

# Effectiveness of nursing Intervention on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention

## An observational cohort study

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### Abstract

The aim of the present study is to investigate effect nursing intervention on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention, and the correlation between patients' anxiety, psychology and self-efficacy and nursing intervention.

One hundred thirty six patients with acute coronary intervention were randomly divided into the experimental group (n = 68) and the control group (n = 68). The experimental group received nursing intervention measures, and control group received routine nursing. We measured the depression, anxiety score of the 2 groups before and after nursing and multiple regressions was to analysis the correlation between patients' anxiety, psychology and self-efficacy and nursing intervention.

The nursing intervention effect of the 2 groups after intervention were improved before intervention ( $P < .05$ ), and the Hospital Anxiety and depression scale (HADS) in the was decreased than that of the control group after psychological intervention. The general self-efficacy scale scores of experimental group were obviously improved after receiving the intervention, and the scores in the experimental group were much higher than the control group after receiving the intervention, namely ( $P < .05$ ). Furthermore, Single regression analysis showed that single (Marital status) ( $r = 0.367$ ,  $P < .001$ ), divorced or separated (Marital status) ( $r = 0.338$ ,  $P < .001$ ), Widowed (Marital status) ( $r = 0.458$ ,  $P < .001$ ), nursing intervention ( $r = 0.431$ ,  $P < .001$ ) and Length of hospital stay ( $r = 0.276$ ,  $P = .003$ ) showed a significant correlation with patients' anxiety, psychology and self-efficacy. Multiple regression analysis showed that Length of hospital stay ( $P = .001$ ) and nursing intervention ( $P < .001$ ) were significantly correlated with patients' anxiety, psychology and self-efficacy.

Nursing intervention maybe significantly improve patients' anxiety, psychology and self-efficacy, and nursing intervention was significantly correlated with patients' anxiety, psychology and self-efficacy. Considering the limited number of studies analyzed, large sample-size clinical trials are necessary to verify the effect nursing intervention on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention.

**Abbreviations:** ACS = acute coronary syndrome, PCI = percutaneous coronary intervention.

**Keywords:** acute coronary syndrome, anxiety, nursing intervention, observational cohort study, percutaneous coronary intervention, psychology and self-efficacy

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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## 1. Introduction

Cardiovascular disease is the leading cause of death and the second largest source of healthcare costs in the world,<sup>[1]</sup> and acute coronary syndrome (ACS) accounts for 50% of cardiovascular deaths.<sup>[2]</sup> As a major public health issue in developing countries, ACS has become highly prevalent, responsible for about 35% of all deaths across the world. In other words, almost 1 million deaths occur each year because of ACS.<sup>[3]</sup> At present, the main treatment method was percutaneous coronary intervention (PCI). However, several studies have indicated that psychological diseases was common following ACS patients, especially among those received PCI treatment.<sup>[4-7]</sup> Studies from developed countries have reported that the incidence of post-ACS anxiety is about 15% to 20% within 1 year, which is 3 times as many as that of the general population.<sup>[8]</sup> Furthermore, the occurrence of anxiety after PCI has been found to be associated with adverse cardiac outcomes and mortality in patients with ACS.<sup>[9]</sup>

Anxiety affects the function of the body's organs and also causes negative health-related consequences in patients with myocardial infarction.<sup>[10]</sup> Moreover, the progression of cardiac ischaemia and even dysrhythmia are the significant negative

consequences of anxiety and depression.<sup>[11]</sup> Part of the reason for this is that patients didn't understand the interventional treatment, or they were suddenly recognized ACS, resulting in fear. Those psychological barriers could possibly relapse ACS after PCI. Therefore, choosing an appropriate method for alleviating patients' anxiety and psychology without the use of drugs is of great importance.

Nursing intervention measures can provide personalized and humanized nursing for patients, understand the psychological needs of patients through communication with patients, relieve psychological pressure, and ensure that patients actively cooperate with surgical treatment measures through the explanation of disease and surgical knowledge. Nurses need to make preparations before, during and after the operation, closely observe the physiological indexes of patients, communicate with the attending doctors, and promote the rehabilitation of patients.

