

Spirituality, Anxiety and Antenatal Outcomes

Received: 30 November 2021

Accepted: 09 December 2021

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Abstract

The present study aims to examine the relationship between spirituality and anxiety during 2nd and 3rd trimesters of pregnancy, the relationship between spirituality and antenatal outcomes viz., gestational age, infant weight and apgar score of 1 & 5 minutes and the relationship between anxiety during 2nd and 3rd trimesters of pregnancy and antenatal outcomes. The study was conducted on a sample of 100 pregnant women of age range between 20-35 years during 2nd and 3rd trimester of their pregnancy who were recruited in Department of Obstetrics and Gynecology of Institute of Medical Sciences Banaras Hindu University, Varanasi. The study follows a correlational design. Spirituality and anxiety have been treated as independent variables, and antenatal outcomes have been treated as dependent variables. Spirituality was measured by using The Daily Spiritual Experiences Scale (Underwood, 2002) and the Hindi adaptation of the scale was done to use in Indian context (Cronbach alpha 0.79). Anxiety was assessed by using State, Trait and Free-floating Anxiety Inventory (Rastogi & Tripathi, 1986). The indices of internal consistency for both state and trait scale is 0.93 and 0.89 respectively. The data was analyzed with correlational analysis and hierarchical regression. The results indicated that spirituality is significantly negatively correlated with anxiety during pregnancy and positively correlated with antenatal outcomes in pregnant women. The results also revealed that anxiety during pregnancy is negatively correlated with antenatal outcomes. Thus, it can be concluded that women with high level of spirituality were more likely to have less anxiety and healthy antenatal outcomes.

Keywords: Spirituality, anxiety, pregnancy, antenatal outcomes

Pregnancy is a joyous period for almost all the women and almost every woman experiences this pleasure once in their lifetime. However, for some women this period may be stressful too. A pregnant woman experiences a lot of physical changes as well as psychological changes e.g. anxiety, depression and stress during her pregnancy. Depending on the type of measure used it is estimated that prevalence of depression during pregnancy can be 16% or more in symptomatic form and 5% as major depression (Leight, Fitelson, Weston, & Wisner, 2010). Although a concrete estimates regarding prenatal anxiety is not available, but previous studies suggested that a significant number of women experience prenatal anxiety during their pregnancy (Ross & McLean, 2006). Several studies found that elevated depression (Grote, Bridge, Gavin, Melville, Iyengar, & Katon, 2010) and anxiety (Kramer, Lydon, Séguin, Goulet, Kahn, McNamara et al., 2009) levels predicted an increased risk for preterm labor

and low birth weight (Schetter & Tanner, 2012). Maternal antenatal anxiety involves a range of experiences e.g. transient mood disturbance, personality-based or trait anxiety, clinical diagnoses of anxiety disorder etc. These experiences of anxiety are generally measured by self-report questionnaire, which are associated with measurable effects on the infant in utero and with later emotional, cognitive, and behavioural effects on the infant/child (Glover, 2011; Talge, Neal, & Glover, 2007) even after controlling the effects for obstetric complications, depression, and complications in the postnatal period (Van Den Bergh, Mulder, Mennes, & Glover, 2005). Although the effect of prenatal maternal anxiety on foetal development does not occur in each case but the behavioural/emotional problems can be attributed from 10–15% in the population (Glover, 2015).

Studies reveal that antenatal maternal anxiety is associated with increased rates of spontaneous preterm

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68/ Spirituality, Anxiety and Antenatal Outcomes

births (less than 37 weeks) (Dancause et al., 2011; Glynn, Wadhwa, Dunkel-Schetter, Chicz-Demet, & Sandman, 2001; Pavlov, Steiner, Kessous, Weintraub, & Sheiner, 2014). Approximately 50–70% of premature infants with birth weight less than 1500gm may develop later dysfunctions, such as learning disabilities, attention problems, autism spectrum disorders, respiratory illnesses, cognitive deficits, psychiatric disorders, neuropsychological deficits, and behavioural problems (Aylward, 2002).

A review by Dunkel Schetter & Glynn, (2011) revealed that seven of eleven studies significantly predicted Preterm Birth in combination with other measures or in subgroups of the sample with State anxiety during pregnancy. But a meta-analysis reported that there was not a significant association between anxiety symptoms and overall perinatal outcomes, though small statistically significant relationships were present for birth weight and 5-minute Apgar score (Littleton et al. 2007).

Several researches have been conducted to understand the relationship between maternal anxiety during pregnancy and child neurodevelopment. One such study conducted by Van den Bergh and Marcoen (2004) claimed that antenatal anxiety accounted 22% of the variance in explaining attention deficit hyperactivity disorder symptoms and explained 9% of variance in anxiety symptoms in children (8 to 9 year).

