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How does overall hospital satisfaction relate to patient experience with nursing care? a cross-sectional study

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Abstract

Objective: To determine how factors related to nursing practices influence patient satisfaction with overall hospital services.

Design: This was a cross-sectional study.

Setting: Inpatients were consecutively recruited at the national hospital (with 2000 beds) in Shanghai, China.

Participants: The inclusion criteria were as follows: (1) hospitalized for 2 days or more; (2) able to read and understand Chinese; and (3) aged 18 years old or above. Patients with mental health problems were excluded. 756 patient surveys distributed among 36 wards were analyzed. The mean age of participants in the study was 57.7 (SD=14.5) and ranged from 18-80 years. Most participants were male (61.5%) and ever married (94.6%).

Primary and secondary outcome measures: Patient experience with nursing care was measured by the self-designed questionnaire under the guidance of the NHS Patient Experience Framework developed by the NHS National Quality Board (NQB), the overall patient satisfaction question was measured with a ten-point response option ranging from 1-10.

Results: A linear relationship between the patient experience with nursing care and overall patient satisfaction was observed after adjusting for age, sex, household monthly income per capita, literacy level, residence, medical insurance, length of hospital stay, number of admissions within one year, and primary diagnosis. The patient experience with nursing care was significantly associated with overall satisfaction in the crude model and in the adjusted models. Even after adjusting for 6 sociodemographic and 3 disease-related factors, the patient experience with nursing

care explained 34.9% of the variation in overall patient satisfaction.

Conclusions: This study showed that patient experience with nursing care was an important predictor for overall patient satisfaction.

Key words: Patient satisfaction; Patient experience; Nurse roles; Health services research

Strengths and limitations of this study

- This study used a valid and specific questionnaire of patient experience with nursing care made by patient interviews, literature analysis, and expert consultation to investigate patient experience with nursing care.
- This study quantitatively analyzed the impact of nursing practice on overall patient satisfaction.
- This study first surveyed patient experience with nursing care systematically and comprehensively in China
- This was a single-center study and our findings therefore may not be generalized.
- This study didn't include patients in outpatient department and emergency department because the questionnaire was specificly developed for inpatients.

1 Introduction

In the age of patient-centered care, as value-based care expands, patient satisfaction has become a key indicator in assessing healthcare quality and hospital performance [1] and is being used more frequently to determine hospital performance and hospital reimbursement [2, 3]. Patients who are satisfied with the healthcare system are more willing to comply with medical orders and treatments [4], are more likely to return to the healthcare organization for future care, and are more likely to recommend healthcare services to their family members and friends [5].

Recognizing factors that influence overall patient satisfaction will help improve medical care. A large body of research has identified the factors that account for the variations in patient satisfaction [6]. However, such studies have largely focused on patient characteristics, such as age [7], gender [8], race/ethnicity [9], financial [10]and health status [11], and organizational factors [12]; additionally, these studies have

inconsistent findings and explained only a small fraction of the variance in patient satisfaction.

In recent years, patient experience has been increasingly used to evaluate the quality of care [10, 13]. Patients' direct experience of the care process can not only provide invaluable insight for daily care and is frequently cited in health policy globally [14] but also significantly impact patient satisfaction with the health care system [15]. Most current literature has explored the relationship between the overall patient experience and patient satisfaction with the health care system [16, 17].

Nurses are a vital and central part of the health care system [18], accounting for nearly half of the global health workforce and spending more time with patients than any other medical professionals [19]. In theory, patient experience with nursing care, as a process indicator, reflects the interpersonal aspects of care received and has an important impact on overall satisfaction with hospital care [20, 21]. In the study of Bjertnaes [17], thirteen variables were significantly associated with overall patient satisfaction with hospitals, and the results of the regression model showed that the most important predictor of patient satisfaction with hospitals was patient experiences with nursing care. Similarly, Schmidt found that the perception of nursing care received was the only significant predictor of overall satisfaction with the hospital experience [22].

However, in terms of using these patient experience data to fully utilize nurses' potential and to reshape nursing care, existing studies have not offered enough feedback due to the low representation of nursing practices in these patient experience surveys [16,17]. Most patient experience scales include a limited number of items related to nursing and fail to provide thorough and detailed insight into nursing practice from patients' perspectives. For instance, the study of Bjertnaes [17] included only 4 items related to nursing care, and the study of Min [10] included only 2 items related to nursing care.

It is of note that factors such as patient characteristics and some organizational characteristics are objective and cannot be influenced, whereas factors related to nursing services are amendable by providers to improve the quality of care. However,

these patient experience with nursing care might be important when evaluating and improving the quality of health services.

We hypothesize that patient experience with nursing care accounts for a considerable portion of the unexplained variation in health system satisfaction after adjustments for the demographic profile, health and organizational factors with which patient satisfaction is usually associated. Understanding the association between patient experience with nursing care and patient satisfaction may help in utilizing the results to improve nursing practice, resulting in better patient satisfaction. Therefore, the purpose of this study was to determine how factors related to nursing practices influence satisfaction among patients.

2 Methods

2.1 Design

This study is a cross-sectional survey and is reported according to the 'The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for reporting observational studies' obtained from the EQUATOR Network website [23].

2.2 Setting

Inpatients were consecutively recruited from July 2020 to August 2020 in Zhongshan Hospital of Fudan University, which is the largest academic hospital (with 2000 beds) in Shanghai, China.

2.3 Sample and participants

We calculated the sample size according to the requirements for factor analysis, which demands that sample size be 5-10 times the number of factors. There were 33 items in the questionnaire and 22 patients and organizational characteristics. Therefore, the sample size was required to be at least 660 with an estimated 20% nonresponse rate. During the study period, a total of 767 inpatients were eligible to participate in the study, 7 patients refused to participate (0.9%), and 4 patients' questionnaires were incomplete (0.5%). Finally, 756 patients (98.6%) were analyzed. The inclusion criteria were as follows: (1) hospitalized for 2 days or more; (2) able to read and understand Chinese; and (3) aged 18 years old or above. Patients with mental

health problems were excluded. Eligible patients were invited to participate in the study. When a patient showed an interest in participating, a recruitment letter explaining the aim, process, and ethical considerations of this study was sent to them. To gain a broad and representative understanding of the patient experience, we varied the recruitment sites. A total of 36 wards were included, including 16 internal medical wards and 20 surgical wards.

2.4 Measures

Patient characteristics

The following characteristics were collected: age, gender, ethics, religion, educational level, household monthly income per capita, family residence, medical assurance, primary caregiver, primary disease diagnosis, number of admissions within one year, and length of hospital stay. The section for disease diagnosis consisted of ten categories: (1) cardiovascular diseases, (2) pulmonary diseases, (3) diseases of the digestive system, (4) diseases of the musculoskeletal system, (5) endocrine/metabolic diseases, (6) neurological diseases, (7) diseases of ophthalmology, (8) diseases of the urinary system, (9) diseases of the hematological system, and (10) other diseases, including allergies.

Patient experience with nursing care

Patient experience with nursing care was measured by the inpatient experience of nursing care questionnaire, which was self-designed under the guidance of the NHS Patient Experience Framework developed by the NHS National Quality Board (NQB)[24]. After a scoping review of current research results concerning patients' expectations of good care, 15 semistructured in-depth interviews with 8 men and 7 women were conducted to obtain insights into issues that are important to patients. Example questions are ‘What aspects of nursing care do you feel are important?’ and ‘What do you see as the nurses’ role when you receive health services?’. The draft items of the questionnaire were generated by interviews and literature analysis. Then, to select the most suitable items to be retained in the questionnaire, the content validity of the items was evaluated by 15 experts in the fields of patient management and quality of care, and items were deleted if the content validity index was less than

0.8. Finally, we conducted a pilot survey and found the Cronbach's α of the questionnaire was 0.84, and the split-half reliability was 0.75.

The final questionnaire consisted of 33 items assessing 8 dimensions of patients' perception of nursing care: (1) Coordination of care (3 items), e.g., the process of admission. (2) Physical environment (3 items), e.g., the cleanliness of the ward. (3) Information and education (7 items), e.g., the information about how to conduct scientific lifestyles. (4) Emotional support (4 items), e.g., nurses' response to patients' anxiety and fear. (5) Technical competencies (2 items), e.g., proficiency in performing nursing procedures. (6) Monitoring the progress of diseases (4 items), e.g., monitoring the vital signs. (7) Responding requests (3 items), e.g., the waiting time after pressing the call button. (8) Patient safety and privacy protection (7 items), e.g., treating patients' information confidentially. Most of the items were assessed by a 5-point Likert scale ranging from "never" to "always", where 'never' = 1, 'occasionally' = 2, 'sometimes' = 3, 'usually' = 4, and 'always' = 5. Response options ranged from "strongly disagree" and "strongly agree" for the admission process and discharge plan. For each item, the patients were offered the option of indicating whether it was *not relevant*. Each dimension score was determined by adding the scores of all items that corresponded to that dimension and dividing it by the number of items. The total inpatient experience score was the mean of all 8 dimension scores.

