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ORIGINAL

META-ANALYSIS OF QUALITY NURSING IMPACT ON NURSING SATISFACTION AND PUNCTURE SUCCESS RATE IN TRANSFUSION ROOM FOR ATHLETIC PATIENTS IN FEVER OUTPATIENT DEPARTMENT

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ABSTRACT

Objective: This meta-analysis aims to systematically assess the impact of high-quality nursing on nursing satisfaction and the puncture success rate specifically in athletic patients receiving treatment in the transfusion rooms of fever clinics. **Method:** A comprehensive literature search was conducted, drawing from databases including the China Science and Technology Journal Full-text Database, China Journal Full-text Database (CNKI), Wanfang, CBM, Embase, PubMed, and the Cochrane library, with publications up to January 2022. The focus was on comparing nursing satisfaction and puncture success rates between high-quality nursing and routine nursing practices in the fever outpatient infusion rooms, specifically among athletic patients. Analysis was performed using RevMan version 5.2 software. **Results:** Six randomized controlled trials (RCTs) were included, encompassing a total of 1040 athletic subjects. The results indicated that high-quality nursing significantly improved nursing satisfaction related to patient care ($I^2 = 68\%$, $RR = 1.21$, $95\% CI = 1.06-1.15$, $P < 0.000 01$) as well as the success rate of puncture procedures ($I^2 = 79\%$, $RR = 1.24$, $95\% CI = 1.05-1.22$, $P < 0.000 01$) in this specific patient group. **Conclusion:** The promotion of high-quality nursing care in the transfusion rooms of fever clinics is particularly beneficial for athletic patients. It markedly enhances nursing satisfaction and the success rate of puncture procedures, demonstrating a more favorable outcome compared to conventional nursing practices. This finding underscores the importance of specialized nursing

approaches in addressing the unique healthcare needs of athletic patients.

KEYWORDS: Fever clinic; Intravenous infusion; Quality care; Satisfaction; Puncture; Meta analysis.

1. INTRODUCTION

In recent years, there has been a growing recognition of the specialized healthcare needs of athletic individuals, particularly in outpatient settings such as fever clinics. These patients often present unique challenges due to their high physical conditioning and specific health requirements related to their athletic pursuits. This meta-analysis aims to shed light on the impact of quality nursing on two critical aspects of care in this context: nursing satisfaction and the success rate of puncture procedures in the transfusion rooms of fever outpatient departments (Buchanan, Dawkins, & Lindo, 2015).

High-quality nursing care is pivotal in any medical setting, but it takes on additional significance in the context of athletic patients (Murphey, 2020; Smith et al., 2012). These individuals often require more frequent and precise medical interventions, such as intravenous therapies and blood draws, due to their rigorous training schedules and the physical demands of their sports (Omdahl et al., 2023). The efficiency, accuracy, and comfort of these procedures can have a direct impact on their health outcomes and ability to continue their athletic activities (Van Loon, Buise, Claassen, Dierick-van Daele, & Bouwman, 2018). Furthermore, the satisfaction of patients with the nursing care they receive is a crucial indicator of the overall quality of healthcare services. In the case of athletic patients (Zhang et al., 2020), this satisfaction is not only influenced by the technical competencies of the nursing staff (Zhang et al., 2020) but also by their ability to understand and cater to the unique needs and concerns of this patient group (Huang, Huang, & Hu, 2021).

To explore these issues, this study conducts a comprehensive analysis of relevant literature up to January 2022, sourced from various databases including the China Science and Technology Journal Full-text Database, CNKI, Wanfang, CBM, Embase, PubMed, and the Cochrane library. The methodology involves comparing the outcomes of high-quality nursing versus routine nursing practices in the fever outpatient infusion rooms, focusing specifically on athletic patients (Zhang et al., 2020).

By examining randomized controlled trials (RCTs) and analyzing data using robust statistical methods, this meta-analysis aims to provide valuable insights into how quality nursing can enhance care for athletic patients in fever clinics (Wang & Wang, 2021). The goal is to inform nursing practices and healthcare policies to better meet the unique needs of this patient population, ultimately improving their healthcare experiences and outcomes. (Karaca & Durna, 2019) In this study, we showed that practicing high-quality nursing

care in the infusion room of the fever clinic is favorable to considerably improve the relevant nursing satisfaction of patients and the success rate of puncture, and the effect is better than that of conventional nursing.

