

Health promotion behaviors of pregnant women and spiritual well-being: Mediator role of pregnancy stress, anxiety, and coping ways

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Abstract

Purpose: Little is known the link between and health promotion behaviors and spiritual well-being in pregnant women. The study aimed to address the existing gap in the context to explore the direct and indirect effect of spirituality on health promotion behaviors with mediatory roles of pregnancy stress, anxiety, and coping ways.

Methods: A cross-sectional study was conducted to sampled 200 pregnant women aged above 18 years with gestational age of at least 12 weeks. All participants completed five questionnaires including; Promoting Lifestyle Profile (HPLP), Spiritual Well-Being scale (SWBS), State-Anxiety Inventory (SAI), Prenatal Coping Inventory (Nu-PCI), and Revised Prenatal Distress Questionnaire (NuPDQ). A PLS-SEM model (Partial Least Square Structural Equation) was applied to determine whether spirituality can affect the health promotion behaviors through anxiety, pregnancy stress and coping ways.

Results: HPLP were negatively related to state-anxiety ($\beta = -0.36$; $P < 0.001$) and positively to planning-preparation coping ($\beta = 0.23$; $P = 0.001$). Spirituality directly and negatively affected the state-anxiety ($\beta = -0.41$; $P < 0.001$) and NuPDQ ($\beta = -0.36$; $P < 0.001$), while a direct and positive significant impact on the coping domains including planning-preparation ($\beta = 0.36$; $P < 0.001$), avoidance ($\beta = 0.46$; $P < 0.001$), and spiritual-positive coping ($\beta = 0.48$; $P < 0.001$). Spirituality had a significant indirect effect on HPLP ($\beta = 0.33$; $P < 0.001$), mediated through its association with state-anxiety and planning-preparation coping.

Conclusion: Spiritual well-being improves promotion healthy behaviors of pregnant women both directly and indirectly by increases planning-preparation copings and decreases the anxiety.

Introduction

Health promotion behaviors are any kind of conscious planning and functioning, which aim to prevent disease, improve health, increase productivity, and prevent negative consequences, and to achieve individual self-actualization. Pregnancy as a unique event of woman's life that is accompanied by psychological, social and physiological changes (1). This period requires physical and psychological adjustments for the women that can affect pregnancy outcomes depending on their function [1]. Also, natural process of pregnancy can be disrupted by internal and external stressors [2]. Stress and may be lead to neonatal adverse outcomes such as preterm labor, miscarriage, and low birth weight [3-6]. Therefore, it is important to evaluate ways that women cope with stress during pregnancy and to identify coping responses that reduce or, conversely, increase in prenatal emotional distress [7]. Coping responses are ways that individuals can manage stress, includes active coping, avoidant coping and support coping [8]. Spirituality are components that have received little attention in coping theory in the context of pregnancy [9].

Spirituality is important component of health and well-being [10]. Spirituality is divided into a framework of meaning and purpose, connectedness, and values [11]. Lack of attention to the spiritual dimension of life and self-knowledge may be threatened mental health, growth and self-actualization in humans [12].

Recent evidence is reported the effect of spirituality on health outcomes through decreasing the disruptive effects of stress on inflammation [13].

Preparing for birth can be profoundly spiritual experiences as mothers understand the miraculous nature of this phenomenon [14]. Some women believe that there is no more spiritual event than birth [15]. According to studies on maternal health during pregnancy, spirituality has preventive effect on stress during pregnancy [12, 16]. Feelings of belonging to superior power and faith in God and Spiritual support in stressful life conditions help religious enjoy better mental health and suffer less from life's problems [2]. Dolatian et al. (2017) confirmed that the impact of spirituality on specific pregnancy stress reduction [12]. Mann et al. (2007) indicated that greater spirituality is associated with fewer depressive symptoms in pregnant woman [17]. In contrast, negative use of spirituality, although rare, is associated with poor outcomes, including high prevalence of anxiety, stress, depressive symptoms, impaired quality of life, and dissatisfaction with health status [18].