Therefore, the aim of the present study is to investigate the effect of nursing intervention on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention, and the correlation between patients' anxiety, psychology and self-efficacy and nursing intervention.

## 2. Materials and methods

### 2.1. Study design

This observational study was conducted from February 2018 to February 2021. Totally 136 patients with acute coronary intervention were randomly divided into the experimental group (n=68) and the control group (n=68). The researchers systematically explained the role, purpose and process of the study to their families and patients. Their families and patients voluntarily signed the informed consent form to participate in this study. The flowchart is shown in Figure 1.

### 2.2. Inclusion and exclusion standard

**Inclusive criteria:** ① The patient was diagnosed with ACS and received percutaneous coronary intervention treatment; furthermore, conforming to the diagnostic standard of anxiety<sup>[12]</sup>; General Hospital Anxiety and Depression Scale (HADS) was positive; ② Patients were able to understand and communicate; ③ age ≥65 years; ④ The subjects were willing to cooperate and implement the experiment.

**Exclusion criteria:** ① Taking any anxiolytics and sedative drugs before the intervention; ② Severe heart failure, defined as left ventricular ejection fraction ≤30% or New York Heart Association class ≥III.; ③ Patients had a history of asthma, eczema, and allergy; ④ Patients had a history of malignant tumor; ⑤ Pregnancy and lactation; ⑥ Patients had a mental illness before PCI, such as depressive or anxiety disorders; ⑦ Unwilling to participate in our research.

### 2.3. Interventions

**The experimental group:** The patients receive routine care and personalized care program (Table 1). ① **First intervention.** The first intervention was psychological care. The patients were informed of the diet and medication requirements before and after the operation, the principle, method, success rate, reliability of the operation and the matters needing attention after the operation. Moreover, according to the different psychological

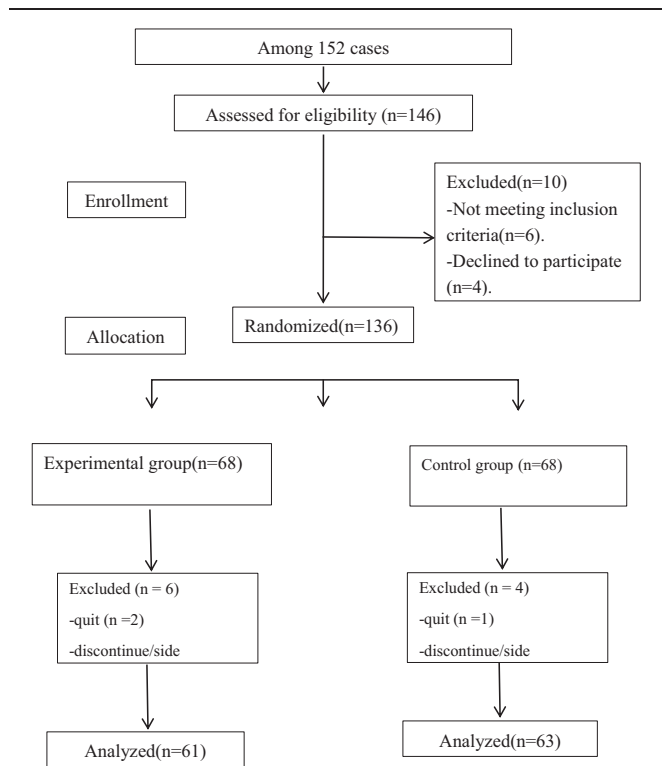


Figure 1. Flow chart showing recruitment.

states of patients, nursing staff take supportive and enlightening psychological nursing to try their best to relieve patients' anxiety and fear. ② **Second intervention.** The second individual intervention was observation of postoperative condition. The vital signs such as blood pressure, heart rate, heart rhythm, body temperature and urine volume of the patients were closely observed. The frequent occurrence of ventricular premature contraction, paroxysmal ventricular tachycardia, ventricular fibrillation and atrioventricular block were mainly observed. At the same time, the manifestations of myocardial ischemia and

Table 1

Comparison of clinical data between the 2 groups.

