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Inpatients' satisfaction with nursing care at a tertiary hospital in Gansu, China: a cross-sectional study

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4 **1 Inpatients' satisfaction with nursing care at a tertiary hospital in**
5 **2 Gansu, China: a cross-sectional study**
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3 **29 Abstract**
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6 **30 Objectives** The aim of the study was to examine the level of patient satisfaction with
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8 nursing care and identify the factors affecting satisfaction from the in-patients'
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11 viewpoints.
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13 **33 Design** This was a cross-sectional study.
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15 **34 Setting** The study was conducted at a tertiary hospital located in the Northwest of
16
17 China.
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20 **36 Participants** Patients who admitted in the wards for at least 48 hours were chosen to
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22 attend the survey.
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24 **38 Primary outcome measure** The Newcastle Satisfaction with Nursing care Scale was
25
26 used. Data was analyzed using SPSS 21.0 software.
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29 **40 Results** A total of 291 patients were involved. The overall inpatient satisfaction with
30
31 nursing care was 60.5% with the mean score 78.15 ± 4.74 . Patients were more
32
33 satisfied with nurse who treatment them as an individual(67.7%) and respect their
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35 privacy. Patients were least satisfied with the type of information nurses gave to
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37 them(11.7%) and awareness of their needs. Patients who were older, married,
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39 hospitalized, having a history of hospitalization, and in-charged by junior nurses had
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41 higher satisfaction with nursing.
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45 **47 Conclusions** The overall level of patient satisfaction was moderate in this study.
46
47 Nursing administrators and clinical nurses should be more sensitive with the factors
48
49 affecting patients satisfaction with nursing care and to sufficiently meet patients'
50
51 expectations.
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55 **51 Keywords:** Inpatient, Nursing care, Tertiary hospital, China
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59 **52**
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3 **53 Strengths and limitations of this study**
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6 ● This study is the first to evaluate inpatients' satisfaction with nursing care in less
7 developed and heavier economic burden area in China.
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11 ● The questionnaire was completed only from Monday to Friday, and maybe some
12 patients which could have better or worse satisfaction during the weekends were
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● It maybe that patient did not express their real feelings regarding nursing care
fearing that the nurses would be against them, furthermore, qualitative interview
is needed to explore individuals true thoughts.

78 **Background**

79 Patient satisfaction is defined by comparing the expectations that the individual has
80 about the care they will receive and the real experience received, being understood as
81 a positive result when care exceeds or meets expectations.¹ Based on this expectation,
82 the evaluation of patient satisfaction objectively reflect the quality of health care
83 services which becomes the golden standard and widely used metric to measure
84 hospital quality management.^{2,3}

85 Patient satisfaction with nursing services refers to patients' evaluation of nursing
86 services⁴ and allows identification of areas requiring improvement in nursing practice,
87 thus guiding nursing planning, decision-making and result monitoring.¹ From the time
88 of admission, nurses provide care for patients every day without fail until discharge,
89 involve in almost every aspect of patients, therefore they comprise the majority of
90 health care providers.⁴ Thus, patient s' satisfaction regarding nursing service become
91 an important indicator of the care quality.^{5,6} More and more studies are taking
92 globally to evaluate patients' satisfaction with nursing services so as to develop a
93 system that meets patients' care needs. Studies in different countries revealed
94 differences in patient satisfaction, for example, Ethiopia (52.75%),⁷ Malaysia (47.5%)⁸
95 and Pakistan (45%),⁹ while Lebanon (96.6%).¹⁰ Anyway, these studies indicated that
96 current nursing services could not fully satisfy patient needs.

97 In China, there are 20918 hospitals in different levels with 20 million registered
98 nurses. The total bed to nurse ratio is 1:0,426. Of them, the 2232 tertiary public
99 hospitals account for only 7.66% of the all-types health facilities yet provide nearly
100 half(42.5%)of the inpatient care.¹¹ On average, one nurse per 1000 population which
101 was lower than the WHO standard of 2.28 per 1000 population.¹² Excessive worklord
102 leads to lower job satisfaction of nurse staff in tertiary hospitals than in other types of

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3 103 health facilities.^{11,13} Under such environment, the patients satisfaction in tertiary
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5 104 hospitals needs more attention. Ministry of Health of China have formulated the "
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7 105 Standards for Implementing Quality Nursing Services in Hospitals (Trial)" in 2010
8
9 106 which aimed to provide patients with safe and high-quality nursing services.¹⁴ With
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11 107 these standards, " quality nursing service project" was carry out national wide. By
12
13 108 the end of 2015, all tertiary hospitals in China had carried out high-quality nursing
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15 109 services, with 87.0 % of them were tertiary A-class hospitals and 82.6 % were B-
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17 110 class.¹⁵

