Scientific Research Publishing

Health, 2024, 16, 1117-1129
https://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

Analysis of Constitutional Factors in Patients with Gallstone Disease

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How to cite this paper: Xu, J.J., Zhang, M., Yu, Y., Zhao, E., He, X.W. and Zhao, Q. (2024) Analysis of Constitutional Factors in Patients with Gallstone Disease. *Health*, **16**, 1117-1129.
https://doi.org/10.4236/health.2024.1611077

Received: October 23, 2024
Accepted: November 24, 2024
Published: November 27, 2024

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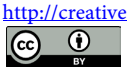

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Abstract

Objective: To summarize the common constitutional types in patients with gallstone disease and analyze influencing factors. **Research Hypothesis:** Qi stagnation constitution may be a potential predisposing constitution for gallstone disease, whereas the Balanced Constitution and Yin deficiency constitution have a lower tendency towards the development of the disease; gallstone disease is more prevalent among young men engaged in mental labor. **Methods:** A retrospective study was conducted on 180 patients with gallstone disease who were hospitalized in the Department of Hepatobiliary Surgery, First Affiliated Hospital of Guangxi University of Traditional Chinese Medicine (TCM), from July 2017 to July 2023. Additionally, 180 healthy individuals undergoing physical examinations at the Health Examination Center of the same hospital were selected as the normal control group. Both groups underwent general condition surveys, TCM constitution scales, Eysenck Personality Questionnaires, Brief Coping Styles Questionnaires, and Social Support Rating Scales to determine risk factors and common types. **Results:** Independent variables such as gender, Qi stagnation constitution, Balanced Constitution, negative coping scores, positive coping scores, and stressful life events were included in the model. The OR values for Balanced Constitution, gender, positive coping style, and overall social support were all less than 1, and the maximum value of the 95% confidence interval was also less than 1. After selecting the intercept into the model and analyzing the standardized regression coefficients, it was found that negative coping scores had a significant impact on the model, while stressful life events showed extremely high relevance to the study. Compared with the normal group, the frequency of Qi stagnation constitution in the study group significantly increased, with a significant difference ($P < 0.001$). The frequency of Yin deficiency constitution and Balanced Constitution in the study group

was notably lower compared to the normal group, with statistical differences ($P < 0.05$, $P < 0.001$). There were 102 cases in the young age group, 42 cases in the middle age group, and 36 cases in the elderly age group in the study group; the corresponding numbers in the normal group were 48, 69, and 63 cases, respectively. When comparing the young age group with the normal group, $\chi^2 = 11.109$, $P = 0.0009$, indicating a significant difference ($P < 0.01$). The frequency of Yang deficiency constitution in the elderly age group was significantly higher compared to the young and middle age groups ($P < 0.01$, $P < 0.05$). Among the patients, there were 117 males and 63 females; in the normal group, there were 84 males and 69 females. Chi-square test results showed $\chi^2 = 4.0890$, $P = 0.0432$, indicating a significant difference ($P < 0.05$). In the study group, there were 111 mental workers and 69 physical workers, while in the normal group, there were 93 mental workers and 87 physical workers. Comparing the two groups, no significant difference was found ($P > 0.05$). However, when comparing mental workers with physical workers within the patient group, the frequency of Qi stagnation constitution in mental workers was significantly higher, with $\chi^2 = 6.8467$, $P = 0.012$, indicating a significant difference ($P < 0.05$). **Conclusion:** Qi stagnation constitution is a potential predisposing constitution for gallstone disease, whereas the tendency to develop the disease is relatively low for Balanced Constitution and Yin deficiency constitution. Gallstone disease is more commonly found in young male mental workers.

