

## Original Article

# Factors related to anxiety and depression in patients undergoing adrenalectomy in 220 Chinese people

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**Abstract:** Objective: The aim of this study was to evaluate the factors related to anxiety and depression in patients undergoing adrenalectomy. Subjects and Methods: From October 2011 to October 2014, 220 consecutive inpatients undergoing adrenalectomy were enrolled in this study. Documented informed consent for the study was obtained from each subject. All subjects completed a detailed questionnaires for information of sociodemographics, the Zung self-rating anxiety scale (SAS), the Zung self-rating depression scale (SDS) before operations, and three days after operations. Results: Univariate analysis showed that preoperative SAS and SDS scores were positively related to age ( $r=0.280$ ,  $r=0.322$ , respectively, both  $P<0.001$ ). And a high degree of preoperative anxiety or depression was correlated with their low level of educational status, and with the occurrence of religious faith. The same negative relation was found between SAS/SDS and level of educational status after operation. Multiple regression analysis revealed that age and level of educational status were related to preoperative SAS ( $\beta=0.072$ ,  $P<0.05$  and  $\beta=-0.838$ ,  $P<0.05$ , respectively). The occurrence of laparoscopic operation was negatively related to preoperative SDS ( $\beta=-1.932$ ,  $P<0.05$ ). Age, gender and other diseases were related to postoperative SAS. And other diseases were also related to postoperative SDS. Conclusions: The present study suggested that age, gender, other diseases, level of educational status, operation method were associated with anxiety or depression before or after operations. Individual traits should be taken into account when we intervene to treat anxiety and depression in patients undergoing adrenalectomy.

**Keywords:** Adrenalectomy, factors, anxiety, depression

## Introduction

Adrenal operation rates have been increasing along with the increased prevalence of incidental adrenal masses found on routine imaging [1]. Endoscopic adrenalectomies, including the transperitoneal lateral and retroperitoneal lateral approaches, are currently the standard procedures used for treating adrenal tumors [2], since the introduction of the laparoscopic approach to adrenalectomy in 1992 by Gagner et al. [3]. And they are now progressively used for bulky adrenal tumors and adrenal secondaries [4]. However, open adrenalectomy is also necessary sometimes, such as when the tumor with a diameter of more than 10 centimeters etc [5].

Anxiety and depression are common phenomenon among hospitalized patients [6], particularly in preoperative and postoperative patients. They are associated with increased heart rate

and blood pressure and other changes that can have a negative impact before and after operation [7]. Therefore, to evaluate the factors related to anxiety and depression in patients before and after operation and the methods to relieve anxiety and depression are also important matters. Some researches have founded that some factors were associated with the level of anxiety and depression in patients before and after operations, such as operation type demographic and social data [8]. However, there were no studies concerning on patients undergoing adrenalectomy. In this study, we investigated the anxiety and depression status and analyzed the factors related to anxiety and depression in patients undergoing adrenalectomy.

## Subjects and methods

### Subjects

A total of 220 patients undergoing adrenalectomies due to adrenal masses from October

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**Table 1.** Distribution of the sociodemographics and clinical features of the patients undergoing adrenalectomy

Sociodemographics and clinical features	
Age, years	44.72±11.64
Sex	
Male	95 (43.2%)
Female	125 (56.8%)
Monthly income	
<2000 RMB	123 (55.9%)
2000-5000 RMB	71 (32.3%)
>5000 RMB	26 (11.8%)
Occupational status	
Unemployed	52 (23.6%)
Employed	168 (76.4%)
Educational status	
Illiterate	35 (15.9%)
Primary education	51 (23.2%)
High school	114 (51.8%)
Higher education	20 (9.1%)
Marital status	
Married	212 (96.4%)
Unmarried	8 (3.6%)
Religious faith	
Yes	13 (5.9%)
No	207 (94.1%)
Operation type	
Laparoscopic	157 (71.4%)
Open	63 (28.6%)
Other diseases	
Yes	137 (62.3%)
No	83 (37.7%)
Medicare	
Yes	187 (85.0%)
No	33 (15.0%)
Postoperative leaving bed time	18.68±5.21 (range 8-41)

Data are expressed as the mean ± standard deviation or number (percentage), as appropriate; RMB = renminbi.

2011 to October 2014 were included in the study. All patients who underwent adrenalectomies in this period were included in the study. However, to get reliable results from the study, the psychiatric histories of all patients were questioned in detail. Subjects with history of any psychiatric diagnosis or taking drugs associated with psychiatric disorders were excluded from the study.

### Study design and procedure

This study was approved by the ethical committee of Anhui Medical University. And all patients

provided informed consent before their participation in this study. All patients underwent preoperative systematic physical examination, complete blood cell count, and routine biochemical examination. Each of the subjects were required to completed a questionnaire one day before the operation, which included sociodemographics (gender, age, marital status, educational status, and monthly income, occupation, religious belief, Medicare, etc.), other diseases and the Zung self-rating anxiety scale (SAS), the Zung self-rating depression scale (SDS) one day before operations. Another questionnaire including SAS and SDS, as well as operational manner and postoperative leaving bed time were recorded three days after operations for each subject.

