-wk culturally tailored, faith-based weight loss intervention on weight loss, dietary fat consumption, and physical activity in overweight/obese black women. Although the results were not statistically significant, the effect size suggests that the addition of the faith component improved results.

Sattin et al.[65] used a “fit body and soul (FBAS)” (an FBI program) for diabetes prevention to reduce weight and fasting plasma glucose (FPG) and increase physical activity from baseline to week-12 and to month-12 among overweight parishioners and recorded a significant decline in FPG in FBAS compared to the comparison group. In a methodological review, another study[47] found that faith-based organizations may be a promising avenue for delivering diabetes self-management education to Black Americans.

Another study on faith-based diabetes prevention program (fine, fit, and fabulous) for Black and Latino congregants at churches in low-income New York City neighborhoods, which included nutrition education and fitness activities while incorporating bible-based teachings that encourage healthy lifestyles, accounted for statistically significant change in participants’ dietary habits[66]. Participants reported that they ate less fast food and were less likely to overeat at follow-up. The average weight loss across churches was 4.38 pounds or 2% of participants’ initial body weight. Churches and other faith-based organizations are increasingly popular settings to conduct health promotion programs[48]. Table 2 shows the works conducted so far on the impact of FBIs on diabetes management. Table 2 suggests that all the studies found a positive impact of FBI in the management of diabetes across populations[67-70].

**MECHANISMS OF CHANGE FOR FBIS FOR DIABETES MANAGEMENT**

Considering that FBIs are efficacious in the management of diabetes, it is right to propose that such interventions work with multi-modal mechanisms, affecting different dimensions of the illness. FBI has positive effects on the prevention, self-management and mental health of patients with diabetes[49]. This suggests that FBI may take multiple pathways to affecting different dimensions of diabetes, however, little is known about the mechanisms of change in the area of FBIs for diabetes management. Mechanisms of change explain the key processes within a therapeutic intervention that are crucial to clinical change. Investigating mechanisms of change can help to identify and preserve the ingredients of an intervention which must not be diluted to achieve change and can enable the development of more effective treatments[71].

In the case of FBI for diabetes management, some of the paramount mechanisms are increasing general and religious social support, strengthening spiritual beliefs and cognition, providing relevant information, and integrating health-religion relationship
## Table 2 Studies on the impact of faith-based interventions on diabetes management

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Topic</th>
<th>Study objective</th>
<th>Sample</th>
<th>Intervention</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duru et al[47]</td>
<td>Sisters in Motion: A randomized controlled trial of a faith-based physical activity intervention</td>
<td>To evaluate a faith-based intervention (“Sisters in Motion”) intended to increase walking among older, sedentary African American women</td>
<td>Sixty-two African American women &gt; 60 yr</td>
<td>Multi-component curriculum including scripture readings, prayer, goal-setting, a community resource guide, and walking competitions. Both intervention and control participants participated in physical activity sessions</td>
<td>At 6 mo, intervention participants had increased their weekly steps by 9883 on average, compared to an increase of 2426 for controls ($P = 0.016$); SBP decreased on average by 12.5 mmHg among intervention participants and only 1.5 mmHg among controls ($P = 0.007$)</td>
</tr>
<tr>
<td>Fitzgibbon et al[64]</td>
<td>Results of a faith-based weight loss intervention for black women</td>
<td>The goals of the study were to estimate the effects of a 12-wk culturally tailored, faith-based weight loss intervention on weight loss, dietary fat consumption and physical activity</td>
<td>Fifty-nine overweight/obese black women were randomized to one of the two interventions</td>
<td>‘Faith on the Move,’ intervention</td>
<td>Although the results were not statistically significant, the effect size suggests that the addition of the faith component improved results.</td>
</tr>
<tr>
<td>Sattin et al[65]</td>
<td>Community trial of a faith-based lifestyle intervention to prevent diabetes among African-Americans</td>
<td>To reduce weight and fasting plasma glucose and increase physical activity from baseline to week-12 and to month-12 among overweight parishioners through a faith-based adaptation of the diabetes prevention program called “FBAS”</td>
<td>604 African Americans, aged 20 to 64 years single-blinded, cluster-randomized, community trial</td>
<td>FBAS is an adapted faith-based diabetes prevention program</td>
<td>FBAS participants had a significant difference in adjusted weight loss compared with those in HE (2.62 kg vs 0.50 kg, $P = 0.001$) at 12-wk and (2.30 kg vs 0.465 kg, $P = 0.005$) at 12-mo and were more likely (13%) than HE participants (5%) to achieve a 7% weight loss ($P &lt; 0.001$) at 12-wk and a 7% weight loss (19% vs 8%, $P &lt; 0.001$) at 12-mo.</td>
</tr>
<tr>
<td>Gutierrez et al[66]</td>
<td>Health, community, and spirituality: Evaluation of a multicultural faith-based diabetes prevention program</td>
<td>To evaluate FFF, a faith-based diabetes prevention program for black and Latino congregants at churches in low-income New York City neighborhoods</td>
<td>Participants ($n = 183$)</td>
<td>FFF, a faith-based diabetes prevention program. FFF is a 12-wk, bilingual program developed by the Bronx Health REACH Coalition. FFF includes nutrition education and fitness activities while incorporating Bible-based teachings that encourage healthy lifestyles</td>
<td>Participants reported statistically significant improvements in knowledge and healthy behaviors from baseline. Increased numbers of participants reported exercising in the past 30 d, eating fruit daily, being able to judge portion sizes, and reading food labels</td>
</tr>
<tr>
<td>Frank et al[67]</td>
<td>A faith-based screening/education program for diabetes, CVD, and stroke in rural African Americans</td>
<td>To investigate the effectiveness of a faith-based screening/education program for reducing diabetes, cardiovascular diseases, and stroke in rural African Americans</td>
<td>120 parishioners from African American churches</td>
<td>The program included education about the prevention of diabetes and cardiovascular diseases</td>
<td>Positive feedback was recorded by both pastors and participants</td>
</tr>
<tr>
<td>Rhodes et al[68]</td>
<td>Cost-effectiveness of a faith-based lifestyle intervention for diabetes prevention among African-Americans: A within-trial analysis</td>
<td>To assess costs and cost-effectiveness of implementing FBAS, a church-based 18-session lifestyle education intervention for African Americans</td>
<td>604 overweight participants in 20 churches</td>
<td>FBAS, a church-based 18-session lifestyle education intervention</td>
<td>Per-person intervention cost of FBAS was $50.39 more than HE ($842.22 vs $891.83 per person), and adjusted differences in weight change (1.9 kg [95%CI: 1.0-2.8]) and waist circumference (2.4 cm [95%CI: 1.3-3.4]) were both significant. For a modest increase in cost, FBAS led to greater weight and waist reductions among African Americans in a church setting</td>
</tr>
<tr>
<td>McElfish et al[69]</td>
<td>Design of a randomized controlled trial testing a WORD DPP vs a PILI DPP for Marshallese in the United States</td>
<td>To investigate the comparative effectiveness of a randomized controlled trial testing 2 DPP interventions designed to reduce participant’s weight, lower HbA1c, encourage healthy eating and increase physical activity</td>
<td>384 Marshallese participants from 32 churches located in Arkansas, Kansas, Missouri, and Oklahoma</td>
<td>WORD DPP focuses on connecting faith and health to attain a healthy weight, eat healthfully, and be more physically active. In contrast, PILI DPP is a family and community-focused DPP curriculum specifically adapted for Ongoing</td>
<td></td>
</tr>
</tbody>
</table>
Goode[70] The effect of a diabetes self-management program for African Americans in a faith-based setting (pilot study)
To test a 6-wk faith-based diabetes self-management program for African American adults diagnosed with diabetes
32 African Americans 18 yr or older participate in the study
Diabetes self-management education intervention
There were significant improvements among participants in diabetes knowledge, self-efficacy, diabetes symptom management, and improvements in diabetes self-care activities (diet, exercise, and foot care)

