

# Correlation analysis between depression and family fitness in chronic obstructive pulmonary disease inpatients

## A cross-sectional study

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### Abstract

To explore the relationship between depression and family fitness in chronic obstructive pulmonary disease (COPD) inpatients.

COPD inpatients (280) in our hospital from Jan to June 2016 were included. Depression level and family fitness were quantified with self-rating depression scale (SDS) and Adaptability, Partnership, Growth, Affection, and Resolve (APGAR) test. The relationship and correlation of SDS value and APGAR score was analyzed.

Family fitness for all COPD inpatients was grossly well, among which 93 patients (34.87%) experienced medium-to-severe family unfitness. Further analysis shows that better fitness correlated with less depression and worse fitness correlated with more depression. Depression levels were significantly different in patients under family fitness. Inpatients were grossly in light depression, among which 186 (69.66%) patients exhibited depression symptoms. Family fitness was significantly different among patients with different levels of depression. Correlation analysis showed that depression level was negatively correlated with family fitness.

Depression in patients is significantly correlated with family fitness. The condition of patients can be improved by active family fitness and patients' interactions with family members. Thus involvement of family member during admitting should be encouraged.

**Abbreviations:** APGAR = Adaptability, Partnership, Growth, Affection, and Resolve, COPD = chronic obstructive pulmonary disease, SDS = Self-rating depression scale.

**Keywords:** COPD inpatients, correlation, depression, family experience

## 1. Introduction

Chronic obstructive pulmonary disease (COPD) is a type of lung diseases with flow limitation whose death rate is ranged as 4th among all known diseases worldwide.<sup>[1]</sup> COPD can cause retardation of lung function, mobility restriction, undernourishment and cardiovascular diseases, leading to impairment of self-care capability and depression at high probability (13%–51%)<sup>[2–3]</sup> and other related problems. Early diagnosis of depression in COPD patients and psychiatric interventions have been becoming

main solution to manage COPD related depression.<sup>[4]</sup> There were lots of studies focusing on relative factors in depression of COPD patients, but whether family fitness influences depression is unknown.

As family fitness is important sign of family status and a most important factor in both mental and physical development of its family and can improve development of its member,<sup>[5]</sup> we aimed to study whether it plays any role in COPD related, thus providing theoretical basis for better patient management.

## 2. Material and method

### 2.1. Subjects

COPD inpatients from Jan to June 2016 in our hospital were recruited. Criteria for inclusion were as followed:

- 1) with symptoms for COPD listed in the Guidelines for Diagnosis and Treatment of COPD of Respiratory Disease Branch of Chinese Medical Association;<sup>[6]</sup>
- 2) with clear consciousness;
- 3) with certain reading, understanding and communication capabilities;
- 4) well informed and signed written consents.

Criteria for exclusion were as followed:

- 1) with mental disease or related family history, seizure history or other psychiatric disease histories;
- 2) refusing to cooperate.

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This study was approved by The Ethics Committee of West China Hospital of Sichuan University. Participants have provided their written informed consent to participate in this study.

The authors declare there have no conflicts of interest.

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## 2.2. Method

**2.2.1. Survey.** Well-trained nursery served as surveyors. Guidelines were provided and strictly followed during communicating subjects for 1 week. The questionnaires were filled by patients. Explanations from surveyors are neutral. Surveyors filled the questionnaires exactly following patients' will in case patient cannot himself. Questionnaires were distributed and collected face to face.