### Statistical analysis

Statistical analysis was performed using SPSS 19.0 software (SPSS Inc., Chicago, United States). We performed the univariate analysis between the preoperative or postoperative SAS/SDS scores and investigated sociodemographic and medical factors to determine possible independent variables by the Pearson correlation coefficient or Spearman's rank correlation coefficient. Multiple linear regression analysis was used to identify the factors that may affect SAS/SDS. All statistical analyses were two-sided, and a *P* value<0.05 was considered statistically significant.

### Results

All the patients completed the questionnaires. Detailed sociodemographics and clinical features information of all subjects included in the study were shown in **Table 1**.

**Table 2** demonstrated the results of univariate analysis between preoperative or postoperative SAS/SDS scores and factors we investigated in this study. It was showed that preoperative SAS and SDS scores were positively related to age. And a high degree of preoperative anxiety or depression was correlated with their low level of educational status, and with the occurrence of religious faith. The same negative relation was found between SAS/SDS and level of educational status after operation.

**Table 3** showed the results of multiple regression analysis between preoperative SAS/SDS

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**Table 2.** Univariate analysis of the factors associated with preoperative and postoperative SAS/SDS in patients undergoing adrenalectomy

	Preoperative SAS		Preoperative SDS		Postoperative SAS		Postoperative SDS	
	<i>r</i>	<i>P</i> *	<i>r</i>	<i>P</i> *	<i>r</i>	<i>P</i> *	<i>r</i>	<i>P</i> *
Age	0.280	<b>&lt;0.001</b>	0.322	<b>&lt;0.001</b>	0.116	0.085	0.097	0.151
Sex	0.023	0.739	0.129	0.055	0.130	0.055	0.153	<b>0.023</b>
Monthly income	-0.009	0.893	-0.011	0.875	-0.043	0.529	0.013	0.848
Occupational status	0.064	0.348	-0.033	0.629	0.178	<b>0.008</b>	0.091	0.181
Educational status	-0.285	<b>&lt;0.001</b>	-0.236	<b>&lt;0.001</b>	-0.205	<b>0.002</b>	-0.173	<b>0.010</b>
Marital status	-0.117	0.084	-0.069	0.310	-0.002	0.982	0.014	0.832
Religious faith	-0.021	0.756	-0.157	0.020	-0.021	0.760	-0.063	0.353
Operation type	0.012	0.856	-0.013	0.846	0.120	0.077	0.018	0.789
Other diseases	-0.022	0.745	-0.116	0.085	-0.042	0.534	-0.116	0.086
Medicare	0.046	0.497	0.041	0.542	0.150	<b>0.026</b>	0.037	0.585
Postoperative leaving bed time	-	-	-	-	-0.102	0.130	-0.078	0.247

\*Univariate analysis was performed on Spearman's rank correlation coefficient or Pearson correlation coefficient, as appropriate; Date in bold indicates a  $P < 0.05$ .

**Table 3.** Multiple regression analysis of the factors associated with preoperative SAS/SDS in patients undergoing adrenalectomy

	Preoperative SAS				Preoperative SDS			
	Coefficient	Standardized Coefficient	<i>t</i>	<i>P</i> *	Coefficient	Standardized Coefficient	<i>t</i>	<i>P</i> *
Age	0.072	0.029	2.462	<b>0.015</b>	0.085	0.025	3.373	<b>0.001</b>
Sex	-0.025	0.509	-0.050	0.960	0.876	0.437	2.006	<b>0.046</b>
Monthly income	0.775	0.487	1.593	0.113	0.397	0.417	0.951	0.343
Occupational status	1.092	0.907	1.203	0.230	-0.304	0.778	-0.390	0.697
Educational status	-0.838	0.380	-2.205	<b>0.029</b>	-0.604	0.326	-1.852	0.066
Marital status	0.546	1.501	0.363	0.717	1.668	1.287	1.296	0.196
Religious faith	0.329	1.082	0.304	0.761	-0.741	0.928	-0.799	0.425
Operation type	0.030	0.563	0.054	0.957	-0.413	0.482	-0.857	0.393
Other diseases	-0.450	0.516	-0.871	0.385	-1.071	0.443	-2.419	<b>0.016</b>
Medicare	-0.389	1.081	-0.360	0.719	-0.902	0.927	-0.100	0.921

Multiple regression analysis was performed on multiple linear regression analysis; Date in bold indicates a  $P < 0.05$ .

scores and possible associated factors. It was revealed that age and level of educational status were related to preoperative SAS ( $\beta=0.072$ ,  $P < 0.05$  and  $\beta=-0.838$ ,  $P < 0.05$ , respectively). Age was also positively related to preoperative SDS ( $\beta=0.085$ ,  $P=0.001$ ). Female had higher preoperative SDS than male ( $\beta=0.876$ ,  $P=0.046$ ). And subjects with other diseases had higher preoperative SDS than the others ( $\beta=1.071$ ,  $P=0.016$ ), as well.

