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Research Article

**THE EFFECT OF SPIRITUAL WELL-BEING ON SURGICAL FEAR IN PATIENTS
SCHEDULED TO HAVE ABDOMINAL SURGERY**

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Abstract: *Abdominal surgery and the postoperative period are very risky experiences. Individuals with fear of surgery will be under high stress and in a state of depression. In this context, the state of spiritual well-being overcoming surgical fears in patients undergoing planned abdominal surgery was examined. This study was conducted to investigate the effects of the levels of the spiritual well-being of patients who are planned to have abdominal surgery on their surgical fear. The study was carried out with the participation of 150 patients at the General Surgery and Transplant clinics at a university hospital between January and May 2020. It was determined that there was a negative significant relationship between surgical fear and spiritual well-being, and the highest score for surgical fear was observed in the individuals who were 65 years old or older. The awareness of healthcare professionals about spiritual well-being should be raised, and they should provide healthcare that ensures supporting patients in spiritual and social aspects.*

Keywords: *Abdominal surgery, surgical fear, spiritual well-being.*

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1. Introduction

Today, as a result of developments in anesthesia techniques and improvements in care quality and technology, surgical interventions are no longer last-resort treatment methods and have become a treatment method that is applied routinely. Although these interventions are performed on a large or small scale in an emergent or elective way to improve the quality of life of patients, they are both physiological and psychological traumas for patients [1,2].

Abdominal surgical interventions are performed on the liver, spleen, stomach, bile duct, intestines and bowels, and pancreas [3]. Laparoscopic and major (open) surgery methods are used. Laparoscopic surgery is preferred more in comparison to open surgery as it is less invasive, causes fewer complications, and shortens the duration of hospital stay [4,5]. However, in cases where a minimally invasive approach is not appropriate, open surgery is performed.

Preoperative fear is affected by information status on the procedures to be applied, previous anesthesia and surgery experience, the type of surgical intervention to be performed, and the degree of difficulty and risk. Fear is a universal reaction in humans against problem-creating situations, dangers, and threats [6]. An individual is expected to display emotional, physiological, and physical reactions in the face of situations that disrupt their well-being. Emotional reactions may manifest themselves as a

feeling of tension, nervousness, a feeling of something bad is about to happen, disturbance, worry, and intense panic attack [7,8].

As a result of the secretion of stress hormones physiologically, the autonomous nervous system gets activated, and certain physical reactions such as sweating, looking pale, crying, blushing and joggling appear [7,9]. Preoperative fear leads to postoperative depression, anxiety, the extended period of scar recovery and hospital stay, use of additional anesthetic medication, and overuse of analgesics in the postoperative period [8].

The religious well-being dimension, which is a part of spiritual well-being, may be interpreted as a spiritual connection with God or a higher power [10]. The existential dimension is a mental and social element and demonstrates who the individual is, what they did for what reason, and where they belong to [10]. The religious dimension guides us towards God, while the existential dimension leads us towards the environment and other people beyond ourselves [11]. In spiritual well-being, in situations where the individual experiences a dead-end or contradiction, they can feel such painful emotions as loneliness, depression, and deficiency and question the meaning of life. This condition requires receiving social and psychological support [10,12]. Spiritual well-being increases life expectation, energy, and motivation [13]. It gives people hope and strengthens adjustment to disease conditions [14]. Abdominal surgical intervention and the postoperative period are highly risky experiences. In this context, being under high stress, loneliness, depression, and breaking up with social environments are usually related to surgical fear. It is essential that patients have the maximum motivation and the least fear in the preoperative period. The study, it was aimed to examine the effects of spiritual well-being in patients who would undergo planned surgery on their surgical fear.

2. Methods

2.1. Design and Sample

The study was conducted with a descriptive and cross-sectional design to determine the effects of spiritual well-being in patients to have abdominal surgery on their surgical fear. The population of the study consisted of patients who would have abdominal surgery at the General Surgery clinic and Organ transplant clinics between January and May 2020 at a university hospital. The sample of the study was calculated as 150 by performing power analysis. The study was completed with the participation of 150 patients who met the inclusion criteria and agreed to participate in the study by employing the purposive sampling method. The data were collected by the researcher through the face-to-face interview method in the patient wards. The data collection form was read out to the patients, and the researcher recorded their responses on the form.