	Experimental group (n=61)	Control group (n=63)	t/χ <sup>2</sup>	P
Age (yr)	74.05 ± 6.91	71.35 ± 7.09	3.25	.24
Sex			3.28	.42
Male (n%)	38 (62.3%)	36 (57.1%)		
Female (n%)	23 (37.7%)	27 (42.9%)		
BMI	22.7 ± 2.28	21.4 ± 2.76	1.209	.33
Smoking	37 (60.7%)	39 (61.9%)	1.96	.59
Marital status			17.83	.24
Married	23 (37.7%)	19 (30.2%)		
Single	16 (26.2%)	12 (19.0%)		
Divorced or separated	12 (19.7%)	13 (20.6%)		
Widowed	8 (13.1%)	15 (23.8%)		
Unknown/missing	2 (3.3%)	4 (6.3%)		
Coronary heart disease			9.978	.213
One-vessel disease	33 (54.1%)	35 (55.6%)		
Two-vessel disease	17 (27.9%)	14 (22.2%)		
Three-vessel disease	11 (18%)	14 (22.2%)		
Length of hospital stay (d)	4.1 ± 1.69	3.9 ± 2.41	9.95	.062

Compared with the control group, significant difference as P < .05.

myocardial reinfarction should be found as soon as possible. ③ Third intervention. The third individual education intervention was health education before discharge. Nurse informed patients that current cardiac medication and personal disease management. In connection with personal disease management, telling that increased physical activity and the appropriate response to future chest pain.

The control group: The patients receive routine care. Routine care was consisted of medication administration based on physicians' orders and scheduled nursing interventions delivered to all patients.

#### 2.4. Primary outcome

① Hospital Anxiety and depression scale (HADS)<sup>[13]</sup>: HADS is consist of 14 items, including 2 subscales of anxiety and depression, with 7 items in each. Each item is scored with 0 to 3 points, and the total score ranges from 0 to 21 points. 0 to 7 is asymptomatic, 8 to 10 is suspicious, and 11 to 21 is certain. The score starts with 8 points, that is, both suspicious and symptomatic patients are positive.

② General self efficacy scale (GSEs)<sup>[14]</sup>: GSEs contains 10 items, the answers are divided into 4 grades, the score is 1 to 4 points, the total score is 40 points, divided into "very low, low, high, very high" 4 grades, the higher the score, the higher the level of self-efficacy, the internal consistency reliability is 0.75 to 0.91, with good reliability and validity.

#### 2.5. Ethics statement

The study was approved by the ethics committee of Laizhou Municipal people's Hospital. Informed consent for participation in the observation cohort was obtained from all participants.

#### 2.6. Statistical analysis

All data were analyzed by SPSS 25.0, and GraphPad InStat. The statistical results are expressed by mean  $\pm$  standard deviation ( $\pm$ s), the data comparison is conducted by *t*-test and the correlation analysis is conducted by person linear phase. For non-parametric measures like VAS and WOMAC, differences between baseline and post-treatment scores for each group are computed by the Wilcoxon signed ranks test.  $P < .05$  was the difference with statistical significance.

#### 2.7. Data analysis

The collected data will be recorded in standardized forms. The investigators will be supervised and verified when analyzes are

performed to avoid errors and minimize biases in the process. Descriptive statistics were calculated for the dependent and independent variables. This analysis will include summary statistics of demographic information, VAS and WOMAC outcome measures. The VAS and WOMAC scores and demographic characteristics of subjects in the 2 groups will be compared upon admission using a 2-sample *t*-test (continuous data). Statistical analysis of each segment was applied. For each segment, the cross-sectional analysis between the 2 groups (Experimental group and Control group) was assessed using one-way analysis of variance. Our analysis is based on a longitudinal regression analysis in which we do not have an estimate of the within- participant correlations. Nonparametric methods are used when assumptions of normality are violated. We will submit the results of the trial for publication in an appropriate journal, irrespective of the outcome. We report the trial in accordance with STROBE statement.

### 3. Results

#### 3.1. Clinical data

Between February 2018 and February 2021, 146 patients were assessed for eligibility in this study. Of these, 10 patients were excluded for the following reasons: 6 patients did not meet inclusion criteria; 4 patients refused participation. Finally, there were 124 participants were inclusion analysis (Fig. 1). In addition, the groups were similar regarding age, sex, body mass index (BMI), the rate of smoking, marital status (married, single, divorced or separated, widowed or unknown/missing), and coronary heart disease (One-vessel disease, two-vessel disease and three-vessel disease) (Table 2). There was no statistical significance between 2 group among those clinical data before intervention ( $P > .05$ ).