Another study demonstrated a significant association between anxiety in late pregnancy and doubling the risk of child to suffer from ADHD, anxiety or depression, or conduct disorder at 4 and 7 years of age (O'Connor et al. 2002). Similarly, a recent study conducted by Newman, Judd, & Komiti (2017) revealed that maternal anxiety has a strong impact on neurodevelopment and psychosocial outcomes of infants i.e. reduced foetal heart rate (FHR) (DiPietro et al., 1996); increased rate of spontaneous preterm birth (less than 37 weeks) (Dancause et al., 2011); Hyperactivity/inattention in boys (Loomans, Van Derstelt, Van eijdsen, Hemke, & Vrijkottes, 2012); Lower mental developmental Index (MDI) and psychosocial development Index (PDI) score on Bayley Scales of Infant Development at 8 months (Buitelaar, Huizink, Mulder, De Medina & Visser, 2003) etc.

From ancient times people use spirituality and religion to cope with stressful situations (Harris, Erbes,

Engdahl, Olson, Winkowski, McMahon, 2008; Pargament, Koenig, Tarakeshwar, Hahn, 2001; Pargament, Koenig, Tarakeshwar, Hahn, 2004) so the beliefs and values of women including spirituality and cultural values may be one of the methods to cope with depression and anxiety during pregnancy (DunkelSchetter, 2011). In Indian tradition pregnancy has its religious value too. In Hindu tradition many Samskara are performed before conception, during pregnancy and following the childbirth for a healthy and auspicious pregnancy. For a long time prayer and other spiritual practices are used by the women for their own and others' health concerns (National Centre for Complementary and Alternative Medicine, 2005).

A study conducted on childbearing African-American women, including those who were coping with grief after miscarriage found spirituality was a powerful ameliorating coping strategy (Dailey & Stewart, 2007). Reviews of research conducted regarding spirituality during pregnancy concluded powerful spiritual relationships exist between childbearing women and their unborn children (Hall, 2006; Hall & Taylor, 2004).

The study conducted by Najman et al. (1988) in which they reported the relationship of religiosity to maternal and infant health. They found that highly religious sect members exhibited significantly fewer health risk behaviors during pregnancy and their infant weighed significantly more and had a later gestational age at birth.

Similarly, Magana and Clark (1995), who reviewed the literature on the relationship of religiosity and spirituality to birth outcomes in Mexican American women, postulated that Mexican American women would experience less perinatal mortality and higher birth weights, despite lower socioeconomic status and less perinatal care because of the strong influence of spirituality and religiosity in Latino culture.

Morgan (1996) in a qualitative study (N=33) examined cultural context of prenatal care for African American women in urban and rural environments. An aspect of their findings was that women expressed the importance of spirituality as way to feel a sense of balance. Seema (2015) explored the relationship between spirituality and well-being among antenatal women and the study reported that women who were recognised as highly spiritual enjoyed greater well-being during pregnancy.

Similarly, Bodagietal. (2016) conducted a study to investigate the role of spiritual and social support in the prediction of anxiety, depression, and stress in pregnant women. They found that anxiety, depression, and stress have an inverse relationship with spirituality and social support. Niaghihaetal. (2019) investigated the correlation between spiritual well-being & life-satisfaction given the mediating role of social support in pregnant women. This study showed a significant and direct association between spiritual well-being and life-satisfaction among pregnant women.

Recently, Sanaeinasabetal., (2020) conducted a study to assess the impact of a spiritual intervention in reducing stress, anxiety, depression, & blood pressure during pregnancy. The intervention program utilized a spiritually- integrated cognitive behavioral approach to help the participants. The results revealed a significant decrease in stress, anxiety, & depression scores in the intervention group. Along with this there were also significant differences in systolic and diastolic blood pressure in the intervention group.

Based on previous studies it is evident that spirituality is generally associated with better mental health, also anxiety is prevalent during pregnancy with the possibility that these anxiety symptoms may negatively impact antenatal outcomes and there is very less researches on spirituality and antenatal outcomes, therefore the present study was conducted to examine the relationship between spirituality, anxiety and antenatal outcomes.

Materials and Method

Participants: The present study was conducted on a sample of 100 pregnant women. Recruitment of pregnant women was coordinated by the Department of Obstetrics and Gynecology, Sir Sunder Lal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. Women in the second trimester of their pregnancy were eligible to participate in the study. Informed consent was obtained from all the women and study was approved by Department of Obstetrics and Gynecology, I.M.S., Banaras Hindu University.

Inclusion criteria: The inclusion criteria of the study were age over 20 years up to 35 years, able to read and write Hindi, should be in the second trimester of their pregnancy, no severe medical problems requiring individualized assessment and tracking as “a

high-risk pregnancy” and no presence of psychological or psychiatric disease necessitating hospitalization.