Keywords

Gallstone Disease, Constitution Types, Influencing Factors, Qi Stagnation Constitution, Balanced Constitution, Yin Deficiency Constitution, Yang Deficiency Constitution

1. Introduction

Gallstone disease is a common biliary tract disorder clinically, primarily characterized by the formation of stones within the gallbladder or bile ducts. Its clinical manifestations are diverse and can lead to complications such as cholecystitis, cholangitis, and pancreatitis. Recent studies have shown an increasing trend in the number of gallstone patients globally, accounting for approximately 10% to 20% of the adult population worldwide; the prevalence is 10% to 15% among people in Europe and America, 3% to 15% in Asia, and less than 5% in Africa [1]. In China, the incidence of gallstone disease has surpassed 10%, and it continues to rise annually due to population aging and changes in dietary structure [2]. The incidence of gallstone disease is particularly high among adults, especially women, and predominantly affects middle-aged and elderly women.

The clinical presentation of gallstone disease is related to the location of the stones, the degree of bile duct patency, and inflammation. Clinically, typical symptoms of right upper quadrant colic are rare, and most patients present with symptoms such as abdominal distension and acid reflux. Western medicine primarily

recommends cholecystectomy for symptomatic or high-risk gallstones [3]. Modern medicine attributes the onset of gallstone disease to factors such as diet, lifestyle, and genetic susceptibility. In contrast, the theory of TCM constitution reflects individual peculiarities in physiological functions and the inherent characteristics of yin-yang and qi-blood balance, which also determine the susceptibility to pathogenic factors and the tendency towards certain types of pathological changes. However, current clinical research mostly focuses on the symptoms and pathogenesis of gallstone disease, with few studies exploring the distribution characteristics of constitution types. Therefore, this study aims to investigate the constitution of patients with gallstone disease, seeking to identify their susceptible constitutions to provide a basis for clinical screening and early prevention. This study hypothesizes that Qi stagnation constitution may be a potential susceptible constitution for gallstone disease, while Balanced Constitution and Yin deficiency constitution have a lower propensity for the onset of the disease; furthermore, gallstone disease is more prevalent among young men who engage in intellectual work.

2. Clinical Data

2.1. Case Selection

A retrospective study was conducted on 180 patients with gallstone disease who were admitted to the Department of Hepatobiliary Surgery at the First Affiliated Hospital of Guangxi University of Traditional Chinese Medicine (TCM) from July 2017 to July 2023. These patients were included in the study group. Additionally, 180 healthy individuals who underwent physical examinations at the Health Examination Center of the same hospital were selected as the normal control group.

2.1.1. Inclusion Criteria

1) Patients diagnosed with any of the following conditions related to gallstone disease: "gallbladder stones," "intrahepatic bile duct stones," or "extrahepatic bile duct stones."

2) Diagnostic criteria for "gallbladder stones": confirmed by ultrasound examination or other imaging methods, the presence of one or more solid components within the gallbladder cavity, which may be mobile or fixed.

3) Diagnostic criteria for "intrahepatic bile duct stones": confirmed through abdominal ultrasound, CT, MRI, or ERCP (endoscopic retrograde cholangiopancreatography) that the stones are located within the bile duct system inside the liver.

4) Diagnostic criteria for "extrahepatic bile duct stones": confirmed via abdominal ultrasound, CT, MRI, or ERCP that the stones are present in the extrahepatic bile duct from the liver to the duodenum.

5) Age: between 18 and 70 years old.

2.1.2. Exclusion Criteria

1) Age non-compliance: patients under 18 or over 70 years old.

2) Severe systemic diseases: patients with malignant tumors, systemic autoimmune

diseases (such as lupus erythematosus, rheumatoid arthritis), or severe heart disease.

3) Surgical history: patients with cholangitis caused by intestinal fluid reflux due to surgery.

4) Non-compliance with medical advice: patients unable or unwilling to follow the prescribed treatment regimen and follow-up requirements of the study.

5) Pregnant or breastfeeding patients.

6) Drug allergy: patients with a history of allergy to traditional Chinese medicine or Western medicine used in this study.

7) Recent treatment: patients who have received other treatments within 1 week prior to enrollment.