2.2. Research Inclusion Criteria

1. Having a planned abdominal surgery
2. Being 18 years old or above
3. Not having any communication problems
4. Being an in-patient at the clinic in the preoperative period and agreeing to participate in the study

2.3. Data Collection Tools

As the data collection tools, a “Personal Information Form” developed by taking expert opinion, the “Surgical Fear Scale” (SFS) and the “Three-factor Spiritual Well-being Scale” (SWBS) were used in the study. Information about the scales is presented below.

Surgical Fear Scale (SFS)

The scale, which was developed and introduced to the literature by Theunissen et al [15]. to assess the level of the fear caused by short-term and long-term consequences of surgical operations in patients scheduled to undergo elective surgery was adapted to Turkish by Bağdigen et al [16]. The 11-point Likert-type scale is composed of 8 items and scored between 0 and 10. Each item is scored in a range from 0= "not afraid at all" to 10= "very afraid." The scale consists of two subscales of fear of the short-term consequences of surgery and the long-term consequences of surgery (Items 1 to 4: fear of the short-term consequences of surgery; items 5 to 8: fear of the long-term consequences of surgery). The subscale total score is obtained by adding up the scores of 4 items in the subscales, and the total score of the scale is obtained by adding up the scores of the two subscales. The lowest score to be obtained from the subscales is 0, and the highest score is 40. The total score of the scale ranges from 0 to 80. A high score obtained from the scale indicates a high level of surgical fear.

The scale's Cronbach's alpha internal consistency coefficient was found to be 0.89, while it was 0.86 for the subscale of short-term consequences (SFS-S) and 0.87 for the subscale of long-term consequences (SFS-L) (1). In our study, the Cronbach's alpha coefficient of the scale was calculated as 0.98, and for the subscales, it was 0.97 (SFS-S) and 0.99 (SFS-L).

Three-Factor Spiritual Well-Being Scale

The Three-Factor Spiritual Well-Being Scale was developed and introduced to the literature by Ekşi and Kardaş [17], and it aims to assess how well adults' lives are compatible with their values and understanding of the ultimate meaning in terms of personal, environmental, and social aspects. During the development process of the scale, 17 experts were consulted, and the scale was given its final form. The final form of the scale consisting of 49 items was tested in a study that included 865 adults (498 females, 367 males). Following the implementation of confirmatory factor analysis, the final form of the scale consisted of 29 items and three subscales (transcendence, harmony with nature, and anomie). The scale is in the form of a 5-point Likert-type scale. The scale is scored ranging from 1= "Not applicable to me at all" to 5= "Completely applicable to me." Items "1, 4, 5, 8, 9, 12, 13, 16,17, 20, 21, 24, 25, 27 and 29" of the scale constitute the transcendence dimension, items "2, 6, 10, 14, 18, 22 and 28" form the dimension of harmony with nature, and items "3, 7, 11, 15, 19, 23 and 26" make up the dimension of anomie. While scoring the scale, the anomie dimension is inversely scored. As a result of analyses, the construct validity and reliability of the scale were empirically determined, and a scale with the goodness of fit for the spiritual well-being model was produced (KMO:951, when eigenvalue is taken as 2, the item explanation of total variance is 58.337%). The Cronbach's alpha coefficient of the scale was found to be 0.86, and the Cronbach's alpha coefficients of the subscales of transcendence (i), harmony with nature (ii), and anomie (iii) were determined as 0.95 (i), 0.86 (ii) and 0.85 (iii) [17]. In our study, the Cronbach's alpha coefficient of the scale was identified as 0.93, and for the subscales, they were 0.91 (i), 0.82 (ii), and 0.89 (iii).

2.4. Statistical Analysis

After the data were coded by the researchers, the statistical analyses of the data were performed by using the SPSS 25.0 (Statistical Package for the Social Sciences) software. Before starting the analysis, the normal distribution of the data was determined with the help of the Kolmogorov-Smirnov test. Descriptive statistics were used for the analysis of the data. Correlation analyses were employed to determine the relationships between the scales, and the effects of socio-demographic characteristics on spiritual well-being and surgical fear levels were determined by regression analyses. Descriptive PostHoc analysis was used to identify differences. In the evaluation of the data, a 95% confidence interval and $p < 0.05$ error level were considered.

