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Original Article

High-quality nursing benefits patients with emergency trauma undergoing surgical debridement and suturing and helps relieve pain

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Abstract: Objective: This study was designed to explore the clinical value of high-quality nursing in patients with emergency trauma undergoing surgical debridement and suture and its effects on pain relief. Methods: The clinical data of 181 patients with emergency trauma who received surgical debridement and suture in Shangrao Municipal Hospital from January 2020 to December 2021 were analyzed retrospectively. Among them, patients who received routine nursing were assigned to a control group (n=85), and those who received high-quality nursing were assigned to an observation group (n=96). The neurologic rating scale (NRS) was adopted to evaluate the pain in the two groups before operation and at 1 d, 3 d, and 7 d after the operation. The rescue time and examination time in the two groups were recorded and analyzed, and the effective rescue rate and postoperative complications of the two groups were compared. In addition, the MOS 36-item short-form health survey (SF-36) was employed to evaluate the quality of life (QoL) of the two groups, and a self-designed nursing satisfaction questionnaire was adopted to evaluate and compare the nursing satisfaction in the two groups. The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were used to evaluate the status of anxiety and depression. In addition, independent risk factors for poor prognosis were analyzed by multivariate logistic regression. Results: Before surgery and at 1 d after surgery, the NRS scores of the two groups were not significantly different, while at 3 d and 7 d after surgery, the NRS scores decreased significantly in both groups, and the observation group exhibited significantly lower NRS scores than the control group on these two days. There was no significant difference in the SAS and SDS scores between the two groups before nursing, while after nursing, the scores decreased significantly in both groups, and the decreases in the observation group were more significant than those of the control group. The observation group consumed a significantly shorter rescue time and examination time than the control group, and the observation group showed a significantly higher effective rescue rate than the control group. In addition, the observation group demonstrated a lower incidence of complications than the control group after surgery, and a higher QoL score than the control group. Moreover, the observation group exhibited a higher nursing satisfaction rate than the control group. Age, time from injury to medical treatment, and injury site were risk factors impacting the prognosis of patients, and age was an independent risk factor for prognosis. Conclusion: In patients with emergency trauma undergoing surgical debridement and suture, high-quality nursing can substantially contribute to lower pain, shorter rescue time, higher success rate of rescue, better QoL, and nursing satisfaction, and fewer complications. Therefore, high-quality nursing is worthy of clinical application.

Keywords: High-quality nursing, emergency trauma, surgical debridement and suture, clinical value, pain degree

Introduction

In surgical emergencies, there are various injuries caused by accidental trauma [1]. Emergency trauma refers to injuries to human organs and tissues that occur primarily due to external forces or mechanical forces upon contact with the human body [2, 3]. In daily life, common injuries include cutting and incised injuries, bruise, dysfunction, and bleeding [4]. According to related data [5], in China, the number of patients in the emergency department due to trauma is as high as 62 million people per year, and the number of deaths caused by trauma

reaches 700,000 to 800,000 people each year, accounting for about 9% of the total number of deaths. Trauma is the primary cause of death among people under 45 years old. Therefore, treatment for emergency trauma is one of the major public health problems in China.

Surgical debridement and suture involve the removal of foreign bodies, blood clots, necrotic tissue, inactivated tissue, or seriously contaminated tissue from an open wound. It also includes repairing the wound margin and suturing the wound to minimize contamination or even turn it into a clean wound, thus facilitating wound healing [6, 7]. As common surgical procedures, surgical debridement and suture are conducive to the functional and morphologic recovery of the injured site, thus they are commonly adopted in surgical emergencies [8]. For patients with emergency trauma who need surgical debridement and suture, the treatment should be prompt, with early care to effectively save patients' lives [9].

In previous routine emergency care, injuries were evaluated based on experience, with limited accuracy. Thus, it is of profound importance to explore safe and convenient emergency trauma nursing methods [10]. With the increasing demand for nursing quality, high-quality nursing has become an important nursing concept in nursing science. This approach focuses on patients while attaching importance to the improvement of basic nursing quality, and the specific nursing tasks and responsibilities are specifically delegated to the nurses to provide comprehensive and meticulous care for patients [11, 12]. By providing patients physical and psychological care, it can benefit the recovery and quality of life (QoL) during hospitalization [13]. Unlike personalized nursing, high-quality nursing focuses on enhancing the holistic medical and nursing services, which not only meets the nursing needs of patients, but also improves the professional quality and image of hospitals and medical staff. It can help promote the sustainable development of medical institutions. Halpern et al. [14] verified that high-quality nursing showed a great improvement over routine nursing and was beneficial to cancer patients. However, there is only limited and not comprehensive research on the application of high-quality nursing in patients with emergency trauma undergoing surgical debridement and suture, so further investigation is required.