8) Mental disorders: patients with mental disorders or psychological issues that affect their ability to cooperate with treatment.

2.2. Sample Size

In this study, $\delta = 0.1$, $\sigma = 3.63$, $\alpha = 0.05$, $\beta = 0.10$, and $1 - \beta = 0.90$. Referring to the t-value table for degrees of freedom (∞), the one-sided t0.05 = 1.645 and t0.1 = 1.282. Substituting these values into the formula $n = 2^*[(\alpha + \beta)\sigma/\delta]^2$, it is determined that at least 171 cases are required to meet the above requirements. Considering a dropout rate of 5% - 10%, each group needs a sample size of 180 cases.

2.3. Measurement Tools

2.3.1. TCM Constitution Scale

The TCM Constitution Scale was established by Professor Wang Qi of Beijing University of TCM based on the conceptual framework of TCM constitution types. The development of sub-scales involved the collection of items, the formation of an item pool, the selection of items, the formulation of questions, and pilot testing. The scale consists of 60 items and is a well-performing standardized scale. It includes nine sub-scales: Balanced Constitution, Qi deficiency constitution, Yang deficiency constitution, Yin deficiency constitution, Phlegm-dampness constitution, Damp-heat constitution, Blood stasis constitution, Qi stagnation constitution, and Special endowment constitution.

2.3.2. Eysenck Personality Questionnaire

The Eysenck Personality Questionnaire (EPQ) was developed by British psychologist H.J. Eysenck based on his three-dimensional theory of personality. It is used to assess personality traits such as introversion-extroversion and emotional stability. The EPQ consists of three personality dimensions and one validity scale: Psychoticism (P) dimension, Introversion-Extraversion (E) dimension, Neuroticism (N) dimension, and Lie (L) scale.

2.3.3. Brief Coping Style Scale

The Brief Coping Style Scale was compiled by Xie Yaning in 1998. It consists of 20 items, with the first 12 items forming the positive coping factor and the last 8

items forming the negative coping factor. The scale is self-administered and uses a multi-level rating system, with four options for each item: never used, occasionally used, sometimes used, and frequently used (corresponding scores are 0, 1, 2, and 3, respectively).

2.3.4. Multidimensional Perceived Social Support Scale

The Multidimensional Perceived Social Support Scale was developed by Zimet *et al.*, introduced and revised by Jiang Qianjin *et al.* It is suitable for use in various populations and primarily investigates the subjective perception of social support among patients with psychosomatic disorders (PSD). The scale includes two dimensions: family support and external support, and consists of 12 self-rated items. It uses a 1 - 7 point scoring method, where 1 represents strongly disagree, 2 represents disagree, 3 represents slightly disagree, 4 represents neutral, 5 represents slightly agree, 6 represents agree, and 7 represents strongly agree. The total score ranges from 12 to 84 points, with the family support score ranging from 4 to 28 points and the external support score ranging from 8 to 56 points. Higher scores indicate better perceived social support.

3. Research Methods

3.1. Survey Methods

Investigators: Investigators must have a bachelor's degree or higher in Traditional Chinese Medicine (TCM) or a non-TCM background with systematic training in TCM theory and clinical medical practice.

Training Methods: Qualified investigators will undergo centralized training to understand the content of the project and detailed implementation procedures.

Survey Methods: Surveys will be conducted directly with participants from both the study group and the control group in a quiet environment with natural lighting. Various scales will be administered, and questionnaires with a response rate of over 95% will be considered valid.

3.2. Data Collection

3.2.1. General Information

Participants from both the study group and the control group will be asked about their name, gender, age, occupation, educational level, living situation, marital status, and family medical history.

3.2.2. Lifestyle Habits

Participants will be asked about their sleep patterns, smoking and drinking history, dietary preferences, and daily routines.

3.2.3. Scale Assessments

The Eysenck Personality Questionnaire, Social Support Rating Scale, Coping Style Scale, and TCM Constitution Scale will be used to evaluate the psychological and personality characteristics and constitution of participants in both the study group

and the control group.

