Original Research Article

Effect of peri-operative whole high-quality nursing care on psychological status, vital signs and anesthetic medication of patients undergoing painless gastrointestinal endoscopy: A systematic review and meta-analysis

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Abstract

Purpose: To investigate the impact of perioperative whole high-quality nursing care on psychological status, vital signs and anesthetic medication of patients undergoing painless gastrointestinal endoscopy, and also to provide a reference for reducing adverse risks and improving safety of painless gastrointestinal endoscopy.
Methods: Databases such as Pubmed, Embase, Web of Science, and Cochrane Library were retrieved. Literature was selected based on established standards, and quality evaluations were performed to extract required data. Finally, 13 pieces of literature were included for meta-analysis of relevant data.
Results: In a meta-analysis of 13 relevant randomized controlled trials (RCTs), patients receiving high-quality perioperative nursing care experienced significant improvements in self-reported anxiety and depression levels, vital signs indicators such as systolic and diastolic blood pressure, mean arterial pressure, and heart rate, as well as decrease in narcotic drug dosage. Diagnosis and treatment time also significantly decreased (p < 0.05). Additionally, the incidence of respiratory depression was reduced (p < 0.00001).
Conclusion: This meta-analysis suggests that perioperative high-quality nursing care alleviates the psychological stress of patients with painless gastrointestinal endoscopy, reduces the amount of anesthesia, and effectively reduces application time of endoscopy.

Keywords: Perioperative whole high-quality nursing, Painless gastrointestinal endoscopy, Anesthesia, Meta-analysis, Systematic review

INTRODUCTION

Digestive endoscopy is a major method used to diagnose digestive tract diseases in recent years [1,2]. Because, painless gastroscopy combined with enteroscopy has a painless feeling, only one anesthetic is needed for two kinds of examinations. Pathological conditions of stomach

and colon are obtained once through gastroscopy, which reduces pain and other discomfort of examinees [3,4]. Painless gastroscopy has gradually played a significant role in clinical practice. However, because most examinees do not understand basic knowledge and precautions about painless gastroscopy, (which is an invasive examination method), it leads to psychological stress reaction, restlessness, anxiety, and even fear [5]. It also promotes physical stress reaction of examinee. Two kinds of stress reactions affect and interact with each other, which aggravates their compound stress reaction. At the same time, negative emotions such as anxiety seriously affect examination and recovery [6,7]. Painless gastroscopy takes a long time to operate and is needed to inject more anesthetic drugs, resulting in a high incidence of respiratory depression in patients [8].

During perioperative period, high-quality nursing should be implemented, and basic situation of the patient before examination should be understood, key points for attention explained, one-to-one psychological counseling be conducted, and a friendly nurse-patient relationship should be established, which lays a firm foundation for smooth examination. During examination, strengthening observation of vital signs, psychological conditions, and changes in consciousness, while actively communicating with patients significantly improves sense of security, and eases their tension, doubts, and other negative emotions. It is important to prevent and reduce adverse events by allowing patients to leave after confirming their vital signs, and recovered consciousness [9-13].

Therefore, the impact of peri-operative quality of nursing care on psychological status, vital signs and anesthetic medication of patients undergoing painless gastrointestinal endoscopy was investigated in order to provide reference for reducing adverse risks and improving safety of painless gastrointestinal endoscopy.

METHODS

Inclusion criteria

Case-control studies or cohort studies, English literature related to psychological state, vital signs, and impact of anesthetic drugs in painless gastroscopy patients in various databases, patients who received high-quality nursing treatment throughout the peri-operative period (referred to as study group), patients who received routine nursing treatment (referred to as control group). There was no significant difference in general information between study and control groups.

Exclusion criteria

Conference papers, meta-analyses, case studies, reviews, repeated publications, animal experiments, thesis, etc., unclear research indicators or lack of raw data, and uncontrolled retrospective study.

Search strategy

All literature published from January 31, 2010 to April 30, 2023 in databases such as Pubmed, Embase, Cochrane Library, and Web of Science were retrieved. The search strategy and keywords were as follows: ("high quality of nursing care" or "nursing care"); ("painless gastrointestinal endoscopy" or "Gastrointestinal endoscopy"), and ("anesthetic" or "vital signs") (Figure 1).