Accordingly, this study implemented high-quality nursing interventions for patients with emergency trauma undergoing surgical debridement and suture, and explored its value in this clinical setting.

Methods and data

Clinical data

The clinical data of 181 patients with emergency trauma who received surgical debridement and suture in Shangrao Municipal Hospital from January 2020 to December 2021 were retrospectively analyzed. Among them, patients who received routine nursing were assigned to a control group (n=85), and those who received high-quality nursing were assigned to an observation group (n=96). This study was approved by the Medical Ethics Committee of Shangrao Municipal Hospital.

Inclusion and exclusion criteria

Inclusion criteria: patients who suffered emergency trauma and underwent surgical debridement and suture in Shangrao Municipal Hospital [15]; patients with detailed clinical data; patients who were able to cooperate with the exmainations.

Exclusion criteria: patients who were admitted 12 h after the trauma; patients who died before arriving hospital or during operation; women who were pregnant or lactating women; patients younger than 18 years old; patients with mental illness or cognitive impairment.

Nursing schemes

The control group was given routine nursing intervention, including close monitoring of patients' vital signs and examinations of blood pressure, heart rate and blood routine. The nursing staff were arranged to clean and disinfect the wound of patients. In case of hypoxia, oxygen support should be given, and a venous channel was established in the meantime according to the patient's condition. Specific saving measures were as follows. (1) Keeping the respiratory tract unobstructed: the foreign

bodies and secretions were removed from the oral cavity and respiratory tract to ensure unobstructed breathing. (2) Rapid establishment of venous passage: At least 2 intravenous infusion channels were established to promote the rapid and safe infusion of liquid. (3) ECG monitoring: Patients' blood pressure, pulse, heart rate, blood oxygen saturation, and central venous pressure were monitored if necessary. (4) Management of bleeding: Close observation was paid to the bleeding status of patients, and proactive measures were taken to control active bleeding. In cases of frequent or severe bleeding, immediate interventions such as the use of hemostatic forceps, tourniquet, or ligation were employed to stop bleeding.

The observation group was given high-quality nursing intervention measures on the basis of the control group. The specific measures were as follows: (1) Improving the awareness of active nursing services: The nursing staff in the trauma rescue department were regularly organized to learn high-quality service concepts and skills, and they were encouraged to shift from a passive mindset towards an active nursing service and develop a higher level of comprehensive service capability. Furthermore, they were also expected to deliver humanized nursing care for patients to the best of their abilities [16]; (2) Scientific management and allocation of nursing staff: According to the number and condition of patients with emergency trauma in the hospital, the nursing staff were grouped to give specific nursing work. Specialized nursing staff were arranged to publicize the knowledge of emergency trauma rescue in surgical debridement and suture, and communicate with patients and their families to understand their nursing needs. One to two nurses were designated to prepare for the surgical debridement and suture, so that the procedures could be immediately started after patient admission. In addition, a scientific nursing shift system was developed to ensure that nurses were on call when they were needed. (3) Optimization of first-aid workflow: The condition of emergency trauma patients is generally critical, so it is necessary to ensure that nursing intervention measures are targeted and effective, with few tedious and unnecessary nursing operations. The nursing staff were tasked with minimizing the time delay before surgical debridement and suture for swift and efficient rescue operations. In emergency situations, nurses had to work against the clock, ensuring that the instruments and medicines for surgical debridement and suture were prepared in advance. They also needed to possess proficiency in using relevant instruments and medicines, as well as be well-versed in the associated operating techniques and procedures. Two venous channels should be established to ensure a smooth blood transfusion and gain time for patient rescue. (4) Emphasis on psychological care interventions: Due to the unexpected nature of emergency trauma, patients and their families are often caught off guard, resulting in feelings of fear, nervousness and worry. Nurses were required to actively communicate with patients and their families. During communication, they should adopt a gentle and calming tone and attitude, be attentive to the negative emotions conveyed by patients' expressions and actions, try to alleviate these emotions, and then inform them of their conditions and treatment. The staff were also tasked with communicating with the patients' family members or friends to provide support, which aimed to enhance patients' confidence and ensure they were psychologically and physically prepared for the medical journey.