2.5. Ethical Aspect of the Study

Before the study, institutional permission was obtained from the relevant hospital, and ethics committee approval (Decision Date: 07.01.2020; Decision No: 2020/110) was obtained from the İnönü university. In accordance with the Declaration of Helsinki, the patients were informed by reading the Volunteer Information Form to them by the researcher. Patients who volunteered to participate in the study were included upon taking their verbal consent.

3. Results

In this part, the findings obtained from the study conducted to determine the effects of spiritual well-being on the surgical fear of patients who would undergo abdominal surgery are presented.

Table 1. Demographics and Identifying Characteristics of Patients (n= 150)

	$\bar{X} \pm SD$	Min-max
Average Age	53.10±12.26	28-78
	n	%
Age Groups		
28-49 years old	64	42.7
50-64 years old	52	34.7
65 years old and above	34	22.7
Gender		
Female	67	44.7
Male	83	55.3
Marital Status		
Married	117	78.0
Single	33	22.0
Educational Status		
Illiterate	20	13.3
Literate	16	10.7
Elementary School	21	14.0
High School	48	32.0
University	45	30.0
Income Level Status		
Income less than expenses	56	37.3
Income equal to expenses	77	51.3
Income more than expenses	17	11.3
Body Mass Index		
18.5-24.9 kg/m ² Normal Weight	58	38.7
25-29.9 kg/m ² Overweight	63	42.0
30-39.9 kg/m ² Obese	29	19.3
Additional Chronic Disease Status		
Yes	98	65.3
No	52	34.7

Table 1 Continued.

	n	%
Additional Chronic Disease Types		
HT	30	20.0
DM	48	32.0
KAH	24	16.0
SVO	7	4.7
Goiter	28	18.7
COBD	6	4.0
CKD	8	5.3
Muscular-Skeletal Disease	2	1.3
Previous Hospitalization Status		
Never	40	26.7
Once	39	26.0
More than twice	71	47.3
Previous Surgery Status		
Never	97	64.7
Once	53	35.3
The Type of Current Surgery		
Incisional Hernia	14	9.3
Gastrectomy	10	6.7
Bowel Resections	8	5.3
Hepatectomy	27	18.0
Liver Transplant	30	20.0
Cholecystectomy	8	5.3
Liver Cyst Excision	13	8.7
Colectomy	5	3.3
Pancreas/Bile Surgery	23	15.3
Laparoscopic Surgery	12	8.0

The distribution of identifying information about the individuals included in the study who underwent abdominal surgery is presented in Table 1. It was determined that 42.7% of the patients were between 28 and 49 years of age (mean 53.10±12.26, min. 28, max. 78), 55.3% were male, 78% were married, 32% had high school education, and 51.3% had income levels equal to their expenses based on their own expression. It was also identified that 42% of the patients who had abdominal surgery were overweight, 65.3% had additional chronic diseases, 47.3% had been previously hospitalized more than twice, and 64.7% had never been operated on before (Table 1).

A negative significant relationship was found between the score obtained from the Surgical Fear Scale by the individuals who underwent abdominal surgery and the score obtained from the Spiritual Well-Being Scale (Table 2).

Table 2. The Relationship Between the Patients’ Surgical Fear and Their Spiritual Well-Being

	Spiritual Well-Being Scale	Surgical Fear Scale
Spiritual Well-Being Scale	1	
Surgical Fear Scale	-0.554*	1

* Statistically significant at p<0.001 level according to Pearson chi-square test results

According to the result of Pearson chi-square analysis, there is a significant relationship between spiritual well being and surgical fear scores of participants (r=-0.554, p<0.001)

In order to explain the effect of the scores obtained by the participants from the Spiritual Well-Being Scale on surgical fear, a simple regression analysis was performed.