**2.2.2. Questionnaires.** Three types of questionnaires were included. The first questionnaire is for general information of patients including gender, age, education, children condition, disease course, complication, home, and payment method. The second questionnaire is for family fitness (Adaptability, Partnership, Growth, Affection, and Resolve [APGAR]),<sup>[7]</sup> APGAR is an acronym for adaptability, partnership, growth, affection and resolve. Three scores can be opted with often (rated as 2), sometime (rated as 1) and barely not (rated as 0), thus total rate of APGAR is between 0 and 10 points and 7 to 10 represents good (no disorder), 4 to 6 represents medium disorder and 0 to 3 represents severe disorder. Correlation of measurement and remeasurement is 0.80 to 0.83. The results from Pless-Satterwhite questionnaire correlated with APGAR (correlation index, 0.8). Thus APGAR questionnaire is reliable in current study. The third questionnaire is self-rating depression scale (SDS)<sup>[8]</sup> including 20 questions among which each question represents a related symptom. There are 4 options for each question, 1 represents never or rarely, 2 represents sometimes, 3 represents often and 4 represents always. To avoid habituation, 10 of the questions are scored positively while score of remaining 10 was reversed. Odd-even split half correlation (0.92) indicated SDS is reliable. SDS index (total score/80) is calculated. SDS index below 0.5 represents no-depression, between 0.50 and 0.59 represents slight depression, between 0.60 and 0.69 represents medium to severe depression and above 0.70 represents severe depression.

**2.2.3. Sample size.** Sample size was calculated with Kendell. We have 32 questions from 3 questionnaires (7+5+20). So sample size should be between 160 (32×5) to 320 (32×10). In present study, we recruited and collected 267 (from 280) valid questionnaires.

**2.2.4. Statistics.** Statistical analysis was conducted with SPSS20.0. Normality was first tested. Correlation between family fitness and depression was performed with Spearman analysis. Two-tailed Kruskal Wallis Rank Sum Test, variance analysis, SNK analysis were conducted to analyze depression level and family fitness. Significance was accepted if  $P < .05$ .

## 3. Results

### 3.1. General condition of patients

We distributed and collected 280 questionnaires among which 267 were valid (95.35%). Subjects with valid questionnaires were aged between 43 and 91 ( $65.67 \pm 10.42$ ) with disease course between 1 to 36 years ( $12.4 \pm 8.86$ ). Table 1.

### 3.2. Family fitness and depression information

Since data of experience was not normally distributed, relative parameters were displayed as minimal, maximal, median and interquartile as in Table 2. Data of depression level distributed

**Table 1**

#### General condition of patients.

group	case (%)
Gender	
Male	163 (61.05)
Female	104 (38.95)
Age	
≥60	208 (77.90)
<60	59 (22.10)
Education	
High school and above	113 (42.32)
Elementary school and below	154 (57.68)
Children	
with	256 (95.88)
no	11 (4.12)
Residency	
city	194 (72.66)
rural	73 (27.34)
Complications	
with	124 (46.44)
no	143 (53.56)
Payment	
private	31 (11.61)
public	236 (88.39)

**Table 2**

#### APGAR\* scores (n = 267).

	range of				interquartile range
	Score	median	P25	P75	
Adaptability	1-2	2	1	2	1
Partnership	0-2	2	1	2	1
Growth	0-2	2	1	2	1
Affection	0-2	2	1	2	1
Resolve	0-2	2	1	2	1
Family fitness	2-10	9	5	10	4

\* APGAR: Adaptation, Partnership, Growth, Affection, and Resolve.

normally and were displayed as mean  $\pm$  s (Table 3). COPD inpatients were grossly in slight depression.

### 3.3. Family fitness-based depression analysis

Grouping families into good function, medium disorder and severe disorder and calculation of corresponding depression level showed that patients with different family fitness showed significant different levels of depression (Table 4). SKN analysis further showed that the differences were significant than any 2 groups of patients with distinct family fitness (Table 5).

**Table 3**

#### Depression scores, mean $\pm$ s.

	total depression	no depression	slight depression	median depression	severe depression
Cases	267	81 (30.34)	66 (24.72)	102 (38.20)	18 (6.74)
SDS* Index	$0.58 \pm 0.09$	$0.47 \pm 0.02$	$0.55 \pm 0.03$	$0.65 \pm 0.02$	$0.76 \pm 0.04$

\* SDS: Self-rating depression scale.