Pregnancy period is very important because the maternal behaviors impact on the childbirth outcomes as well as quality of life of mother and child [19]. Research emphasized that spiritual resources in addition to healthy lifestyle behaviors may be important to maternal and child health [20]. A research indicated that increased spirituality is associated with a decreased likelihood of alcohol use, smoking, marijuana use and better maternal nutrition during pregnancy [21]. A review reported that people who are more spirituality have better mental health and healthy behaviors compared to those who are less spirituality [22].

Although previous studies have emphasized the role of spirituality on improvement of physical and mental health [10, 12, 13], there is few information about health promotion behaviors and spirituality in pregnant women [12, 21]. Also, there is no sufficient data about how possible linkage between spirituality and healthy behaviors. Little is known about the structural equations through which the psychological factors influence the healthy behaviors through spirituality. The current study addresses the existing gap in research in the interaction between health promotion behaviors and spirituality based on testing a model that examines the effect of spirituality on health promotion behaviors through mediatory role of stress and coping ways. To the authors' knowledge, this is the first study investigate the direct and indirect effects of spirituality, stress, and coping ways on health promotion behaviors in pregnant women. The aims of the study were:

1. To explore whether spirituality health is associated with anxiety, stress, and coping way
2. To explore whether anxiety is associated with health promotion behaviors.
3. To explore the association between pregnancy stress with health promotion behaviors.
4. To examine the association between coping ways of pregnant women with health promotion behaviors.
5. To test the proposed model in Fig.1. First, to explore the direct effect of spirituality on health promotion behaviors. Second, to explore the indirect effect of spirituality on health promotion behaviors with mediatory roles of pregnancy stress, anxiety, and coping ways.

Methods

Study setting and participants

This research study initiated after approval of ethics committee of Babol University of Medical Sciences (MUBABOL.HRI.REC.1396.62). Besides, all of the participants signed a written informed consent prior to participating in this study. Two public prenatal care clinics were randomly selected. Pregnant women referring to these clinics were sampled to participate voluntarily in the study. Two hundred pregnant women aged 18 years or older with gestational age of at least 12 weeks were eligible for the present study. Those who had not passed 5 years of school or couldn't complete the self-report questionnaires were excluded from the study. Two trained midwives separately administered study inclusion criteria in each clinic and asked demographic information of eligible participants and gave them the questionnaire to be completed. All participants completed five questionnaires including; Promoting Lifestyle Profile (HPLP), Spiritual Well-Being scale (SWBS), State-Anxiety Inventory (SAI), Prenatal Coping Inventory (Nu-PCI), and Revised Prenatal Distress Questionnaire (NuPDQ).

Measurements

Spiritual Well-Being Scale (SWBS): This scale was designed by Raymond Paloutzian et al. to measure one's perception of the spiritual quality of life and life satisfaction [23]. It contains 20 items with 2 subscales: existential well-being (EWB) and religious wellbeing (RWB), with each subscale containing 10 items. The SWBS contains some positive and some negative items. Each item is scored on a six-point Likert scale, ranging from 1 to 6. Scoring is ordered by a 6-point Likert scale as follows: 1) strongly disagree, 2) moderately disagree, 3) disagree, 4) agree, 5) moderately agree, and 6) strongly agree. Negatively worded items (item numbers 1, 2, 5, 6, 9, 12, 13, 16, and 18) have reversed scores so that higher scores represent a greater level of wellbeing. We categorized the score of the SWBS as low (20–40), moderate (41–99), and high (100–120). We used the validated Persian SWBS version [24].

Health Promoting Lifestyle Profile (HPLPII): HPLP II. Walker et al. developed HPLP-II [25], is applied for the purpose of determining the healthy lifestyle behaviors. HPLP-II contains 52 questions with the six aspects of health-promoting behaviors including nutrition (9 items), physical activity (8 items), spiritual growth (9 items), health responsibility (9 items), stress management (8 items) and interpersonal relations (9 items). Items scored from four-part Likert scale from 1 (never) to 4 (always). The scores range from 52 to 208. We used the validated Persian HPLP-11 version [26].