Data extraction and quality assessment

Data extraction was conducted on 13 included studies, including; basic information (first author, region, publication year, and research design type), and clinical observation indicators (various research indicators and number of cases) (Figure 2).
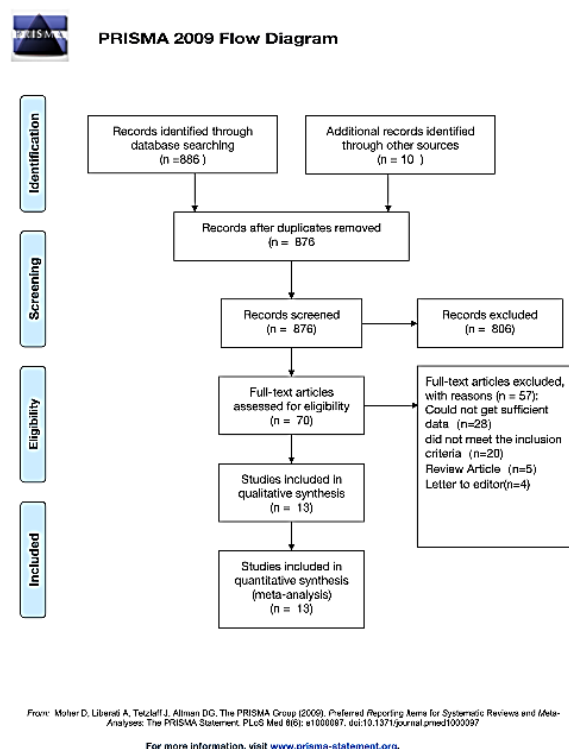
Figure 1: Flow diagram of literature search procedure
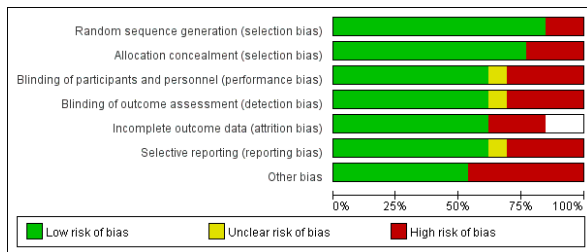
Figure 2: The risk of bias in randomized trials included in the meta-analysis

Statistical analysis

Review Manager 5.4 was used for statistical analysis. When merging effect quantities, odds ratio (OR) and its 95 % confidence interval (CI) were used. For heterogeneity testing, when $I^2 < 50$ %, it is considered homogeneity, and a fixed effects model is selected. When $I^2 \geq 50$ %, heterogeneity exists, and random effects model was selected to conduct subgroup analysis and identify source of heterogeneity.

RESULTS

Flow chart of study selection

As of April 30, 2023, a total of 896 articles were retrieved from databases and imported into Endnote X9 software. A total of 806 duplicate articles were screened out. After reading title and abstract, 70 pieces of literature that did not match the content were screened out. Finally, a total of 13 [14-26] were included for meta-analysis (Table 1).

Pooled analysis

Meta-analysis of data from thirteen eligible studies [14-26] showed that levels of Self Rating Anxiety Scale (SAS) were significantly improved in patients with peri-operative high-quality nursing care (random effect model, SMD = -2.62 95 % CI= -3.5, - 1.75 (Figure 3). Furthermore, Self-Rating Depression Scale (SDS) levels were also significantly improved in patients with peri-operative high-quality nursing care (random effect model, SMD = -13.87, 95 % CI = -16.54, -11.2 (Figure 4). This indicated that peri-operative whole high-quality nursing care ameliorated the psychological status of patients undergoing painless gastrointestinal endoscopy.

Meta-analysis of data from thirteen eligible studies [14-26] also showed that vital signs indices (systolic and diastolic blood pressure, mean arterial pressure, and heart rate) were significantly improved in patients with peri-operative whole high-quality nursing care (Figure 5).