21 111 At present, the survey on the satisfaction of hospitalized patients with nursing
22
23 112 service in China is confusing. On one hand, patients in different facilities reported
24
25 113 high satisfaction about nursing service. A survey about patients satisfaction in 71
26
27 114 hospitals showed the patients satisfaction in 80% of the hospitals were more than
28
29 115 90%.¹⁶A study in some "secondary" A hospitals showed that 78% of patients were
30
31 116 satisfied.¹⁷ This indicated that with the strengthening of high-quality care project,
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33 117 Chinese nursing service continues to be improved. However, unfaithful reports of the
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35 118 mass media and continuous occurrence of disputes and violence are inconsistent with
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37 119 the results of the satisfaction survey. An analysis of workplace violence shows that
38
39 120 40.8% of hospital nurses in China have experienced different types of workplace
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41 121 violence.¹⁸ Zou et al study showed there is a high incidence(59.7 %) of workplace
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43 122 violence among nurses in Chinese tertiary hospitals.¹⁹ In Wang et al study 6.67% of
44
45 123 nurses suffered that.²⁰ Violence in these workplaces will affect nurses' mental health,
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47 124 lead to job burnout,²¹ and thus reduce the quality of nursing services.²²

53 125 Thus, hospital-specific data are still needed to provide evidence for cross-country
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55 126 and cross-cultural comparisons of satisfaction and factors affecting satisfaction using
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57 127 standardized tools. Gansu province is located in north-west of China. Affected by
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3 128 region, the development of economy, culture and information is relatively backward
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5 129 there. According to China's economic comprehensive competitiveness development
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7 130 report, Gansu Province ranks 27th among the 31 provinces in China.²² To our
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9 131 knowledge, this is the first study in Gansu of China. This study has two aims: (1) to
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11 132 assess patient satisfaction with nursing care and (2) to investigate the influence
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13 133 factors affecting patient satisfaction with nursing care.
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17 134 **Methods**

18 135 **Study setting**

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20 136 This study was conducted at Gansu Provincial Hospital(GPH), a tertiary hospital with
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22 137 1700-beds. The services at GPH include ear, nose and throat, surgery, outpatients
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24 138 clinic, emergency, gynaecology and obstetrics, paediatrics and neonatal intensive care
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26 139 unit, maternal and child health, physiotherapy, dental, radiology, traditional Chinese
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28 140 medicine, rehabilitation, and internal medicine. GPH is also a teaching hospital for
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30 141 nursing, health officer, medicine, midwifery and pharmacy undergraduate and
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32 142 graduate students. The hospital has a total of 4070 healthcare employees whereas
33
34 143 1200 of them are nurses who providing health care in 60 nursing units. The average
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36 144 outpatient per day were about 4500 with 250 of them were admitted to different wards.
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38 145 The quality management department of the hospital conducts an annual patient
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40 146 satisfaction survey that is based on merely five questions. These surveys do not use
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42 147 the standard questionnaires nor include general characteristics of the patients and was
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44 148 not subjected for further analysis and comparisons.
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51 149 **Study design and sampling**

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53 150 This study was a cross-sectional survey. The sample of the study was determined
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55 151 using simple stochastic sampling. The number of open beds in GPH is about 1500
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57 152 after excluding departments such as paediatrics, intensive care units, emergency
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wards and VIP wards (about 200). The population of the study was calculated using the formula $N = Z^2 \cdot P(1-P) / E^2$.² In the formula, the symbols represent the following: a margin of error (E)= 5%. In order to narrow the interval, and make the estimation of effect quantity more accurate, we choose 99% as the confidence level, the $Z=2.58$. 90% patient satisfaction with nursing care.¹⁶ We calculated the sample as the following: $Z^2 \cdot P(1-P) / E^2 = (2.58^2 \cdot 0.90(1-0.90) / (0.05^2)) = 6.65 \cdot 0.09 / 0.0025 = 239$. Then we add 20% to the sample size for non-response or for selection bias, thus the sample size would be = 288 approximately. Patients should meet the following inclusion criteria: (1) ≥ 18 years old; (2) admitted in the wards at least for 48h; (3) capable of independent communication with Chinese; (3) voluntary participation. Patients were excluded on any one of the following conditions: critical illness or cognitive impairment that affects judgement; inability to provide written informed consent. Medical, surgical, gynaecology and obstetrics and ear, nose and throat wards were purposefully selected and based on the calculated sample size, the required number of patients from each ward was proportionally allocated. The study started on August 2018. At the time of admission, each new patient to those wards was informed about the purpose of the survey and then lottery method is adopted to select randomly to consider if this patient took part in the study or not by nurse manager. Finally, the study sample consisted of 291 patients.