Exclusion criteria: The exclusion criteria of the study were age below 20 years and above 35 years, illiterate women, women other than second trimester, women with psychological or severe physical problems, unmarried mothers, and HIV positive mothers, inability to read and understand questionnaire of language difficulties and not providing informed consent and women with chronic infectious diseases, cardiopathy, mental diseases, hypertension/preeclampsia/eclampsia, and vaginal bleeding were not included in the study.

Measures

At the time of recruitment the medical, obstetrical and gynecological history was thoroughly documented and their personal details e.g. name, age, education, income, along with physiological variables i.e. height, weight etc. were collected. With the help of these physiological variables body mass index (BMI) was calculated (weight (kg) /height (m²).

In addition, standardized questionnaires on spirituality and anxiety were also completed. Following the completion of pregnancy, information regarding delivery, labor, infant weight etc. were obtained from the hospital record.

Psychometric Evaluations

Daily Spiritual Experience Scale: The Daily Spiritual experiences scale is constructed by Lynn Underwood (2002) and it is developed in western context so, the Hindi adaptation of the scale was done such that it can be used in Indian context. This scale aims to assess the individual's perception of the supreme power i.e. God, the divine in his daily life. Thus, the items of this scale measures the daily spiritual experiences of an ordinary person. In this scale, the following dimensions were identified: connection with the transcendent; sense of support from the transcendent, wholeness, transcendent sense of awe, gratitude, compassion; mercy and longing for the transcendent. The scale consists of 16 items and the response categories of all items except for the question 16 are: many times a day; everyday; most days; some days; once in a while; never or almost never. The reliability was calculated by Cronbach alpha and it was found to be 0.79.

The Self-Evaluation Scale (An anxiety scale for state, trait and free-floating anxieties):- The self-

70/ Spirituality, Anxiety and Antenatal Outcomes

evaluation scale was used to assess the levels of maternal state and trait anxiety. It was constructed by R.R. Tripathi and Ambar Rastogi on the basis of state-trait anxiety Inventory (Spielberger, 1970). The self-evaluation scale consists of 3 subscales in which Part-I is for Anxiety- State subscale, Part-II is for Anxiety-Trait subscale and Part –III is for Anxiety- Free-floating subscale.

In the present study Part-I and part-II of scale were used for measuring the anxiety level in pregnant women. The items for A-State Scale and A-Trait Scale have been drawn largely from the Spielberger Scale, the STAI (Spielberger et al., 1970) with some modification. The Hindi version of the STAI (Spielberger, et al., 1973) was considered unfit for adaptation because of its inappropriate Hindi rendering. Thus, state anxiety scale consists of 20 items in which 10 are positive and 10 are negative items.

Similarly, Trait anxiety scale consists of 28 items in which there are 16 positive items and 13 items are from Spielberger et al., (1970)'s trait anxiety scale and 3 more items had been added. A positive –negative imbalance in the trait scale was correlated by additional items. Thus, the preliminary structure of the A-trait scale was also prepared with positive-negative balance and wider coverage of contents. The response category of state anxiety scale ranges from 1 "nominally" to 5 "exceedingly" and response category of trait anxiety scale ranges 1 "seldom" to 5 "always". A total score is calculated by summing all the items. Higher scores obtained by subjects indicate greater degree of anxiety. The indices of internal consistency for both state and trait scale is .93 and .89 respectively.

Results

Correlational analysis was performed to see the relationships between demographic variables and antenatal outcomes because pregnancy is affected by a number of factors.

Table 1: Correlation matrix between demographic variables and neonatal outcomes viz., gestational age, infant weight, apgar score of 1 & 5 minutes

	Gestation age	Infant weight	Apgar score 1 minute.	Apgar score 5 minute
Age	.223*	.289**	.135	.147
Education	.242*	.293**	.254*	.217*
Income	.333**	.400**	.335**	.330**
Parity	.124	.113	-.009	.034
BMI 2 nd trimester	.276**	.302**	.177*	.215*
BMI 3 rd trimester	.332**	.388**	.261**	.310**

** p<0.01; * p<0.05

Table 1 presents the correlation between demographic variables and antenatal outcomes. The matrix shows that all of the demographic variables are significantly related to antenatal outcomes except parity. The age of the mother is significantly positively correlated with the gestational age ($r = .22$, $p < 0.05$) and birth weight ($r = .28$, $p < 0.01$) but not with the apgar

score of one minute and five minutes, indicating that mothers with appropriate age were more likely to have a infant of full gestational age and good birth weight (as the sample is only till 35 years). Similarly, education and income was significantly positively correlated with gestational age ($r = .24$, $p < 0.05$ & $r = .33$, $p < 0.01$), infant weight ($r = .29$ & $r = .40$ $p < 0.01$), apgar score 1 minute

($r = .25$, $p < 0.05$ & $r = .33$, $p < 0.01$) and apgar score 5 minute ($r = .21$, $p < 0.05$ & $r = .33$, $p < 0.01$). But, parity was non-significantly related to gestational age, infant birth weight and apgar score of 1 minute & apgar score of 5 minutes.