4. Statistical Methods

The statistical software SPSS 21.0 was utilized for item coding, data entry, and statistical analysis. Descriptive statistics were employed to calculate frequencies and composition ratios. For categorical data, the Chi-square test (χ^2 test) was used to investigate the distribution patterns of constitutions among the study participants. Logistic regression analysis was conducted to explore the correlation between constitution and the incidence of the disease. The Chi-square test is suitable for analyzing the relationship between two categorical variables, applicable in this study for comparing the distribution of constitutions across different groups (e.g., patients with gallstone disease versus control groups). Logistic regression is appropriate for analyzing the relationship between a binary outcome variable (such as whether or not a participant has gallstone disease) and multiple independent variables (such as constitution characteristics, lifestyle habits, etc.), useful in this study for exploring the correlation between constitution and the incidence of gallstone disease.

The Odds Ratio (OR) is a measure of association between an exposure and an outcome. The odds refer to the probability of one category of a binary event relative to its opposite category. In the case group, the odds are calculated as the number of exposed individuals divided by the number of unexposed individuals; similarly, in the control group, the odds are the number of exposed individuals divided by the number of unexposed individuals. An OR value greater than 1 suggests that the exposure factor is a promoter of the positive outcome; an OR value less than 1 indicates that the exposure factor is a deterrent to the positive outcome; and an OR value equal to 1 implies that the exposure factor has no effect on the occurrence of the positive outcome.

5. Experimental Results

5.1. Logistic Regression Analysis Results of the Influence of Constitution on Disease Onset

The logistic regression analysis results will provide insights into how different constitutions influence the onset of gallstone disease. This section will detail the specific findings, including the odds ratios (OR) and confidence intervals (CI) for various constitutional types, and discuss the statistical significance of these findings. See **Table 1**.

5.1.1. Univariate Logistic Regression Analysis

The independent variables selected for the model include gender, qi stagnation constitution, Balanced Constitution, scores of negative coping, scores of positive coping, and stressful life events. The OR values for Balanced Constitution, gender, positive coping style, and total social support are all less than 1, and the maximum value of the 95% confidence interval is also less than 1. See **Table 2**.

Table 1. Logistic regression variable coding table.

Variable	Content	Value
Y	Dependent Variable	Research Group = 1, Normal Group = 2
X1	Gender	Male = 0, Female = 1
X2	Occupation	Mental Labor = 0, Physical Labor = 1
X3	Education Level	College Degree and Above = 0, Below College Degree = 1
X4	Family History	No Family History of Disease = 0, Family History of Disease = 1
X5	Age	≤39 = 1, 40~54 = 2, ≥55 = 3
X6	Stressful Life Events	None = 0, Present = 1
X7	Qi Depression Type	No = 0, Yes = 1
X8	Phlegm-Dampness Type	No = 0, Yes = 1
X9	Qi Deficiency Type	No = 0, Yes = 1
X10	Blood Stasis Type	No = 0, Yes = 1
X11	Yin Deficiency Type	No = 0, Yes = 1
X12	Yang Deficiency Type	No = 0, Yes = 1
X13	Abnormal Physique Type	No = 0, Yes = 1
X14	Damp-Heat Type	No = 0, Yes = 1
X15	Neutral Type	No = 0, Yes = 1
X16	EPQ-N	Scale Score
X17	EPQ-E	Scale Score
X18	EPQ-P	Scale Score
X19	EPQ-L	Scale Score
X20	Positive Coping Score	Scale Score
X21	Negative Coping Score	Scale Score
X22	Objective Support Score	Scale Score
X23	Subjective Support Score	Scale Score
X24	Support Utilization Rate	Scale Score
X25	Total Social Support Score	Scale Score

Table 2. Univariate logistic regression analysis.