Outcome measures

Primary outcome measures: The neurologic rating scale (NRS) was adopted to evaluate the pain at 1 d, 3 d, and 7 d after operation [17]. The NRS utilizes a scale of 0-10 points, with a higher score indicating severer pain. The effective rescue rate was evaluated according to the following criteria. Markedly effective: The rescue process proceeded smoothly, and the patient's condition was stabilized afterwards, with recovery of consciousness. Effective: The rescue process was relatively smooth, and the patient's condition was relatively stable afterwards, with partial recovery of consciousness. Ineffective: The rescue process encountered challenges, and as a result, the patient's condition remained unstable with a low level of consciousness. Total effective rescue rate = (number of cases with markedly effective rescue + that of cases of effective rescue)/total number of cases * 100%. The MOS 36-Item Short-Form Health Survey (SF-36) was adopted to evaluate the patients' QoL [18]. This scale covers 8 dimensions, namely, social functioning, physi-

Table 1. Comparison of baseline data between the two groups

	Observation group (n=96)	Control group (n=85)	χ^2 value	*P* value
Age			0.695	0.401
≥50 years old	42	32		
<50 years old	54	53		
Sex			0.772	0.380
Male	56	55		
Female	40	30		
BMI			0.024	0.877
≥23 kg/m^2	15	14		
<23 kg/m^2	81	71		
Time from injury to medical treatment			0.072	0.788
≥5 h	30	25		
<5 h	66	60		
Cause of injury			4.750	0.093
Traffic injury	30	39		
Falling injury	25	21		
Mechanical injury	41	25		
Injury site			2.647	0.104
Limbs or joints	50	34		
Chest or abdomen	46	51		

BMI: Body mass index.

cal functioning, role emotional, role physical, bodily pain, mental health, vitality, and general health, with 100 points for each item. A higher total score suggests better QoL. To identify the risk factors for unfavorable prognosis, the 1-month prognosis of patients was recorded, and the independent risk factors for poor prognosis were analyzed by multiple logistic regression.

Secondary outcome measures: The rescue time and examination time in the two groups were recorded respectively. The postoperative complications (wound infection, local scar, fatty liquefaction, and sensory disturbance) of the two groups were recorded. Before discharge, the patients were asked to fill in a nursing satisfaction questionnaire developed by Shangrao Municipal Hospital, which covered questions about psychological nursing and comfort nursing. The questionnaire has a total score of 100 points, with a score <60 points for dissatisfaction, a score of 60-89 points for satisfaction, and a score >90 points for high satisfaction. Total satisfaction rate = high satisfaction rate + satisfaction rate. The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were employed to evaluate the anxiety and depression of the patients before and after nursing [19, 20].

Statistical analyses

This study adopted the SPSS 22 statistical software for statistical analyses, and GraphPad Prism 8 for data visualization. Counted data were described by percentage, and their inter-group comparison was conducted using the chi-square test. Measured data were described by mean ± SD, and their inter-group comparison was conducted using the t test. P<0.05 suggested a significant difference.

Results

Comparison of baseline data between the two groups

The two groups were not significantly different in age, sex, body mass index, time from injury to medical treatment, or reasons of injury (P>0.05, **Table 1**), so they were comparable.