Body mass index (BMI) of 2nd and 3rd trimester were also significantly positively correlated to

gestational age ($r = .27$ & $r = .33$, both $p < 0.01$), infant birth weight ($r = .30$ & $r = .38$, both $p < 0.01$), and apgar score of 1 min. ($r = .17$, $p < 0.05$ & $r = .26$, $p < 0.01$) and apgar score of 5 minute ($r = .21$, $p < 0.05$ & $r = .31$, $p < 0.01$ respectively), revealing that BMI (body mass index) is an important factor in determining gestational age, infant weight, and apgar score of newborn baby.

Table 2: Correlations between spirituality and anxiety during 2nd & 3rd trimester of pregnancy

	State anxiety 2 nd trimester	Trait anxiety 2 nd trimester	State anxiety 3 rd trimester	Trait anxiety 3 rd trimester
Spirituality	-.696**	-.611**	-.599**	-.525**

** $p < 0.01$

Table 2 shows the correlation between spirituality and anxiety during 2nd and 3rd trimester of pregnancy. This table shows that spirituality is significantly negatively correlated with state anxiety of 2nd and 3rd trimester ($r = -.696$, $p < 0.01$ & $r = -.599$, $p < 0.01$ respectively) and trait anxiety of 2nd and 3rd trimester ($r = -.611$, $p < 0.01$ & $r = -.525$, $p < 0.01$ respectively)

revealing that women with high spirituality were less anxious during their pregnancy.

Again, correlation analysis was applied to examine the relationship between spirituality and antenatal outcomes viz., gestational age, infant weight and apgar score of 1 & 5 minutes. The results of correlation analysis between spirituality and antenatal outcomes are shown in shown in Table 3.

Table 3: Correlations between spirituality and antenatal outcomes

	Gestational age	Infant weight	Apgar score 1 min.	Apgar score 5 min.
Spirituality	.566**	.579**	.482**	.485**

** $p < 0.01$

The results indicate that spirituality has significant positive correlation with gestational age ($r = .566$, $p < 0.01$), birth weight ($r = .579$, $p < 0.01$) apgar score of 1 minute ($r = .482$, $p < 0.01$), and apgar score of 5 minutes ($r = .485$, $p < 0.01$) respectively. These correlations suggest that spirituality is significantly positively associated with antenatal outcomes, revealing that women who were more spiritual were more likely to

have healthy antenatal outcomes in terms of gestational age, infant weight and apgar score of 1 and 5 minutes.

Again, several correlation analysis was conducted to test the relationship between anxiety and the antenatal outcomes i.e. gestational age (delivery at ≥ 37 weeks), infant weight (≥ 2500 grams), and apgar score of 1 & 5 minutes as displayed in Table 4.

72/ Spirituality, Anxiety and Antenatal Outcomes

Table 4: Correlations between anxiety of 2nd trimester and antenatal outcomes

	Gestation age	Infant weight	Apgar score of 1 minute	Apgar score of 5 minute
State anxiety	-.562**	-.607**	-.577**	-.512**
Trait anxiety	-.512**	-.541**	-.487**	-.464**

** p<0.01

Table 4 shows the correlation between anxiety during 2nd trimester of pregnancy with gestational age, infant birth weight, apgar score of 1 minute and apgar score of 5 minutes. State and trait anxiety are negatively correlated with gestational age ($r = -.562$, $p < 0.01$; $r = -.512$, $p < 0.01$ respectively), infant weight ($r = -.607$, $p < 0.01$ & $r = -.541$, $p < 0.01$ respectively), apgar score

of 1 minute ($r = -.577$, $p < 0.01$ & $r = -.487$, $p < 0.01$), and apgar score of 5 minutes ($r = -.512$, $p < 0.01$ & $r = -.464$, $p < 0.01$) showing that women who reported higher state and trait anxiety were more likely to deliver an infant of shorter gestational age and more likely to deliver a low birth weight infant.