Related Factors	χ^2	P	OR	95% CI
Gender	4.0389	0.0445	0.471	0.226 - 0.982
Qi Deficiency Type	9.6099	0.0019	6.257	1.963 - 19.948
Neutral Type	7.0119	0.0081	0.172	0.047 - 0.633
Positive Coping	13.0166	0.0003	0.322	0.174 - 0.596
Negative Coping	15.0606	0.0001	5.508	2.327 - 13.038
Total social support	14.7493	0.0001	0.479	0.329 - 0.698
Stressful Life Events	45.8653	<0.0001	32.500	11.867 - 89.008

5.1.2. Multivariate Logistic Regression Analysis

The intercept was included in the model, and the model's convergence status was satisfactory when the relative gradient convergence criterion was set at IE-8. The residual Chi-square (χ^2) test result showed a χ^2 value of 110.570, with $P \leq 0.0001$, indicating that the result is statistically significant. During the stepwise selection process of independent variables, negative coping scores and stressful life events were sequentially entered into the model. From the analysis of standardized regression coefficients, it was found that the negative coping score had a greater impact on the model. Stressful life events were highly associated with the incidence of gallstones, with individuals experiencing stressful life events having an incidence rate 59 times higher than that of the general population. The results are shown in Table 3.

Table 3. Multivariate logistic regression analysis.

Risk Factors	χ^2	P	OR	95% CI
Negative coping score	10.884	0.001	5.989	2.068 - 17.346
Stressful Life Events	7.018	0.008	59.016	2.889 - 999.999

5.2. Analysis of the Distribution Frequency of Patient Constitutions

5.2.1. Overall Distribution Patterns of Patient Constitutions

Compared to the normal group, the frequency of patients with Qi stagnation constitution in the study group was significantly increased, showing a notable difference ($P < 0.001$); the frequencies of Yin deficiency constitution and balanced constitution in the study group were significantly decreased compared to the normal group, with statistical differences ($P < 0.05$, $P < 0.001$). There were no significant differences in other constitution types between the study group and the normal group ($P > 0.05$). See Table 4.

Table 4. Distribution of constitution types comparison (n = 180).

Group	Research Group	Normal Group	χ^2	P
Qi Depression	111	12	44.840	<0.0001
TypePhlegm-Dampness Type	9	18	1.081	0.299
Qi Deficiency Type	21	21	0.000	1
Blood Stasis Type	9	12	0.152	0.694
Yin Deficiency Type	3*	21	4.821	0.028
Yang Deficiency Type	9	6	0.210	0.647
Abnormal Physique Type	0	0	0.000	1.000
Damp-Heat Type	12	33	3.733	0.053
Neutral Type	6	57	16.681	<0.0001

5.2.2. Distribution Patterns of Constitutions among Different Age Groups of Patients

There were 102 cases in the youth group, 42 cases in the middle-aged group, and 36 cases in the elderly group. In the normal group, there were 48 cases in the youth group, 69 cases in the middle-aged group, and 63 cases in the elderly group. When comparing the youth group with the normal group, $\chi^2 = 11.109$, P = 0.0009, indicating a significant difference (P < 0.01). In the analysis of the frequency of constitutional types in the youth and middle-aged groups of the study group, the chi-square test showed no significant differences; however, there were significant differences in the Yang deficiency constitution in the elderly group compared to the youth group and middle-aged group (P < 0.01, P < 0.05). See Table 5.

Table 5. Distribution of constitutions among different age groups of patients (%).

	Qi Depression Type	Phlegm-Dampness Type	Qi Deficiency Type	Blood Stasis Type	Yin Deficiency Type	Yang Deficiency Type	Abnormal Physique Type	Damp-Heat Type	Neutral Type
Youth	55.9	5.9	14.7	5.9	2.9	0.0	0.0	11.8	2.9
Middle-aged	78.6	0.0	7.1	7.1	0.0	0.0	0.0	0.0	7.1
Elderly	58.3	8.3	8.3	0.0	0.0	25.0	0.0	0.0	0.0

5.2.3. Distribution of Physical Constitution Types among Patients of Different Genders

There were 117 male patients and 63 female patients; in the normal group, there were 84 males and 69 females. A chi-square test showed $\chi^2 = 4.0890$, P = 0.0432, indicating significant differences (P < 0.05). However, there were no significant differences in the distribution of physical constitution types between different genders (P > 0.05). See Table 6.