**Table 4** showed the results of multinomial regression analysis between preoperative SAS/SDS scores and some possible associated factors. It was revealed that subjects undergoing open operation had higher postoperative SAS than the ones undergoing laparoscopic opera-

tion ( $\beta=1.932$ ,  $P=0.047$ ). And subjects with other diseases also had higher postoperative SDS than the others ( $\beta=1.905$ ,  $P=0.038$ ).

### Discussion

In this study, we found that some factors, such as age, gender, other diseases, level of educational status, operation method, were associated with anxiety or depression before or after operations. To our knowledge, it was the first research to evaluate the factors related to anxiety and depression in patients undergoing adrenalectomy.

Our research found that age was an independent factor affecting the level of preoperative

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**Table 4.** Multiple regression analysis of the factors associated with postoperative SAS/SDS in patients undergoing adrenalectomy

	Postoperative SAS				Postoperative SDS			
	Coefficient	Standardized Coefficient	t	P*	Coefficient	Standardized Coefficient	t	P*
Age	0.052	0.050	1.025	0.307	0.065	0.052	1.261	0.209
Sex	1.098	0.876	1.254	0.211	1.420	0.898	1.580	0.116
Monthly income	1.481	0.837	1.769	0.078	1.493	0.859	1.739	0.083
Occupational status	2.599	1.561	1.666	0.097	2.392	1.601	1.494	0.137
Educational status	-1.159	0.654	-1.773	0.078	-1.001	0.671	-1.493	0.137
Marital status	2.963	2.581	1.148	0.252	4.548	2.648	1.718	0.087
Religious faith	0.678	1.860	0.364	0.716	0.959	1.908	0.503	0.616
Operation type	1.932	0.967	1.997	<b>0.047</b>	0.694	0.992	0.699	0.485
Other diseases	-1.156	0.888	-1.301	0.195	-1.905	0.911	-2.091	<b>0.038</b>
Medicare	0.907	1.860	0.488	0.626	0.161	1.908	0.085	0.933
Postoperative leaving bed time	-0.131	0.083	-1.157	0.114	-0.088	0.085	-1.040	0.299

Multiple regression analysis was performed on multiple linear regression analysis; Date in bold indicates a P<0.05.

anxiety. It might be accounted for that the elderly considered more on postoperative recovery and the effect of the operations on their lives. We also found female higher preoperative SDS than male. It was similar with the research of Aybala et al. that female had a higher level of perioperative anxiety than male [8].

For level of educational status, a great deal of researches had founded its relationship with anxiety and depression. Aybala et al. found that a low level of education was determined to be one of the predominant and most effective factors responsible for increasing preoperative anxiety [8]. Meiyang et al. also found that SAS scores correlated with educational level in patients with dry eye syndrome [9]. It was considered that patients with low level of educational status had difficulties in reaching accurate information on the diseases and operations. At the same time, the lack of self-confidence in understanding what the doctors telling them and making the right decision after evaluating the information might account for this situation to some extent [8]. Bener et al. thought that low education was one of the high risk factors for depression in developing country [10]. And in China, education background was related to the social status and economic income. A large proportion of patients with poor education background abandoned further subsequent visit and treatment [11]. They all might cause that low education was related to anxiety and depression.

It was revealed that subjects undergoing open operation had higher postoperative SAS than

the ones undergoing laparoscopic operation in our study. It was different with the results of Aybala et al [8]. That laparoscopic operation was a risk factor for anxiety in patients undergoing cholecystectomy. Adrenalectomy has been performing laparoscopic operations for many years, and our doctors and nurses explained the advantages of laparoscopy detailedly might account for the result that subjects undergoing laparoscopic operation had lower postoperative SAS.

We also found that other diseases were related to preoperative and postoperative SDS in this study. Gendelman et al. found that adults with type 1 diabetes report more symptoms of depression compared with nondiabetic participants. Depression might be a response to the psychosocial stress caused by living with the demands and constraints imposed by other diseases [12].

Several limitations of the current study should be considered. Firstly, only 220 subjects were enrolled in this study, a larger patient sample are needed to confirm our results. Secondly, no interventions were taken in subjects with anxiety or depression in this study, and how to relieve anxiety or depression will be researched further.

### Conclusion

Our study revealed that some factors, such as age, gender, other diseases, level of educational status, operation method, were associated with anxiety or depression before or after oper-

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ations in patients undergoing adrenalectomy. Anxiety and depression should be considered during perioperative period as well as operations. The Individual traits should be taken into account when we intervene to reduce anxiety and depression in patients undergoing adrenalectomy.

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### Disclosure of conflict of interest

None.

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