Instruments

The questionnaire included: (1) general demographic characteristics: age, sex, occupational status, educational status, marital status, monthly family income, history of admission, hospital length of stay, admission ward, patients know the nurse in charge of his/her care. (2) the Newcastle Satisfaction with Nursing care Scale (NSNS) to measure satisfaction with nursing care. The NSNS was developed by Thomas et

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3 178 al.²³ The Chinese version of the scale was tested for its validity and reliability by
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5 179 Jiao.²⁴ The NSNS includes two subscales: the Experience of Nursing Care Scale
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7 180 (ENCS) and the Satisfaction with Nursing Care Scale (SNCS). These two subscales
8
9 181 can be applied either together or separately. In this study, the SNCS was applied
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11 182 which consists of a total of 19 items and using a 5-point Likert scale. For assessing
12
13 183 the degree of satisfaction, 'not at all', 'barely', 'satisfied', 'very', 'completely' scored
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15 184 from 1- 5 respectively. Patient responses across all items are summed and transformed
16
17 185 to yield an overall satisfaction score of 0–95, which denotes complete satisfaction
18
19 186 with all aspects of nursing care.

187 **Patient and Public Involvement**

188 Verbal consent was obtained from each admitted patient during data collection. The
189 respondents were told that participating in the study has no known risks rather benefit
190 from the study since they have an opportunity to express their views for future quality
191 nursing care improvements. The respondents also had given the right to refuse to take
192 part in the study as well as to withdraw at any time during the study. No identifying
193 information indicated on the questionnaires. None of the patients were involved in the
194 recruitment to and conduct of the study?

195 **Institutional Review Board approval**

196 Consent were acquired from nurse director of each ward and verbal approvals were
197 obtained from patients. This study was also approved by Gansu Provincial Hospital
198 Research Ethics Committee.

199 **Data collection**

200 Five nursing students attended each ward from Monday to Friday to collect data. The
201 students were trained previously regarding the content of the questionnaire and how to
202 conduct the survey. The selected patients who had at least 2 days inpatient

203 experiences in each ward were approached by the students. A private room at the
 204 hospital was used to interview patients. Family members were present during some of
 205 the interviews at the request of some patients. If the patient cannot fill in the form due
 206 to various factors, the researcher would ask and help to fill in the questionnaire. In
 207 addition, medical records were reviewed for certain variables such as hospital length
 208 of stay and history of admission. Till November of 2018, there were 291 patients
 209 completed the survey.

210 Data analysis

211 The data were collected and analyzed with SPSS version 21.0. Patient satisfaction
 212 with nursing service is described by mean, standard deviation, frequency and
 213 percentage. Considering the study by Ahmed et al,⁷ we used the same method to use
 214 mean satisfaction score as a cut point to dichotomise satisfaction into ‘satisfied’ and
 215 ‘not satisfied’. Binary logistics regression analysis and backward stepwise method
 216 was used to screen variables which affect patient satisfaction. The strength of the
 217 associations was described using ORs and 95% CI.

218 **Table 1** Sociodemographic characteristics and NSNS calculated score for example(N=291)

Variables	Categories	Frequency	NSNS score
		n(%)	Mean (SD)
Sex	Male	159(54.6)	79.00±4.44
	Female	132(45.4)	77.12±4.85
Monthly family income(CNY)*	<100	1(0.3)	78.0±0.35
	<1000	17(5.7)	77.52±4.05
	1000-2999	103(34.6)	85.0±0.05
	3000-4999	130(43.6)	78.56±4.37
	≥5000	39(13.1)	77.0±6.45
	≥10000	1(0.3)	78.52±4.05
Marital status	Single	20(6.9)	78.5±2.35
	Married	255(87.6)	77.98±4.95
	Others	16(5.5)	80.4±1.59
Educational status	Primary school	69(23.7)	78.27±4.01
	High school	146(50.2)	77.90±4.53
	Advanced diploma	40(13.7)	77.82±6.15
	Bachelor’s degree	35(12.0)	79.11±4.96

		Master degree	1(0.3)	85.0±0.05
	Admission ward	Medicine	99(33.7)	78.62±4.93
		Surgery	78(26.5)	77.63±2.97
		Obstetrics and gynecology	42(14.4)	74.5±5.5
		Ophthalmology and otorhinolaryngology	18(6.2)	79.77±3.13
		Rehabilitation department	22(7.6)	80.86±5.13
	History of admission	Yes	146(50.2)	78.76±4.57
		No	145(49.8)	77.53±4.82
	Patients know the nurse in charge of his/her care	Yes	221(75.9)	78.47±4.65
		No	70(24.1)	77.14±4.82
	Living area	urban	146(50.2)	77.98±4.08
		rural	145(49.8)	78.31±5.28
	Title of staff nurse	Junior RN	177(61.7)	79.15±4.25
		Senior RN	114(38.3)	76.56±4.98