Patient satisfaction

The overall patient satisfaction question was 'All in all, were you satisfied with the care and treatment you received at the hospital?', with a ten-point response option ranging from 1-10 (with 1 labeled "not at all satisfied" and 10 labeled "to a very large extent satisfied").

2.5 Data Collection

Eligible patients were invited to participate in the study. After informed consent was given, all data were obtained by interviews and the analysis of medical records and were collected by trained investigators. The timing of collecting the patients' feedback may affect their response to the questionnaires because some of them may worry that negative appraisals about their hospital experience and satisfaction would

affect the treatment and care they received during hospitalization, and thus they might be unwilling to provide negative feedback. To encourage the participants to respond frankly, the survey was taken on the patients' discharge day, and the nursing staff did not administer the survey.

2.6 Data analysis

Statistical analyses were conducted using IBM-SPSS software version 22 (IBM Corp., Armonk, NY, USA), Empower (R) (www.empowerstats.com, X&Y solutions, Inc., Boston, MA), and R statistical software. Descriptive analysis was performed for participants' characteristics and their responses to items about satisfaction and experience. Values were expressed as the mean and standard deviation for continuous variables or percentages for categorical variables. Multiple regression models were used to analyze the effects of patient experience with nursing care and other variables on the overall patient satisfaction. Independent variables were selected based on evidence in previous studies showing a significant relation to overall patient satisfaction and we also included other variables based on our clinical experience. Model 1 was adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance; model 2 was adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance, diagnosis, number of admissions within one year, length of hospital stay. Non-ordinal categorical variables and ordinal categorical variables with non-equidistant data were transformed into dummy variables. The probability was considered significant when $p < .05$. No missing data imputation methods were used.

2.7 Patient and Public Involvement statement

It was not appropriate or possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.

3 Result

Sociodemographic and clinical characteristics of the study participants

Overall, 756 patient surveys distributed among 36 wards were analyzed. The demographic and clinical characteristics of the participants are shown in Table 1.

Patient experience with nursing care

The total patient experience score was 4.54 (0.37). The scores of each item are presented in Table 2. The lowest scores were related to 'information and communication' (4.34±0.52), 'coordination of care' (4.42±0.53) and 'emotional support' (4.56±0.45). Patients had better experiences with 'patient safety and privacy protection' (4.65±0.39), 'technical competencies' (4.64±0.38) and 'responding requests' (4.63±0.41).

Patient satisfaction with hospital services

The overall patient satisfaction item was skewed toward a positive assessment: 9.2 on a scale of 1-10, where 10 represents the best score. Of those who responded, 52.0% were satisfied with the hospital services to a very large extent. Only 1.9% reported being satisfied to only a small extent, and 0.3% were not at all satisfied with the hospital services.

Relationships between patient experience with nursing care and overall patient satisfaction

A linear relationship between the patient experience of nursing care and overall patient satisfaction was observed after adjusting for age, sex, household monthly income per capita, literacy level, residence, medical insurance, length of hospital stay, number of admissions within one year, and primary diagnosis (Fig. 1). Table 3 presents the results of multivariate regression for the effects of patient experience with nursing care on the patients' overall satisfaction with hospital services. The patient experience with nursing care was significantly associated with overall satisfaction in the crude model and in the adjusted models. Even after adjusting for 6 sociodemographic and 3 disease-related factors in model 2, the patient experience with nursing care was still significantly associated with overall patient satisfaction (β=1.257, adjusted R^2= 34.9%, p<0.001).

Subgroup analysis of the relationship between patient experience with nursing care and overall patient satisfaction

The subgroup analysis is presented in Figure 2. No significant heterogeneity was found among analysed subgroups stratified according to age, sex, residence, literacy level, household monthly income per capita, type of medical assurance, primary

diagnosis, number of admissions within one year, and length of hospital stay.

4 Discussion

The aim of our study was to analyze the effects of patient experience with nursing care on overall patient satisfaction. The results showed a linear relationship between patient experience with nursing care and overall patient satisfaction after the adjustment for age, sex, family monthly income, educational level, residence, medical insurance, length of hospital stay, number of admissions, primary diagnosis (Fig. 1). The patient experience with nursing care explained 34.9% of the variance in overall patient satisfaction. This finding was consistent with previous studies [17, 22, 25], which showed that the most important predictor of patient satisfaction with hospitals was patient experiences with nursing care.

The existing studies are commonly characterized by several limitations, particularly the methods used for the measurement of patient experience with nursing care. Alongside clinical effectiveness and safety, patient experience is increasingly recognized as one of the three pillars of healthcare quality [26]. A patient experience survey is a valid approach to provide feedback about the delivery of health care services, which asks patients to report their experiences in detail by asking them specific questions about to what extent certain processes and events occurred during the course of care. This type of survey can provide results that can be easily interpreted and acted upon. However, existing studies exploring the relationship of patient experience with nursing care and overall patient satisfaction did not offer enough feedback about nursing services. The primary barrier is the low representation of nursing practice in the existing patient experience surveys. Most patient experience scales include a limited number of items relating to nursing and fail to provide thorough and detailed insight into nursing practice from the patients' perspectives. For instance, the study of Bjertnaes [17] included only 4 items related to nursing care. Our study developed and used a questionnaire of patient experience with nursing care through patient interviews, literature analysis, and expert consultation. It consisted of 33 items assessing 8 dimensions of the patients' perception of nursing care and it had good validity and reliability. Therefore, the survey tool used in our study had a high

representation of nursing practice.

To our knowledge, this is the first study in China to survey patient experience with nursing care and to analyze its impact on overall patient satisfaction. Recently, there has been a growing interest in using patient experience to assess and improve the performance of the healthcare system in China [17]. However, nursing seems to be overlooked in this growing trend [27]. Our study showed that patients had worse experience with 'information and communication', 'coordination of care' and 'emotional support', which was consistent with study of Senarat[28].

As patients' healthcare demands increase, they are no longer satisfied with passively receiving care; instead, they are eager to become fully involved in the treatment and recovery process[29]. Additionally, nurses spend the most time with them among all medical professionals. In addition to direct care providers, nurses are also expected to act as navigators coordinating all aspects of care and promoting patient-centered care. Therefore, coordination of care is a fundamental and core value of nursing practice, a predictor of quality and a known predictor of satisfaction with medical care [30]. Humanistic care is an indispensable characteristic of nursing services. Numerous studies have demonstrated that patients' health outcomes can be improved much more significantly when caring behaviors are performed with empathy and compassion [31]. Christopher et al. also noted that tactics alone, such as bedside shift reports, health education, and follow-up phone calls after discharge, were insufficient, while meaningful strategies to create a positive organizational culture were vital drivers to promote a successful patient experience [32]. However, most healthcare institutions in China are task-oriented, and the delivery of nursing care is streamlined with standardized processes, protocols, and paths. These practices result in the fragmented nursing care, and patients receive less psychological care and more technical care from nurses, which negatively influences patient experience.

Compared to the other determinants that influence overall patient satisfaction with hospital services, such as the reputation and the image of hospitals, education and socioeconomic status of the patients, and length of stay [6], patient experience with nursing care is amendable. For instance, organizing an afternoon ward round by

nurses to address the communication needs of patients and hanging a poster to share patient feedback with the medical team have been proven to be efficient ways to facilitate good experiences with communication [33]. Understanding the importance of patients' perception of nursing service delivery would enable nursing managers and nursing practitioners to have a better understanding of current problems with healthcare delivery, push for continuous improvement, redesign the delivery of services and help professionals reflect on their practice.

Limitations

This was a single-center study and our findings therefore may not be generalized. However, our hospital is a national large general hospital and the nursing services model has a leading role around the country, therefore, for the Chinese region, our results can be regarded as representative to a considerable extent.

Conclusion

This study provides the first evidence of the importance of nursing care in improving overall patient satisfaction, and demonstrates that when the roles of nurses are expended and the potential of nurses is released, high-quality patient outcomes can be achieved. Understanding the importance of patients' perception of nursing services delivery would enable nursing managers and nursing practitioners to have better understanding of current problems with healthcare delivery, push for continuous improvement, redesign the delivery of services and help professionals reflect on practice modern.