Table 3. Regression Analysis Results of the Surgical Fear Scale for Spiritual Well-Being

Dependent Variable	Independent Variable	β	t	p	F	Model (p)	R	Adjusted R ²
Surgical Fear	Constant	129.144	12.082	0.000				
	Spiritual Well-Being	-0.681	-8.095	0.000	65.53	0.000	0.307	0.302

When the significance level corresponding to the F value was considered, it was determined that the model was statistically significant (F=65.53; p<0.05). When Beta coefficients, t-value, and significance levels were examined, it was seen that the score level obtained from the Spiritual Well-Being Scale had a statistically significant effect on the scores obtained from the Surgical Fear Scale (p<0.005). In this context, it may be claimed that, as the score level obtained from the Spiritual Well-Being Scale increases, the score level obtained from the Surgical Fear Scale will decrease. It was determined that 30% of the change in the score obtained from the Surgical Fear Scale was explained by the scores obtained from the Spiritual Well-Being Scale (Adjusted R²=0.302) (Table 3).

The identifying information of the participants was compared to the total mean scores obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale.

Table 4. Comparison of the Patients' Identifying Information with Total Mean Scores Obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale

	Surgical Fear Scale			Spiritual Well-Being Scale		
	Mean±SD	Test	p	Mean±SD	Test	p
Age						
28-49 years old (1)	34.89±19.4			130.89±11.12		
50-64 years old (2)	34.89±19.4	F:12.965	0.000	128.73±16.20	F:16.366	0.000
65 years old and above (3)	57.41±19.4			111.35±24.65		
PostHoc	1,2<3			1,2>3		
Gender						
Female	55.02±19.5	t: 6.274	0.000	123.93±17.65	t: -1.069	0.287
Male	34.22±20.6			127.16±18.98		
Marital Status						
Married	45.23±22.7	t:1.755	0.081	123.80±19.71	t:-3.373	0.001
Single	37.45±21.6			132.48±10.44		
Educational Level						
Illiterate (1)	60.65±18.8			103.35±27.65		
Literate (2)	35.43±24.8			128.56±19.16		
Elementary School (3)	37.19±21.4	F:10.663	0.000	131.52±18.02	F:12.495	0.000
High School (4)	52.45±19.8			125.15±12.60		
University (5)	32.20±18.5			132.53±8.98		
PostHoc	1>4>3>2,5			3,5>1,2,4		
Income Level status						
Income less than expenses (1)	48.30±21.3			120.12±23.50		
Income equal to expenses (2)	41.79±23.7	F:2.571	0.080	128.10±14.71	F:4.914	0.009
Income more than expenses (3)	35.58±18.7			133.29±5.56		

Table 4. Continued.

	Surgical Fear Scale			Spiritual Well-Being Scale		
	Mean±SD	Test	p	Mean±SD	Test	p
PostHoc	1>2>3			3>2>1		
Body Mass Index						
18.5-24.9kg/m ² Normal weight (1)	35.41±21.3			129.84±18.50		
25-29.9 kg/m ² Overweight (2)	43.25±21.0	F:13.692	0.000	126.41±16.60	F:5.971	0.003
30-39.9 kg/m ² Obese (3)	60.31±19.8			115.93±18.98		
PostHoc	3>2>1			1>2>3		
Additional Chronic Diseases						
Yes	48.30±21.3	t:-2.398	0.018	123.43±20.36	t:2.077	0.040
No	48.30±21.3			130.02±13.14		
Previous Hospitalization						
Never	33.00±15.8			130.35±11.59		
Once	54.97±21.3	F:10.510	0.000	120.46±17.87	F:2.937	0.056
More than twice	43.15±23.7			125.99±21.10		
Previous Surgery Status						
Never	31.38±16.4	t:5.903	0.000	132.71±9.46	t:-13.550	0.009
Once	65.73±13.9			112.91±23.40		

F=One-Way ANOVA, t=Student t-test

A statistically significant relationship was identified between the individuals' age, gender, educational level, body mass index, presence of additional chronic diseases, previous hospitalization and previous surgery status, and surgical fear status ($p < 0.05$). Again, there appeared to be a statistically significant relationship between the individuals' age, marital status, educational level, body mass index, presence of additional chronic diseases, previous surgery status, and spiritual well-being ($p < 0.05$) (Table 4). According to the descriptive PostHoc analysis result that the highest fear of surgery and the lowest spiritual well-being were found for those 65 years old and above. In the illiterate, the fear of surgery was the highest and the level of spiritual well-being was the lowest. Similarly, surgical fear was highest in obese individuals, and spiritual well-being was lowest.