2. Material and Methods

2.1 Data retrieval strategies

The relevant literature was obtained from China Science and Technology Periodicals, Full-text Database, China Journal Full-text Database (CNKI), Wanfang, CBM, Embase, PubMed and Cochrane Library databases. Search keywords in Chinese include: "infusion room in fever clinic", "routine nursing", "quality nursing", "puncture success rate" and "nursing satisfaction". English Key Words: Fever Symptom Infusion Room;" How to Provide Feedback of Routine Nursing "," High-quality Nursing "," Puncture Success Rate "and" Nursing satisfaction ".

2.2 Literature accession criteria

① Type of study: RCTs; ② Subjects of the study: patients receiving transfusion in the transfusion room of fever clinic; ③ Intervention measures: the experimental group received superior nursing care whereas the control group received standard nursing care; ④ The main outcome index was nursing satisfaction, and the secondary outcome index was puncturing success rate. ⑥ Language: literature published in Chinese and English.

2.1.1 Exclusion criteria for literature

① The outcome index of observation is not perfect and the standard of judgment is very different; ② repetitive reports, conferences, reviews, poor quality literature, etc.; ③ There are no full-text data and other important contents of the literature.

2.2.2 Literature extraction and quality assessment

Two researchers independently chose the literature, evaluated its quality, and extracted the data in accordance with the inclusion and exclusion criteria. For incomplete literature, first authors were contacted for more information if possible. Furthermore, the Cochrane Systematic Review handbook was used to evaluate the contained literature's quality. Randomization, hidden grouping, blindness, completeness of outcome data, and selective reporting were among the contents.

2.3 Statistical Methods

Meta-analysis was performed on the data provided by the included literature using RevMan 5.2 software. In the included studies' clinical and

methodological heterogeneity was evaluated, the results were statistically analyzed; if the heterogeneity test results showed $P > 0.10$ and $I^2 < 50\%$, the studies were homogenous, and the fixed-effect model was used to conduct meta-analysis. If the heterogeneity test results showed $P < 0.10$ and $I^2 > 50\%$, the inter-study heterogeneity was considered, and the random-effect model was used to conduct meta-analysis. Relative risk (RR) and 95% confidence interval (CI) were used to represent the effect size of dichotomous variables. Egger test was used to evaluate the bias of the included literature.

3. Results

3.1 Literature retrieval

A comprehensive selection of literature was done, and a total of 138 publications were retrieved. After browsing and excluding irrelevant literature, only 12 of the publications were selected in the preliminary assortment. Finally, after another round of thorough whole paper search, 6 of the considered literature were considered relevant for this study. The basic characteristics of the included research literature are shown in Table 1. The flow chart of literature retrieval is shown in Figure 1.