Furthermore, meta-analysis of data from thirteen eligible studies [14-26] also showed that dose of narcotic drugs was significantly decreased in patients with peri-operative whole high-quality nursing care (random effect model, SMD = -10.98, 95 % CI = -12.74, - 9.22 (Figure 6). In terms of diagnosis and treatment time, meta-analysis showed that patients with peri-operative whole high-quality nursing care significantly decreased diagnosis and treatment time (random effect model, SMD = -9.16, 95 % CI = -13.04, - 5.29) (Figure 7). Also, meta-analysis of data from thirteen eligible studies [14-26] showed that the incidence of respiratory depression was significantly decreased in patients with peri-operative whole high-quality nursing care (random effect model, SMD = 0.19, 95 % CI = 0.1, 0.37 (Figure 8).
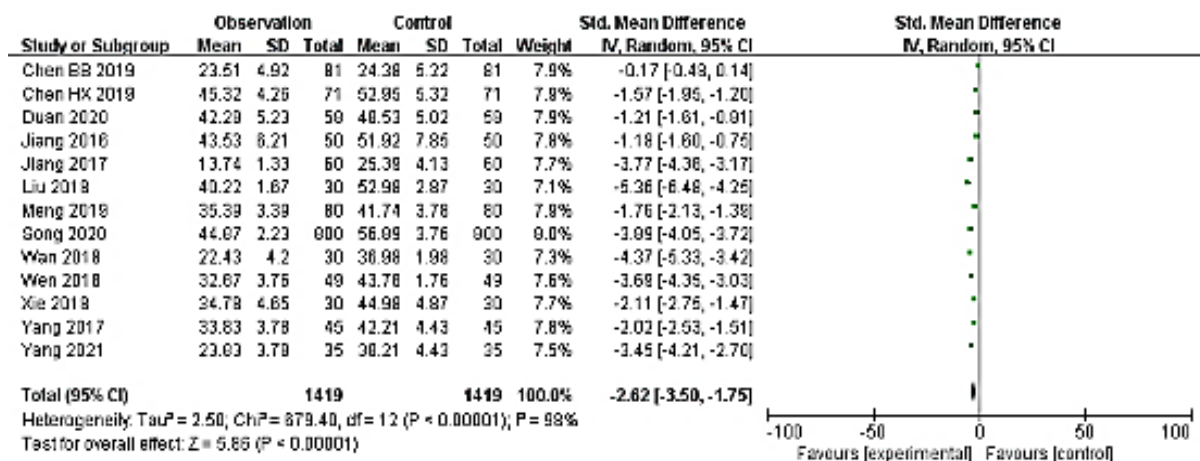
Figure 3: Meta-analysis on SAS in study group compared to control group