**Table 4**  
Comparison of depression level based on family fitness, n (%) ±s.

	good	medium disorder	severe disorder	F	P
Cases	174 (65.20)	72 (27.00)	21 (7.87)	170.43	.00
SDS* Index	0.53±0.06	0.66±0.05	0.71±0.06		

\* SDS: Self-rating depression scale.

### 3.4. Depression-based family fitness analysis

Based on depression levels, patients were grouped into no, slight, median and severe depression and calculation of corresponding family fitness showed that patients with different depression experienced significant different family fitness ( $P < .05$ , Kruskal Wallis rank sum test, Table 6).

### 3.5. Correlation between family fitness and depression

Spearman approach was applied for analyzing correlation between depression level and family fitness. Depression levels negatively correlated with all family fitness parameters, indicating that depression is negatively correlated with family fitness (Fig. 1).

## 4. Discussion

In this study, we studied the correlation between family fitness and depression in patients. We found profound relationship between family fitness and depression. Thus it is important for proper involvement of family members to improve patients' prognosis.

Generally speaking, family fitness was good across COPD inpatients (Table 2), this is consistent with previous finding.<sup>[9]</sup> Family fitness is consisted of adaptability, partnership, growth, affection, and resolve. adaptability points to the capability of adapting family crisis;<sup>[10]</sup> partnership points to the capability of forming common sense among family members;<sup>[11]</sup> growth<sup>[11]</sup> points to the interactive supporting among family member; affection points to mutual care among family members;<sup>[11]</sup> resolve points family time, common financial resources and space.<sup>[10]</sup> Proper family fitness for COPD inpatients pointed to

**Table 5**  
SNK analysis of depression level based on family fitness.

Experience	alpha = 0.05		
	1	2	3
Good	0.5299		
Medium disorder		0.6612	
Severe disorder			0.7081
Significance	1.000	1.000	1.000

the fact that family members might spend more efforts in the fact of patients' condition and economic requirements. We found among 93 subjects with median to severe family unfitness, patients with less family unfitness show less depression (Tables 3 and 4). Thus besides direct medical intervention, family members could also bring beneficial to patients.

Patients generally showed slight depression among whom 186 exhibited depression symptoms and 168 were with median depression (Tables 5 and 6). This observation was higher than that described in previous study.<sup>[12]</sup> Differences in exact numbers might involve difference in test, criteria, population distribution and socioeconomic background. However, it is obvious that depression is common among COPD patients and may be related to disease severity.<sup>[13]</sup> In this sense, much more efforts should be paid to improve psychiatric status of patients for their better prognosis.

Depression levels negatively correlated with general family fitness, no matter for adaptability, partnership, growth, affection or resolve (Fig. 1), indicating better fitness lead to less depression. Such assumption is in line with previous study in patients with other chronic diseases.<sup>[10]</sup> Thus family unfitness is a risk factor for psychiatric disorders such as depression in COPD patient.<sup>[11,14]</sup> Improvement in family fitness can help avoid negative emotion in COPD patients.

In summary, as the incidence and death rate of COPD is increasing, patients are becoming less confident, anxious and depressed, which can influence prognosis and cause disease deterioration.<sup>[15-16]</sup> Thus family fitness must be maintained for better prognosis of COPD patients. However, present study was limited to COPD patients only in our hospital with small sized samples and lots of old patients (208 cases, 77.90%) with

**Table 6**  
Comparison of family fitness based on depression level.

Depression	Adaptability			Partnership			Growth		
	rank mean	x <sup>2</sup>	P	rank mean	x <sup>2</sup>	P	rank mean	x <sup>2</sup>	P
No	170.70	111.969	.00	185.87	121.939	.00	186.78	133.864	.00
Slight	167.93			159.20			164.68		
Median	94.16			92.32			88.41		
Severe	70.17			44.39			42.33		