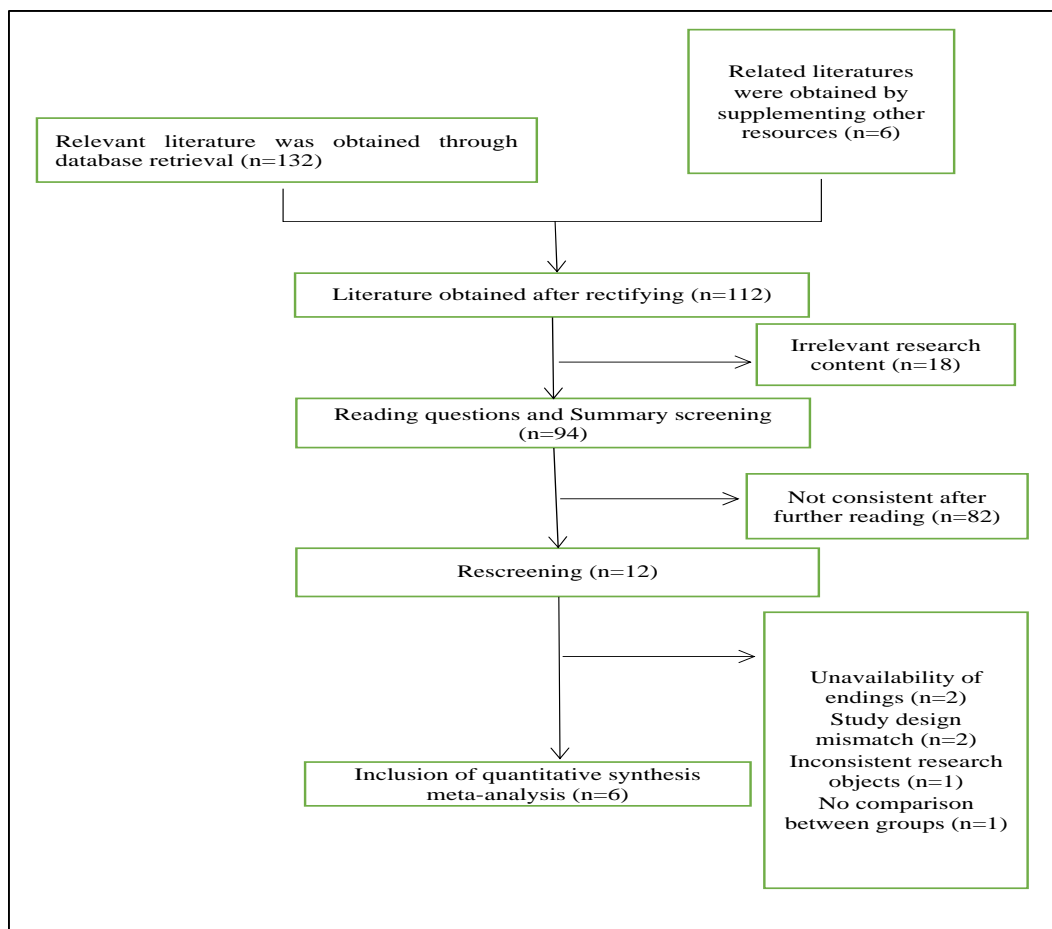


Figure 1: Flow chart of literature retrieval, n represent the total number of collected literature.

Table 1: Basic features of the included studies

AUTHOR AND YEAR	REGION	ROUTINE CARE (N)/QUALITY CARE (N)	OUTCOME INDICATORS
(Huang et al., 2021)	China	100/100	①
(Wang & Wang, 2021)	China	120/120	①②
(Van Loon et al., 2018)	China	50/50	①
(Laschinger et al., 2008)	China	100/100	①②
(Smith et al., 2012)	China	120/120	①
(Zhang et al., 2020)	China	30/30	①

Note: ①: nursing satisfaction; ②: Puncture success rate.

3.2 Meta-analysis

3.2.1 Nursing satisfaction results

Nursing satisfaction was counted as an index in all 6 literature studies, and a total of 1040 observation subjects were included. Both the quality care group and the conventional care group each had 520 patients. The heterogeneity test of the 6 included studies showed that I^2 was 68%, and $P < 0.0001$. Hence, the inter-study heterogeneity was considered, and the random effect model was used. Results showed an RR value of 1.02, 95% CI, 1.06-1.15, and $P < 0.00001$. Indicating that the comparison of nursing satisfaction between routine care and quality care was statistically significant. This shows that after the application of high-quality nursing, patients' nursing satisfaction is significantly improved, as shown in Table 2.