State-Anxiety Inventory (SAI): The SAI, a subscale of the STAI, measures state anxiety. The state anxiety scale consists of 20 questions that determine how the respondents "feel right now." Of the 20 statements, 10 represent anxiety-present items and the rest represent anxiety absent items. Each item is scored on a four-point scale, ranging from 1 (not at all) to 4 (almost always). The total score of the SAI can range from 20 to 80. We used the validated Persian SAI version [27].

Revised Prenatal Coping Inventory (Nu-PCI): The Nu-PCI is a revised version of the 36-item PCI [28], it is a specific self-report instrument that focuses on the coping style of pregnant women during the prenatal period. The Nu-PCI subscales include Planning-Preparation, Spiritual-Positive Coping, and Avoidance. Respondents report how often they used different kinds of coping in the past month on a scale from 0 (never) to 4 (very often). The higher the mean subscale score, the more frequently that coping style was used. Cronbach's alpha for the planning-preparation subscale in early, mid, and late pregnancy was 0.82, 0.85, and 0.86, respectively. Cronbach's alpha for the avoidance subscale ranged from 0.77 to 0.80 during pregnancy. Cronbach's alpha for the spiritual-positive subscale varied from 0.73 to 0.78 over the three trimesters of pregnancy [29, 30]. We used the validated Persian Nu-PCI version [31].

Revised Prenatal Distress Questionnaire (NuPDQ): The scale is a revised version of the 12-items PDQ [28]. It contains 17 items that assesses distress associated with pregnancy-specific concerns, including bodily changes, physical symptoms, fetal health, labor and delivery. Responses are on a three point scale ranging from 0 (not at all) to 2 (very much) [30].

Partial Least Square Structural Equation (PLS-SEM) Modeling

A PLS-SEM model was applied to determine whether spirituality can affect the Health Promoting Lifestyle Profile (HPLP) through anxiety, Pregnancy-specific distress and coping subscales-as mediator variables- and whether there exists a causal relationship between them. The conceptual model was depicted in Figure 1 expressed with the structural equation model.

PLS-SEM Model Assessment

In order to assess PLS-SEM model fitting, we went across two steps. First, internal consistency reliability was measured using rhoA proposed by Dijkstra and Henseler (2015). The second step was to assess the convergent validity of each construct measure by the average variance extracted (AVE) computed for each construct (latent variable). The variance inflation factor (VIF) was used to evaluate collinearity of the latent variables in construct model. We also computed pairwise Pearson's correlation between constructs. STATA software Version 15 (STATA Corp, College Station, Texas) was used to run PLS-SEM and other relevant analyses. A P value less than 0.05 was considered statistically significant.

Results

Sample Characteristics and correlations

The investigated sample consisted of 200 eligible pregnant women (184 housekeepers, 92%). The participants ranged in age from 17 to 44 years (Mean = 27.5; SD = 5.34). A total of 49 (24.5%) participants stated a University-Educated as their highest educational level, 108 (54.5%) a diploma degree, 39 (19.5%) a high school degree, and 4 (2%) participants declared a completed primary school as their highest educational level. The mean gestational age at time of filling the scales was 23.98 weeks (SD=6.61, Table 1).

Descriptive results of the constructs including mean and standard deviation (SD), and Pairwise correlation coefficients between them were provided in Table 2. Correlations between the examined constructs provided that the Spirituality total score was significantly negatively correlated with State-Anxiety, NuPDQ (all $P < 0.001$). Furthermore, spirituality was positively relevant to HPLP, planning-preparation, avoidance, and spiritual-positive coping (all $P < 0.001$) (see Table 2). In addition, state-anxiety was negatively linked to (P < 0.001), while Planning-Preparation was positively related to HPLP (P < 0.001).

PLS-SEM model fit assessment

Internal consistency rhoA for constructs were shown in Table 3. All the values of rhoA were in acceptable range (0.47 to 0.95). Moreover, the average variance extracted (AVE) for all construct was below 0.5 which indicated the construct explains less than 50 percent of the variance of the items that make up the construct (Table 3). Finally, all VIF values were lower than 3 which on can conclude collinearity issues in the construct model was not considerable.

Effect of spirituality on HPLP

The PLS-SEM results provided us the necessary information to test the direct effects; to be able to test meditational hypotheses.