Comparison of NRS score between the two groups

Before surgery and at 1 d after surgery, the NRS scores of the two groups were not greatly different (P>0.05), while at 3 d and 7 d after surgery, the NRS scores of both groups decreased considerably, and the observation

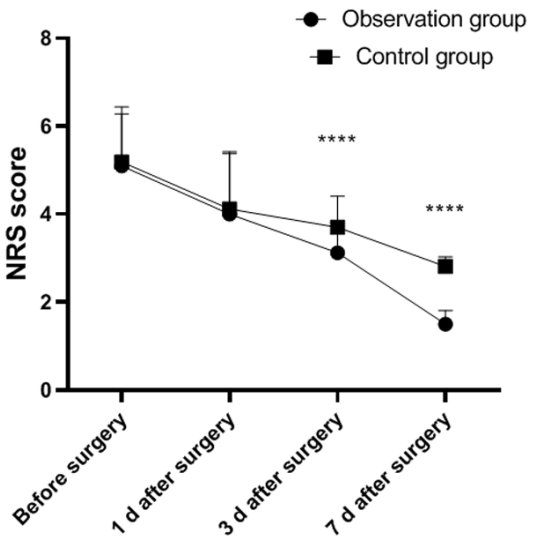

Figure 1. Comparison of NRS scores between the two groups. Notes: NRS: neurologic rating scale; ****P<0.0001 *vs.* the control group.

group exhibited lower NRS scores than the control group on these two days (P<0.0001, **Figure 1**).

Comparison of SAS and SDS scores between the two groups

There was no significant difference in the SAS or SDS scores between the two groups before nursing. After nursing, the SAS and SDS scores of the two groups decreased significantly, and the decreases in the observation group were more significant than those in the control group (P<0.05, **Figure 2**).

Comparison of rescue time and examination time between the two groups

The observation group took a shorter rescue time and examination time than the control group (P<0.05, **Figure 3**).

Comparison of effective rescue rate between the two groups

The observation group showed a significantly higher effective rescue rate than the control group (P=0.0002, **Table 2**).

Comparison of complications between the two groups

The observation group demonstrated a lower incidence of complications after surgery than the control group (P=0.0333, **Table 3**).

Comparison of QoL between the two groups

According to comparison of QoL between the two groups after surgery, the two groups were not greatly different in vitality scores (P>0.05), but the observation group exhibited greatly higher scores than the control group in social functioning, physical functioning, role emotional, role physical, bodily pain, mental health, vitality, and general health (P<0.05, **Figure 4**).

Comparison of nursing satisfaction rate between two groups

The observation group showed a higher nursing satisfaction rate than the control group (P=0.0013, **Table 4**).

Analysis of factors affecting prognosis

The patients were re-grouped according to their recovery within 1 month after surgery. Patients with good recovery were included into a favorable-prognosis group (n=120) and the others were included into an unfavorable group (n=61). Then the differences in clinical data between the two groups were compared, and the data were subjected to univariate analysis. According to the results, age, time from injury to medical treatment, and injury site were the risk factors affecting the prognosis of patients (**Table 5**). These significant indicators were assigned (**Table 6**) and subjected to further multivariate analysis. According to logistic regression analysis, age was an independent risk factor affecting the prognosis of the patients (**Table 7**).

Discussion

Emergency trauma is showing an increasing incidence and has become the primary cause of death among young people in China, bringing a heavy burden to families and society, as well as posing a great challenge to China's medical and health system [3, 21]. As common surgical procedures in emergency surgery, surgical debridement and suture are mostly adopted for injuries caused by traffic accidents, struggles, and mechanical injuries. The operation involves timely hemostasis, disinfection, debridement, and suture [22]. Patients often have negative emotions such as nervousness and anxiety during treatment, leading to significant psychological stress reactions. Additionally, they may experience a strong pain, which can result in some patients refusing to cooperate with the treatment [23]. Therefore, during surgical

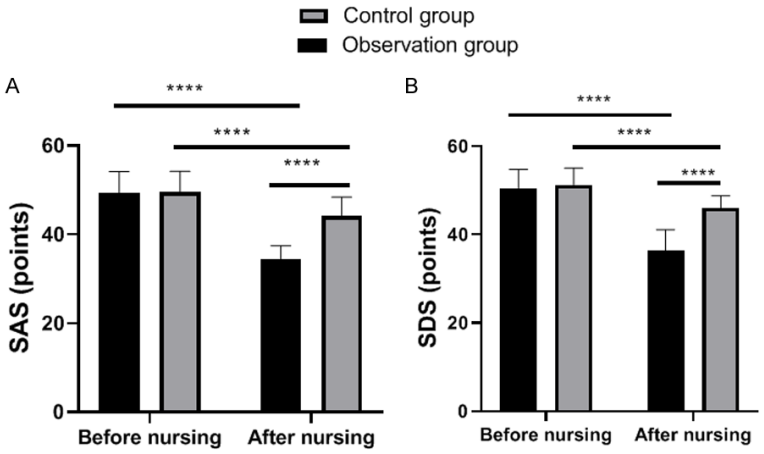

Figure 2. Comparison of SAS and SDS scores between the two groups before and after nursing. A: Comparison of SAS scores; B: Comparison of SDS scores; Notes: SAS: Self-rating anxiety scale; SDS: Self-rating depression scale. ****P<0.0001 *vs.* the control group.