Contributorship statement

Xiao CHEN and Yuxia ZHANG contributed to the study conception and design. Material preparation, data collection and analysis were performed by Xiao CHEN, Yuxia ZHANG, Wei QIN, Zhenghong YU, Jingxian YU, Ying LIN, Xiaorong LI, Zheng ZHENG, and Ying WANG. The first draft of the manuscript was written by Xiao CHEN and Yuxia ZHANG, Wei QIN, Zhenghong YU, Jingxian YU, Ying LIN, Xiaorong LI, Zheng ZHENG, and Ying WANG commented on and revised previous versions of the manuscript. All authors read and approved the final manuscript, and agreed to be accountable for all aspects of the work in ensuring that questions related

to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

Competing interest

- We had no associations with commercial entities that provided support for the work reported in the submitted manuscript.
- We had no associations with commercial entities that could be viewed as having an interest in the general area of the submitted manuscript.
- We had no similar financial associations involving their spouse or their children under 18 years of age.
- We had no Non-financial associations that may be relevant to the submitted manuscript

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Ethical statement

The study was approved by the Ethics Committee of Zhongshan hospital of Fudan university (Approval number B2020-074) and was performed in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments. Prior to data collection, all participants were informed of the purpose of this study and signed written consent forms were obtained to inform them of the rights, risks, and advantages of participation.

Data sharing

Data are available upon reasonable request.

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Table 1 Socio-demographic and clinical characteristics of study participants

Characteristics	Value
Sex, n(%)	
Male	465, 61.5%
Female	291, 38.5%
Age, mean±SD	57.7±14.5
Marital status, n(%)	
Single	41, 5.4%
Ever married	715, 94.6%
Literacy level, n(%)	
Primary education or below	109, 14.4%
Secondary education	454, 60.1%
College education or above	193, 25.5%
Household monthly income per capita, n(%)	
＜5000 RMB	288, 38.1%
5000-9999 RMB	293, 38.8%
>10000 RMB	175, 23.1%
Main source of medical expense, n(%)	
Urban medical insurance	505, 66.8%
Rural medical insurance	163, 21,6%
Commercial medical insurance	8, 1.0%
Personal funds	80, 10.6%
Residence, n(%)	
Rural areas	204, 27%
Urban areas	416, 55%
Rural-urban fringe areas	136, 18%
Patient admitting ward, n(%)	
Medical ward	360, 47.6%
Surgical ward	396, 52.4%
Diagnosed with cancer, n(%)	
Yes	302, 39.9%
No	454, 60.1%
Number of hospital admissions within 1 year, n(%)	
1	457, 60.4%
2	121, 16.0%
3	58, 7.7%
>3	120, 15.9%

Table 2 Percentage distribution of items for experience with nursing care in participants (n, %)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Coordination of care	Nurses provided well-organized admission process	0(0.0%)	5(0.7%)	31(4.1%)	317(41.9%)	403(53.3%)
	Nurses informed me about who are responsible for my treatment and care	0(0.0%)	2(0.3%)	37(4.9%)	299(39.6%)	418(55.2%)
	Nurses provided well-organized discharge plan	3(0.4%)	7(0.9%)	89(11.8%)	336(44.4%)	321(42.5%)
Physical environment	Nurses provided a clean ward environment	4(0.5%)	2(0.3%)	15(2.0%)	281(37.2%)	454(60.1%)
	Nurses provided a quiet ward environment	4(0.5%)	7(0.9%)	24(3.2%)	251(33.2%)	470(62.2%)
	Nurses provided an ordered ward environment	2(0.3%)	6(0.8%)	26(3.4%)	246(32.5%)	476(63.0%)
Information and communication	Nurses informed me about usage, dosage and side effects of medicines	0(0.0%)	0(0.0%)	14(1.9%)	347(45.9%)	395(52.2%)
	Nurses helped me better know the disease	0(0.0%)	1(0.1%)	70(9.3%)	393(52.0%)	292(38.6%)
	Nurses informed me about results of tests	14(1.9%)	110(14.5%)	145(19.2%)	382(50.5%)	105(13.9%)
	Nurses provided information about the appropriate dietary	0(0.0%)	2(0.3%)	64(8.5%)	314(41.5%)	376(49.7%)
	Nurses provided information about disease recovery	0(0.0%)	1(0.1%)	28(3.7%)	276(36.5%)	451(59.7%)
	Nurses provided health information through multiple routes	0(0.0%)	0(0.0%)	30(4.0%)	272(35.9%)	454(60.1%)
	Nurses provided relevant instructions before implementing medical procedures	0(0.0%)	16(2.1%)	27(3.6%)	331(43.8%)	382(50.5%)

Table 2 Percentage distribution of items for experience with nursing care in participants (continued)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Emotional support	Nurses treated me patiently	0(0.0%)	1(0.1%)	14(1.9%)	288(38.1%)	453 (59.9%)
	Nurses treated me with respect	0(0.0%)	2(0.3%)	4(0.5%)	239(31.6%)	511 (67.6%)
	Nurses' behaviors made me feel cared for	0(0.0%)	0(0.0%)	38(5.0%)	298(39.4%)	420(55.6%)
	Nurses helped me manage the anxiety, stress, fears I had about my illness	1(0.1%)	4(0.5%)	23(3.0%)	307(40.6%)	421(55.8%)
Technical competencies	Nurses were proficient in venipuncture procedures	0(0.0%)	1(0.1%)	5(0.7%)	261(35.8%)	463(63.4%)
	Nurses were proficient in other nursing procedures, such as intramuscular injection, hypodermic injection, change of dressing, etc.	0(0.0%)	0(0.0%)	3(0.4%)	257(34.0%)	496(65.6%)
Monitoring the progress of diseases	Nurses made an inspection tour of the ward	0(0.0%)	2(0.3%)	21(2.8%)	191(25.3%)	542(71.7%)
	Nurses monitored my vital signs timely	1(0.1%)	3(0.4%)	6(0.8%)	264(34.9%)	482(63.4%)
	Nurses monitored the process of drug treatment	0(0.0%)	0(0.0%)	8(1.1%)	243(32.1%)	505(66.8%)
	Nurses could recognize my health issues on time	2(0.2%)	1(0.1%)	43(5.7%)	300 (39.7%)	410(54.2%)

Table 2 Percentage distribution of items for experience with nursing care in participants (continued)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Responding requests	Nurses could come and see me in time after pressing the call button	4(0.5%)	2(0.3%)	20(2.6%)	88(11.6%)	642 (84.9%)
	Nurses dealt with my requests promptly	0(0.0%)	0(0.0%)	29(3.8%)	304(40.2%)	423(56.0%)
	Nurses responded to my suggestions or complaints seriously	1(0.1%)	1(0.1%)	13(1.7%)	280(37.0%)	461(61.0%)
Patients safety and privacy protection	Nurses could handle in time when my condition experienced changes	0(0.0%)	1(0.1%)	13(1.7%)	282(37.3%)	460(60.8%)
	Nurses informed me about how to prevent the risk events, such as falling and dropping from the bed	3(0.4%)	4(0.5%)	21(2.8%)	251(33.2%)	477(63.1%)
	Nurses clearly introduced the use of safety protection equipment, such as the emergency call button in the toilet	5(0.7%)	2(0.3%)	26(3.4%)	249(32.9%)	474(62.7%)
	Nurses verified my identify when performing nursing procedures	1(0.1%)	0(0.0%)	1(0.1%)	231(30.6%)	523(69.2%)
	Nurses applied hand disinfection before performing nursing procedures	0(0.0%)	1(0.1%)	55(7.3%)	186(24.6%)	514(68.0%)
	Nurses provided protective measures when performing nursing procedures in private body parts	2(0.3%)	0(0.0%)	1(0.1%)	99(13.1%)	654(86.5%)
	Nurses treated my information confidentially	1(0.1%)	4(0.5%)	6(0.8%)	248(32.8%)	497(65.7%)

Table 3 Multivariate regression for effect of patient experience with nursing care on overall patient satisfaction

Variable	Crude model			Multivariate-adjusted model 1			Multivariate-adjusted model 2		
	β (95% CI)	P value	P for trend	β (95% CI)	P value	P for trend	β (95% CI)	P value	P for trend
Patient experience with nursing care (Continuous)	1.269 (1.150,1.389)	<0.001		1.273 (1.153-1.393)	<0.001		1.257 (1.138-1.377)	<0.001	
Patient experience with nursing care (Tertiles)									
T1 (3.23-4.45)	0		<0.001	0		<0.001	0		<0.001
T2 (4.46-4.84)	0.726 (0.609,0.843)	<0.001		0.778 (0.669-0.887)	<0.001		0.774 (0.665-0.882)	<0.001	
T3 (4.85-5.00)	0.964 (0.846,1.083)	<0.001		1.011 (0.901-1.121)	<0.001		0.995 (0.885-1.105)	<0.001	

Model 1 adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance; model 2 adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance, diagnosis, number of admissions, length of hospital stay.

