

Correlation between health promotion behavior and quality of life in survivors of stanford B aortic dissection

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Abstract

Background: To understand the current situation of health promotion behavior and quality of life of aortic dissection survivors and the correlation between them.

Methods: The associations between stanford B aortic dissection survivors' health promotion behavior scores and health status questionnaire (SF-36) scores was determined with pearson correlation coefficients. Associations between health promotion behavior scores and health status questionnaire (SF-36) scores were analyzed with multivariable regression analysis.

Results: 131 stanford B aortic dissection survivors were evaluated with the self-developed aortic dissection patient health promotion behavior scale and health status questionnaire (SF-36), the score of aortic dissection health promotion behavior (85.05 ± 11.28), The score of quality of life (61.44 ± 18.41) showed that the health promotion behavior of stanford B AD survivors was positively correlated with the quality of life ($r=0.403$, $P=0.01$). Regression analysis showed that age, education, sick time, behavior motivation and exercise entered the regression equation of quality of life ($R^2=0.464$, $P=0.01$).

Conclusion: Stanford B AD survivors had a lower quality of life, Medical staff can formulate intervention measures from two aspects of behavioral motivation and exercise to improve the quality of life of ad survivors.

1. Introduction

Aortic dissection (AD) is due to disruption of the aortic-wall integrity and architecture, most often related to underlying genetic disorders, abnormal shear stress, inflammatory disease, trauma, or combinations thereof. According to the Stanford system, type B AD is defined as involving the descending aorta or the arch (distal to the left subclavian artery) without involvement of the ascending aorta, stanford B AD accounted for about 20% to 40% of all AD patients^[1]. Currently, there is 90% survival rate to hospital discharge for patients with type B AD^[1]. Effective disease treatment means that more patients with AD go into chronic disease management. However, a study about 6937 patients with unplanned admissions for type B aortic dissections from 2010 through 2014 reports that nonelective 90-day readmission rate was 25.1%, an additional 4.7% of patients were electively readmitted, the most common cause for nonelective readmission was new or recurrent arterial aneurysm or dissection, the mortality rate during nonelective readmission was 5.0%, and the mean cost of the rehospitalization was \$22,572 \$41,598^[2].

Thoracic endovascular aortic repair (TEVAR) has become the preferred treatment for patients with type B AD. However, patients are at risk of endoleak, continued aneurysm sac expansion, and ultimately endovascular and/or open revision of the thoracic aortic repair following TEVAR^[3]. In addition several studies^[4-6] have shown that quality of life (QoL) in AD survivors are not in a desirable level. The high nonelective readmission rate of type B AD survivors and low QoL level need to be solved urgently.

Health promoting behaviors refer to those behaviors that make people able to improve their own and their society's health. The areas of health promoting behaviors include nutrition, physical activity, stress management, health responsibilities, interpersonal relationships, and spiritual growth^[7]. Health-promoting behaviors that have been recommended for patients with AD include control of diet, physical activity, cessation of smoking, medication adherence, and adherence to medical recommendations (including monitoring blood pressure and body weight daily).^[8] These healthy lifestyle interventions are quite effective in reducing the risk of cardiovascular disease while lowering rehospitalization rates^[9].

Improving health promoting behaviors may lead to better quality of life and lower incidence of AD events^[10]. Whereas, most published literature concerns about surgical outcome, survival of patients, and complications leading to disability. Postoperative health promoting behaviors and QoL is rarely considered in this view. Consequently, it is essential and very significant to carry out this investigation to address the gap in the research literature. The following article concerns about long-term outcome and QoL after thoracic endovascular aortic repair (TEVAR), and focuses on the correlation between health promotion behavior and QoL.

2. Methods

2.1. Design

A cross-sectional study with data collection on the basis of questionnaires.

2.2. Setting

This study was conducted in the cardiovascular surgery of The Affiliated Hospital of Zunyi Medical University.

2.3. Participants

From December 2016 to June 2020, 205 patients received TEVAR for Stanford type B AD. Convenience sample of 131 survivors (response rate, 63.9%) agreed to participate in the study. The questionnaire was issued through telephone and was filled out within 30 minutes. The investigators sorted out and verified the recovered questionnaires on the spot, and corrected the missing or wrong questionnaires in time to ensure the quality of questionnaires recovery. Finally, a total of 205 questionnaires were distributed and 131 valid questionnaires were collected.