4. Discussion

Spirituality affects humans' lives greatly and involves plenty of personal and social events in it [18]. Besides, it has significant impacts on the prevention of diseases, increasing the success of treatment and recovery [19].

In the study, the mean total score obtained by the individuals from the Spiritual Well-Being Scale was determined to be the highest in the age group of 28-49 as 130.89 ± 11.12 and the lowest in the age group of 65 years and above as 111.35 ± 24.65 . Additionally, the mean score from the Surgical Fear Scale was determined as 57.41 ± 19.44 in the individuals at the age of 65 years and above. In a previous study, it was reported that preoperative affective disorder was observed more in elderly patients [20]. In another study, a significant relationship was identified between gaining hope and religious-spiritual coping, but it was not associated with mental wellness [21].

Some studies in the literature have associated spiritual well-being with mental wellness [10,14,22]. This situation suggests that elderly people have more spiritual accumulation due to their life

experiences, and therefore, they consider the problems they face more expectable. However, it is inferred from both the literature and the findings of this study that elderly people are more negatively affected by problems in comparison to other age groups.

In the study, a negative significant relationship was found between the mean scores obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale. Surgery is an unexpected experience for everyone which puts the quality of life at risk, requires extra effort, and is highly stressful. According to the data of the study, as the individuals' spiritual well-being levels increased, their surgical fear was reduced.

In a previous study, the effects of religious coping strategies and social support systems on the physiological symptoms of stress (Serum cortisol level, C-Reactive Protein, Interleukin 6) were examined, and in the cohort study conducted with the participation of 162 patients, the postoperative results of the patients were determined to be better [22].

In another study, 335 patients were observed for 30 months, and it was identified that anxiety and depression were affected by piety on a higher level than expected. In the same study, spiritual well-being, optimism, hope, and religious practices were assessed, and it was determined that surgical experience led to higher existential growth in the psycho-spiritual development in individuals with strong spirituality [23].

The data of this study were consistent with the results in the literature. Being conducted on a single surgery patient group, being carried out at one center, observing the patients in a short time in the postoperative period may be listed among the limitations of the study.

5. Conclusion and Recommendations

Surgical fear is affected by spiritual well-being. Psychological problems caused by fear trigger physiological problems and further complicate the already stressful experience of surgery, negatively affecting the recovery process. Therefore, it is of great importance to identify and use all support systems that will make the surgical experience less stressful and be known by healthcare professionals. In this context, expectations of patients should be identified and supported to improve their spiritual well-being in the preoperative period, which is both an inexpensive and highly effective method.

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Ethical Aspect of the Study: Before the study, institutional permission was obtained from the relevant hospital, and ethics committee approval (Decision Date: 07.01.2020; Decision No: 2020/110) was obtained from the İnönü university. In accordance with the Declaration of Helsinki, the patients were informed by reading the Volunteer Information Form to them by the researcher. Patients who volunteered to participate in the study were included upon taking their verbal consent.

Authors' contributions:

All authors participated in drafting the paper and gave final approval of the version to be submitted. Study conception and design: GK %50 and BD %50; Acquisition of data: GK %75 and SB %25; Analysis and interpretation of data: SB %50 and SS %50; Drafting of the manuscript: GK %40, SB %30, BD %30; Critical revision: SS, BD.

All authors read and approved the final manuscript.