Figure 1 The relationship between patient experience with nursing care and overall patient satisfaction

Figure 2 Subgroup analysis for effect of patient experience with nursing care on overall satisfaction with hospital services

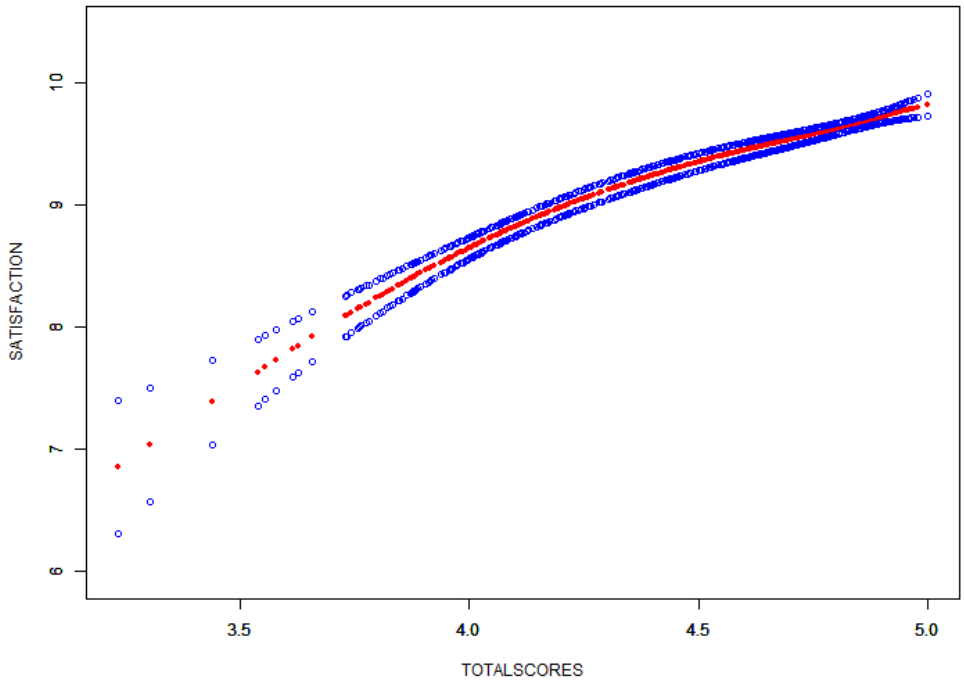

Figure 1 The relationship between patient experience with nursing care and overall patient satisfaction

254x197mm (72 x 72 DPI)

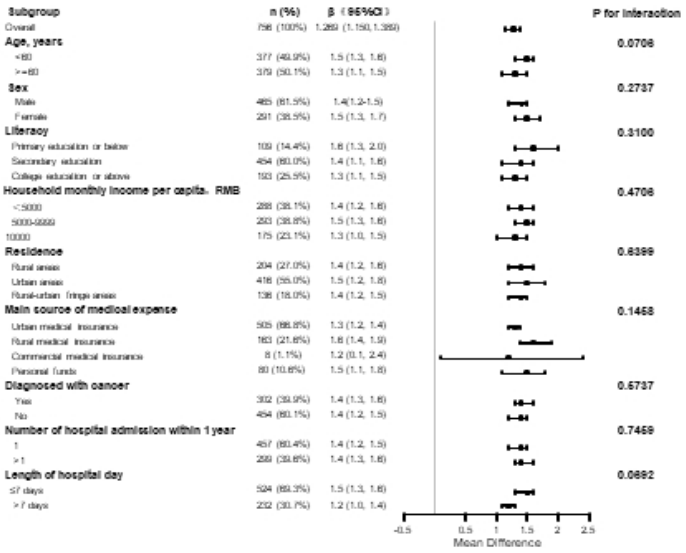

Figure 2 Subgroup analysis for effect of patient experience with nursing care on overall satisfaction with hospital services

403x353mm (38 x 38 DPI)

How does overall hospital satisfaction relate to patient experience with nursing care? a cross-sectional study

Xiao CHEN, Yuxia ZHANG, Wei QIN, Jingxian Yu, Zhenghong YU, Zheng ZHEN

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This study is a cross-sectional survey and is reported according to the 'The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for reporting observational studies' obtained from the EQUATOR Network website.

Item	STROBE description	Reported on pages
1. Title and abstract	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
	(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1
2. Background	Explain the scientific background and rationale for the investigation being reported	2-3
3. Objectives	State specific objectives, including any prespecified hypotheses	3
4. Study design	Present key elements of study design early in the paper	4
5. Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
6. Participants	Give the eligibility criteria, and the sources and methods of selection of participants	4
7. Variables	Clearly define all outcomes, exposures, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5

Item	STROBE description	Reported on pages
8. Data sources	For each variable of interest, give sources of data and details of methods of assessment. Describe comparability of assessment methods if there is more than one group	5
9. Bias	Describe any efforts to address potential sources of bias	4,7
10. Study size	Explain how the study size was arrived at	4
11. Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
12. Statistical methods	(*a*) Describe all statistical methods, including those used to control for confounding (*b*) Describe any methods used to examine subgroups and interactions (*c*) Explain how missing data were addressed (*d*) If applicable, describe analytical methods taking account of sampling strategy (*e*) Describe any sensitivity analyses	7
13. Participants	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	4
14. Descriptive data	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	Table 1

Item	STROBE description	Reported on pages
15. Outcome data	Report numbers of outcome events or summary measures	Table 2
16. Main results	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (*b*) Report category boundaries when continuous variables were categorized (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8
17. Other analyses	Report other analyses done-eg analyses of subgroups and interactions, and sensitivity analyses	Figure 2; 9
18. Key results	Summarise key results with reference to study objectives	9-11
19. Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
20. Interpretation	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	9-11
21. Generalisability	Discuss the generalisability (external validity) of the study results	11
22. Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Title page

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How does overall hospital satisfaction relate to patient experience with nursing care? a cross-sectional study in China

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How does overall hospital satisfaction relate to patient experience with nursing care? a cross-sectional study in China

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Abstract

Objective: To determine how patient experience with nursing care influence patient satisfaction with overall hospital services.

Design: This was a cross-sectional study.

Setting: Inpatients were consecutively recruited at the national hospital (with 2000 beds) in Shanghai, China.

Participants: The inclusion criteria were as follows: (1) hospitalized for 2 days or more; (2) able to read and understand Chinese; and (3) aged 18 years old or above. Patients with mental health problems were excluded. 756 patient surveys distributed among 36 wards were analyzed. The mean age of participants in the study was 57.7 (SD=14.5) and ranged from 18-80 years. Most participants were male (61.5%) and ever married (94.6%).

Primary and secondary outcome measures: Patient experience with nursing care, meaning the sum of all interactions between patients and nurses, was measured using the self-designed questionnaire, which was developed by patient interviews, literature analysis and expert consultation. The overall patient satisfaction question was measured with a ten-point response option ranging from 1-10.

Results: A linear relationship between the patient experience with nursing care and overall patient satisfaction was observed. The patient experience with nursing care was significantly associated with overall satisfaction in the crude model and in the adjusted models. Even after adjusting for 6 sociodemographic and 3 disease-related factors, the patient experience with nursing care explained 34.9% of the variation in overall patient satisfaction.

Conclusions: This study showed that patient experience with nursing care was an

important predictor for overall patient satisfaction.

Key words: Patient satisfaction; Patient experience; Nursing care; Health services research

Strengths and limitations of this study

- This study used a valid and specific questionnaire of patient experience with nursing care made by patient interviews, literature analysis, and expert consultation to investigate patient experience with nursing care.
- This study quantitatively analyzed the impact of patient experience with nursing care on overall patient satisfaction.
- This study first surveyed patient experience with nursing care systematically and comprehensively in China.
- This was a single-center study and our findings therefore may not be generalized.
- This study didn't survey hospital-unit-related characteristics, such as the organization's patient-centered culture and nurses' practice environment. These variables were not available in our data sample but might be associated with patient experience with nursing care and also have an effect on overall patient satisfaction.

1 Introduction

In the age of patient-centered care, as value-based care expands, patient satisfaction has become a key indicator in assessing healthcare quality and hospital performance [1] and is being used more frequently to determine hospital performance and hospital reimbursement [2, 3]. Patients who are satisfied with the healthcare system are more willing to comply with medical orders and treatments [4], are more likely to return to the healthcare organization for future care, and are more likely to recommend healthcare services to their family members and friends [5]. As the healthcare quality improvement action plan proliferated internationally, the National Health Commission of the People's Republic of China posted an announcement implementing the National Healthcare Improvement Initiative (NHII) in January 2015, with the overall goal of improving the patient satisfaction on a national level

[6].

Recognizing factors that influence overall patient satisfaction will help improve medical care. A large body of research has identified the factors that account for the variations in patient satisfaction [7]. However, such studies have largely focused on patient characteristics, such as age [8], gender [9], race/ethnicity [10], financial status [11], and organizational factors [12, 13]; additionally, these studies have inconsistent findings and explained only a small fraction of the variance in patient satisfaction.