Table 6. Distribution of physical constitution types among patients of different genders (%).

Gender	Qi Depression Type	Phlegm-Dampness Type	Qi Deficiency Type	Blood Stasis Type	Yin Deficiency Type	Yang Deficiency Type	Abnormal Physique Type	Damp-Heat Type	Neutral Type
Male	66.7*	7.7	10.3	2.6	0.0	7.7	0.0	5.1	0.0
Female	52.4	0.0	14.3	9.5	4.8	0.0	0.0	9.5	9.5

5.2.4. Distribution of Physical Constitution Types among Patients of Different Professions

In the study group, there were 111 intellectual laborers and 69 manual laborers; in the normal group, there were 93 intellectual laborers and 87 manual laborers. Compared between the two groups, there were no significant differences (P > 0.05). When comparing the Qi-Stagnation type among intellectual laborers and manual laborers in the study group, the result was $\chi^2 = 6.8467$, P = 0.012, indicating significant differences (P < 0.05). See Table 7.

Table 7. Distribution of physical constitution types among patients of different professions (%).

Occupation	Qi Depression Type	Phlegm-Dampness Type	Qi Deficiency Type	Blood Stasis Type	Yin Deficiency Type	Yang Deficiency Type	Abnormal Physique Type	Damp-Heat Type	Neutral Type
Intellectual	68.8	3.1	9.4	3.1	3.1	3.1	0.0	9.4	0.0
Manual	53.6	7.1	14.3	7.1	0.0	7.1	0.0	3.6	7.1

6. Discussion

6.1. General Distribution of Patient Constitutions

Constitution refers to the relatively stable characteristics displayed by individuals in terms of morphology, physiological function, and psychological activity, determined by hereditary and acquired factors during their life process [4]. Traditional Chinese medicine theory posits that form and spirit are a unified whole; specific morphological structures consistently exhibit certain psychological tendencies, while the functional activities of different organs correspondingly manifest specific emotions, emotional responses, and cognitive activities. This study found that among 180 patients surveyed, there were 111 cases of Qi stagnation constitution, 21 cases of Qi deficiency constitution, 9 cases of blood stasis constitution, 3 cases of Yin deficiency constitution, 9 cases of Yang deficiency constitution, 12 cases of damp-heat constitution, and 6 cases of Balanced Constitution. The age distribution included 102 in the youth segment, 42 in the middle-aged segment, and 36 in the elderly segment; there were 117 males and 63 females, with 111 engaged in intellectual labor and 69 in physical labor. Compared to the normal control group, the frequency of Qi stagnation constitution in the research group was significantly higher ($P < 0.001$). The frequencies of Yin deficiency constitution and Balanced Constitution in the research group were significantly lower compared to the normal control group ($P < 0.05$, $P < 0.001$). No significant differences were found in other constitutional types between the research group and the normal control group ($P > 0.05$). These results suggest that Qi stagnation is a latent constitution in patients with gallbladder stone disease, while harmonious and Yin deficiency constitutions exhibit a lower tendency for disease onset.

6.2. Distribution of Constitution Types by Age Groups

Different physiological characteristics associated with various age stages also correspond to different constitutional traits. The researchers surveyed 100 adults and found that the balanced constitution was more prevalent among young adults, while imbalances in Yin and Yang were more common in middle-aged individuals, particularly with a predominance of Yin deficiency over Yang excess [5]. This study found that the youth stage (≤39 years) was the most frequent age for research, likely due to this age group being at the peak of their careers, facing significant work pressure and numerous life stressors, leading to frequent stressful life events. Physiologically, this age group has abundant Qi and blood, and strong righteous Qi, making them susceptible to developing a latent Qi stagnation

constitution.