The causal model (displayed in Table 4) resulted that spirituality directly and negatively affected the state-anxiety ($\beta = -0.41$; $P < 0.001$) and pregnancy stress ($\beta = -0.36$; $P < 0.001$). It also had a direct and positive significant impact on the coping domains including planning-preparation ($\beta = 0.36$; $P < 0.001$), avoidance ($\beta = 0.46$; $P < 0.001$), and spiritual-positive coping ($\beta = 0.48$; $P < 0.001$). HPLP were negatively related to state-anxiety ($\beta = -0.36$; $P < 0.001$) but not to pregnancy stress ($\beta = -0.09$; $P = 0.14$). Finally, avoidance ($\beta = 0.07$; $P = 0.33$), and spiritual-positive coping ($\beta = 0.08$; $P = 0.23$) were not relevant to HPLP. However, planning-preparation coping were significantly related to HPLP ($\beta = 0.23$; $P = 0.001$).

Moreover, PLS-SEM analysis revealed significant indirect effect of spirituality health on HPLP (indirect effect = 0.33; $P < 0.001$), mediated through its association with state-anxiety and planning-preparation coping (Fig 2.).

Discussion

The current study determined the effect of spiritually well-being on health promotion behaviors of pregnant women in mediating the relationship between pregnancy stress, general anxiety, and coping ways with health promotion behaviors.

The results revealed the direct positive effect of spiritual well-being on health promotion behaviors. In consistent with our results, previous research reported that increasing religiosity was associated with a decreasing likelihood of smoking, alcohol use, and drug abuse, as well as a greater likelihood of better maternal nutrition during pregnancy [32, 33]. Cyphers et al. (2017) reported that increased levels of

religiosity were associated with more frequent health promotion behaviors [21]. However, this study had measurement difference with that Cyphers et al. (2017). The measurement of Cyphers's study religion index and religion commitment, while measurement of this study was spiritual well-being.

Correlational findings showed that spiritual well-being was related negatively with state-anxiety, and pregnancy stress. Our data support the conclusion that the main factor had negative effect on health promotion behaviors is state-anxiety. Evidence is showed that spiritual well-being predicts 39.1% of state-anxiety of adult [34]. Also, a study reported that spiritual well-being was correlated negatively with pregnancy-specific stress [12]. Mann et al (2008) reported that spirituality was associated with decreased anxiety of pregnant women (odds ratio [35], 0.53; $p = 0.006$) [36]. However, Mann's study pregnant women with positive for moderate to severe anxiety included the study. Also, the assessment of anxiety symptoms was the anxiety subscale of the Hospital Anxiety and Depression Scale (HADS). On the other hands, spirituality may be related positively to anxiety [35, 37]. A review study explained the spirituality can be increased anxiety by means of negative belief, negative religious copings, misunderstanding, and miscommunication [38].

Another correlational finding was positive correlation of spiritual well-being with three types of pregnancy coping ways; planning-preparation, avoidance, and spiritual-positive coping. We conclude that the effect of spiritual well-being on coping ways and health promotion behaviors depends on the type of coping ways. Although spiritual well-being had positive relationship with three kinds of coping, avoidance and spiritual-positive coping did not significant effect on health promotion behaviors. It is seams that only planning-preparation coping may be increase the healthy behaviors. Previous study is shown that spiritual coping was correlated positively with problem-solving strategies and emotional-solving in pregnant women [31].

The results support that indirectly strong positive effect of spiritual well-being on health promotion behaviors of pregnant women through mediatory role of anxiety and planning-preparation coping. Now, there is a question how the Planning-preparation coping and stat-anxiety mediated the relationship of spiritual well-being with health promotion behaviors? The mechanism effect of spirituality on anxiety or planning-preparation coping as well as effect of the mediatory effects on healthy behaviors is known. However, there are assumption to interpretation of the effects.

First, level of anxiety is related both to spirituality and healthy behaviors. Research has shown that spirituality is associated with lower levels of anxiety and less perceived stress [13]. Also, State anxiety was predicted negatively healthy behaviors of pregnant women including; healthy nutrition, physical activity, and health responsibility [39].