In recent years, patient experience has been increasingly used to evaluate the quality of healthcare [14]. Patient experience is defined as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care" [15]. Patient experience measures the structures and processes of care, while patient satisfaction survey serves as a patient-reported outcome measure [15]. The causal link between structure, process and outcome might be expected theoretically. However, patient satisfaction is subjective and obscure, and dependent on patients' expectations, fulfilment of expectations, actual experiences, health outcome, and other individual factors. Therefore, several studies have explored the relationship between patient experience and patient satisfaction with the health care system [16-18], with an attempt to determine to what extent that patient experience affects patient satisfaction, considered that patient experience can provide tangible feedbacks to current care delivery and these feedbacks are amendable and actionable by providers to improve quality of healthcare, whereas other factors such as patients' expectations and individual characteristics are hard to change.

Nurses are a vital and central part of the health care system [19], accounting for nearly half of the global health workforce and spending more time with patients than any other medical professionals [20]. According to the data from the latest China Health Statistics Yearbook issued by the National Health Commission of the People's Republic of China, as of the end of 2020, the number of nurses in China reached 4.7 million, accounting for 44.1% of the total number of healthcare professionals [21]. In theory, patient experience with nursing care, as a process indicator, reflects interactions between patients and nurses and has an important impact on overall

satisfaction with hospital care [22, 23]. In the study of Bjertnaes [18], thirteen variables were significantly associated with overall patient satisfaction with hospitals, and the results of the regression model showed that the most important predictor of patient satisfaction with hospitals was patient experiences with nursing care. Similarly, Schmidt found that the perception of nursing care received was the only significant predictor of overall satisfaction with the hospital experience [24].

However, in terms of using these patient experience data to improve nursing care, existing studies have not offered enough feedback due to the low representation of nursing care in these patient experience surveys [17, 18]. Most patient experience scales include a limited number of items related to nursing and fail to provide thorough and detailed insight into nursing care from patients' perspectives. For instance, the study of Bjertnaes [18] included only 4 items related to nursing care, and the study of Min [12] included only 2 items related to nursing care. Therefore, to what extent patient experience with nursing care explains satisfaction with the health-care system remains unclear.

We hypothesize that patient experience with nursing care accounts for a considerable portion of the unexplained variation in health system satisfaction after adjustments for the demographic profile, health and organizational factors with which patient satisfaction is usually associated. Understanding the association between patient experience with nursing care and patient satisfaction may help in utilizing the results to improve nursing services, resulting in better patient satisfaction. Therefore, the purpose of this study was to determine how patient experience with nursing care influence satisfaction among patients.

2 Methods

2.1 Design

This study is a cross-sectional survey and is reported according to the 'The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for reporting observational studies' obtained from the EQUATOR Network website [25].

2.2 Setting

Inpatients were consecutively recruited from July 2020 to August 2020 in Zhongshan Hospital of Fudan University, which is the largest academic hospital (with 2000 beds) in Shanghai, China.

2.3 Sample and participants

We calculated the sample size according to the requirements for multivariate analysis, which demands the sample size be 5-10 times the number of variables [26]. There were 33 items in the questionnaire and 22 patients and organizational characteristics. Therefore, the sample size was required to be 660 with an estimated 20% nonresponse rate. During the study period, a total of 767 inpatients were eligible to participate in the study, seven patients refused to participate (0.9%), and four patients' questionnaires were incomplete (0.5%). Finally, 756 patients (98.6%) were analyzed. The inclusion criteria were as follows: (1) hospitalized for 2 days or more; (2) able to read and understand Chinese; and (3) aged 18 years old or above. Patients with mental health problems, such as dementia, schizophrenia, and severe depression, were excluded. Eligible patients were invited to participate in the study. When a patient showed an interest in participating, a recruitment letter explaining the aim, process, and ethical considerations of this study was sent to them. To gain a broad and representative understanding of the patient experience, we varied the recruitment sites. A total of 36 wards were included, including 16 internal medical wards and 20 surgical wards, followed by cardiology, hepatology, respiratory department, gastroenterology, hematology, oncology, nephrology, orthopedics, urology, neurology, obstetrics and gynecology, endocrinology, otorhinolaryngology, and hepatobiliary surgery department, from each of which accounted for at least three percent of the patients in our sample.

2.4 Measures

Patient characteristics

The following characteristics were collected: age, gender, ethics, religion, educational level, household monthly income per capita, family residence, medical assurance, primary caregiver, primary disease diagnosis, number of admissions within one year, and length of hospital stay. The section for disease diagnosis consisted of ten

categories: (1) cardiovascular diseases, (2) pulmonary diseases, (3) diseases of the digestive system, (4) diseases of the musculoskeletal system, (5) endocrine/metabolic diseases, (6) neurological diseases, (7) diseases of ophthalmology, (8) diseases of the urinary system, (9) diseases of the hematological system, and (10) other diseases, including allergies.

Patient experience with nursing care

Patient experience with nursing care was measured by the inpatient experience of nursing care questionnaire, which was self-designed to evaluate patients' perceptions of quality of nursing care in Chinese hospitals. After a scoping review of current research results concerning patient experience with nursing care, 15 semi-structured in-depth interviews with 8 men and 7 women were conducted to obtain insights into patient-perceived important elements of nursing care. Example questions are 'What aspects of nursing care do you feel are important?' and 'What do you see as the nurses' role when you receive health services?'. The draft items of the questionnaire were generated by interviews and literature analysis. Then, to select the most suitable items to be retained in the questionnaire, the content validity of the items was evaluated by 15 experts in the fields of patient management and quality of care, and items were deleted if the content validity index was less than 0.8. Finally, we conducted a pilot survey and found the Cronbach's α of the questionnaire was 0.84, and the split-half reliability was 0.75.

The final questionnaire consisted of 33 items assessing 8 dimensions of patients' perception of nursing care (Online Supplemental Material 1): (1) Coordination of care (3 items), e.g., the process of admission. (2) Physical environment (3 items), e.g., the cleanliness of the ward. (3) Information and education (7 items), e.g., the information about how to conduct scientific lifestyles. (4) Emotional support (4 items), e.g., nurses' response to patients' anxiety and fear. (5) Technical competencies (2 items), e.g., proficiency in performing nursing procedures. (6) Monitoring the progress of diseases (4 items), e.g., monitoring the vital signs. (7) Responding requests (3 items), e.g., the waiting time after pressing the call button. (8) Patient safety and privacy protection (7 items), e.g., treating patients' information confidentially. Most of the items were

assessed by a 5-point Likert scale ranging from "never" to "always", where 'never' = 1, 'occasionally' = 2, 'sometimes' = 3, 'usually' = 4, and 'always' = 5. Response options ranged from "strongly disagree" and "strongly agree" for the admission process and discharge plan. For each item, the patients were offered the option of indicating whether it was *not relevant*. Each dimension score was determined by adding the scores of all items that corresponded to that dimension and dividing it by the number of items. The total inpatient experience score was the mean of all 8 dimension scores.

Patient satisfaction

The overall patient satisfaction question was 'All in all, were you satisfied with the care and treatment you received at the hospital?', with a ten-point response option ranging from 1-10 (with 1 labeled "not at all satisfied" and 10 labeled "to a very large extent satisfied").

2.5 Data Collection

Eligible patients were invited to participate in the study. After informed consent was given, all data were obtained by trained investigators. Characteristics included in the hospital information system, such as gender, age, and diagnosis, were collected by checking the information system, while characteristics related to family income, literacy level and number of hospital admissions were assessed by interviewing patients and their family members. The timing of collecting the patients' feedback may affect their response to the questionnaires because some of them may worry that negative appraisals about their hospital experience and satisfaction would affect the treatment and care they received during hospitalization, and thus they might be unwilling to provide negative feedback. To encourage the participants to respond frankly, the patient experience with nursing care survey and the overall patient satisfaction survey were taken on the patients' discharge day, and the nursing staff did not administer the survey.

2.6 Data analysis

Statistical analyses were conducted using IBM-SPSS software version 22 (IBM Corp., Armonk, NY, USA), Empower (R) (www.empowerstats.com, X&Y solutions, Inc.,

Boston, MA), and R statistical software. Descriptive analysis was performed for participants' characteristics and their responses to items about satisfaction and experience. Values were expressed as the mean and standard deviation for continuous variables or percentages for categorical variables. Multiple regression models were used to analyze the effects of patient experience with nursing care and other variables on the overall patient satisfaction. Independent variables were selected based on evidence in previous studies [6-8] showing a significant relation to overall patient satisfaction and we also included other variables based on our clinical experience. To ensure the stability of the model, and determine whether the relationship between patient experience with nursing care and patient overall satisfaction would be weakened after adjusting different variables, we chose different kinds of variables into the model successively. Model 1 was adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance; model 2 was adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance, diagnosis, number of admissions within one year, length of hospital stay. We also conducted the subgroup analyses test whether the relationship between patient experience with nursing care and overall patient satisfaction was valid among different populations. Non-ordinal categorical variables and ordinal categorical variables with non-equidistant data were transformed into dummy variables. The probability was considered significant when $p < .05$. No missing data imputation methods were used.