219 NSNS, Newcastle Satisfaction with Nursing Scale.*USD1 is 7.4 Chinese Yuan (CNY).

220 Results

221 Patients' characteristics

222 Of the participant, the mean age is 45.59 ± 15.96 . As seen in table 1, 54.6% were male,
 223 87.6% were married and 23.7% were primary school graduates; 33.7% were
 224 admitted in medical department, 43.6% monthly family income is 3000-4999
 225 RMB(related to 436-726 USD). More than three-quarters (79%) of patients knew a
 226 nurse in charge of their nursing care and more than half(61,7%) were cared by junior
 227 registered nurses. Patients had the duration of the hospital stay varied between 2 and
 228 36 days, with a mean of 7.20 ± 5.69 days. The hospital length of stay of inpatients in
 229 surgery ward (an average of 11 days) was longer than that for medical inpatients (an
 230 average of 7 days).

231 Satisfaction with nursing care

232 As shown in Table 1, the average satisfaction score of patients is 78.15 ± 4.74 .
 233 Overall, 60.5% of the study participants were satisfied with the care provided by
 234 nurses. Regarding nursing care, as shown in table 2, patients reported the highest
 235 satisfaction when nurses treated them as an individual(67.7%) and respect their
 236 privacy (60.8%). Patients were least satisfied with the type of information nurses gave
 237 to them(11.7%) and awareness of patient's needs(9.6%).

238

239 **Table 2** Percentage distribution of items for satisfaction with nursing care in admitted patients at GPH.

Item	Not at all satisfied n (%)	Barely satisfied n (%)	Quite satisfied n (%)	Very satisfied n (%)	Completely satisfied n (%)
1.The amount of time nurses spent with patient	0	4(1.4)	42(14.4)	179(61.5)	66(22.7)
2.How capable nurses were at their job	0	1(0.3)	16(5.5)	156(53.6)	118(40.5)
3.There always being a nurse around when needed	0	2(0.7)	58(19.9)	164(56.4)	67(23.0)
4.The amount nurses knew about patient care	0	1(0.3)	38(13.1)	193(66.3)	59(20.3)
5.How quickly nurses came when patient called them	0	1(0.3)	30(10.3)	123(42.3)	137(47.1)
6.The way the nurses made patient feel at home	0	1(0.3)	47(16.2)	187(64.3)	56(19.2)
7.The amount of information nurses gave to patient about their condition and treatment	0	5(1.7)	124(42.6)	102(35.1)	60(20.6)
8.How often nurses checked to see if patients were well	0	1(0.3)	27(9.3)	176(60.5)	87(29.9)
9.Nurses' helpfulness	0	1(0.3)	26(8.9)	192(66.0)	72(24.7)
10.The way nurses explained things to patient	1(0.3)	0	29(10.0)	166(57.0)	95(32.6)
11.How nurses helped put patient relatives' or friends' minds at rest	0	0	41(14.1)	161(55.3)	89(30.6)
12.Nurses' manner in going about their work	0	0	12(4.4)	111(38.1)	167(57.4)
13.The type of information nurses gave to patient about his/her condition and treatment	0	3(1.0)	97(33.3)	157(54)	34(11.7)
14.Nurses' treatment of patient as an individual	0	1(0.3)	14(4.8)	78(26.8)	197(67.7)
15.How nurses listened to patient worries and concerns	0	1(0.3)	55(18.9)	196(67.4)	39(13.4)
16.The amount of freedom patient was given on the ward	0	0	83(28.5)	170(58.4)	38(13.1)
17.How willing nurses were to respond to patient requests	0	2(0.7)	51(17.5)	177(60.8)	61(21)
18.The amount of privacy nurses gave patient	0	0	36(12.4)	78(26.8)	177(60.8)
19.Nurses' awareness of patient needs	0	3(1.0)	130(44.7)	130(44.7)	28(9.6)

240

241 Factors influencing satisfaction

242 History of admission and surgery were significant factors influencing patient

243 satisfaction with nursing care. The higher level of patient satisfaction was found to be

244 significantly existed in patients married, with history of admission($P<0.05$). Patients

245 admitted in medical wards showed the highest satisfaction comparing with those in

246 other wards. The score without surgery was higher than that with($p=0.045$, $OR=0.64$,

247 $95\% CI=0.38-1.07$). The higher the nurse's professional title, the lower the score. The

248 patient don't know the nurse in-charge has the lower score($p=0.028$, $OR=1.77$, 95%

249 $CI=0.98-3.19$)(Table 3).

