

Meta-analysis of Influencing Factors of Psychological Distress in Patients with Enterostomy

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Abstract: *Objective:* To explore the factors affecting the psychological pain of patients with enterostomy through meta-analysis, with the aim of reducing psychological pain and improving patients' quality of life. *Methods:* Published literature on psychological pain in enterostomy patients was retrieved from Chinese and English databases, including CNKI, Wanfang, VIP, China Biomedical Network, PubMed, Embase, Ovid, and Web of Science. The search period covered the establishment of the databases until October 2024. Literature was screened based on inclusion and exclusion criteria, and its quality was evaluated. Data analysis was performed using R Studio software. *Results:* A total of 2,237 articles involving 1,221 patients with enterostomy and 11 influencing factors were identified. The results of the meta-analysis indicated that age, marital status, ostomy complications, self-care ability, pain severity, and sleep quality were the primary contributors to psychological distress. *Conclusion:* Multiple factors influence psychological pain in enterostomy patients. Medical staff should prioritize addressing these factors to alleviate psychological pain and enhance patients' quality of life.

Keywords: Enterostomy; Psychological pain; Influencing factors; Meta-analysis

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1. Introduction

Enterostomy, also referred to as an artificial anus, is a commonly employed procedure in the treatment of Crohn's disease, ulcerative colitis, colorectal cancer, and other conditions ^[1]. Globally, the number of patients requiring enterostomy is substantial. In China alone, the number of patients with enterostomies has exceeded one million and continues to grow ^[2,3]. Following enterostomy, patients often face issues such as changes in body image, odor, and postoperative complications, which contribute to feelings of stigma and varying levels of psychological pain ^[4,5].

Psychological pain represents a significant challenge for patients with enterostomy. It is characterized as an unpleasant emotional experience triggered by various factors and is recognized by the NCCN as the "sixth vital sign," following pain ^[6]. The WCET International Ostomy Guide highlights that psychological pain negatively impacts patients' quality of life, with heightened negative emotions exacerbating psychological pain and further impairing quality of life ^[7].

Healthcare professionals must focus on the factors contributing to psychological pain in enterostomy patients. While existing research has examined these influencing factors, discrepancies among findings persist. Additionally, no meta-analyses have been conducted to comprehensively investigate the factors influencing psychological pain in this patient population.

Therefore, this study employs meta-analysis to identify and evaluate the influencing factors of psychological pain in patients with enterostomy. The findings aim to guide clinical practices in addressing psychological pain and implementing effective interventions to improve patient's quality of life.

2. Materials and methods

2.1. Sources of data

Chinese and English databases, including CNKI, Wanfang, VIP, China Biomedical Network, PubMed, Embase, Ovid, and Web of Science, were searched. The search period spanned from the establishment of the databases to October 2024. The search strategy combined subject terms and free terms. The Chinese search terms included “enterostomy, enterostomy,”; “psychological pain, psychological distress, emotional distress,”; and “influencing factors, correlating factors, risk factors, correlations, etc.” The English search terms included “colostomy, stoma”; “psychological distress, distress syndrome, emotional distress, related factors, and cross-sectional study.”

2.2. Literature inclusion and exclusion criteria

Inclusion criteria:

- (1) Study subjects: patients over 18 years old with enterostomy;
- (2) Type of study: cross-sectional study;
- (3) Research tool: psychological pain thermometer;
- (4) Outcome index: influencing factors of psychological pain.

Exclusion criteria:

- (1) Non-Chinese and non-English literature;
- (2) Conference papers, dissertations, reviews, etc.;
- (3) Studies where the full text was unavailable;
- (4) Studies that did not report the influencing factors of patients' psychological distress.

2.3. Literature screening, quality evaluation, and data extraction

The literature was imported into EndNote X20 software, and duplicate entries were removed. Titles and abstracts were then reviewed, followed by a detailed selection of studies meeting the inclusion criteria. This study adopted the cross-sectional research criteria of the JBI Evidence-Based Health Care Center^[8]. Quality evaluation was conducted using four dimensions: “yes,” “no,” “unclear,” and “not applicable.” The extracted data included the first author, year of publication, region, type of study, assessment tool, average age, sample size, influencing factors, OR value/B value, and 95% CI.

2.4. Statistical processing

Meta-analysis was performed using R Studio software. The I^2 value was used to assess the heterogeneity of the included studies. If $P > 0.1$ and $I^2 \leq 50\%$, the studies were considered to have good homogeneity and a fixed-effect model was applied to integrate the influencing factors. For studies with heterogeneity, a random-effect model was

used. In cases of heterogeneity, sensitivity analysis was conducted to identify its root cause.

3. Results

3.1. Literature search results

The database search yielded a total of 2237 articles, including 40 from CNKI, 1846 from Wanfang, 13 from VIP, 37 from the China Biomedical Network, 19 from PubMed, 81 from Web of Science, 212 from Embase, and 68 from Ovid. After stepwise screening, six papers^[9-14] were ultimately included. The process of literature screening is illustrated in **Figure 1**.