2.7 Patient and Public Involvement statement

It was not appropriate or possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.

3 Results

Sociodemographic and clinical characteristics of the study participants

A total of 756 participants with a mean age of 57.7 years were recruited. Of these, 61.5% (465/756) were male, and 39.9% (302/756) were diagnosed with cancer. The detailed demographic and clinical characteristics of the participants are shown in Table 1.

Patient experience with nursing care

The total patient experience score was 4.54 (0.37). The scores of each item are presented in Table 2. The lowest scores were related to 'information and communication' (4.34±0.52), 'coordination of care' (4.42±0.53) and 'emotional support' (4.56±0.45). Patients had better experiences with 'patient safety and privacy protection' (4.65±0.39), 'technical competencies' (4.64±0.38) and 'responding requests' (4.63±0.41).

Patient satisfaction with hospital services

The overall patient satisfaction item was skewed toward a positive assessment: 9.2 on a scale of 1-10, where 10 represents the best score. Of those who responded, 52.0% were satisfied with the hospital services to a very large extent. Only 1.9% reported being satisfied to only a small extent, and 0.3% were not at all satisfied with the hospital services.

Relationships between patient experience with nursing care and overall patient satisfaction

A linear relationship between the patient experience of nursing care and overall patient satisfaction was observed after adjusting for age, sex, household monthly income per capita, literacy level, residence, medical insurance, length of hospital stay, number of admissions within one year, and primary diagnosis (Fig. 1). Table 3 presents the results of multivariate regression for the effects of patient experience with nursing care on the patients' overall satisfaction with hospital services. The patient experience with nursing care was significantly associated with overall satisfaction in the crude model and in the adjusted models. Even after adjusting for 6 sociodemographic and 3 disease-related factors in model 2, the patient experience with nursing care was still significantly associated with overall patient satisfaction (β=1.257, adjusted R^2= 34.9%, p<0.001).

Subgroup analysis of the relationship between patient experience with nursing care and overall patient satisfaction

The subgroup analysis is presented in Figure 2. No significant heterogeneity was found among analysed subgroups stratified according to age, sex, residence, literacy

level, household monthly income per capita, type of medical assurance, primary diagnosis, number of admissions within one year, and length of hospital stay.

4 Discussion

The aim of our study was to analyze the effects of patient experience with nursing care on overall patient satisfaction. The results showed a linear relationship between patient experience with nursing care and overall patient satisfaction after the adjustment for age, sex, family monthly income, educational level, residence, medical insurance, length of hospital stay, number of admissions, primary diagnosis (Fig. 1). The patient experience with nursing care explained 34.9% of the variance in overall patient satisfaction. This finding was consistent with previous studies [24, 27], which showed that the most important predictor of patient satisfaction with hospitals was patient experience with nursing care. The variance in overall patient satisfaction that patient experience with nursing care explained in our study was larger than that in study of Bjertnaes [18]. The possible reason may be the different tools we used. The study of Bjertnaes [18] included only 4 items relating to nursing and had low representation of nursing care, failing to provide thorough and detailed insight into nursing care from the patients' perspectives, while our study developed and used a questionnaire of patient experience with nursing care through patient interviews, literature analysis, and expert consultation, which consisted of 33 items assessing 8 dimensions of the patients' perception of nursing care and had good validity and reliability. Therefore, the survey tool used in our study had a high representation of patient-perceived nursing care.

To our knowledge, this is the first study in China to survey patient experience with nursing care and to analyze its relationship with overall patient satisfaction. Recently, there has been a growing interest in using patient experience to assess and improve the performance of the healthcare system in China [11]. However, nursing seems to be overlooked in this growing trend [28]. Our study showed that patients had better experiences with 'patient safety and privacy protection', 'technical competencies' and 'responding requests'. The year of 2021 is the 11th anniversary of the launch of Quality Care Demonstration Project by the Chinese government, aiming at improving

satisfaction of patients, society, and government through high-quality nursing care [29]. Driven by the implementation of the 'high-quality care project', Chinese nursing services have continued to be improved regrading patients' physical care.

However, there should be recognition of the potential need for psychological and emotional support, as well as of the importance of meeting communication and information needs. The result of our study showed that patients had worse experience with 'information and communication', 'coordination of care' and 'emotional support', which was consistent with study of Senarat [30]. As patients' healthcare demands increase, they are no longer satisfied with passively receiving care; instead, they are eager to become fully involved in the treatment and recovery process [31]. Additionally, nurses spend the most time with them among all medical professionals. In addition to direct care providers, nurses are also expected to act as navigators coordinating all aspects of care and promoting patient-centered care. Therefore, coordination of care is a fundamental and core value of nursing care, a predictor of quality and a known predictor of patient satisfaction with healthcare [32]. Humanistic care is an indispensable characteristic of nursing services. Numerous studies have demonstrated that patients' health outcomes can be improved much more significantly when caring behaviors are performed with empathy and compassion [33, 34]. The study of Karam [15] also showed that tactics alone, such as bedside shift reports, health education, and follow-up phone calls after discharge, were insufficient, while meaningful strategies to create a positive organizational culture were vital drivers to promote a successful patient experience. However, most healthcare institutions in China are task-oriented, and the delivery of nursing care is streamlined with standardized processes, protocols, and paths. These practices result in the fragmented nursing care, and patients receive less psychological care and more technical care from nurses, which negatively influences patient experience. Efforts should be made by hospital administrators and nursing managers to overcome the tendency to streamline the care delivery by standardized processes and determine how these patient-perceived attributes of nursing care can be developed and rooted in the daily practice through organizational changes, culture shaping and staff education.

Compared to the other determinants that influence overall patient satisfaction with hospital services, such as the reputation and the image of hospitals, education and socioeconomic status of the patients, and length of stay [6], patient experience with nursing care is amendable and actionable. For instance, organizing an afternoon ward round by nurses to address the communication needs of patients and hanging a poster to share patient feedback with the medical team have been proven to be efficient ways to facilitate good experiences with communication [35]. Understanding the importance of patient experience with nursing care would enable nursing managers and nursing practitioners to have a better understanding of current problems with healthcare delivery, push for continuous improvement, redesign the delivery of services and help professionals reflect on their practice.

Limitations

This was a single-center study and our findings therefore may not be generalized. However, our hospital is a national large general hospital and the nursing services model has a leading role around the country, therefore, for the Chinese region, our results can be regarded as representative to a considerable extent. Moreover, even though we had consider several variables which are likely related to patient outcomes, we might have omitted other hospital-unit-related characteristics, such as the organization's patient-centered culture and nurses' practice environment. These variables were not available in our data sample but might be associated with patient experience with nursing care and also have an effect on overall patient satisfaction. Further researches are needed to analyze the external factors that could have influenced patient experience with nursing care**.**

Conclusion

This study provides the first evidence of the importance of nursing care in improving overall patient satisfaction, and demonstrates that nurses have the huge potential to contribute to the patient-centered healthcare system and nursing should be more involved in the healthcare quality improvement. Understanding the importance of patients' perception of nursing services delivery would enable nursing managers and

nursing practitioners to have better understanding of current problems with healthcare delivery, push for continuous improvement, redesign the delivery of services and help professionals reflect on practice modern.

Contribution statement

Xiao CHEN and Yuxia ZHANG contributed to the study conception and design. Material preparation, data collection and analysis were performed by Xiao CHEN, Yuxia ZHANG, Wei QIN, Zhenghong YU, Jingxian YU, Ying LIN, Xiaorong LI, Zheng ZHENG, and Ying WANG. The first draft of the manuscript was written by Xiao CHEN and Yuxia ZHANG, Wei QIN, Zhenghong YU, Jingxian YU, Ying LIN, Xiaorong LI, Zheng ZHENG, and Ying WANG commented on and revised previous versions of the manuscript. All authors read and approved the final manuscript, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

Competing interest

- We had no associations with commercial entities that provided support for the work reported in the submitted manuscript.
- We had no associations with commercial entities that could be viewed as having an interest in the general area of the submitted manuscript.
- We had no similar financial associations involving their spouse or their children under 18 years of age.
- We had no Non-financial associations that may be relevant to the submitted manuscript

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Ethical statement

The study was approved by the Ethics Committee of Zhongshan hospital of Fudan university (Approval number B2020-074) and was performed in accordance with the

ethical standards of the 1964 Declaration of Helsinki and its later amendments. Prior to data collection, all participants were informed of the purpose of this study and signed written consent forms were obtained to inform them of the rights, risks, and advantages of participation.