The Chi-square test on the frequency distribution of constitution types across different age groups indicated no significant differences in the distributions between youth and middle-aged groups, while the elderly group exhibited a significant difference in Yang deficiency compared to the youth and middle-aged groups ($P < 0.01$, $P < 0.05$), suggesting broader distribution of Yang deficiency constitution in elderly patients.

6.3. Distribution of Constitution Types by Gender

Due to differences in genetic traits, body morphology, organ structure, and other factors, men and women also exhibit distinct physiological functions and psychological characteristics, leading to gender differences in constitution. This affects emotional traits and directly influences the incidence, pathogenesis, and treatment of diseases. Wang Na analyzed the constitution characteristics of 2967 cases using clustering research and examined the differences between genders [6]. The findings indicated numerous differences in constitution between men and women, with women generally exhibiting more deficiency, imbalance, and disordered constitutions, particularly with deficiencies in essence and blood. Zhang Huimin and others surveyed 395 individuals aged over 16 in urban, town, and rural populations of Beijing regarding Qi deficiency constitution distribution. The results showed that women were more likely than men to exhibit Qi deficiency constitution.

This study suggests that in terms of incidence, men exhibit a higher prevalence than women, possibly due to greater societal responsibility and roles that are less favorable for psychological counseling, leading to the accumulation of negative emotions such as frustration and sadness, which contributes to Qi stagnation. The frequency distribution of constitution types between different genders showed no significant differences according to the Chi-square test, indicating that the distribution of constitution types in the research patients is basically the same across genders.

6.4. Distribution of Constitution Types by Occupation

Different occupational groups have distinct working characteristics and psychological traits, resulting in relatively stable constitutions over time, which leads to varying disease susceptibility across people of different occupations and education levels. For instance, those engaged in manual labor with lower educational backgrounds may face exhaustion and economic challenges, leading to various health issues; conversely, those engaged in intellectual work and with higher education may become weakened due to excessive mental strain and lack of exercise.

This study indicates that in terms of incidence, occupational factors do not significantly correlate with the diseases under study. However, it was found that among intellectual laborers, the frequency of Qi stagnation constitution was significantly higher compared to physical laborers ($P < 0.05$), suggesting a broader

distribution of Qi stagnation constitution among intellectual laborers.

In summary, the Qi stagnation constitution is a latent predisposition for gallstone disease, while the balanced constitution and Yin deficiency constitution have a lower tendency for onset; it is commonly found among young males engaged in mental labor.

6.5. Limitations of the Study

Despite obtaining some meaningful results, the current study also has several limitations that may affect the reliability and applicability of the findings:

Selection Bias: The sample was sourced from a single healthcare institution, which may introduce selection bias. The representativeness of the sample is limited, and it may not fully reflect the distribution of constitutions among gallstone disease patients nationwide or in broader populations.

Recall and Information Bias: The data for this study were primarily collected through questionnaires and clinical records, which can introduce recall bias and information bias. Self-reported data, in particular, may be affected by the respondents' memory and personal interpretation, potentially compromising the accuracy of the data.

Unidentified or Uncontrolled Confounding Factors: Although we attempted to control for some confounding factors in our analysis, there may still be unidentified or uncontrolled confounders such as dietary habits and living environment that could influence the study outcomes. These factors might confound the relationships observed in the study, affecting the validity of the conclusions.

Funding

Guangxi Key R&D Program: Standardized Research on Diagnosis and Treatment of Advantageous Diseases in the Jing Ethnic Group (Gui Ke AB21196013); Exploration of Diagnostic and Treatment Techniques for Advantageous Diseases in the Jing Ethnic Group and Development of Formulations by the "Jing Medical and Nursing Gastroenterology Eight Directions" Medical Institutions (Gui Ke AB23026064).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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