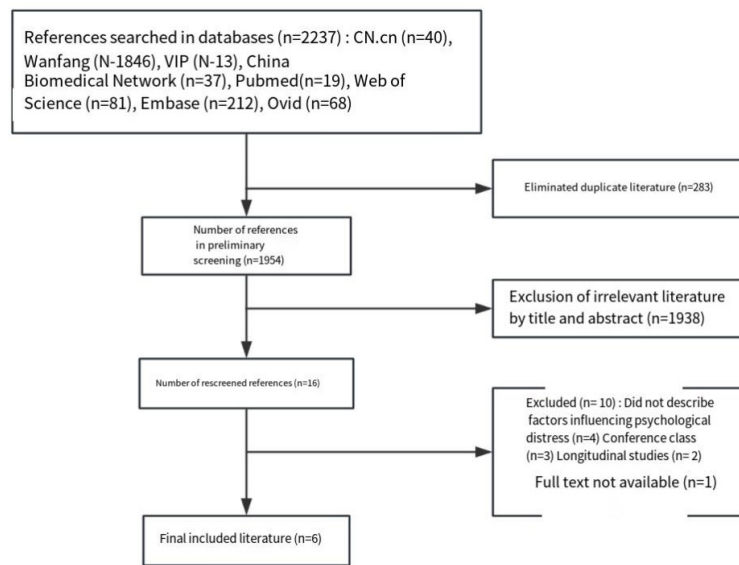


Figure 1. Literature screening flow chart

3.2. Basic characteristics of included literature

Six cross-sectional studies were included in this meta-analysis, involving a total of 1221 patients with enterostomy. The basic characteristics of the included literature are detailed in **Table 1**.

Table 1. Basic characteristics of the included literature

Included studies	Years	Survey area	Assessment tools	Average age (years)	Sample size	Influencing factors
Mou Qianqian ^[9]	2018	Sichuan	Psychological pain thermometer	53.30 ± 11.60	137	②⑦
Liu Xin ^[10]	2019	Guangxi	Psychological pain thermometer	52.80 ± 10.09	180	③⑤⑥⑧
Shi Yanping ^[11]	2019	Henan	Psychological pain thermometer	61.00 ± 9.00	112	①③④⑤⑩
Jing Min ^[12]	2020	Hebei	Psychological pain thermometer	63.96 ± 11.08	86	①②⑥⑦
Wang Airu ^[13]	2020	Sichuan	Psychological pain thermometer	-----	146	②⑥⑦
Wu Wei ^[14]	2020	Harbin	Psychological pain thermometer	56.23 ± 8.35	560	①④⑤⑦⑨⑩

Note: ① Age; ② Marital status; ③ Education; ④ Family income; ⑤ Ostomy complications; ⑥ Ostomy self-care ability; ⑦ Pain level; ⑧ Carer; ⑨ Psychological status; ⑩ Sleep status; ⑪ Personality.

3.3. Quality evaluation

The selected studies were determined to be of high quality. The quality evaluation results are presented in **Table 2**.

Table 2. Quality evaluation of included studies

Included studies	①	②	③	④	⑤	⑥	⑦	⑧
Mou Qianqian ^[9]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Liu Xin ^[10]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shi Yanping ^[11]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jing Min ^[12]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wang Airu ^[13]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wu Wei ^[14]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: ① Are the inclusion criteria of the subjects clearly defined? ② Are the research objects and research sites described in detail? ③ Were exposure factors measured using valid and reliable methods? ④ Are objective and standardized methods used to measure health problems? ⑤ Are confounding factors identified? ⑥ Are measures taken to control confounding factors? ⑦ Are effective and credible methods used to measure outcome indicators? ⑧ Is the data analysis method appropriate?

A meta-analysis was conducted on the influencing factors identified in the included studies. Eight influencing factors with effect sizes that could be synthesized were extracted. The results revealed good homogeneity for marital status and sleep status ($I^2 < 50\%$). For these factors, the fixed-effect model was employed, and significant differences were observed ($P < 0.05$). In contrast, high heterogeneity ($I^2 > 50\%$) was identified for age, education level, family income, ostomy complications, ostomy self-care ability, and pain level. For these factors, the random-effects model was applied. Significant differences were found for age, ostomy complications, ostomy self-care ability, and pain level ($P < 0.05$), while education level and family income did not show significant differences ($P > 0.05$). Sensitivity analysis indicated stable results for all influencing factors.