Data sharing

Data are available on the Dryad repository and the DOI number is https://doi.org/10.5061/dryad.qfttdz0jg

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Table 1 Socio-demographic and clinical characteristics of study participants

Characteristics	Value
Sex, n(%)	
Male	465, 61.5%
Female	291, 38.5%
Age, mean±SD	57.7±14.5
Marital status, n(%)	
Single	41, 5.4%
Ever married	715, 94.6%

Literacy level, n(%)	
Primary education or below	109, 14.4%
Secondary education	454, 60.1%
College education or above	193, 25.5%
Household monthly income per capita, n(%)	
＜5000 RMB	288, 38.1%
5000-9999 RMB	293, 38.8%
>10000 RMB	175, 23.1%
Main source of medical expense, n(%)	
Urban medical insurance	505, 66.8%
Rural medical insurance	163, 21,6%
Commercial medical insurance	8, 1.0%
Personal funds	80, 10.6%
Residence, n(%)	
Rural areas	204, 27%
Urban areas	416, 55%
Rural-urban fringe areas	136, 18%
Diagnosed with cancer, n(%)	
Yes	302, 39.9%
No	454, 60.1%
Number of hospital admissions within 1 year, n(%)	
1	457, 60.4%
2	121, 16.0%
3	58, 7.7%
>3	120, 15.9%
Units type, n(%)	
Cardiology	78, 10.3%
Hepatology	72, 9.5%
Respiratory department	65, 8.6%
Gastroenterology	64, 8.5%
Hematology	53, 7.0%
Oncology	53, 7.0%
Nephrology	51, 6.7%
Orthopedics	46, 6.1%
Urology	44, 5.8%
Neurology	43, 5.7%
Obstetrics and gynecology	39, 5.2%
Thoracic surgery department	37, 4.9%

Endocrinology	35, 4.6%
Otorhinolaryngology	28, 3.7%
hepatobiliary surgery department	27, 3.6%
Breast department	21, 2.8%

Table 2 Percentage distribution of items for experience with nursing care in participants (n, %)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Coordination of care	Nurses provided well-organized admission process	0(0.0%)	5(0.7%)	31(4.1%)	317(41.9%)	403(53.3%)
	Nurses informed me about who are responsible for my treatment and care	0(0.0%)	2(0.3%)	37(4.9%)	299(39.6%)	418(55.2%)
	Nurses provided well-organized discharge plan	3(0.4%)	7(0.9%)	89(11.8%)	336(44.4%)	321(42.5%)
Physical environment	Nurses provided a clean ward environment	4(0.5%)	2(0.3%)	15(2.0%)	281(37.2%)	454(60.1%)
	Nurses provided a quiet ward environment	4(0.5%)	7(0.9%)	24(3.2%)	251(33.2%)	470(62.2%)
	Nurses provided an ordered ward environment	2(0.3%)	6(0.8%)	26(3.4%)	246(32.5%)	476(63.0%)
Information and communication	Nurses informed me about usage, dosage and side effects of medicines	0(0.0%)	0(0.0%)	14(1.9%)	347(45.9%)	395(52.2%)
	Nurses helped me better know the disease	0(0.0%)	1(0.1%)	70(9.3%)	393(52.0%)	292(38.6%)
	Nurses informed me about results of tests	14(1.9%)	110(14.5%)	145(19.2%)	382(50.5%)	105(13.9%)
	Nurses provided information about the appropriate dietary	0(0.0%)	2(0.3%)	64(8.5%)	314(41.5%)	376(49.7%)
	Nurses provided information about disease recovery	0(0.0%)	1(0.1%)	28(3.7%)	276(36.5%)	451(59.7%)
	Nurses provided health information through multiple routes	0(0.0%)	0(0.0%)	30(4.0%)	272(35.9%)	454(60.1%)
	Nurses provided relevant instructions before implementing medical procedures	0(0.0%)	16(2.1%)	27(3.6%)	331(43.8%)	382(50.5%)

Table 2 Percentage distribution of items for experience with nursing care in participants (continued)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Emotional support	Nurses treated me patiently	0(0.0%)	1(0.1%)	14(1.9%)	288(38.1%)	453 (59.9%)
	Nurses treated me with respect	0(0.0%)	2(0.3%)	4(0.5%)	239(31.6%)	511 (67.6%)
	Nurses' behaviors made me feel cared for	0(0.0%)	0(0.0%)	38(5.0%)	298(39.4%)	420(55.6%)
	Nurses helped me manage the anxiety, stress, fears I had about my illness	1(0.1%)	4(0.5%)	23(3.0%)	307(40.6%)	421(55.8%)
Technical competencies	Nurses were proficient in venipuncture procedures	0(0.0%)	1(0.1%)	5(0.7%)	261(35.8%)	463(63.4%)
	Nurses were proficient in other nursing procedures, such as intramuscular injection, hypodermic injection, change of dressing, etc.	0(0.0%)	0(0.0%)	3(0.4%)	257(34.0%)	496(65.6%)
Monitoring the progress of diseases	Nurses made an inspection tour of the ward	0(0.0%)	2(0.3%)	21(2.8%)	191(25.3%)	542(71.7%)
	Nurses monitored my vital signs timely	1(0.1%)	3(0.4%)	6(0.8%)	264(34.9%)	482(63.4%)
	Nurses monitored the process of drug treatment	0(0.0%)	0(0.0%)	8(1.1%)	243(32.1%)	505(66.8%)
	Nurses could recognize my health issues on time	2(0.2%)	1(0.1%)	43(5.7%)	300 (39.7%)	410(54.2%)

Table 2 Percentage distribution of items for experience with nursing care in participants (continued)

Domain	Items	Never/Strongly disagree	Occasionally/ Disagree	Sometimes/ Neutral	Often/ Agree	Always/Strongly Agree
Responding requests	Nurses could come and see me in time after pressing the call button	4(0.5%)	2(0.3%)	20(2.6%)	88(11.6%)	642 (84.9%)
	Nurses dealt with my requests promptly	0(0.0%)	0(0.0%)	29(3.8%)	304(40.2%)	423(56.0%)
	Nurses responded to my suggestions or complaints seriously	1(0.1%)	1(0.1%)	13(1.7%)	280(37.0%)	461(61.0%)
Patients safety and privacy protection	Nurses could handle in time when my condition experienced changes	0(0.0%)	1(0.1%)	13(1.7%)	282(37.3%)	460(60.8%)
	Nurses informed me about how to prevent the risk events, such as falling and dropping from the bed	3(0.4%)	4(0.5%)	21(2.8%)	251(33.2%)	477(63.1%)
	Nurses clearly introduced the use of safety protection equipment, such as the emergency call button in the toilet	5(0.7%)	2(0.3%)	26(3.4%)	249(32.9%)	474(62.7%)
	Nurses verified my identify when performing nursing procedures	1(0.1%)	0(0.0%)	1(0.1%)	231(30.6%)	523(69.2%)
	Nurses applied hand disinfection before performing nursing procedures	0(0.0%)	1(0.1%)	55(7.3%)	186(24.6%)	514(68.0%)
	Nurses provided protective measures when performing nursing procedures in private body parts	2(0.3%)	0(0.0%)	1(0.1%)	99(13.1%)	654(86.5%)
	Nurses treated my information confidentially	1(0.1%)	4(0.5%)	6(0.8%)	248(32.8%)	497(65.7%)

Table 3 Multivariate regression for effect of patient experience with nursing care on overall patient satisfaction

Variable	Crude model			Multivariate-adjusted model 1			Multivariate-adjusted model 2		
	β (95% CI)	P value	P for trend	β (95% CI)	P value	P for trend	β (95% CI)	P value	P for trend
Patient experience with nursing care (Continuous)	1.269 (1.150,1.389)	<0.001		1.273 (1.153-1.393)	<0.001		1.257 (1.138-1.377)	<0.001	
Patient experience with nursing care (Tertiles)									
T1 (3.23-4.45)	0		<0.001	0		<0.001	0		<0.001
T2 (4.46-4.84)	0.726 (0.609,0.843)	<0.001		0.778 (0.669-0.887)	<0.001		0.774 (0.665-0.882)	<0.001	
T3 (4.85-5.00)	0.964 (0.846,1.083)	<0.001		1.011 (0.901-1.121)	<0.001		0.995 (0.885-1.105)	<0.001	

Model 1 adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance; model 2 adjusted for age, sex, residence, literacy level, household monthly income per capita, type of medical assurance, diagnosis, number of admissions, length of hospital stay.