2.4. Procedure and data collection

The data were collected between March and May 2021 under the instruction of trained investigators. Participants were recruited through telephone during follow-up. The questionnaires were completed by

telephone inquiry. We obtained every participant's demographic characteristics including gender, age, levels of education and so on.

2.5 Measures

Demographic characteristics

Sociodemographic and clinical data were collected from participants using patients' file and a self-designed questionnaire including age, gender, education level.

SF-36 Questionnaire

The SF-36 measures 8 QOL domains which are dichotomized into physical

(functioning, role limitations-physical, pain, general health) and mental health (vitality, social functioning, role limitations-emotional, and emotional/ mental health) Item scores were converted to a 0–100 point scale; domain scores were derived by averaging individual items within the subscale; Higher values are indicative of better QOL. A Chinese version of the standard SF-36 questionnaire has been validated for a Chinese population^[11].

AD Health promotion behavior questionnaire

AD Health promotion behavior questionnaire is a self-designed questionnaire including 5 domains: nutrition (6 items), exercise (6 items), blood pressure management (5 items), disease knowledge (5 items) and behavioral motive (3 items). Each item uses a 5-point scale to measure the level of agreement with each statement (1 = never, 2 = seldom, 3 = sometimes, 4 =often, 5=always). A score is calculated for each domain, and the sum of scores corresponds to the level of overall health behavior. Higher scores indicate better health behavior. The Cronbach's α was 0.691–0.907, the reliability was 0.930, and the validity was 0.796.

2.6. Ethical considerations

This study was conducted according to the ethical guidelines described in the Helsinki Declaration (World Medical Association, 2013). The study was approved by the Affiliated Hospital of Zunyi Medical University (Approval No. :KLLY-2020-014). All subjects provided informed consent to participate in the study. The data underlying this article will be shared on reasonable request to the corresponding author.

3. Data Analysis

Descriptive statistics (mean, standard deviation, frequency and percentage) were used to describe the sample's characteristics. Ttest and variance analysis were applied for univariate analysis, and Pearson correlation analysis and multivariable regression analysis were applied for multivariable analysis. The normal distribution and types of variables were considered to decide which tests were suitable for the analysis. For the continuous variables "age," patients were stratified into different subgroups based roughly on logical numerical break points. Age was stratified by decade into <44 years, 45-54 years, 55-64 years, and ≥65 years. All data were input in Excel and analyzed with SPSS Statistics for Windows, version 18.0. Significance was assessed at $P < 0.05$ level in the bivariate analysis.

4. Results

A total of 131 participants were included in the study with more men (80.15%) than women (19.85%). The ages of these patients ranged from 25 to 86 years. As demonstrated in Table 1, the mean total score of health behavior was 85.05 ± 11.28 . Disease knowledge showed lowest score followed by exercise and nutrition. As demonstrated in Table 2, the mean total score of QoL was 61.44 ± 18.41 . Other key characteristics of the sample were also included (Table 3). The univariate analysis between general information and QoL that there were significant differences in QoL scores of different ages, gender, levels of education and time of illness ($P < 0.01$).

Table 1

Score of health promoting behavior in patients with type B AD [$\bar{x} \pm SD$]

Domains	Score of each dimension	Total score of the dimension	Standardized Scores	Scores ranking
Exercise	19.34 ± 4.58	30	64.47	4
Blood pressure Management	20.64 ± 3.92	25	82.56	1
Disease knowledge	13.27 ± 3.88	25	53.08	5
Nutrition	21.05 ± 3.59	30	70.17	3
Behavioral motive	10.75 ± 2.36	15	71.67	2

Note: Standardized score index = (Score of each dimension/total score of dimension) × 100%

Table 2

Score of quality of life in patients with type B AD [$\bar{x} \pm SD$]