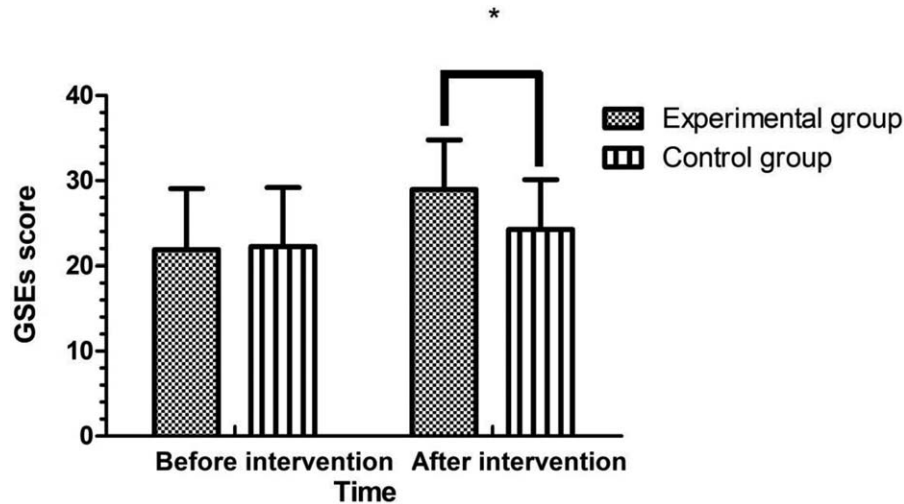
#### 3.2. Assess the patient's anxiety and depression

As shown in Table 2, the score of anxiety before intervention in the experimental group was (10.37  $\pm$  2.10) points, and that in the control group was (10.19  $\pm$  2.01) points; while the score of anxiety after psychological intervention in the experimental group (5.63  $\pm$  2.35) points, and that in the control group was (9.09  $\pm$  2.42) points, there had statistical significance between 2 group after treatment ( $P < .05$ ). The score of depression in the experimental group before and after intervention were respectively (10.67  $\pm$  2.37) and (6.31  $\pm$  2.89) points, while that in the control group were respectively (10.31  $\pm$  2.09) and (9.39  $\pm$  2.32) points, the results indicated that the anxiety and depression symptom was improved after psychological intervention in 2 groups.

**Table 2**  
Comparison of hospital anxiety and depression scale between the 2 groups after intervention (points,  $\bar{x} \pm s$ ).

	time	Experimental group (n=69)	Control group (n=66)	t	P
Anxiety	Before intervention	10.37 $\pm$ 2.10	10.19 $\pm$ 2.01	0.52	.096
	After intervention	5.63 $\pm$ 2.35	9.09 $\pm$ 2.42	5.78	.000
	t	24.9	5.78	–	–
	P	0.000	0.02	–	–
Depression	Before intervention	10.67 $\pm$ 2.37	10.31 $\pm$ 2.09	0.54	.27
	After intervention	6.31 $\pm$ 2.89	9.39 $\pm$ 2.32	6.32	.000
	t	16.91	7.15	–	–
	P	.000	.000	–	–

Compared with the control group, significant difference as  $P < .05$ .



**Figure 2.** Comparison of general self-efficacy scale (GSEs) score between the 2 groups before and after intervention. Note: Compared with experimental group, \* $P < .05$ .