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Table 3 Factors influencing patients' satisfaction with nursing care.

Variables	Level of satisfaction		<i>P</i>	OR	95%CI
	Satisfied (score \geq 78,176), N(%)	Dissatisfied (score <78,115), N(%)			
Gender			0.002	1.16	0.61-2.19
Male	105(59.66)	54(46.05)			
Female	71(40.34)	61(53.04)			
Marital status			0.011	0.25	0.10-0.67
Single	12(6.82)	8(6.96)			
Married	158(89.77)	97(84.35)			
Others	16(9.09)	0			
Admission ward			0.073	0.97	0.761-1.24
Medicine	69(39.20)	29(25.22)			
Surgery	41(23.29)	36(31.30)			
Obstetrics and gynecology	11(6.25)	31(26.96)			
Ophthalmology and otorhinolaryngology	13(7.39)	5(4.35)			
Rehabilitation department	16(9.09)	6(5.22)			
History of admission			0.027	1.25	0.68-2.29
Yes	95(53.98)	51(44.33)			
No	81(46.02)	64(55.65)			
History of surgery			0.045	0.64	0.38-1.07
Yes	81(43.02)	66(57.39)			
No	95(53.98)	49(42.61)			
Know the nurse in charge			0.028	1.77	0.98-3.19
Yes	140(79.55)	81(70.43)			
No	36(20.45)	34(29.56)			
Title of nurse in charge			0.001	2.39	1.41-4.03
junior	121(68.75)	56(48.69)			
senior	55(31.25)	59(51.30)			
Educational status			0.471	0.87	0.59-1.27
Primary school	43(24.43)	26(22.61)			
High school	87(49.43)	59(51.30)			
Advanced diploma	22(12.50)	18(15.65)			
Bachelor's degree	23(13.07)	12(10.43)			
Master degree	1(0.57)	0			

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256 Discussion

257 In this study, our aim was to evaluate patients' satisfaction with hospital nursing care
 258 and to explore the association between patients' characteristics and satisfaction. The
 259 main finding is that patients were moderately satisfied with the care received, as

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3 260 demonstrated by the mean score of 78.15 on the NSNS scale with the overall
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5 261 satisfaction of 60.5%. This is higher than the results obtained in Taiwan(35%),²⁵
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7 262 Ethiopia(49.2%),²⁶ however, it is lower than that in Lebanon,¹⁰ Beijing, China,²⁷
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9 263 Spain²⁸ and Australia.²⁹ This might be related to differences in sample size and region,
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11 264 therefore, it is difficult to make absolute comparison of research results. However,
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13 265 these results show that there are still many factors leading to dissatisfaction of patients
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15 266 with hospital nursing services, and nursing managers need to analyze the reasons and
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17 267 strengthen rectification. Patients' satisfaction with hospital care are significantly
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19 268 associated with better patient safety, clinical effectiveness,³⁰ health outcomes³¹ and
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21 269 less medical resource utilization.³² Therefore, nurses should be aware of the
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23 270 importance of patients' satisfaction and its role.

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28 271 Although overall patient satisfaction was moderate in this study, the findings
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30 272 identified two problems which in need of improvement: (1) the type of information
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32 273 gave to patients and (2) the awareness of patient needs. Patients' needs assessment is
33
34 274 important to define the target areas in which resources and efforts should be
35
36 275 concentrated.³² However, the study indicated that nurses did not stress the importance
37
38 276 of patients care needs. It could be inferred from the research that, first of all, nurses
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40 277 may not have enough knowledge reserves to fully answer patients' various questions.
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42 278 Second, due to the heavy workload, more time is spent on completing doctor's orders
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44 279 and other nursing and therapeutic work, and less time is spent on communicating with
45
46 280 patients and conducting health education. This may also result from the fact that in
47
48 281 most Chinese hospitals there are no nurse assistants whose task is mainly performance
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50 282 of basic nursing activities such as bathing, oral toilet, changing, ect.³³ Nurse staff with
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52 283 different layer need to perform all types of direct and indirect nursing activities in
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54 284 China. Meanwhile, the nurse to patient ratio is one of the impressive nursing care
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3 285 features whereas 0.42:1 in GPH, it was a increase in the number of patients each nurse
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5 286 to provide more direct attention. With such workload, nurses were eager to educate
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7 287 patients and therefore providing incomplete information or information that unmet
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9 288 patients' needs.³⁴ The findings regarding low patient satisfaction scores related to
10
11 289 hospital staff responding to patient needs and information are consistent with the
12
13 290 outcomes of other studies.^{35,36} Belayneh stated that patients were least satisfied with
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15 291 the least given information by nurses.³⁷ Chan study showed patients communicated
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17 292 with nurse and doctors about medicines and discharge information were more
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19 293 satisfied with healthcare provider.³⁸ In various clinical settings, information is the
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21 294 decisive factor for good patient experience.³⁹ Poor communication between health
22
23 295 care professionals and their patients is a key problem in the growing number of
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25 296 complaints against health care professionals worldwide.⁴⁰ Therefore, investigating all
26
27 297 aspects of patients' needs and provide them with care and information to meet their
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29 298 needs through communication plays an important role in patients' satisfaction.