Domains	Scores
Physical Functioning	70.99±20.43
Role Limitations(physical)	33.97±44.3
Pain	91.39±13.56
General Health	51.26±18.69
Vitality	64.08±19.71
Social Functioning	56.20±27.18
Mental Health	59.76±20.70
Role Limitations(emotional)	63.87±43.76
Scores of QoL	61.44±18.41

Table 3

Comparison of quality of life scores in patients with type B AD (N=131)

Characteristic	n(%)	Scores($\bar{x}\pm SD$)	t/F	p
Gender				
Male	105(80.15%)	62.6±19.38	3.987	0.046
Female	26(19.85%)	56.76±13.14		
Age				
≤44	7(6.6%)	75.63±8.88	7.096	0.001
45-54	25(21.4%)	68.80±16.61		
55-64	39(32.4%)	66.79±16.49		
≥65	60(39.7%)	53.27±17.77		
Degree of education				
primary school and below	35(26.72%)	54.7±17.95	5.849	0.004
junior high school and technical secondary	86(65.65%)	62.54±18.23		
high school and above	10(7.63%)	75.57±11.39		
Course of disease				
< 2 years	16(12.21%)	59.83±13.34	3.03	0.032
3~4 years	49(31.3%)	58.27±15.82		
4~5 years	38(29%)	68.81±21.8		
>5 years	28(21.37%)	57.92±18.12		

The correlation analysis that the total score of health promotion Behavior scale was positively correlated with that of quality of life scale($r=0.403$, $P<0.01$), it means the higher the level of health promotion behavior, the higher the quality of life. The 5 domains scores of health promotion behavior scale were positively correlated with those of quality of life($r=0.532$, $P<0.01$)(Table 4).

Table 4

Correlation between Health-Promoting Lifestyle and Quality of Life ($N=131$)

	Scores of health promotion behavior	Behavior motivate	Nutrition	Blood pressure management	Disease knowledge	Exericse
Scores of QoL	0.403**	0.532**	0.339**	0.362*	0.415*	0.402**
Physical Functioning	0.406*	0.312*	0.190*	0.199*	0.063	0.467**
Role Limitations(physical)	0.402*	0.139	0.329**	0.336*	0.168	0.150
Pain	0.393**	0.392**	0.115	0.369**	0.076	0.308**
General Health	0.381**	0.454**	0.385*	0.218*	0.139	0.418**
Vitality	0.427**	0.576**	0.324*	0.067	0.486*	0.579**
Social Functioning	0.129	0.156	0.044	0.040	0.037	0.305*
Mental Health	0.451**	0.668**	0.196*	0.016	0.200*	0.430**
Role Limitations(emotional)	0.317**	0.564**	0.139	0.037	0.340**	0.208*
**. At the 0.01 level (two-tailed), the correlation was significant.						
*. At the 0.05 level (two-tailed), the correlation was significant.						

Multiple linear regression analysis in influence factors of type B AD survivors QoL in cardiovascular surgery of the hospitals in ZunYi, was conducted with total QoL score, as the dependent variables. We assign values to independent variables (Table 5). The independent variables were exercise, disease knowledge, behavioral motive and the statistically significant variables of univariate analysis (entry level was 0.05, deletion level was 0.10). According to the results of the regression equations, the independent variables in the QoL regression equation were ages, gender, levels of education, time of illness exercise, disease knowledge and behavioral motive (Modle : $F=45.9$, $P<0.001$)(Table 6).

Table 5

Assignment of independent variable.

Independent variable	Assignment situation
Gender	Male=1 Female=2
Age	25~34=1 35~44=2 45~54=3 55~64=4 ≥65=5
Degree of education	primary school and below =1 Junior high school or high school =2 Junior college and above=3
Course of disease	2=1 3~2 4~3 5=4
Health promotion behavior	Original value entry

Table 6

Multiple linear regression analysis of factor influencing AD survivors in QoL

Independent variable	<i>b</i>	<i>Sb</i>	<i>b'</i>	<i>t</i>	<i>p</i>
(Constant)	29.180	11.025	-	2.647	0.009
Age	-7.069	1.271	-0.361	-5.563	0.001
Course of disease	3.481	1.270	0.181	2.740	0.007
Behavior motivate	3.360	0.574	0.431	5.858	0.001
exercise	1.036	0.288	0.257	3.594	0.001
<i>F</i> =29.159 <i>P</i> 0.001 <i>R</i> ² =0.481 Adjust <i>R</i> ² = 0.464, - no value					