Table 5: Correlations between anxiety of 3rd trimester and antenatal outcomes

	Gestation age	Infant weight	Apgar score of 1 minute	Apgar score of 5 minute
State anxiety	-.458**	-.548**	-.521**	-.462**
Trait anxiety	-.446**	-.484**	-.477**	-.443**

** p<0.01

Table 5 shows the correlation between anxiety of 3rd trimester with gestational age, infant weight, apgar score of 1 minute and apgar score of 5 minutes. State and trait anxiety are negatively correlated with gestational age ($r = -.458$, $p < 0.01$ & $r = -.446$, $p < 0.01$), infant weight ($r = -.548$, $p < 0.01$ & $r = -.484$, $p < 0.01$ respectively), apgar score of 1 minute ($r = -.521$, $p < 0.01$

& $r = -.477$, $p < 0.01$), and apgar score of 5 minutes ($r = -.462$, $p < 0.01$ & $r = -.443$, $p < 0.01$).

On the basis of these correlational analyses, further several multiple hierarchical regression analyses was performed to study the relationship between these variables after controlling the effects of demographic variables.

Table 6: Results of Multiple Linear Regression Analysis (Hierarchical) using spirituality as predictor and anxiety of 2nd trimester as criterion (N=100)

Dependent variable	Standardized Beta value			
	State anxiety		Trait anxiety	
Control variable	Step 1	Step2	Step1	Step2
Age	.115	.123	.135	.142
Education	-.223*	-.172*	-.223*	-.179
Income	-.155	-.078	-.170	-.102
Parity	-.060	-.035	-.075	-.053
BMI	-.375***	-.191*	-.307**	-.145
Independent variable				
Spirituality		-.605***		-.531***
R	.489	.741	.442	.658
R ²	.240	.549	.195	.433
R ² change	.240	.309	.195	.238
F α	5.92***	63.68***	4.55***	39.02***

Step 1= 5, 94

*p<0.05

Step 2= 1, 93

**p<0.01

***p<0.001

Table 6 presents the results of hierarchical regression analyses using spirituality as predictor and state anxiety and trait anxiety during 2nd trimester of pregnancy as criterion. The results displayed in the Table showed that spirituality is significantly negatively correlated with state anxiety ($\beta = -.605$, $p < 0.001$) and trait anxiety ($\beta = -.531$, $p < 0.001$) during 2nd trimester

of pregnancy even after controlling the effects of demographic variables.

Spirituality entered in the model accounted 30.9 % of total variance in explaining the state anxiety, 23.8% of total variance in explaining trait anxiety. Thus, the results indicate that higher spirituality is predictive of lesser anxiety during second trimester of pregnancy.

Table 7: Hierarchical regression analysis using spirituality as predictor and anxiety during 3rd trimester of pregnancy as criterion

Dependent variable	<i>Standardized Beta value</i>			
	<i>State anxiety</i>		<i>Trait anxiety</i>	
Control variable	Step 1	Step2	Step1	Step2
<i>Age</i>	.021	.055	.115	.144
<i>Education</i>	-.196	-.159	-.223*	-.191
<i>Income</i>	.037	.072	-.184	-.154
<i>Parity</i>	-.015	-.019	-.062	-.066
<i>BMI III</i>	-.373***	-.181	-.230*	-.066
Independent variable				
Spirituality		-.530***		-.454 ***
R	.412	.632	.421	.588
R2	.169	.400	.177	.346
R2 change	.169	.230	.177	.169
F α	3.83 **	35.65 ***	4.05 **	23.95 ***

Step 1= 5, 94

Step 2= 1, 93

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Similarly, Table 7 shows the results of hierarchical regression analysis using spirituality as predictor and anxiety during 3rd trimester of pregnancy as criterion. It can be seen from Table 7, that spirituality is significantly negatively correlated with state anxiety ($\beta = -.530$, $P < 0.001$) and trait anxiety ($\beta = -.454$,

$p < 0.01$). It accounted 23.0% total variance in predicting state anxiety and 16.9% of total variance in predicting trait anxiety revealing that women with high spirituality were having less anxiety, during their 3rd trimester of pregnancy.

Table 8: Multiple Linear Regression Analysis (Hierarchical) using spirituality as predictor and antenatal outcomes as criterion (N=100)

Dependent variable	<i>Standardized Beta value</i>							
	<i>Gestational age</i>		<i>Infant weight</i>		<i>Apgar score 1min.</i>		<i>Apgar score 5 min.</i>	
Control variable	Step 1	Step2	Step1	Step2	Step1	Step2	Step1	Step2
<i>Age</i>	.017	-.015	.093	.062	-.037	-.064	-.019	-.046
<i>Education</i>	.144	.111	.156	.125	.133	.105	.093	.066
<i>Income</i>	.178	.147	.176	.146	.217	.190	.207	.181
<i>Parity</i>	.076	.080	.026	.030	-.035	-.032	-.015	-.011
<i>BMI II</i>	-.010	.000	-.150	-.141	-.184	-.176	-.226	-.218
<i>BMI III</i>	.254	.071	.434*	.260	.366	.209	.449	.298
Independent variable								
<i>Spirituality</i>	-	.481***	-	.456***	-	.413** *	-	.398** *
R	.435	.615	.518	.663	.406	.552	.419	.553
R ²	.189	.378	.268	.439	.165	.304	.176	.305
R ² change	.189	.190	.268	.170	.165	.140	.176	.129
F α	3.61**	28.06***	5.68**	27.94**	3.06*	18.46**	3.30*	17.14**