References

- [1] Helander, E.M., Webb, M.P., Menard, B., Prabhakar, A., Helmstetter, J., Cornett, E.M., Urman, R.D., Nguya, V.H., Kaye, A.D. “Metabolic and the surgical stress response considerations to improve postoperative recovery”, *Current Pain and Headache Reports*, 23(5), 33, 2019.
- [2] Ljungqvist, O., Scott, M., Fearon, K.C. “Enhanced recovery after surgery: A review”, *JAMA Surg*, 152(3), 292-8, 2017.
- [3] Mavros, M.N., Velmahos, G.C., Lee, J., Larentzakis A. “Morbidity related to concomitant adhesions in abdominal surgery”, *J Surg Res*, 192(2), 286-92, 2014.
- [4] Nanashima, A., Hiyoshi, M., Imamura, N. et al. “A cohort study on the risk of hepatectomy and pancreatectomy after history of abdominal surgery on other organs”, *Ann Hepatobiliary Pancreat Surg*, 22(4), 344-9, 2018.
- [5] Yamamoto M., Okuda, J., Tanaka, K. et al. “Effect of previous abdominal surgery on outcomes following laparoscopic colorectal surgery”, *Dis Colon Rectum*, 56(3), 336-42, 2013.
- [6] Alvi, T., Aurangzeb F.A., Malik, M.A.N. “Anxiety and depression in burn patients”, *J Ayub Med Coll Abbottabad*, 21(1), 137-41, 2009.
- [7] Akelma, H., Kılıç, E.T., Özkılıç, M., Karahan, Z.A., Kaya, S. “Determination of preoperative fear and anxiety levels caused by multiple pediatric burn surgeries in patients and their parents”, *World Family Medicine*, 16(9), 4-12, 2018.
- [8] Ralph, N., Norris, P. “Current opinion about surgery-related fear and anxiety”, *Journal of Perioperative Nursing*, 31(4), 3, 2018.
- [9] Spitzer, R.L., Kroenke, K., Williams, J.B.W., Löwe, B. “A brief measure for assessing generalized anxiety disorder: the GAD-7”, *Arch Intern Med*, 166(10), 1092-7, 2006.
- [10] Fathi, M., et al. “Hope and spiritual well-being in Iranian patients undergoing chemotherapy”, *Journal of Evolution of Medical and Dental Sciences-Jemds*, 7(27), 3106-11, 2018.
- [11] Ellison, L. “A review of the spiritual well-being scale”, Marshall Digital Scholar, (2006). [Online]. Available on: http://mds.marshall.edu/co_faculty/9/
- [12] Fatemi, S.N., et al. “Prayer and spiritual well-being in cancer patients”, *J Iran Institute Health Sci Res*, 5(4), 295-303, 2006.
- [13] Mohammadi, S.Z., Tajvidi, M. “Relationship between spiritual well-being with hopelessness and social skills in Beta-thalassemia major adolescents”, *Modern Care Journal*, 8(3), 116-24, 2011.
- [14] Nelson, C.J., Rosenfeld, B., Breitbart, W., Galietta, M. “Spirituality, religion, and depression in the terminally ill”, *Psychosomatics*, 43(3), 213-20, 2002.
- [15] Theunissen, M., Peters, M.L., Schouten, E.G.W., et al. “Correction: validation of the surgical fear questionnaire in adult patients waiting for elective surgery”, *PLoS One*, 11(9), e0162737, 2016.
- [16] Bağdigen, M., Karaman Özlü, Z. “Validation of the Turkish version of the surgical fear questionnaire”, *J Perianesth Nurs*, 33(5), 708-14, 2018.
- [17] Ekşi, H., Kardaş, S. “Spiritual well-being: Scale development and validation”, *Spiritual Psychology and Counseling*, 2, 73-88, 2017.

- [18] Hasanshahi, M., Mazaheri, MA. “The effects of education on spirituality through virtual social media on the spiritual well-being of the public health students of isfahan university of medical sciences in 2015”, *Int J Community Based Nurs Midwifery*, 4(2), 168-75, 2016.
- [19] Koenig, H.G., Larson D.B., Larson, S.S. “Religion and coping with serious medical illness”, *Ann Pharmacother*, 35(3), 352-9, 2001.
- [20] Krannich, J.H., Weyers, P., Lueger, S., Herzog, M., Bahrer, T., Elert, O. “Presence of depression and anxiety before and after coronary artery bypass graft surgery and their relationship to age”, *BMC Psychiatry*, 7, 47, 2007.
- [21] Ai, AL., Park, C.L., Huang, B., Rodgers, W., Tice, T.N. “Psychosocial mediation of religious coping styles: a study of short-term psychological distress following cardiac surgery”, *Pers Soc Psychol Bull*, 33(6), 867-82, 2007.
- [22] Ai, A.L., Kabbaj, M., Kathy, L.L. et al. “Body affects mind? Preoperative behavioral and biological predictors for postoperative symptoms in mental health”, *J Behav Med*, 37(2), 289-99, 2014.
- [23] Ai, AL., Hall, DE. “Divine love and deep connections: a long-term followup of patients surviving cardiac surgery”, *J Aging Res*, 841061, 2011.