5. Discussion

5.1. The current Health promotion behaviors situation of AD survivors in ZunYi

Health promotion behaviors are considered to be important determinants of health, and promoting them can prevent one third of mortality. Accurate assessment is helpful to identify the risk of cardiovascular risk factors in AD survivors and prevent and reduce the occurrence of clinical events^[9]. At present, the health promotion behavior measurement tools are universal, but the rehabilitation mode, exercise type and nutritional requirements of AD patients have their particularity. The universal scale is often difficult to reflect the specificity of AD. Therefore, this study uses the self-developed health promotion behavior evaluation scale for AD patients to evaluate AD survivors, which is more targeted and applicable to China AD patients.

The present study's findings indicate that ZunYi AD survivors had the lowest score on their disease knowledge followed by exercise and nutrition among the 5 domains. This finding was consistent with Kehler^[12] and Thijssen^[13]. This may be related to the low incidence of AD compared with other heart diseases and is not a well-known disease in the public. AD survivors generally have low awareness of rehabilitation knowledge related to AD, resulting in AD survivors unable to identify AD risk factors and physical symptoms, hence they are unable to scientifically formulate diet and exercise plans and increase the risk of recurrence. In addition, due to lack of disease knowledge, most survivors worry that exercise will increase the risk of AD recurrence, hence they are reduced or stop exercise, which will further affect their health promotion behavior^[12]. In view of this situation, medical staff should pay attention to the popularization of AD disease knowledge in the population, and pay attention to diet and exercise. Improve the disease knowledge level of AD survivors through various ways and give full play to the role of nurses. According to patients' education background in area such as diversification of health education, such as knowledge lecture or network platform to provide regular face-to-face support targeted health knowledge movement as well as secondary and tertiary prevention interventions related knowledge, help patients to form the cognition to the disease and rehabilitation exercise knowledge, improve the level of AD disease knowledge of survivors.

On the other hand, in our study, most of the participants lived with family, which may imply that they received more support from family. With the goal of achieving better behavioral changes for the patient, education should also involve the family as they serve an important role in supporting the patient's health-promoting behaviors.

5.2. The current QoL situation of type B AD survivors in ZunYi , China

The SF-36 questionnaire has been widely used to evaluate the quality of life after thoracic aortic surgery^[14, 15], including patients with acute Type A AD after aortic replacement^[16], patients with AD after TEVAR^[17] and patients with abdominal aortic aneurysm repair^[18]. Therefore, the questionnaire is practical and applicable to the study population.

In total, 131 patients completed the self-report questionnaire SF-36 in full. As demonstrated by the findings(table 2), the overall QoL score of type B AD survivors in ZunYi was 61.44 ± 18.41 , Lower than the China norm sample(78.88 ± 15.18)^[19].

This survey revealed that the type B AD survivors in ZunYi were in a low QoL level, which was consistent with the result of a relevant survey conducted in the JiangSu, China^[20]. In addition, in this study, the QoL level of type B AD survivors was much lower than that of type B AD survivors in European countries^[21]. This may be related to the overall low education level of type B AD patients selected in this study (92.37% below high school), and education level is also a positive influence factor of QoL level. According to the univariate analysis of QoL scores(table 3), the lower the education level, the worse the QoL score, which is similar to

the study by Bi^[6]. This may be related to the fact that the patients with higher education level are more likely to acquire disease knowledge and have more full knowledge and understanding of disease. This study found that older the survivors, the lower QoL of type B AD survivors, which is consistent with the study of Berlin Heart Center^[22]. This may be related to the deterioration of the physical function of the elderly type B AD survivors and the poor adaptability of the elderly survivors to recover after surgery. Additionally, Our finding showed that the quality of life score of type B AD survivors at 4 years after discharge was higher than that at other times, which may be because those with lower QOL have died at this point or did not participate in your study. Therefore, Nurses should combine China's medical system and nursing mode, draw lessons from foreign experience to formulate personalized discharge plan for type B AD survivors, pay attention to the discharge readiness of type B AD survivors, and improve their quality of life.