Step 1=6, 93

step 2=1,92

*p<0.05

**p<0.01

***p<0.001

Again hierarchical multiple regression was used to examine the effect of spirituality on the gestational age, birth weight and apgar score of the infants, while controlling the effect of demographic variables. As shown in Table 8 that even after controlling the effects of demographical variables spirituality has significantly predicted the antenatal outcomes. Spirituality was significantly positively correlated to gestational age ($\beta = .481$, $p < 0.001$), infant weight ($\beta = .456$, $p < 0.001$), apgar score of 1 minute ($\beta = .413$, $p < 0.001$), and apgar score

of 5 minutes ($\beta = .398$, $p < 0.001$). The result displayed in Table 8 also explains that spirituality accounted 19.0% of total variance in explaining gestational age, 17.0% of total variance in explaining infant weight, 14.0% of total variance in explaining apgar score of 1 minute and 12.9% of total variance in explaining apgar score of 5 minutes. Thus, findings reveals that women who are highly spiritual would have healthy antenatal outcomes i.e. gestational age (delivery at ≥ 37 weeks), infant weight (≥ 2500 grams), and good apgar score at one and five minutes.

Table 9: Multiple Linear Regression Analysis (Hierarchical) using trait anxiety as predictor and pregnancy outcomes as criterion (N=100)

Dependent variable	Standardized Beta value							
	Gestational age		Infant weight		Apgar score 1min.		Apgar score 5 min.	
Control variable	Step 1	Step2	Step1	Step2	Step1	Step2	Step1	Step2
Age	-.018	.038	.032	.091	-.088	-.025	-.082	-.030
Education	.155	.046	.174	.059	.149	.026	.112	.011
Income	.221	.145	.248*	.168	.278*	.192	.282*	.211
Parity	.110	.081	.085	.053	.014	-.019	.046	.018
BMI II	.207*	.024	.221	.027	.129	-.078	.158	-.013
Independent variable								
State anxiety II	---	-.488***	---	-.516 ***	---	-.550***	---	-.455***
R	.422	.599	.486	.662	.376	.610	.375	.546
R ²	.178	.358	.236	.439	.142	.372	.141	.298
R ² change	.178	.181	.236	.203	.142	.230	.141	.158
F α	4.06**	26.20***	5.80***	33.57***	3.10*	34.04***	3.08*	20.88**

Step 1= 5, 94

step 2= 1,93

*p<0.05

**p<0.01

***p<0.001

Table 9 illustrates the results of hierarchical regression analysis in which state anxiety of 2nd trimester was used as predictor variable and antenatal outcomes as criterion variables. Demographic variables were treated as control variables. It can be seen from the Table 9 that state anxiety is significantly negatively associated with gestational age ($\beta = -.48$, $p < 0.001$), infant weight ($\beta = -.51$, $p < 0.001$), apgar score 1 minute ($\beta = -.55$, $p < 0.001$), and apgar score 5 minute ($\beta = -.45$, $p < 0.001$).

Further, results specify that state anxiety of 2nd trimester accounted 18.1% of total variance in gestational age, 20.3% of total variance in infant weight, 23% of total variance in 1 minute apgar score and 15.8% of total variance in 5 minutes apgar score. The results suggest that higher state anxiety during second trimester of pregnancy is predictive of lesser gestational age, infant weight, and apgar score of 1 & 5 minute.

Similarly, multiple regression analysis was used to identify the significant contribution of trait anxiety during second trimester of pregnancy on gestational age, infant weight, and apgar score of 1 and 5 minutes while controlling for demographic variables.

Table 10 represents the results of hierarchical regression analysis using trait anxiety of 2nd trimester as predictor variable and antenatal outcomes as criterion variables. As shown in Table 10, trait anxiety contributes significantly to gestational age ($\beta = -.41$, $p < 0.001$), infant weight ($\beta = -.42$, $P < 0.001$), apgar score of 1 minute ($\beta = -.42$, $P < 0.001$) and apgar score of 5 minutes ($\beta = -.38$, $P < 0.001$).

The result in the Table 10 also expose that trait anxiety explained 14.1% of total variance in explaining gestational age, 14.8% of total variance in infant weight, 14.2% of total variance in the apgar score of 1 minute and 12% of total variance in apgar score of 5 minute.