Table 2: Nursing satisfaction

STUDY/ SUBGROUP	QUALITY CARE		ROUTINE CARE		RISK RATIO WEIGHT	M-H, RANDOM,95%CI
	EVENTS	TOTAL	EVENTS	TOTAL		
(Huang et al., 2021)	93	100	80	100	5.10%	1.16[1.04,1.30]
(Wang & Wang, 2021)	110	120	98	120	5.60%	1.12[1.02,1.24]
(Van Loon et al., 2018)	48	50	39	50	3.40%	1.23[1.05,1.44]
(Laschinger et al., 2008)	93	100	71	100	4.10%	1.31[1.14,1.50]
(Smith et al., 2012)	112	120	96	120	5.60%	1.17[1.05,1.29]
(Zhang et al., 2020)	28	30	20	30	1.50%	1.40[1.07,1.83]
TOTAL (95%CI)		520		520	100.00%	1.21[1.06,1.15]
TOTAL EVENTS	484		404			

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 49.18$, $df = 6$ ($P < 0.0001$; $I^2 = 68%$; Test for overall effect: $Z = 10.05$ ($P < 0.00001$))

3.2.2 Success rate of puncture

Two literature studies with a total of 440 patients, comprising 220 patients in the quality care group and 220 patients in the conventional care group, showed a high puncture success rate.

In the two included studies, the heterogeneity test showed $I^2 = 79\%$ and $P < 0.0001$. In this study, the combined effect of random effect model was used, and RR was 1.24, 95%CI (1.05, 1.22), $P < 0.0001$, indicating that there was statistical significance in the comparison of the success rate of puncture between conventional nursing and quality nursing.

This indicates that after the application of high-quality nursing, the puncture success rate of patients has been significantly improved, as shown in Table 3.

Table 3: Success rate of puncture

STUDY/ SUBGROUP	QUALITY CARE		ROUTINE CARE (N)		RISK RATIO	
	EVENTS	TOTAL	EVENTS	TOTAL	WEIGHT	M-H, RANDOM,95%CI
(Wang & Wang, 2021)	114	120	101	120	14.1%	1.13[1.03,1.23]
(Laschinger et al., 2008)	92	100	67	100	10.0%	1.37[1.18,1.59]
TOTAL (95%CI)		220		220	100.0%	1.24[1.05,1.22]
TOTAL EVENTS	206		168			

Heterogeneity: Tau²=0.01; $\chi^2=31.37$, $df=2$ ($P<0.0001$); $I^2=79\%$; Test for overall effect: $Z=5.78$ ($P<0.00001$)

3.2.3 Bias analysis

The major outcome score, nursing satisfaction, was subjected to an analysis of publication bias using the Egger test, and the results showed that there was some bias ($P = 0.047$).

3.3 Perception of the overall nursing health care and services

To understand the patient's view of point, we analyzed the selected literature for patient's evaluation reports and comments. Results showed that 80.3 % of the very satisfied patients had evaluated nurse health services as excellent and only 7.3 % of the same group belong to the dissatisfied group

(Figure 2). The rest of the results are shown in Figure 2.

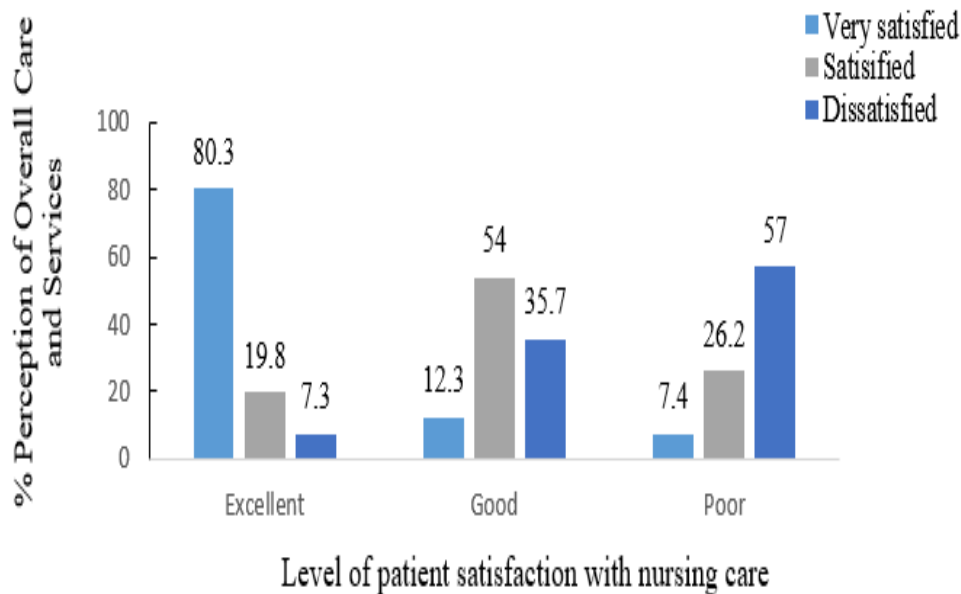


Figure 2: Percentage of patients' perception of the total health care services.