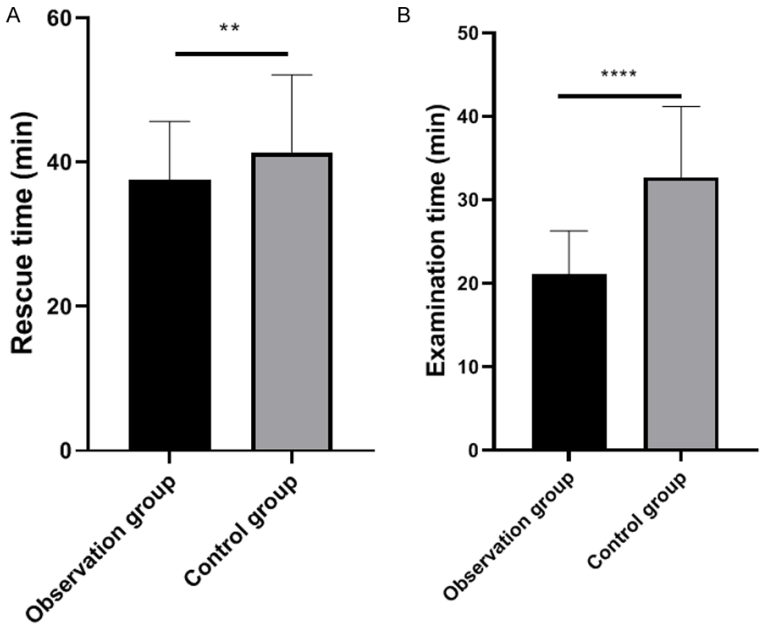

Figure 3. Comparison of rescue time and examination time between the two groups. Notes: **P<0.01 *vs.* the control group; ****P<0.0001 *vs.* the control group.

debridement and suture, it is crucial to provide attentive care work to prevent adverse events caused by psychological factors or ineffective cooperation. Delayed treatment can increase the risk of infection and eventhreaten the patients' life [24].

During rescue of patients with emergency trauma, the intervention effect of nursing must be strengthened to improve nursing quality and patient satisfaction [25]. High-quality nursing is a humanized, meticulous, and comprehensive nursing method, that has delivered favorable results in trauma patients at present [26]. Adirim [12] reviewed, summarized, and prospected the first-aid care for children, and put forward that the first-aid quality care for children had a beneficial impact on them. Davis et al. [27] pointed out that providing high-quality care should be a goal in taking care of surgical emergency patients. This study explored the clinical value of high-quality nursing care in patients with emergency trauma undergoing surgical debridement and suture and its influences on the patients' pain level.

Effective pain management can help patients to conduct early functional exercise, reduce the risk of postoperative complications and improve the QoL [28]. This study compared the postoperative pain between the two groups. According to the results, before surgery and at 1 d after surgery, the NRS scores of the two groups were not greatly different, while at 3 d and 7 d after surgery, the NRS scores of both groups decreased, and scores in the observation group had lower than those in the control group. Compared to routine nursing, high-quality nursing strongly relieved the pain of patients after surgical debridement and suture. Additionally, no difference was found in the SAS and SDS scores before nursing between the two groups, while after nursing, the scores of the two groups decreased significantly, and the scores in the observation group were significantly lower than those in the control group. These results imply that high-quality nursing

Table 2. Effective rescue rate in the two groups

Group	Markedly effective	Effective	Ineffective	Total effective rate (%)
Observation group (n=96)	41 (42.71)	50 (52.08)	5 (5.21)	91 (94.79)
Control group (n=85)	25 (29.41)	39 (45.88)	21 (24.71)	64 (75.29)
χ^2				13.931
P value				0.0002