Depression	Affection			Resolve			Family fitness		
	rank mean	x <sup>2</sup>	P	rank mean	x <sup>2</sup>	P	rank mean	x <sup>2</sup>	P
No	180.06	137.794	.00	182.34	133.430	.00	196.58	154.490	.00
Slight	169.19			166.11			166.35		
Median	91.87			88.84			80.67		
Severe	36.44			54.64			36.00		

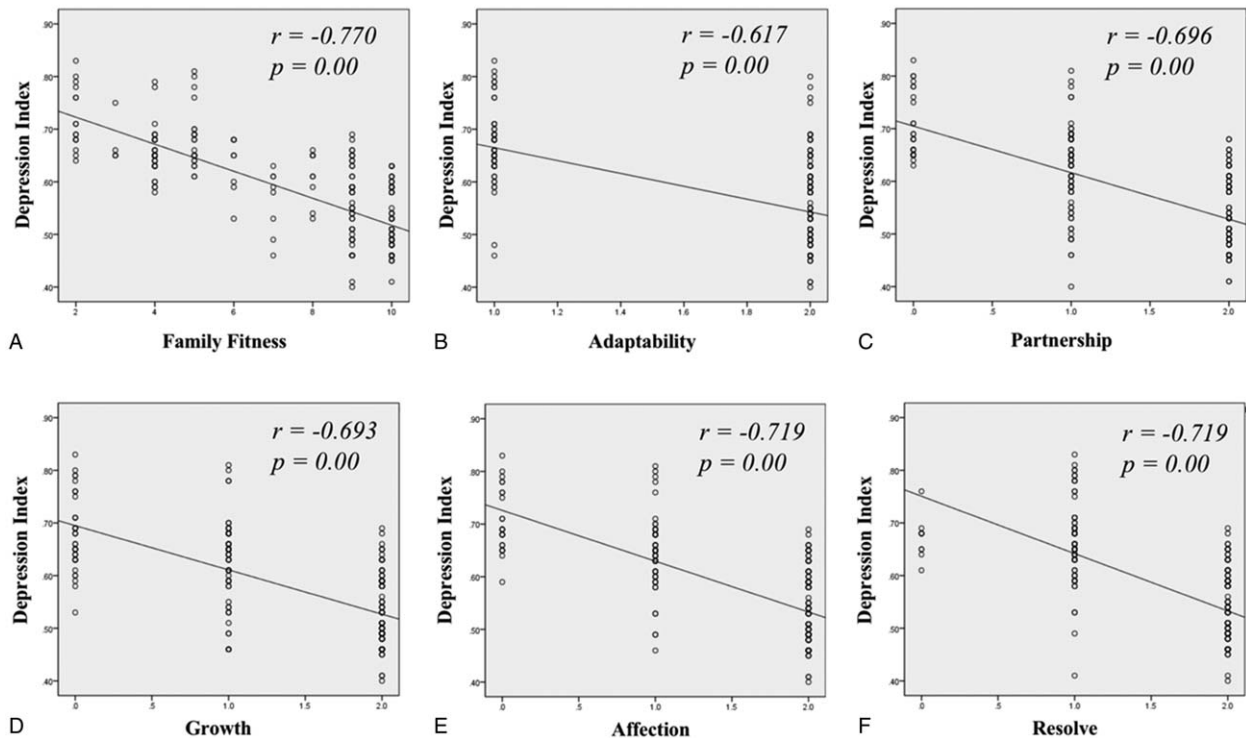


Figure 1. Correlation between depression and family fitness,  $n=267$ .

COPD recurrence, so increased sample size and different propulsion are required to further validate the generality current conclusion.

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### Author contributions

Xuexue Deng wrote the manuscript under the close supervision of Jinping Song. Xuexue Deng and Jinping Song were involved in the conception and design of the study, in the collection, assembly, analysis and interpretation of the data; they also provided statistical expertise, contributed to final approval of the article, provision of study materials, technical and logistical support as well as critical revision of the article for important intellectual content.

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