Second, spirituality helps pregnant women to have higher well-being. Individual with higher spirituality have better cope with stressful life, have sense of control and higher hope [40]. Individual with higher spirituality have higher social support and less social anxiety [37, 41].

Third, the spiritual well-being with increasing the planning-preparation copings may be improved the healthy behaviors of pregnant women. It seems that the spirituality helps women to increase their preparation to plan ways to cope with stressful situations [42]. Evidence supports that spirituality is correlated strongly with problem-solving strategies in pregnant women [31].

These findings underline the importance of anxiety and coping planning in mediating processes that explain how spirituality well-being produce their effects on health promotion behaviors of pregnant women. Moreover, investigating the association between mental disorders and health behaviors of pregnant women is recommended. Also, more research is necessary to determine the effect of spirituality on healthy behaviors in the maternal and neonatal pregnancy outcome. Further research is needed to explore how may interaction of spiritual well-being and coping way stress influence the healthy behaviors of pregnant women? How avoidance coping decreased the stress anxiety but not had effect on healthy behaviors? Could enhancing the healthy behaviors of pregnant women through decreasing anxiety and increasing planning-coping ways? In future research, these matters need to be addressed.

These findings can propose the path for various practical implications. Health care professionals could emphasize the positive effects of spirituality well-being on decreasing anxiety and pregnancy stress as well as increasing of healthy behaviors. Educating mothers and their partners about the benefits of role of spirituality well-being on decreasing anxiety and increasing planning-copings may be an important facilitating factor for improving health promotion behaviors in pregnancy period.

This study has some limitations that create restriction in generalization. First, the design of the project is cross-section study, therefore cause-effect conclusions should be treated with caution. Cohort studies are needed to assess the effect of spiritual well-being on healthy behaviors of pregnant women. Second, the present findings were based on self-reporting of the participants, thus the response bias threatened the results.

Conclusion

Spiritual well-being may decrease state-anxiety and pregnancy stress, whereas increases planning-preparation, avoidance, and spiritual-positive copings. Planning-preparation coping and stat-anxiety mediated the relationship of spiritual well-being with health promotion behaviors. The fact that spiritual well-being both directly and indirectly with increases planning-preparation copings and decreases the anxiety improves promotion healthy behaviors seems to be intuitive.

Declarations

Ethical Approval: The study was approved by the Ethic Committee of Babol University of Medical Sciences (MUBABOL.HRI.REC.1396.62). Written informed consent was obtained directly from the participants.

Consent for publication: All of the participants signed a written informed consent prior to participating in this study.

Availability of data and materials: The data will be available for editors in case of reasonable requests.

Competing Interests: No authors have conflict of interest related with this

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Author Contributions: MF was the principal investigator of this study. MC contributed to the development of the project and performed the statistical analyses. SA and ME contributed development of the project and gathering the data. SSR contributed the writing the manuscript. All authors contributed to the drafting of this paper and approved the final manuscript.

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Tables

Table 1. Demographic characteristics of study participants n=200

Variable	Mean (SD) or Frequency (%)
Age	27.5 (5.34)
Educational Level	
Primary	4 (2%)
High School	39 (19.5%)
Diploma	108 (54.5%)
University-Educated	49 (24.5%)
Gestational Age	23.98 (6.61)
Job	
Housekeeper	184 (92%)
Employed	16 (8%)

Table 2. Pairwise Pearson's correlation coefficients between constructs and their descriptive statistics (Mean and SD).

construct	1	2	3	4	5	6	7
1.SWBS	1						
2.State-Anxiety	-0.41*	1					
3.NuPDQ	-0.36*	0.47*	1				
4.Planning	0.35*	-0.29*	0.0032	1			
5.Avoidance	0.46*	-0.40*	-0.24*	0.60*	1		
6.Spiritual-positive coping	0.48*	-0.34*	-0.21*	0.54*	0.58*	1	
7.HPLP	0.45*	-0.59*	-0.34*	0.47*	0.48*	0.45*	1
Mean	101.5	39.23	11.6	41	27.07	18.21	135.06
SD	10.59	8.32	4.82	10.56	7.23	3.34	22.49