Table 1: Characteristics of studies in the meta-analysis

| Author (Year)	Country	Age (EG vs. CG) (Mean±SD)	Size EG/CG	Types of studies and intervention	Therapy (months)
Yang et al [14]	China	50.5±5.8 vs. 49.7±5.3	35/35	RCT comparing the use of perioperative whole high-quality nursing intervention (study group) + routine nursing intervention (Control group)	24
Duan et al [15]	China	72.85±4.66 vs. 72.93±4.72	58/58	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	17
Jiang [16]	China	36.41±3.42 vs. 36.82±3.51	60/60	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	12
Meng and Sun [17]	China	48.34±7.16 vs. 48.05±7.32	80/80	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	12
Chen and Li [18]	China	48.05±7.32 vs. 43.3±4.2	71/71	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	24
Chen and Chen [19]	China	58.26±1.97 vs. 58.34±4.62	81/81	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	24
Wen [20]	China	59.5±4.7 vs. 58.3±4.6	49/49	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	14
Xie [21]	China	39.56±10.77 vs. 39.00±10.55	30/30	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	16
Wan [22]	China	51.43±1.07 vs. 51.27±1.23	30/30	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	20
Yang [23]	China	55.21±4.43 vs. 56.17±4.53	45/45	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	12
Liu et al [24]	China	34.0±3.0 vs. 33.8±2.8	30/30	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	19
Song et al [25]	China	56.89±20.74 vs. 57.28±21.22	800/800	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	6
Jiang [26]	China	45.3±15.9 vs. 45.2±15.6	50/50	RCT comparing the use of perioperative whole high-quality nursing intervention (Observational group) + routine nursing intervention (Control group)	17
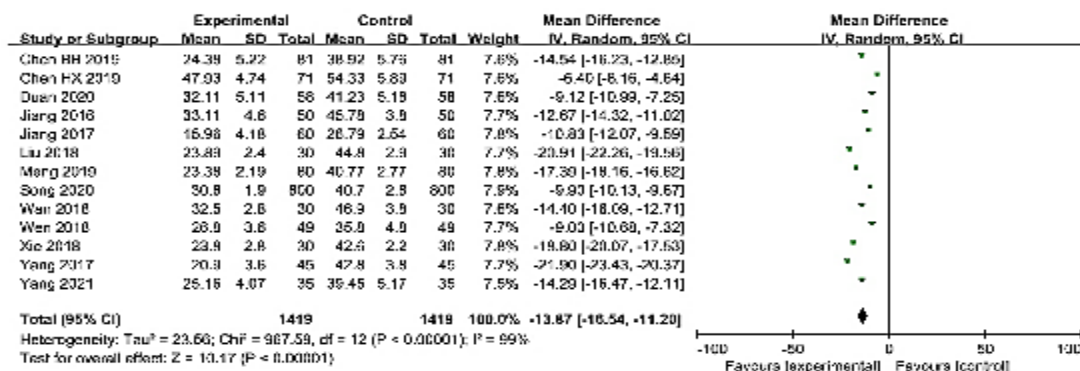
Figure 4: Meta-analysis of SDS in study group compared to control group
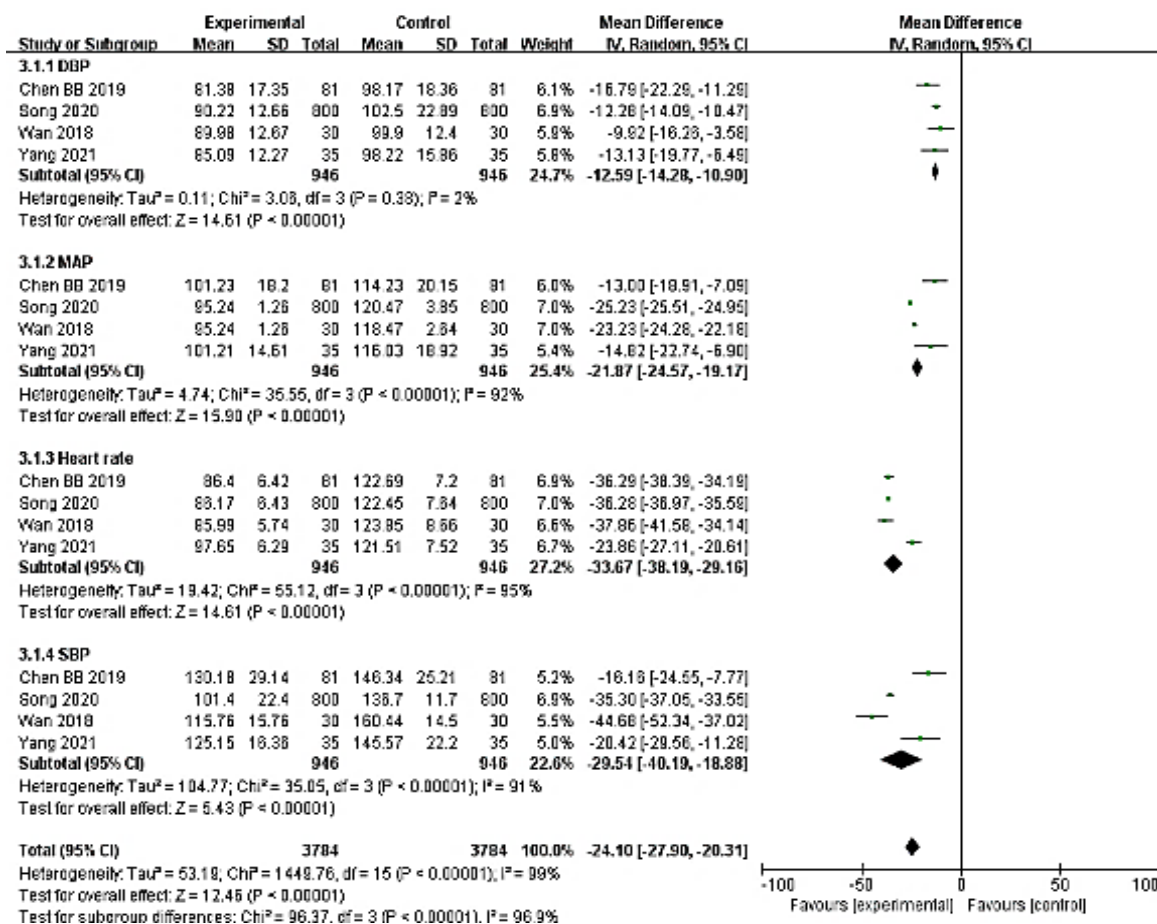