CVD: Cardiovascular disease; DPP: Diabetes prevention program; FBAS: Fit body and soul; FFF: Fine, fit, and fabulous; PILI DPP: Pacific culturally adapted diabetes prevention program; WORD DPP: Faith-based diabetes prevention program.

through improving emotion regulation and cognitive restructuring[71,72]. For clarity, Figure 1 provides the pathways to changes in diabetes management due to FBI. Hence, we proposed that providing FBI for diabetes management culturally tailored and affect different dimensions that are sensitive to diabetes prevention, management and control. Within the Social Cognitive Theory Framework, FBI would improve diabetes knowledge, self-efficacy, diabetes symptoms management, and diabetes self-management outcomes. To this end, FBI focuses on the three major dimensions, including the person (diabetes knowledge, self-efficacy, symptom management) and behavior (diabetes self-management) and the environment (the church setting). In the light of these expositions, we present a framework of FBI in the context of diabetes management as shown in Figure 1.

**IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH**

The present study has helped to illustrate the impact of FBIs and spiritual beliefs in the management of diabetes. The outcome of the study calls for emergent FBI modalities for diabetes management across the world. Further studies may attempt to develop and validate a standardized FBI program that would be useable in different religious samples. Such will provide handy, step-by-step approaches to FBI for diabetes. Researchers should attempt to increase access to diabetes management using a faith-based framework in different religious organizations. This is especially important given the place of effective management in diabetes prevention, treatment and control.

The spiritual beliefs of patients living with diabetes are of paramount impact for the purpose of maintaining good mental health of the patient[7,11-14]. Linking spirituality with health has been found to be relevant in understanding the impact of FBI in the management of diabetes[15]. Further studies are encouraged to trace the spiritual bases of diabetes management by finding out the mechanism through which spirituality affects diabetes outcomes. Given the link between spiritual variables such as prayers and beliefs and scriptures with diabetes management, and since the present study only relied on existing studies irrespective of their methodological flaws, correlation studies are encouraged, examining the impact of spiritual beliefs on diabetes outcomes. Studies should be intensified to determine the mechanisms of change in the FBI for diabetes management through experimental approaches. This will help determine the specific faith-based factors that account for positive change in diabetes management with FBIs.

**CONCLUSION**

There is a tendency of spiritual beliefs to be linked with the acceptance and management of diabetes conditions and FBIs can be useful in diabetes management.
Figure 1 Framework of faith-based intervention in diabetes management. The faith-based intervention acts on the three reciprocal sources of learning according to social-cognitive theory (the person, behavior, and the environment). The three sources interact to produce improved skills, health behavior, mental health and social support. Finally, the improved outcomes lead to positive outcomes in diabetes management.

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