4. Discussion

To provide high-quality nursing services, it is necessary to provide phased training for nurses before the implementation, such as operation skills, attitude, communication skills with patients and health education (Pouya, Mosavianasl, & Moradi-Asl, 2019). The specific content for nurse education includes: ① Environment and service attitude; ② Improvement work efficiency and optimize nursing; ③ Patient and nursing health education before infusion; ④ Need for nursing puncture site; (5): Importance of communication before(Ramer et al., 2016), during and after infusion (Laschinger et al., 2008).

Research on the quality of nursing in China, has demonstrated that the process is relatively slow due to the environmental characteristics of transfusion room in fever clinic, which affects the quality of the literature included in this study to a certain extent (Goff et al., 2013). In regard to health ministry's efforts to promote high-quality nursing, it is expected that more high-quality and large-sample studies will be conducted to verify and promote high-quality nursing services suitable for transfusion rooms in fever clinics (Zurmehly, 2010).

In this study, analysis of nursing satisfaction showed that patients' satisfaction with nursing has been significantly improved after the use of high-quality nursing. Nursing staff need to strengthen their own operating skills and the ability to communicate, pay attention to appearance, being cheerful and encourage patients, in order to remove their fear and resistance in the puncture. This will also assist the family members to scientifically understand the patient's behavior and reaction, and obtain the cooperation of the family members, so as

to facilitate the puncture (Ku, Kim, Kang, & Lee, 2010). This result also showed that the puncture success rate of patients with high quality nursing was significantly improved compared with the conventional nursing group. With the continuous progress of medical technology and the increase in the demand of people's health, transfusion rooms in fever clinic need to fully implement the "patient-centered" concept. Nurses need to constantly improve their professional skills and optimize the process of medical care (Mark et al., 2015). Patients in fever outpatient clinics are at risk of suspected infectious diseases, making them a special group of patients. It is a key mandate of hospital nursing to optimize the nursing quality of fever clinic and improve patients' satisfaction (Zavdoveev et al., 2020). The success rate of puncture is the premise and basis of fever outpatient nursing. Quality nursing is based on the needs of patients and aims to improve the pertinence of nursing and compliance of patients (Plumer, 2007). The Egger test was carried out on the main outcome index under the high-quality nursing of transfusion room of fever outpatient clinic, and $P < 0.05$ was obtained, which reflected the publication bias. Due to the regional differences in the literature included in this study and the differences in the medical level of each place, there is some heterogeneity in the included literature of this study.

In the meta-analysis of the included studies, attention was paid in quality care of fever clinics. They heralded the necessity of : creating appropriate environment for patients and maximizing the removal of patients with negative psychology; standardizing the behavior of health care nurses; carrying out sound health education, such as setting up appropriate boards and graphic health promotion cards to help patients and their families master disease-related knowledge and cultivate a healthy and harmonious nurse-patient relationship; Improving nursing skills and professional ethics of nursing workers; and the need to continuously improve the traditional passive nursing to achieve harmonized nursing. Certain problems during implementation of care and the related literature from the nurses' clinical survey statistics showed; existence of nurse human resource shortages, imperfection in the performance appraisal system, little enthusiasm of working nurses, younger nursing team, and security risks (Andrick et al., 2022). As patients' satisfaction is the core content of evaluation of "high quality nursing service," this literature research generally pointed out that patient's satisfaction need to be promoted. However, due to cited problems nurses are often work over-loaded, and with little or no timely response and feedback from patient. Such factors will inhibit patient satisfaction (Zerong, Yanli, & Fengming, 2017).