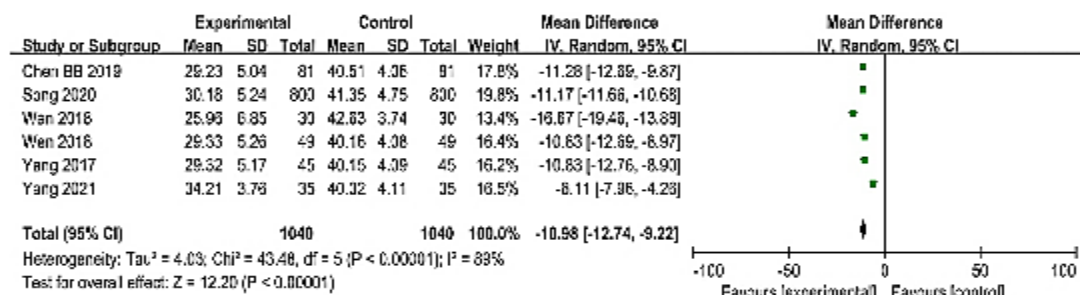**Figure 5:** Meta-analysis of vital signs in study group compared to control group

Figure 6: Meta-analysis of dose of narcotic drugs in study group compared to control group
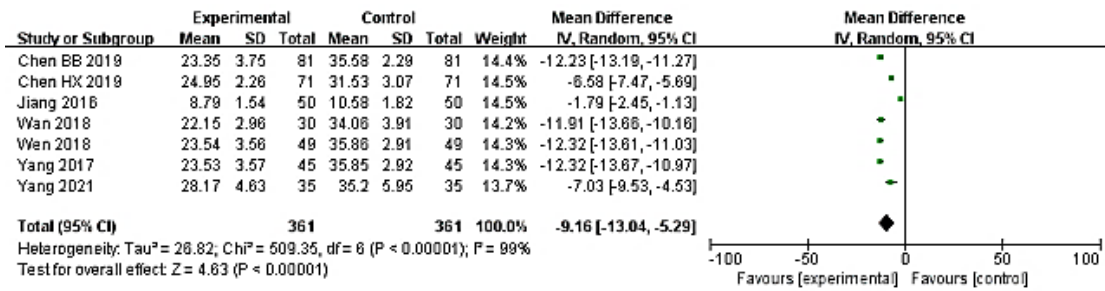
Study or Subgroup	Experimental			Control			Weight	Mean Difference IV, Random, 95% CI
	Mean	SD	Total	Mean	SD	Total		
Chen BB 2019	23.35	3.75	81	35.58	2.29	81	14.4%	-12.23 [-13.19, -11.27]
Chen HX 2019	24.95	2.26	71	31.53	3.07	71	14.5%	-6.58 [-7.47, -5.69]
Jiang 2016	8.79	1.54	50	10.58	1.82	50	14.5%	-1.79 [-2.45, -1.13]
Wan 2018	22.15	2.96	30	34.06	3.91	30	14.2%	-11.91 [-13.66, -10.16]
Wen 2018	23.54	3.56	49	35.86	2.91	49	14.3%	-12.32 [-13.61, -11.03]
Yang 2017	23.53	3.57	45	35.85	2.92	45	14.3%	-12.32 [-13.67, -10.97]
Yang 2021	28.17	4.63	35	35.2	5.95	35	13.7%	-7.03 [-9.53, -4.53]
Total (95% CI)			361			361	100.0%	-9.16 [-13.04, -5.29]