*P<0.001; SD: Standard Deviation

Table 3. Results of PLS-SEM model fitting internal consistency, convergent and discriminant validity

Fitting Index	SWBS	State-Anxiety	NuPDQ	Planning	Avoidance	Spiritual-positive coping	HPLP
RhoA	0.86	0.90	0.47	0.88	0.64	0.68	0.95
AVE	0.27	0.32	0.12	0.33	0.14	0.40	0.27

Table 4. Direct, Indirect Effects of latent variables (constructs) in conceptual model

Effect	Direct	P value	VIF
SWBS -> HPLP			1.54
Direct	0.13	0.04	
Indirect	0.33	<0.001	
Total	0.46		
SWBS -> State-Anxiety	-0.41	<0.001	1
SWBS-> NuPDQ	-0.36	<0.001	1
SWBS -> planning-preparation	0.36	<0.001	1
SWBS -> avoidance	0.46	<0.001	1
SWBS -> spiritual-positive cop	0.48	<0.001	1
State-Anxiety->HPLP	-0.36	<0.001	1.49
NuPDQ-> HPLP	-0.09	0.14	1.38
planning-preparation-> HPLP	0.23	0.001	1.82
Avoidance-> HPLP	0.07	0.33	1.95
spiritual-positive cop-> HPLP	0.08	0.23	1.70