5.3. Analysis of the influencing factors of type B AD survivors' QoL in ZunYi

As listed in Table 4, The total score of health promotion behavior, blood pressure management, behavioral motivation, nutrition, disease knowledge, exercise dimension and quality of life of type B AD survivors were positively correlated ($r=0.403$, $P<0.01$). Further multivariable analysis showed that behavioral motive and exercise were the influencing factors of QoL (Table 6).

5.3.1. Behavioral motive

Behavioral motivation is an important factor affecting the quality of life of ad survivors. Similar to the research results of Archer^[23], behavioral motivation can mobilize the rehabilitation enthusiasm of patients to a great extent. In this study, the behavioral motivation score of ad survivors is high, indicating that they have high enthusiasm and initiative in rehabilitation. Zunyi is a city with relatively low economic level in China. Thus most type B AD survivors in ZunYi have limited economic conditions. Out of concern about high medical expenses in cardiac rehabilitation center, in our institutions, patients after TEVAR are usually not involved in cardiac rehabilitation. Therefore, type B AD survivors in Zunyi have stronger initiative in out of hospital active rehabilitation. In view of the strong behavioral motivation of type B AD survivors observed in this study, using behavioral motivation to formulate relevant home-based rehabilitation interventions may be an effective way to improve the quality of life of type B AD survivors.

5.3.2 Exercise

Exercise also has a certain impact on the quality of life of ad survivors, which is consistent with the results of Schwaab's study^[24]. Regular aerobic exercise can increase the shear force mediated by blood flow in vascular wall, improve vascular endothelial function, reduce resting blood pressure, and slow down the heart rate of ad survivors by reducing sympathetic activity^[25]. The American Heart Association (AHA)

[26]and European Heart Association (ESC)[27] recommend that patients with AD should perform 30 to 60 minutes moderate-intensity aerobic physical activity for a minimum of three days each week to prevent AD attack and death. Although many studies[28-30] have shown that aerobic exercise and regular physical activity can reduce other cardiovascular risks and reduce incidence rate and mortality rate of AD survivors, greatly improve the prognosis of AD disease, and can greatly improve the quality of life of AD survivors. However, studies[13] have shown that most ad survivors reduce or stop exercise due to fear of disease recurrence caused by exercise after discharge. Medical staff should strengthen the cognition of AD survivors on the importance of physical activity, and can evaluate the disease rehabilitation status and physical function of AD survivors in detail before they leave the hospital[31]. Formulate a sports intervention plan for ad survivors, including sports type, intensity, frequency and time, promote ad survivors to implement sports plans by using sports management app, sports monitoring ring and other tools, regularly evaluate the sports effect and completion, and dynamically adjust the sports plan, to help patients to do safe rehabilitation exercise at home.

This study has some limitations. First, the sample size is still relatively small. This is a cross-sectional study, unable to explore the relationship between quality of life and other variables. Second, questionnaires filled in by patients have diagnostic limitations: questions may be understood differently by different individuals and not all aspects of health promotion behavior are covered. We suggest that future intervention studies should be carried out to develop intervention plans on exercise and diet, and implement interventions combined with some models to promote patients' behavioral motivation.

In conclusion, improving the health promotion behavior of type B AD survivors is an important measure to improve their quality of life. The quality of life of ad survivors can be improved by promoting the health promotion behavior of behavioral motivation and exercise, thus as to reduce the readmission rate and reduce secondary hospitalization rate.

Declarations

Ethical Approval and Consent to participate

The study was approved by the Affiliated Hospital of Zunyi Medical University (Approval No. :KLLY-2020-014). All subjects provided informed consent to participate in the study.

Consent for publication

Not applicable.

Availability of supporting data

Data shall only be shared with researchers upon reasonably request, at the discretion of the principal investigator.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Tujianxin and Zhoujiamei wrote the main manuscript text , Wang fei prepared figures 1-3, Yinfurong Zhaobenli Zhanglinxue prepared figures 4-6, All authors reviewed the manuscript.

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