Heterogeneity: Tau² = 26.82; Chi² = 509.35, df = 6 (P < 0.00001); I² = 99%
Test for overall effect: Z = 4.63 (P < 0.00001)

Figure 7: Meta-analysis of diagnosis and treatment time in study group compared to control group

Study or Subgroup	Experimental		Control		Weight	Risk Ratio M-H, Fixed, 95% CI
	Events	Total	Events	Total		
Chen BB 2019	4	81	11	81	21.2%	0.36 [0.12, 1.09]
Chen HX 2019	1	71	7	71	13.5%	0.14 [0.02, 1.13]
Jiang 2016	2	50	4	50	7.7%	0.50 [0.10, 2.61]
Wen 2018	1	49	12	49	23.1%	0.08 [0.01, 0.62]
Yang 2017	1	45	13	45	25.0%	0.08 [0.01, 0.56]
Yang 2021	1	35	5	35	9.6%	0.20 [0.02, 1.63]
Total (95% CI)		331		331	100.0%	0.19 [0.10, 0.37]
Total events	10		52			

Heterogeneity: Chi² = 4.13, df = 5 (P = 0.53); I² = 0%
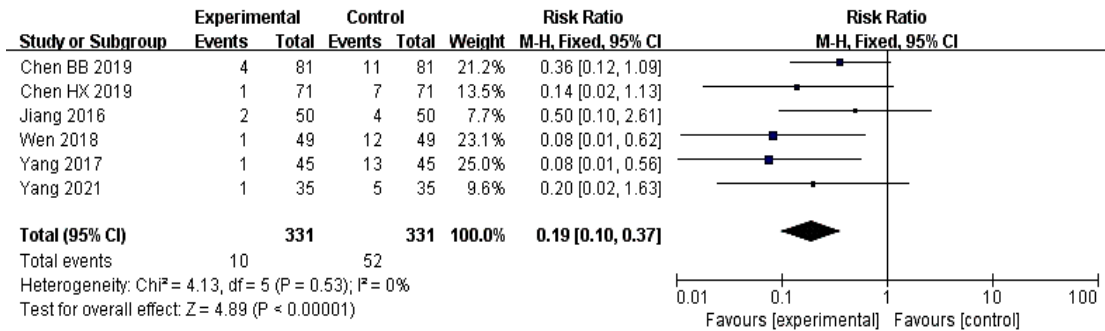Test for overall effect: Z = 4.89 (P < 0.00001)

Figure 8: Meta-analysis of the incidence of respiratory depression in study group compared to control group

Sensitivity analysis and publication bias

Sensitivity analysis revealed that after excluding various studies, merged results did not change, indicating that research results are relatively stable. On the other hand, the funnel plot of this study shows a symmetrical distribution, indicating no publication bias (Figure 9).
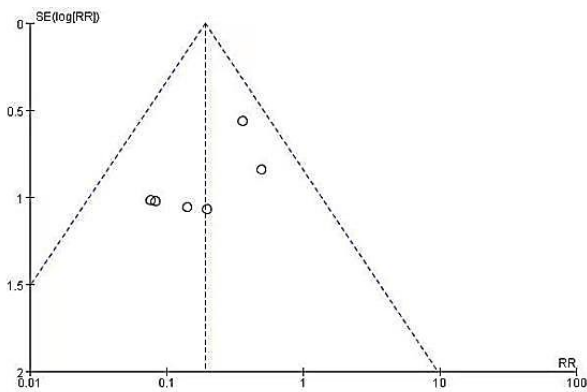
Figure 9: Funnel plot of data in the analysis of SAS