VIF: Variance Inflation Factor

Figures

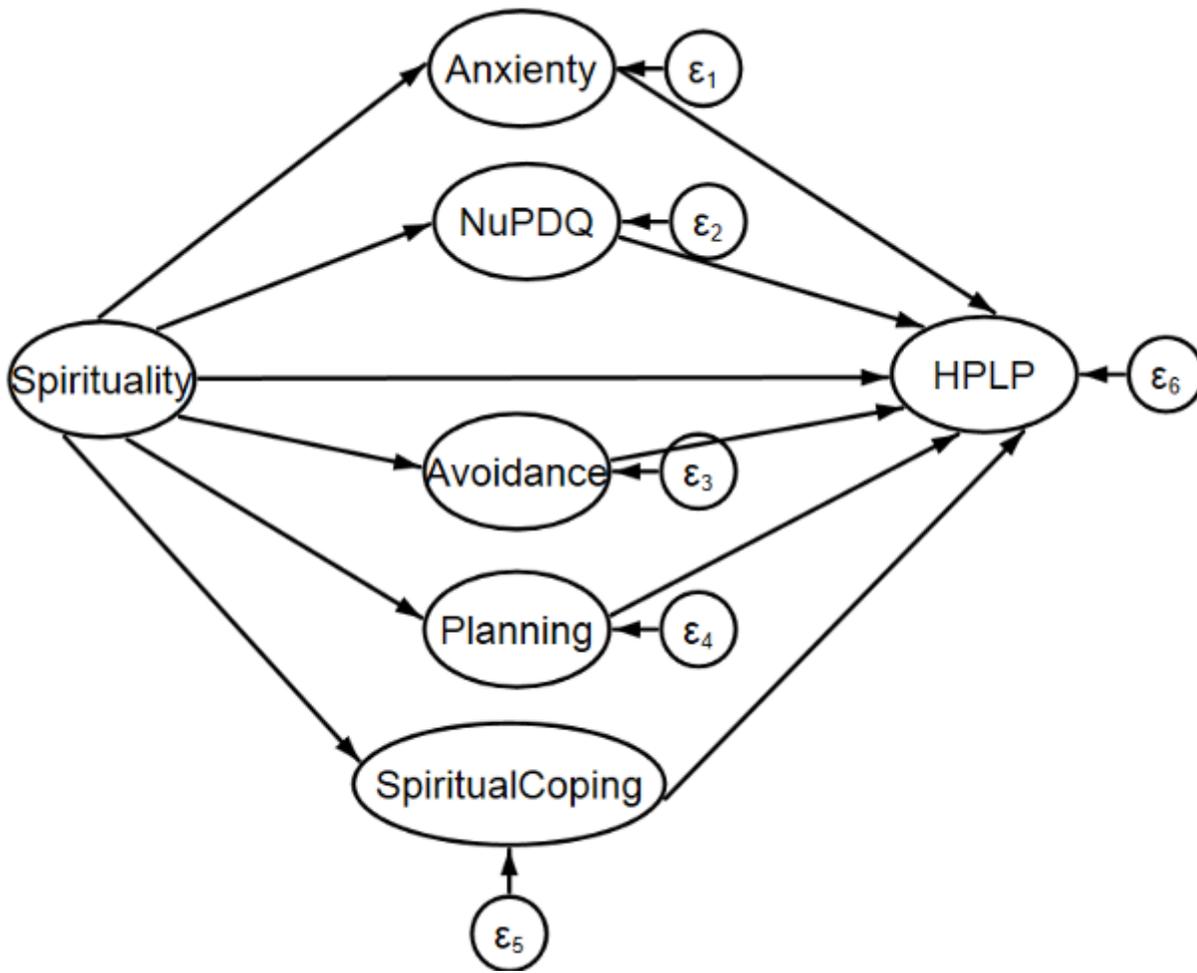


Figure 1

Path diagram of the Conceptual model depicting direct and indirect association between spirituality and Health Promoting Lifestyle Profile (HPLP)

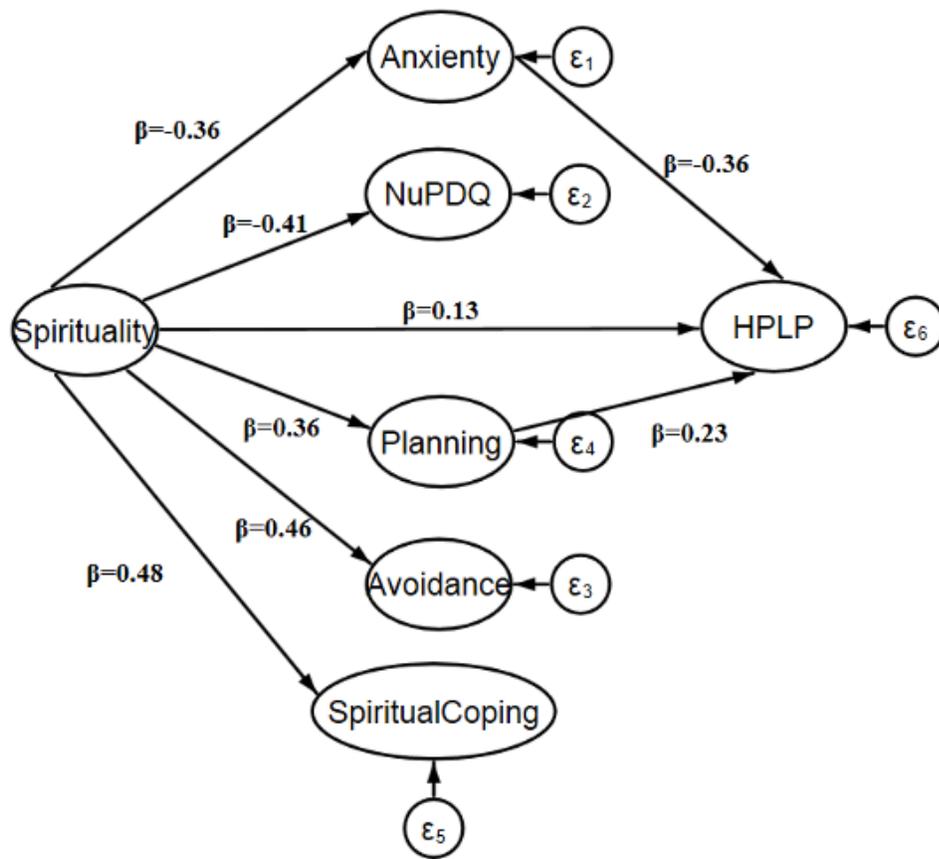


Figure 2

Final model of path diagram including significant coefficients for spirituality, prenatal Coping, and Health Promoting Lifestyle Profile (HPLP)