76/ Spirituality, Anxiety and Antenatal Outcomes

Table10: Multiple Linear Regression Analysis (Hierarchical) using trait anxiety as predictor and neonatal outcomes as criterion

Dependent variable	<i>Standardized Beta value</i>							
	<i>Gestational age</i>		<i>Infant weight</i>		<i>Apgar score 1min.</i>		<i>Apgar score 5 min.</i>	
Control variable	Step 1	Step2	Step1	Step2	Step1	Step2	Step1	Step2
<i>Age</i>	-.018	.039	.032	.090	-.088	-.031	-.082	-.030
<i>Education</i>	.155	.061	.174	.078	.149	.055	.112	.026
<i>Income</i>	.221	.149	.248*	.175	.278*	.207	.282*	.216
<i>Parity</i>	.110	.078	.085	.052	.014	-.018	.046	.016
<i>BMI II</i>	.207*	.078	.221	.089	.129	.000	.158	.039
Independent variable								
<i>Trait anxiety II</i>	-	-.419***	-	-.429***	-	-.420***	-	-.387***
R	.422	.565	.486	.620	.376	.533	.375	.511
R ²	.178	.319	.236	.384	.142	.284	.141	.261
R ² change	.178	.141	.236	.148	.142	.142	.141	.120
F α	4.06**	19.31***	5.80***	22.42***	3.10*	18.43*	3.08*	15.15***

Step 1= 5, 94

step 2= 1,93

*p<0.05

**p<0.01

***p<0.001

Table 11: Multiple Linear Regression Analysis (Hierarchical) using state anxiety of 3rd trimester as predictor and pregnancy outcomes as criterion (N=100)

Dependent variable	<i>Standardized Beta value</i>							
	<i>Gestational age</i>		<i>Infant weight</i>		<i>Apgar score 1min.</i>		<i>Apgar score 5 min.</i>	
Control variable	Step 1	Step2	Step1	Step2	Step1	Step2	Step1	Step2
<i>Age</i>	.016	.024	.071	.081	-.063	-.053	-.052	-.044
<i>Education</i>	.145	.074	.166	.080	.146	.054	.109	.034
<i>Income</i>	.179	.193	.190	.206	.235	.252*	.229	.243*
<i>Parity</i>	.077	.071	.039	.033	-.019	-.026	.005	-.001
<i>BMI III</i>	.244*	.109	.295**	.132	.196	.021	.241*	.098
Independent variable								
<i>State anxiety III</i>	-	-.363***	-	-.439***	-	-.469***	-	-.384***
R	.435	.546	.514	.652	.398	.584	.408	.537
R ²	.189	.298	.264	.425	.158	.341	.166	.288
R ² change	.189	.109	.264	.160	.158	.183	.166	.122
F α	4.37***	14.51***	6.75***	25.91***	3.54**	25.78***	3.74**	15.96***

Step 1=5,94

step 2=1,93

*p<0.05

**p<0.01

***p<0.001

Again, hierarchical regression analyses were conducted to determine how much variance on the gestational age, infant weight, apgar scope of 1 minute and apgar score of 5 minutes could be explained by the state anxiety during third trimester of pregnancy. In the first step of analysis, demographic factors were entered as control variables such that to control their effects on dependent measures. At second step state anxiety was entered to examine its role on gestational age, infant weight, apgar score of 2 and 5 minutes.

The results are represented in Table 11 showed that state anxiety significantly predicted the gestational age,

infant weight, and apgar score of 1 & 5 minutes. The state was significantly negatively related to gestational age ($\beta = -.36$, $p < 0.001$), infant weight ($\beta = -.43$, $p < 0.001$), apgar score 1 minute ($\beta = -.46$, $p < 0.001$) and apgar score of 5 minute ($\beta = -.38$, $p < 0.001$).

State anxiety explained 10.9 % of total amount of variance in gestational age, 16% of total variance in infant weight, 18.3% of total variance in apgar score of 1 minute and 12.2% of variance in apgar score of 5 minutes. The results reveal that state anxiety of third trimester is a stronger predictor of antenatal outcomes.