Table 3. Meta-analysis results of influencing factors of psychological distress in enterostomy patients

Influencing factors	Number of articles	Heterogeneity test		Effect model	Meta-analysis		Sensitivity analysis
		I^2 (%)	P value		OR (95% CI)	P value	OR (95% CI)
Age	3 ^[11,12,14]	76.1	0.015	Random	0.05 (0.01; 0.17)	0.001	0.03 (0.02; 0.04)
Marital status	3 ^[9,12,13]	0.0	0.969	Fixed	0.23 (0.13; 0.41)	0.001	0.23 (0.13; 0.41)
Literacy	2 ^[10,11]	86.6	0.006	Random	0.84 (0.44; 1.57)	0.575	0.96 (0.79; 1.17)
Household income	2 ^[11,14]	91.7	0.001	Random	0.65 (0.03; 15.77)	0.354	0.65 (0.26; 1.62)
Ostomy complications	3 ^[10,11,14]	70.5	0.034	Random	6.40 (1.92; 21.38)	0.003	4.94 (2.84; 8.59)
Ostomy self-care ability	3 ^[10,12,13]	82.4	0.003	Random	3.77 (1.74; 8.18)	0.001	5.48 (4.15; 7.23)
Pain level	4 ^[9,12-14]	91.3	0.001	Random	5.70 (2.11; 15.42)	0.001	5.52 (4.32; 7.06)
Sleep status	2 ^[11,14]	0.0	0.846	Fixed	3.58 (1.69; 7.57)	0.001	3.58 (1.69; 7.57)

4. Discussion

4.1. General factors

This study found that the age of patients with enterostomy was associated with psychological distress. Specifically, as age increases, the degree of psychological distress tends to decrease. This finding is consistent with the results reported by Wu *et al.* ^[14], which may be attributed to the stronger psychological endurance of older individuals ^[12]. The influence of marital status on psychological distress was statistically significant. Multiple studies have indicated that the higher incidence of psychological distress among unmarried patients, compared to married patients, may be related to their experience of significant illness events at an early stage in life, changes in body image, excessive concern about how others perceive them, and a lack of emotional support ^[9,12,13]. The meta-analysis conducted in this study showed that the combined results for education level and total household income were not statistically significant.

4.2. Ostomy complications

The incidence of enterostomy complications in China is reported to be as high as 53.8% ^[15]. This study demonstrated that ostomy complications significantly impact the psychological distress of patients, indicating that complications increase the risk of psychological distress. In other words, patients with ostomy complications tend to experience a higher level of psychological distress. This may be attributed to the fact that the occurrence of complications further increases the economic burden on patients, a finding that aligns with the results of Shi *et al.* ^[11]. Therefore, healthcare professionals should prioritize the prevention and management of postoperative complications to alleviate psychological distress among patients.

4.3. Self-care ability of ostomy

The effect of ostomy self-care ability on psychological distress was found to be statistically significant in this study. Patients with higher self-care abilities exhibited a lower incidence of psychological distress and an improved quality of life ^[13,14]. This indicates that self-care ability plays a crucial role in reducing psychological distress among patients with enterostomy.

4.4. Pain level

The findings of this study suggest that pain is closely associated with the occurrence of psychological distress. The risk of psychological distress increases with the severity of pain. Persistent pain can exacerbate psychological distress, thereby negatively affecting the quality of life ^[14]. Healthcare professionals should strengthen the assessment of patients' pain levels and implement effective interventions promptly to alleviate pain, reduce psychological distress, and enhance the overall quality of life.

4.5. Sleep status

The results of this study indicate that sleep status is significantly related to psychological distress, with patients experiencing sleep disorders having a higher incidence of psychological distress. Sleep disorders can lead to anxiety, depression, and other adverse emotions, which, in turn, exacerbate psychological distress, weaken immune function, and accelerate disease progression ^[16]. The research by Cui *et al.* ^[17] similarly highlights that excessive psychological stress can cause insomnia, leading to anxiety and depression, and subsequently intensifying psychological distress. Therefore, healthcare professionals should address sleep-related issues among patients

with enterostomy. Effective interventions should be implemented for patients with sleep disorders to alleviate psychological distress.

Psychological distress is a common condition among patients with enterostomy^[18]. The study by Chen *et al.*^[19] reported that the overall detection rate of psychological distress in such patients was as high as 56.8%. In the current study, a meta-analysis was conducted, revealing that the degree of psychological distress is influenced by factors such as age, marital status, complications, self-care ability, pain severity, and sleep status.

4.6. Limitations

While previous studies have systematically evaluated psychological distress in patients with enterostomy, these studies primarily focused on detection rates and did not thoroughly assess the influencing factors. Consequently, this study has some limitations. First, the included studies are generally of high quality but are all cross-sectional, which may affect the reliability of the results. Second, there is a limited number of original studies on factors influencing psychological distress in enterostomy patients, potentially affecting the accuracy of the findings. Lastly, only studies that provided odds ratios (ORs) and 95% confidence intervals were included, and the limited number of studies prevented subgroup analyses and publication bias detection.

5. Summary

This study identified age, marital status, ostomy complications, ostomy self-care ability, pain severity, and sleep status as the primary factors contributing to psychological distress among patients with enterostomy. Currently, the prevalence of psychological distress in patients with enterostomy remains high but has not received sufficient attention. It is essential for healthcare professionals to recognize these contributing factors and implement measures to reduce the incidence of psychological distress among patients.

Disclosure statement

The authors declare no conflict of interest.

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