Figure 1 The relationship between patient experience with nursing care and overall patient satisfaction

Figure 2 Subgroup analysis for effect of patient experience with nursing care on overall satisfaction with hospital services

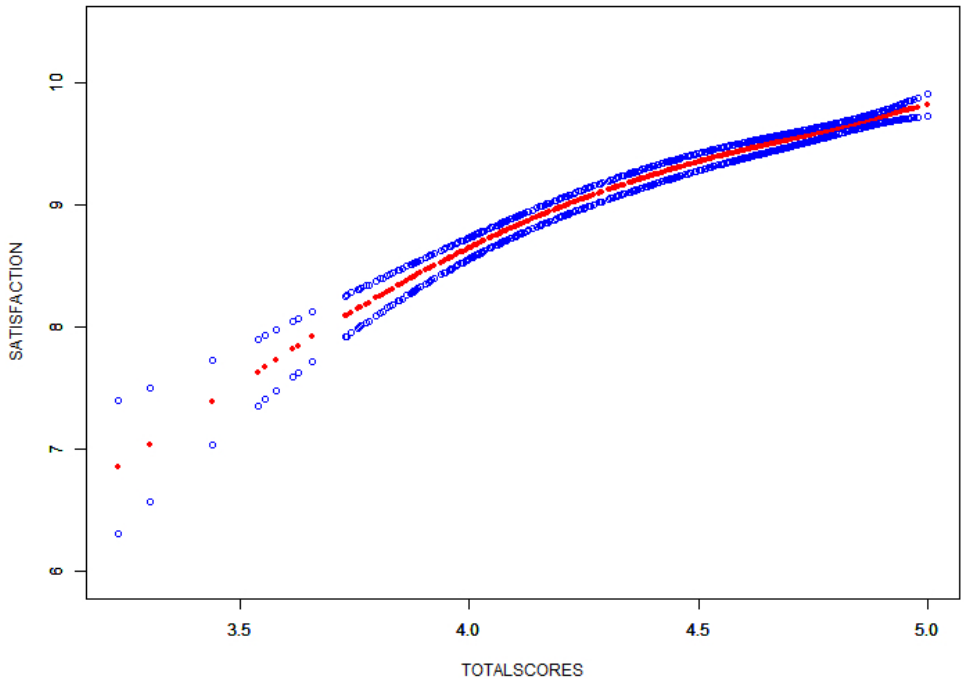

Figure 1 The relationship between patient experience with nursing care and overall patient satisfaction

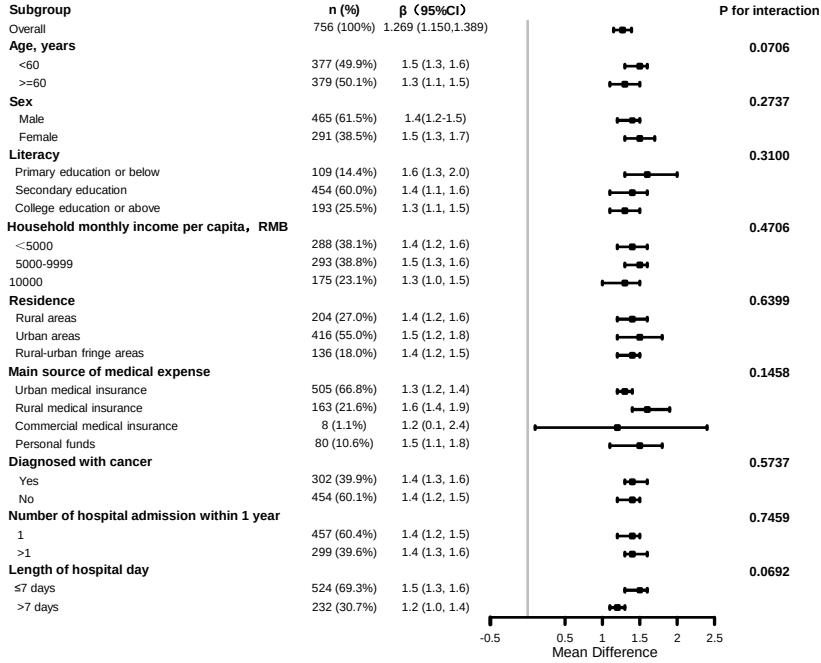

Figure 2 Subgroup analysis for effect of patient experience with nursing care on overall patient satisfaction

The Inpatient Experience of Nursing Care Survey

Instructions

This survey is about your experience with nursing care **during this hospitalization stay,** the responses you give will help improve nursing service. You answers will be confidential and will not be shared with the health professionals who looked after you.

This survey is easy to answer, please read the questionnaire and answer all questions. For each question, please place a tick in the box next to the answer that most closely match your own experience. **If you didn't experience any nursing care, please place a tick in the box next to "not applicable"**.

Thank you for your support.

1、Nurses provided well-organized admission process.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

2、Nurses informed me about who are responsible for my treatment and care.

□ Never □ Occasionally □ Sometimes □ Often □ Always

3、Nurses provided well-organized discharge plan.

□ Strongly disagree □ Disagree □ Neutral □ Agree □ Strongly agree

4、Nurses provided a clean ward environment.

□ Never □ Occasionally □ Sometimes □ Often □ Always

5、Nurses provided a quiet ward environment.

□ Never □ Occasionally □ Sometimes □ Often □ Always

6、Nurses provided an ordered ward environment.

□ Never □ Occasionally □ Sometimes □ Often □ Always

7、Nurses informed me about usage, dosage and side effects of medicines.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

8、Nurses helped me better know the disease.

□ Never □ Occasionally □ Sometimes □ Often □ Always

9、Nurses informed me about results of tests when needed.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

10、Nurses provided information about the appropriate dietary.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

11、Nurses provided information about disease recovery.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

12、Nurses provided health information through multiple routes.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

13、Nurses provided relevant instructions before implementing medical procedures.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

14、Nurses treated me patiently.

□ Never □ Occasionally □ Sometimes □ Often □ Always

15、Nurses treated me with respect.

□ Never □ Occasionally □ Sometimes □ Often □ Always

16、Nurses' behaviors made me feel cared for.

□ Never □ Occasionally □ Sometimes □ Often □ Always

17、Nurses helped me manage the anxiety, stress, fears I had about my illness.

□ Never □ Occasionally □ Sometimes □ Often □ Always

18、Nurses were proficient in venipuncture procedures.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

19、Nurses were proficient in other nursing procedures, such as intramuscular injection, hypodermic injection, change of dressing, etc.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

20、Nurses made an inspection tour of the ward.

□ Never □ Occasionally □ Sometimes □ Often □ Always

21、Nurses monitored my vital signs timely.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

22、Nurses monitored the process of drug treatment.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

23、Nurses could recognize my health issues on time.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

24、Nurses could come and see me in time after pressing the call button.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

25、Nurses dealt with my requests promptly.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

26、Nurses responded to my suggestions or complaints seriously.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

27、Nurses could handle in time when my condition experienced changes.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

28、Nurses informed me about how to prevent the risk events, such as falling and dropping from the bed.

□ Never □ Occasionally □ Sometimes □ Often □ Always

29、Nurses clearly introduced the use of safety protection equipment, such as the emergency call button in the toilet.

□ Never □ Occasionally □ Sometimes □ Often □ Always

30、Nurses verified my identify when performing nursing procedures.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

31、Nurses applied hand disinfection before performing nursing procedures.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

32、Nurses provided protective measures when performing nursing procedures in private body parts.

□ Never □ Occasionally □ Sometimes □ Often □ Always □ Not applicable

33、Nurses treated my information confidentially.

□ Never □ Occasionally □ Sometimes □ Often □ Always

How does overall hospital satisfaction relate to patient experience with nursing care? a cross-sectional study

Xiao CHEN, Yuxia ZHANG, Wei QIN, Jingxian Yu, Zhenghong YU, Zheng ZHEN

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This study is a cross-sectional survey and is reported according to the 'The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for reporting observational studies' obtained from the EQUATOR Network website.

Item	STROBE description	Reported on pages
1. Title and abstract	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
	(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1
2. Background	Explain the scientific background and rationale for the investigation being reported	2-3
3. Objectives	State specific objectives, including any prespecified hypotheses	3
4. Study design	Present key elements of study design early in the paper	4
5. Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
6. Participants	Give the eligibility criteria, and the sources and methods of selection of participants	4
7. Variables	Clearly define all outcomes, exposures, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5

Item	STROBE description	Reported on pages
8. Data sources	For each variable of interest, give sources of data and details of methods of assessment. Describe comparability of assessment methods if there is more than one group	5
9. Bias	Describe any efforts to address potential sources of bias	4,7
10. Study size	Explain how the study size was arrived at	4
11. Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
12. Statistical methods	(*a*) Describe all statistical methods, including those used to control for confounding (*b*) Describe any methods used to examine subgroups and interactions (*c*) Explain how missing data were addressed (*d*) If applicable, describe analytical methods taking account of sampling strategy (*e*) Describe any sensitivity analyses	7
13. Participants	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	4
14. Descriptive data	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	Table 1

Item	STROBE description	Reported on pages
15. Outcome data	Report numbers of outcome events or summary measures	Table 2
16. Main results	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (*b*) Report category boundaries when continuous variables were categorized (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	8
17. Other analyses	Report other analyses done-eg analyses of subgroups and interactions, and sensitivity analyses	Figure 2; 9
18. Key results	Summarise key results with reference to study objectives	9-11
19. Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
20. Interpretation	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	9-11
21. Generalisability	Discuss the generalisability (external validity) of the study results	11
22. Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Title page