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36 299 Patient perception with service quality is a key indicator of hospital care,⁴¹ which
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38 300 also be one of the main determinants of patient's trust.⁴² Therefore, a better
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40 301 understanding of the factors affecting care quality can help hospital managers
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42 302 implement effective plans to improve service quality.⁴³ In the current study, married
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44 303 patients and those admitted to medical departments were more satisfied than others.
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46 304 This finding was in cord with a study conducted at three public hospitals of Amhara
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48 305 Region⁴⁴ which use NSNS scale, and in hospital in China²⁴ which used other scale to
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50 306 assess patients satisfaction. This could be that unmarried patients pay more attention
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52 307 to the impact of diseases on their future life. Therefore, they have relatively more
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54 308 demand for healthcare knowledge, and engaging in treatment decision-making.
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56 309 Patients admitted in medical wards are affected by chronic diseases, with relatively
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3 310 frequent hospitalization, more opportunities to contact and communicate with nurses,
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5 311 and more knowledge about the progress and outcome of their own diseases due to
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7 312 long-term illness. These was also revealed in other study which showed patients
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9 313 receiving chronic disease management reported high levels of enablement.²⁹ Stress
10
11 314 from surgery and postoperative recovery will have a significant impact on patient's
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13 315 physiology and psychology. Prevalence of preoperative anxiety was range of 60–80%
14
15 316 in population,⁴⁵ these will lead to an increase in patient's demand for nursing services
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17 317 and the expectation of the quality of nursing service. Any unmet of their expectations
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19 318 during hospitalization will cause dissatisfaction. However, preoperative anxiety is
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21 319 commonly neglected by clinicians.⁴⁶ Study has shown that patients be well-informed
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23 320 and understand the process have a better surgical experience.²⁸ It is suggested that
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25 321 patients need to be assessed regularly for anxiety during the preoperative visit and
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27 322 appropriate anxiety reducing methods should be introduced. Nursing staff should
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29 323 attach importance to nurse-patient communication through assess patients needs to
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31 324 provide health related information and care services so as to meet patients needs and
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33 325 to increase their satisfaction.

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41 326 Another aspect in this study is that patients with previous history of admission
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43 327 were found to be more satisfied than their counter parts, similar result was found in
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45 328 other study conducted in Ethiopia²⁶ and in China.²⁴ This could be related with patients
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47 329 hospitalized for first time are unfamiliar with nursing staff and hospital environment.
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49 330 They may have more requirements in communication with nurse regarding their
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51 331 disease and nursing services. For patients with previous history of admission, they
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53 332 have a certain understanding of their own diseases and health conditions, are familiar
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55 333 with the hospital environment and the nurses in-charge, and have a stronger sense of
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57 334 security than patients hospitalized for the first time. Study showed patients receiving
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3 335 continuity of care with the same nurse were more satisfied than those who not.²⁹ The
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5 336 findings provide evidence for the value of nursing in nursing practice. Patients
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7 337 require more individualized care from nurses regarding education, communication
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9 338 and comfort² which will improves their well-being through reducing anxiety and
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11 339 depression, and also indirectly, by building trust and social support.⁴⁷
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14 340 Patients need sympathy, which is one of many factors to improve the doctor-
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16 341 patient relationship.⁴⁸ In the clinical environment, empathy includes the ability to
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18 342 listen to patients, understand their views, sympathize with their experiences, express
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20 343 understanding, respect and support. Lack of empathy will affect the effectiveness of
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22 344 nursing. ⁴⁹Our findings show that nurses need to invest more time in patients-not only
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24 345 in providing nursing skills, but also in realizing patients' empathy expectations. ⁵⁰ Of
25
26 346 course, besides nursing, there are many factors that will affect the patient's
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28 347 satisfaction, including patient staffing ratio, the use of health information technology,
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30 348 the amount of surgery in the hospital and the health teaching situation.⁵¹ Based on our
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32 349 experience, we suggest to conduct interviews with patient as a first step to learn what
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34 350 patients are most concerned with when seeking nursing services.
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41 351 **Conclusion**