Moreover, the study pointed out that in the actual nursing work, most patients do not have a clear understanding of "quality nursing service". Related studies have proved that different groups of people have different knowledge and understanding of quality nursing. Currently, studies have reported mainly from a professional perspective and rarely from a patient perspective. While

carrying out high-quality nursing services, It is essential to understand the patient's nursing demand by starting with the patient's need for nursing services. This is conducive to fundamentally promote the improvement of quality service. Therefore, grasping the real and specific needs of patients for quality care is the top priority for in-depth implementation of quality care.

Nurses need to clarify their own responsibilities, adjust the appearance of nursing services, and strengthen the implementation of nursing responsibility system. Emphasis on holistic nursing, humanistic care and optimization of nurse-patient communication requires nurses to have a variety of abilities at the same time, such as observation ability, communication ability, adaptability and management ability. Nursing staff need to take the initiative to learn relevant nursing knowledge and put it into practice. Hospitals and departments need to pay attention to and emphasize the cultivation of nurses' comprehensive ability, rationally allocate nurses' human resources, encourage nurses to go out or go abroad for further study, and cultivate high-quality nursing talents with comprehensive humanistic and social ability. The performance assessment system of all departments in today's tertiary hospitals are certain deficiencies, mainly reflected in the lack of universal assessment tools, and the accuracy of assessment results. Therefore, it is necessary to develop scientific and reasonable assessment tools for nurse work performance, according to the level of nurses and target. In accordance with the relevant requirements of the reform and development of China's health, laws were set to firmly establish and implement the concept of coordinated, green, open, innovative and shared nursing development, putting the needs of the society as a guide. In addition, it pointed out that nursing services for the elderly should be developed to better coordinate the development of nursing and social economy and meet the diversified needs of patients for health services.

This research had some limitations, not all included studies were randomized control studies, this might have introduced a certain level of bias within analysis of the results. Furthermore, all the included literature in this study were assessed by internal researchers, this may also increase the level of bias to some extent. Different literature used in this study was collected from possibly different hospitals with different practitioners and facilities, this in turn may or may not affect the quality of the results. Due to this fact, different practitioners or nurses practice depending on the region or customs to which they are located. Hence, a standard assessment may overlook those factors. Lastly, there was not enough literature to conclusively evaluate the implementation of "quality nursing service" from the perspective of patients.

5. Conclusion

The findings of this meta-analysis provide compelling evidence that high-quality nursing significantly enhances the experience and outcomes for athletic

patients in fever clinic transfusion rooms. The improvement in nursing satisfaction and puncture success rates underlines the critical role of specialized, high-quality nursing care in meeting the specific needs of this patient demographic. Athletic patients often have distinct healthcare requirements due to their unique physical condition and the nature of their sports-related activities. The increased nursing satisfaction observed in the study is indicative of the effectiveness of high-quality nursing in addressing these specialized needs, which may include more precise vascular access, a deeper understanding of the athletes' physiology, and a tailored approach to care and communication.

Furthermore, the notable increase in the success rate of puncture procedures is a crucial finding. For athletic patients, who may require rapid and efficient treatment to resume their training and competitive activities, the success of these procedures is paramount. The high success rate not only minimizes discomfort and potential complications but also ensures a quicker return to their normal activities, an aspect of utmost importance for athletes. The results of this meta-analysis strongly advocate for the implementation and promotion of high-quality nursing practices in transfusion rooms, especially in fever outpatient departments catering to athletic patients. By doing so, healthcare facilities can significantly improve patient care outcomes and satisfaction levels, ultimately contributing to the faster recovery and return of athletes to their peak physical condition. This study also highlights the need for ongoing training and development of nursing staff in specialized areas such as sports medicine and athletic healthcare. Continuous education and skill enhancement in these areas will enable nurses to provide care that is not only clinically effective but also tailored to the unique needs of athletic patients.

In summary, the implementation of high-quality nursing in fever clinic transfusion rooms markedly benefits athletic patients, enhancing both their care experience and clinical outcomes. This approach should be considered a key component in the healthcare management of athletic individuals, ensuring that their specific medical and recovery needs are effectively met.

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