Table 3. Postoperative complications of the two groups

Group	Wound infection	Local scar	Fatty liquefaction	Sensory disturbance	Incidence of complication
Observation group (n=96)	3 (3.13)	2 (2.08)	1 (1.04)	1 (1.04)	7 (7.29)
Control group (n=85)	5 (5.88)	4 (4.71)	3 (3.53)	3 (3.53)	15 (17.65)
χ^2					4.528
P value					0.0333

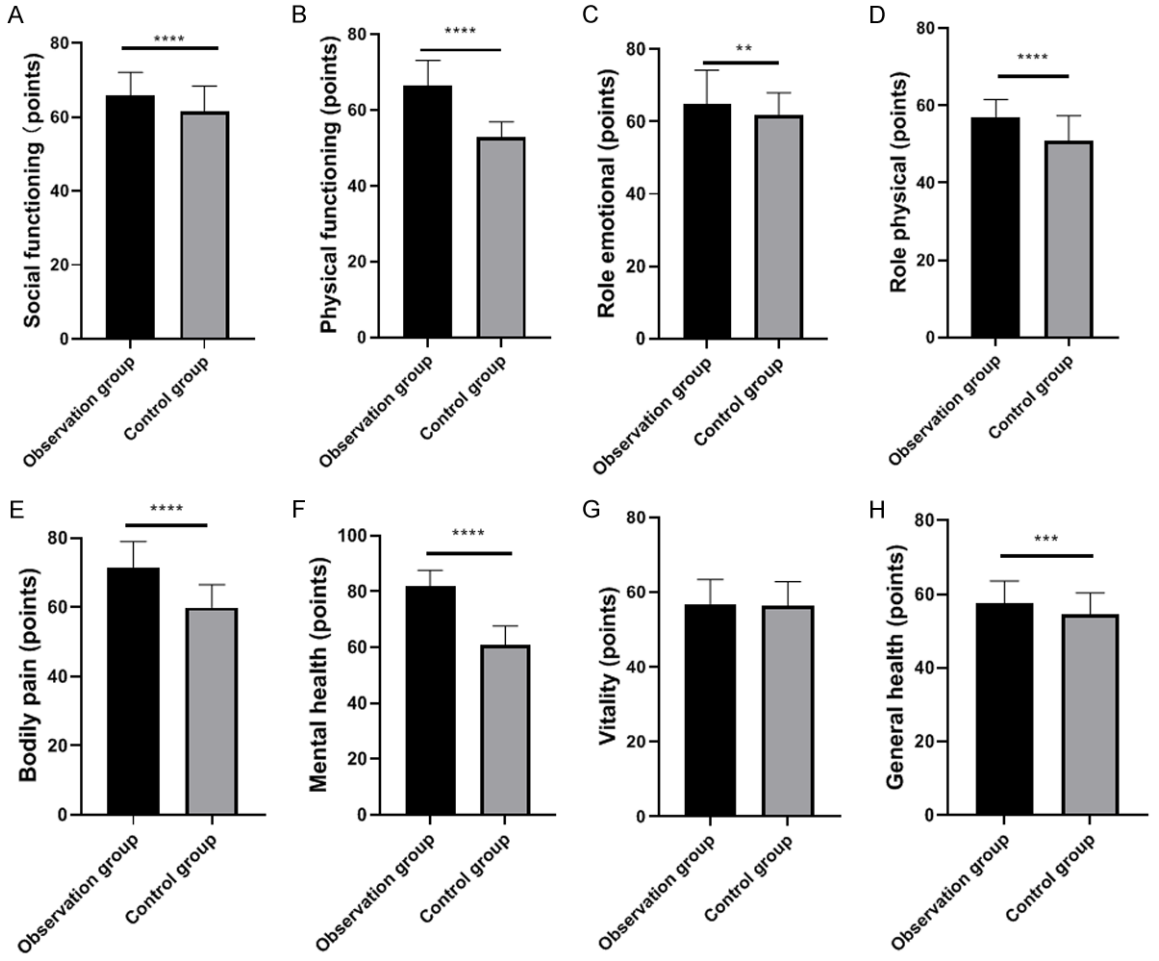

Figure 4. Comparison of postoperative quality of life between the two groups. A: Postoperative social functioning scores; B: Postoperative physical functioning scores; C: Postoperative role emotional scores; D: Postoperative role physical scores; E: Postoperative bodily pain; F: Postoperative mental health scores; G: Postoperative vitality cores; H: Postoperative general health scores; Notes: **, *** and **** indicates P<0.01, P<0.001, and P<0.0001, respectively, in comparison to the control group.