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44 352 In conclusion, current study explored the level of patients satisfaction with nursing
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46 353 services and its associated factors. It shows that the care needs of hospitalized patients
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48 354 are still not satisfied to some extent. The current finding will have direct implication
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50 355 towards nurse professionals and nursing administrators. Nurses should establish a
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52 356 good relationship with patients through more communicational, and should pay
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54 357 attention to the factors affecting patients' satisfaction with nursing care so as to
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56 358 sufficiently meet patients' expectations.
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3 **359 List of abbreviations**
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6 **360** GPH: Gansu Provincial Hospital.
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8 **361** NSNS, Newcastle Satisfaction with Nursing Scale.
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10 **362**

11 **363 Declarations**
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15 **364 Ethics approval :** This study was approved by Gansu Provincial Hospital's Ethic
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17 **365** Commission.
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20 **366 Consent for publication:** Not applicable.
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24 **367 Availability of data and material :** The datasets used and/or analysed during the
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26 **368** current study are available from the corresponding author on reasonable request.
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30 **369 Competing interests :** The authors declare that they have no competing interests
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37 **371** funding has no role in in the design of the study and collection, analysis, and
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40 **372** interpretation of data and in writing the manuscript.
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44 **373 Authors' contributions :** YLM and WXY performed the survey. WJC analyzed and
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47 **374** interpreted the patient data regarding satisfaction and effective factors. ZJX
48

49 **375** performed the was a major contributor in writing the manuscript. DJ and SWJ
50

51 **376** collected data. All authors read and approved the final manuscript.
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56

57 **378** questionnaire survey.
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STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Title, paragraph 1-2 Abstract, paragraph 30-50
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Background, paragraph 79-131
Objectives	3	State specific objectives, including any prespecified hypotheses	Background, paragraph 132-133
Methods			
Study design	4	Present key elements of study design early in the paper	Study design, paragraph 150
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Setting, paragraph 136-138
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	sample, paragraph 153-171
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	paragraph 177-186
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	paragraph 192-201
Bias	9	Describe any efforts to address potential sources of bias	paragraph 165-171
Study size	10	Explain how the study size was arrived at	Sample, paragraph 153-160
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Data Analysis, paragraph 158-161
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Data Analysis, paragraph 203
		(b) Describe any methods used to examine subgroups and interactions	Data Analysis, paragraph 204-209
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	Sample, paragraph 153-160
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	General characteristics, paragraph 214-222
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	General characteristics, paragraph 214-222
		(b) Indicate number of participants with missing data for each variable of interest	Result, paragraph 224-229

Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(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	Result, paragraph 234-241
		(b) Report category boundaries when continuous variables were categorized	Result, paragraph 234-241
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion, paragraph 251-253
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	paragraph 54-60
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion, paragraph 249-342
Generalisability	21	Discuss the generalisability (external validity) of the study results	Conclusion, paragraph 334-350
Other information			
Funding	22	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	Funding, paragraph 368-370

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Inpatients' satisfaction with nursing care in the backward region: a cross-sectional study from Northwestern China

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Primary Subject Heading:	Health services research
Secondary Subject Heading:	Epidemiology, Health services research, Nursing
Keywords:	EPIDEMIOLOGY, SOCIAL MEDICINE, STATISTICS & RESEARCH METHODS

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1 **Inpatients' satisfaction with nursing care in the backward region: a**
2 **cross-sectional study from Northwestern China**

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2
3 **29 Abstract**
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6 **30 Objectives** The aim of the study was to examine the level of patient satisfaction with
7
8 nursing care and identify the factors affecting satisfaction from the in-patients'
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10 viewpoints in backward region of China.
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13 **33 Design** This was a cross-sectional study.
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15 **34 Setting** The study was conducted at a tertiary hospital located in Northwest China.
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17 **35 Participants** Patients who were admitted to the ward for at least 48 hours were
18
19 chosen to undertake the survey.
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22 **37 Primary outcome measure** The Newcastle Satisfaction with Nursing care Scale was
23
24 used. Data were collected from 219 patients.
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27 **39 Results** The overall inpatient satisfaction with nursing care was 60.5% with the mean
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29 score being 78.15 ± 4.74 . Patients were more satisfied with nurses who respected their
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31 privacy and treated them as individuals (67.7%). Patients were least satisfied with the
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33 type of information nurses gave to them (11.7%) and awareness of their needs.
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36 Patients who were married, having a history of hospitalization, having a history of
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38 surgery and in-charged by junior nurses had higher satisfaction with nursing.
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41 **45 Conclusions** The overall level of patient satisfaction was moderate in this study in
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43 comparison to many studies. There is a need for nurses to be aware of patients'
44
45 individualized care needs and provide more information for them. This study
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47 may urge hospital administrators, policy makers and nurses to be more sensitive with
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49 patients' married status, history of hospitalization and surgery, professional title of in-
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51 charged nurses when providing care.
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55 **51 Keywords:** Inpatient, Nursing care, Satisfaction, Backward region, China
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60 **52**