DISCUSSION

Gastrointestinal diseases are a common kind of diseases in clinics. With increased work pressure and changes in eating habits, the incidence rate of gastrointestinal diseases is increasing yearly [27]. Gastrointestinal endoscopy is often used in clinical diagnosis of gastrointestinal diseases, mainly to examine the condition of patients' gastrointestinal tract through gastrointestinal endoscopy for early diagnosis and timely intervention [28]. Traditional gastroenteroscopy is associated with a certain degree of pain. In addition, examination takes a long time, and some patients have resistance to gastroenteroscopy. Emergence of electronic painless gastroenteroscopy has therefore effectively reduced the pain of gastroenteroscopy, mainly by using anesthetic drugs to enable patients to be examined when they are asleep. Examination time is short, and there is no pain [29]. However, in process of electronic painless gastroenteroscopy, there are also some nursing risk factors. For example, patients refused to accept painless gastroscopy because they did not know about electronic painless gastroscopy before examination and were worried about the effects of anesthetic drugs on their bodies [30,31]. Therefore, reasonable nursing interventions should be implemented for patients when conducting electronic painless gastroscopy.

High-quality nursing takes patients as the center of nursing services, enhancing service quality level of overall nursing while intervening in basic nursing measures, penetrating systematic and high-quality nursing services in different stages before, during and after diagnosis and treatment [32]. Previous studies have confirmed that high-quality nursing significantly improved negative

psychological emotions of patients undergoing surgery and reduced stress reactions [33]. High-quality nursing adopted in this study was aimed at patients undergoing painless gastrointestinal endoscopy diagnosis and treatment. Before diagnosis and treatment, psychological, and emotional conditions, and problems of patients were analyzed in detail, and then a more targeted nursing intervention program was developed, which significantly reduced negative psychological emotions. At the same time, it also significantly enhanced awareness of painless gastrointestinal endoscopy diagnosis and treatment technology, thus improving compliance with diagnosis and treatment. In addition, during painless gastrointestinal endoscopy diagnosis and treatment, implementation of high-quality nursing intervention guided patients in choosing the appropriate posture and position, so that diagnosis and treatment effect is significant. After diagnosis and treatment, implementation of high-quality nursing helps to correctly address various nursing problems, such as avoiding overheated or excellent food, which significantly reduces the severity of damage to gastrointestinal mucosa [34,35].

Results of meta-analysis showed that SAS and SDS scores of patients in study group after nursing intervention were significantly lower than control group before and after nursing intervention. High-quality nursing significantly reduces negative psychological emotions with painless gastrointestinal endoscopy, such as anxiety and depression. Obvious improvement in negative psychological emotions also reduced stress reactions during diagnosis and treatment. Furthermore, results also revealed that SBP, DBP, MAP, heart rate and other vital signs in study group during diagnosis and treatment were significantly lower than control group, suggesting that high-quality nursing significantly inhibited stress response. Diagnosis and treatment operation also directly reflected a significant improvement in psychological emotion and stress reaction state. The study found that total amount of anesthetic drugs and incidence of respiratory depression in study group were significantly lower than control group. Also, the diagnosis and treatment duration of painless gastroscopy were significantly shorter in study group compared to control group. This suggests that high-quality nursing reduces trauma caused by painless gastroscopy and accelerates recovery speed after surgery. With longer painless gastrointestinal endoscopy, more anesthetic drugs will be needed in total, and risk of respiratory depression in patients will increase significantly [36].

High-quality nursing significantly reduced incidence of respiratory depression and improved the safety and reliability of diagnosis and treatment operations. In addition, close monitoring of relevant indicators of vital signs after diagnosis and treatment is needed, so as to effectively prevent and reduce incidence of various adverse reactions. It has been reported that most elderly patients are accompanied by chronic diseases such as hypertension, coronary heart disease and diabetes. These diseases accompanied by intravenous use of propofol and other drugs, easily result in complications such as decreased blood pressure, slow heart rate, respiratory depression, increased risk of diagnosis and treatment operations, and endanger life safety of patients [37].

CONCLUSION

Perioperative high-quality nursing intervention, through intra-operative nursing, reduces occurrence of respiratory depression, cough and other complications, as well as fluctuation in vital signs. It also encourages patients to go through hitch-less examination and treatment. The success rate of gastroenteroscopy significantly improves, and patients' safety is enhanced through post-operative nursing, including safety protection, disease observation, health guidance and other measures.

DECLARATIONS

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Ethical Approval

None provided.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Use of Artificial Intelligence/Large Language Models

None provided.

Use of Research Reporting Tools

None provided.

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