Table 4. Nursing satisfaction rate of the two groups

Group	Highly satisfied	Satisfied	Dissatisfied	Total satisfaction rate
Observation group (n=96)	52 (54.17)	42 (43.75)	2 (2.08)	94 (97.92)
Control group (n=85)	21 (24.71)	51 (60.00)	13 (15.29)	72 (84.71)
χ^2				10.351
P value				0.0013

Table 5. Univariate analysis

	Favorable prognosis group (n=120)	Unfavorable prognosis group (n=61)	χ^2 value	*P* value
Age			59.231	<0.0001
≥50 years old	25	49		
<50 years old	95	12		
Sex			0.207	0.649
Male	75	36		
Female	45	25		
BMI			3.283	0.070
≥23 kg/m^2	15	14		
<23 kg/m^2	105	47		
Time from injury to medical treatment			15.361	<0.0001
≥5 h	25	30		
<5 h	95	31		
Cause of injury			2.155	0.340
Traffic injury	50	19		
Falling injury	30	16		
Mechanical injury	40	26		
Injury site			20.361	<0.0001
Limbs or joints	70	14		
Chest or abdomen	50	47		

BMI: Body mass index.

Table 6. Assignment

Factor	Assignment
Age	<55 years old =0, ≥55 years old =1
Time from injury to medical treatment	<5 h =0, ≥5 h =1
Injury site	Limbs or joints =0, Chest or abdomen =1
Prognosis	Favorable prognosis =0, unfavorable prognosis =1

can greatly alleviate the negative emotions of patients. In terms of the rescue and examination time, we found a shorter rescue time and examination time in the observation group than in the control group, suggesting a benefit of high-quality nursing. As for the effective rescue rate and postoperative complications, the observation group showed a higher effective rescue rate and a lower incidence of complications after surgery than the control group. This suggests that high-quality nursing can improve the rescue success rate and reduce complications. QoL is a crucial index to measure nursing effect. In this study, the two groups were not significantly different in vitality scores, but the observation group exhibited significantly higher scores than the control group in social functioning, physical functioning, emotional role, physical role, bodily pain, mental health, vitality, and general health. It indicates that high-quality

Table 7. Multivariate analysis

	B	S.E,	Wald	df	Sig.	Exp (B)	95% CI of EXP (B)	
							Lower limit	Upper limit
Time from injury to medical treatment	-0.395	0.326	1.465	1	0.226	0.674	0.356	1.277
Age	0.811	0.283	8.208	1	0.004	2.250	1.292	3.918
Injury site	0.359	0.286	1.573	1	0.210	1.432	0.817	2.509

nursing is more conducive to the QoL of patients with acute trauma after surgical debridement and suture. Similar to the results of this study, Chen et al. [29] found that high-quality care promoted the recovery of limb function, the QoL, and the satisfaction of elderly patients. Regarding nursing satisfaction rate, this study found a higher nursing satisfaction rate in the observation group than in the control group, indicating that high-quality nursing was recognized by patients. The analysis of prognostic factors showed that age, time from injury to medical treatment, and injury site were risk factors for poor prognosis, while logistic regression analysis showed that age was an independent risk factor affecting the prognosis.

This study has verified the clinical value of high-quality nursing in patients with emergency trauma undergoing surgical debridement and suture and its influences on patients' pain levels. It has some limitations. First, the limited sample size in this study may lead to certain biases in the conclusion. Second, we did not conduct long-term follow-up, so we are unable to understand the long-term prognosis of patients. In the future, we hope to conduct a more comprehensive analysis with an expanded sample size about the application of high-quality nursing to obtain more experimental results.

To sum up, in patients with emergency trauma undergoing surgical debridement and suture, high-quality nursing can substantially contribute to lower pain, shorter rescue time, higher success rate of rescue, and better QoL and nursing satisfaction, and fewer complications.

Disclosure of conflict of interest

None.

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