Table 12: Multiple Linear Regression Analysis (Hierarchical) using trait anxiety of 3rd trimester as predictor and neonatal outcomes as criterion (N=100)

Dependent variable	Standardized Beta value							
	Gestational age		Infant weight		Apgar score 1min.		Apgar score 5 min.	
Control variable	Step 1	Step2	Step1	Step2	Step1	Step2	Step1	Step2
Age	.016	.054	.071	.111	-.063	-.019	-.052	-.013
Education	.145	.071	.166	.090	.146	.061	.109	.034
Income	.179	.118	.190	.127	.235	.165	.229	.167
Parity	.077	.056	.039	.018	-.019	-.043	.005	-.016
BMI III	.244*	.168	.295**	.216*	.196	.108	.241*	.163
Independent variable								
Trait anxiety III	---	-.332***	---	-.343***	---	-.382 ***	---	-.337***
R	.435	.529	.514	.601	.398	.528	.408	.510
R2	.189	.279	.264	.361	.158	.279	.166	.260
R2 change	.189	.090	.264	.097	.158	.120	.166	.094
F α	4.37***	11.67***	6.75***	14.11***	3.54**	15.49***	3.74**	11.75***

Step 1=5,94

* $p < 0.05$

step 2=1,93

** $p < 0.01$

*** $p < 0.001$

With the aim of predicting the role of trait anxiety of 3rd trimester on antenatal outcomes hierarchical regression analysis was applied. In this analysis trait anxiety was used as predictor variable and antenatal outcomes as criterion variable. Demographic variable were treated as control variables.

Table 12 displays the results of hierarchical regression representing trait anxiety of 3rd trimester as the predictor and antenatal outcomes as the criterion. Results shows that trait anxiety of third trimester is negatively associated with the gestational age of the baby ($\beta = -.33$, $p < 0.001$) and the infant weight ($\beta = -.34$, $p < 0.001$), apgar score of 1 minute ($\beta = -.38$, $p < 0.001$), and apgar score of 5 minutes ($\beta = -.33$,

$p < 0.001$). The total amount of variance explained by trait anxiety for gestational age is 9% and for infant weight is 9.7%, similarly 12% of total variance in apgar score 1 minute and 9.4% of total variance in apgar score of 5 minutes. Thus, from the table we can interpret that trait anxiety of 3rd trimester has its significant effect on gestational age, infant weight and apgar score of 1 and 5 minutes.

Discussion

The aim of this study was to investigate the relationships spirituality, anxiety and antenatal outcomes. Our findings showed that spirituality is significantly negatively related with both state anxiety and trait anxiety during pregnancy. This finding is

consistent with the study conducted by Mann et al. (2008) in which they examined the relationships between religiosity, spirituality, and anxiety on the sample of pregnant women and the study revealed that overall religiosity and spirituality (odd ratio 0.53; $p=0.006$) and social support (OR, 0.42; $p<0.00001$) were significantly associated with significantly lower odds of a positive anxiety screen. This study also revealed that anxiety is significantly negatively associated with antenatal outcomes.

The findings are consistent with the studies conducted by Dancause et al., (2011); Glynn, Wadhwa, Dunkel-Schetter, Chicz-Demet, & Sandman, (2001); Pavlov, Steiner, Kessous, Weintraub, & Sheiner (2014) in which they found that antenatal maternal anxiety is associated with increased rates of spontaneous preterm births (less than 37 weeks).

Finally, the study also demonstrated that spirituality is significantly positively related with birth outcomes. Contrary, to the study conducted by Jesse and Alligood (2002) in which they found that higher maternal religiosity scores were significantly associated with earlier gestational age at birth, and a spiritual perspective was associated with birth outcomes.

The results of present study is consistent with the study conducted by Najman et al. (1988) in which they reported the relationship of religiosity to maternal and infant health. They found that highly religious sect members exhibited significantly fewer health risk behaviors during pregnancy and their infant weighed significantly more and had a later gestational age at birth. Bodaghi et al. (2016) stated that spirituality had

an inverse relationship with anxiety, depression and stress among pregnant women.

Similarly, Sanaeinasab et al., (2020) claimed that spiritual intervention i.e. spiritually- integrated cognitive behavioral approach is helpful in reducing stress, anxiety, and depression during pregnancy.

Thus, the findings of present study is more or less consistent to these findings, which indicates that more spiritual women had a full term delivery (≥ 37 weeks), their infants had more weight (≥ 2500 gm) and good apgar score. Thus, in the light of present literature, results from present data supports the research that spirituality is associated with healthy antenatal outcomes in terms of gestational age, birth weight and apgar scores of 1 & 5 minutes.

Conclusion

Based on the present findings this paper concludes that the pregnant women who were more spiritual were having less anxiety during their pregnancy and had healthy antenatal outcomes in terms of gestational age i.e. delivery ≥ 37 weeks, birth weight ≥ 2500 grams, and good apgar scores of 1 & 5 minutes. As studies showed that spirituality and religiosity can help people to cope with the mental problems as it provides a cognitive framework that enhances adaptive coping (Morerira-Almeida, 2006) thus, acknowledging the spiritual dimension of women's lives during their childbirth and motherhood may be the ideal contexts to enrich spirituality (Callister & Khalaf, 2010) which may provide them to cope with the various stressors of the pregnancy.

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80/ Spirituality, Anxiety and Antenatal Outcomes

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