**3.3. General self-efficacy scale score**

There was no significant difference in GSEs score between the 2 groups before intervention ((21.88 ± 7.17) VS (22.26 ± 6.93),  $P = .37$ ). After the psychological intervention, the general self-efficacy scale scores of the 2 groups were improved, and the GSEs score of the experimental group was higher than that of the control group, the difference was statistically significant ((28.94 ± 5.85) VS (24.24 ± 5.89),  $P = .002$ ). (Fig. 2)

**3.4. The correlations of patients’ anxiety, psychology and self-efficacy with independent variables**

As shown in Table 3. Regarding the variables, single (Marital status) ( $r = 0.367$ ,  $P < .001$ ), divorced or separated (Marital status) ( $r = 0.338$ ,  $P < .001$ ), Widowed (Marital status) ( $r = 0.458$ ,  $P < .001$ ), nursing intervention ( $r = 0.431$ ,  $P < .001$ ) and Length of hospital stay ( $r = 0.276$ ,  $P = .003$ ) showed a significant correlation with patients’ anxiety, psychology and self-efficacy. The age, BMI, smoking and coronary heart disease showed no significant correlation with patients’ anxiety, psychology and self-efficacy.

**Table 3**  
The correlations of patients’ anxiety, psychology and self-efficacy with independent variables.

Indexes	rho	P
Age	-0.071	.454
BMI (kg/m <sup>2</sup> )	-0.070	.461
Smoking	0.064	.511
Married (Marital status)	-0.032	.743
Single (Marital status)	0.367	<.001
Divorced or separated (Marital status)	0.338	<.001
Widowed (Marital status)	0.458	<.001
Nursing intervention	0.431	<.001
Length of hospital stay (d)	0.276	.003
One-vessel disease	0.174	.064
Two-vessel disease	0.088	.355
Three-vessel disease	-0.070	.461

The person correlation analysis method is used for normal distribution data and Spearman correlation analysis method is used for non normal distribution data.

**3.5. Multiple regression analysis**

Five variables with  $P < .5$  (i.e., married, single, divorced or separated, widowed, nursing intervention, and length of hospital stay) were entered in the multiple regression analysis. Multicollinearity was checked in variables. Length of hospital stay ( $P = .001$ ) and nursing intervention ( $P < .001$ ) were selected as independent variables in the multiple regression model of patients’ anxiety, psychology and self-efficacy (Table 4).

**4. Discussion**

This study had suggested that nursing intervention can significantly improve patients’ anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention, and nursing intervention was significantly correlated with patients’ anxiety, psychology and self-efficacy. To our best of knowledge, this study is the first research on the effect of nursing intervention in psychology diseases patients with ACS who have undergone PCI, and it further demonstrated that nursing intervention was significantly correlated with patients’ anxiety, psychology and self-efficacy.

As shown in our results, the nursing intervention effect of the 2 groups after intervention were improved before intervention ( $P < .05$ ), and the Hospital Anxiety and depression scale (HADS) in the was decreased than that of the control group after psychological intervention. The general self-efficacy scale scores of experimental group were obviously improved after receiving the intervention, and the scores in the experimental group were much higher than the control group after receiving the intervention, namely ( $P < .05$ ). Furthermore, Single regression analysis showed that single (Marital status) ( $r = 0.367$ ,  $P < .001$ ), divorced or separated (Marital status) ( $r = 0.338$ ,  $P < .001$ ), Widowed (Marital status) ( $r = 0.458$ ,  $P < .001$ ), nursing intervention ( $r = 0.431$ ,  $P < .001$ ) and Length of hospital stay ( $r = 0.276$ ,  $P = .003$ ) showed a significant correlation with patients’ anxiety, psychology and self-efficacy. Multiple regression analysis showed that Length of hospital stay ( $P = .001$ ) and nursing intervention ( $P < .001$ ) were significantly correlated with patients’ anxiety, psychology and self-efficacy.

**Table 4****Multiple regression analysis.**

Dependent variables	Independent variables	B	SE	$\beta$	P value
Patients' anxiety, psychology and self-efficacy	Length of hospital stay	0.203	0.053	0.333	.001
	Nursing intervention	1.288	0.394	0.284	<.001

B: nonstandard regression coefficient; SE = standard error; b: standardized regression coefficient;  $\beta$ : multiple correlation coefficient adjusted for the degrees of freedom.

Our intervention included multiple components, all of which have been included that psychological care, observation of postoperative condition and health education. In our study, patients received overall care during before, post-operation and before discharge. And we contact patients to address their intermedication issues at 30 days after discharge. This demonstrated that a multifaceted nursing intervention with collaborative care could improve patients' anxiety, psychology and self-efficacy.

The main reasons for the high incidence of anxiety and depression in elderly patients with ACS after PCI are: the elderly suffer from ACS diseases, leading to a decline in the quality of life or maladjustment to sudden diseases, which makes the physical diseases induce or aggravate the emotional disorders. In addition, the economic pressure brought by hospitalization also aggravates the ideological pressure. If they lack the companionship and support of relatives and friends at this time, they will have to pay more attention to anxiety and depression. The high incidence of anxiety and depression was caused by counseling.<sup>[15,16]</sup> Studies have shown that the main risk factors of anxiety and depression in elderly patients are death of spouse, female patients, non-public medical care, more than 4 kinds of diseases, less hobbies, lack of family care and so on.<sup>[17]</sup> Other studies also show that there is a moderate negative correlation between the self-efficacy and the degree of depression of the elderly, that is, the lower the self-efficacy of the elderly, the more serious the degree of depression.<sup>[18]</sup>

At present, the main ways to reduce the anxiety and depression of elderly patients are to establish a good nurse patient relationship, increase nurse patient interaction and other measures to maintain the patient's self-esteem and increase the patient's sense of self-worth, so as to reduce their anxiety and depression.<sup>[19]</sup> In this study, according to the susceptible factors and related factors of anxiety and depression in elderly patients, the intervention group was given systematic psychological nursing. The results showed that the scores of anxiety and depression in the 2 groups were significantly different from those before intervention ( $P < .05$ ) after 2 weeks of intervention, but the scores of anxiety and depression in the intervention group were much lower than those in the control group after intervention ( $P < .05$ ), indicating that the systematic psychological nursing has more obvious advantages than the general psychological nursing in improving the elderly patients with early anxiety and depression. With the system of psychological intervention, nurses give more care to patients. Through professional psychological intervention, patients' anxiety and depression can be released to a certain extent, and through targeted communication between nurses and patients, patients can be relieved. At the same time, the collective psychotherapy made the old patients with few hobbies find their own hobbies again under the influence of their peers, which also alleviated the anxiety and depression of patients to a certain extent.

Self-efficacy plays an important role in the health management of chronic diseases. Health intervention (including psychological

intervention) for patients with chronic diseases should focus on the cultivation and improvement of their self-efficacy.<sup>[20]</sup> There are 4 main sources of information to construct self-efficacy: success or failure experience, substitution experience, verbal persuasion, physiological and emotional state.<sup>[21]</sup> As shown in our results, the self-efficacy scores of the 2 groups were significantly different from those before intervention after 2 weeks intervention ( $P < .05$ ), but the self-efficacy scores of the intervention group after intervention were higher than those of the control group ( $P < .05$ ), indicating that systematic psychological nursing can play a stronger role in enhancing the self-efficacy of patients than traditional psychological nursing.

Although this research demonstrated that nursing intervention can have beneficial effects on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention, potential limitations of our study should also be considered. Firstly, this is a small, single center cohort study. Secondly, a lack of long-term follow-up may have resulted to some bias. Thirdly, the limited number of enrolled patients is another weakness, which is explained by our choice of strict inclusion /exclusion criteria and rigid procedure. Moreover, further multicenter, large scale randomized controlled study are needed.

In conclusion, nursing intervention can be considered an efficient therapy for alleviating anxiety, depression, and physiological responses among elderly patients with acute coronary syndrome after percutaneous coronary intervention. The researchers considered that this nonpharmacologic intervention may be used by clinical to alleviate anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention. Considering the limited number of studies analyzed, large sample-size clinical trials are necessary to verify the effect nursing intervention on anxiety, psychology and self-efficacy among elderly patients with acute coronary syndrome after percutaneous coronary intervention.

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### Author contributions

**Data collection:** Leifang Yuan, Leihua Yuan.

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**Investigation:** Leihua Yuan, Leifang Yuan.

**Methodology:** Leihua Yuan, Leifang Yuan.

**Resources:** Leifang Yuan, Leihua Yuan.

**Software:** Leihua Yuan, Leifang Yuan.

**Supervision:** Leihua Yuan.

**Validation:** Leifang Yuan.

**Writing – original draft:** Leifang Yuan.

**Writing – review & editing:** Leihua Yuan.

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