53 **Strengths and limitations of this study**

- 54 ● This study is the first to evaluate inpatients' satisfaction with nursing care using
55 NSNS instrument in less developed and more economically burdened Chinese
56 areas.
- 57 ● The sample of the study was recruited from one hospital in northwest China. As
58 such, its social background and current situation of healthcare disturbance may be
59 different from other areas.
- 60 ● The study sample was small, so it is not likely to be representative of the patients
61 in all Chinese hospitals. Larger samples across multiple sites are needed in future
62 research.
- 63 ● The study adopted self-reported questionnaires, so all answers were based on the
64 respondents' own perception. Hence, there is a possibility that their responses
65 were influenced by social desirability, leading to response bias.

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77 **Background**

78 Patient satisfaction have been defined by scholars from different aspects. Swarupa
79 defined it as people's expectation for health care services due to the requirements of
80 health, disease, quality of life and other aspects.¹Berkowitz suggested that patient
81 satisfaction is an individual's evaluation of the degree to which the medical services
82 provided are in line with their expectations and preferences.² Ahmed believes that
83 patient satisfaction is the result of patients filtering medical service experience and
84 evaluating the degree to which medical service experience meets their needs from
85 their own unique perspective.³Among them, most scholars believe that the best
86 definition of patient satisfaction is the evaluation of medical services by patients
87 based on the degree to which their expectations are met. ⁴Based on this expectation,
88 the evaluation of patient satisfaction objectively reflect the quality of health care
89 services which becomes the gold standard and widely used metric to measure hospital
90 quality management.^{5,6}

91 Patient satisfaction with nursing service is an important component of patient
92 satisfaction, ⁷and there is no consistent definition at present. Risser defines it as the
93 degree to which the patient's expectation of ideal care is consistent with the actual
94 care.⁸Eriksen defines it as the subjective evaluation made by patients according to
95 their own expectations of nursing and their cognitive and emotional reactions to the
96 interaction of actual receiving nursing services. ⁹The American Nurses Association
97 (ANA) is defined as a patient or his family staff's evaluation of the nursing care
98 received. ¹⁰ The above definitions are slightly different, and the consistent point is that
99 patients' satisfaction with nursing is a subjective feeling, which is closely related to
100 their expectation and perception of nursing quality. From the time of admission until

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3 101 discharge, nurses provide care for patients every day without fail and are involved in
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5 102 almost every aspect of patient care. Therefore, as main healthcare providers, nurses
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7 103 have a significant impact upon patients' perceptions about their hospital experience.⁷
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10 104 Thus, patients' satisfaction regarding nursing service become an important indicator
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12 105 of the care quality.^{11,12}
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15 106 In order to achieve the goal of high-care quality, decision makers should not only
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17 107 know whether the patient is satisfied, but also, more importantly, why the patient is
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19 108 not satisfied. That is, they should identify the factors that affect the patient's
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21 109 satisfaction with nursing services, so as to carry out nursing that meets patients' care
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23 110 needs. In this case, many studies are occurring globally to evaluate patients'
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25 111 satisfaction with nursing services. More than half of the respondents (52.75%) in an
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27 112 Ethiopian Study were satisfied with the nursing care they received, citing factors such
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29 113 as previous history of admission, patients' income level, and type of admission rooms
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31 114 to affect overall satisfaction.¹³ A study in Malaysia found that less patients were
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33 115 satisfied with certain parts of the services (47.5%), while a low level of education,
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35 116 monthly household income less than 3000 and frequency of visits had significant
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37 117 association with high level of satisfaction.¹⁴ Another study in Pakistan showed that
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39 118 45% of patients were satisfied with nursing services,¹⁵ in contrast to Lebanon
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41 119 (96.6%).¹⁶ Although these studies used various instruments to assess patient
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43 120 satisfaction, the studies indicate that current nursing services could not fully satisfy
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45 121 patient needs.
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53 122 In China, there are 20918 hospitals in different levels with 20 million registered
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55 123 nurses. The average bed to nurse ratio is about 1:0.45. Of them, the 2232 tertiary
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57 124 public hospitals account for only 7.66% of the all-types health facilities, yet provide
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59 125 nearly half (42.5%) of the inpatient care.¹⁷ On average, the rate of one nurse per 1000
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3 126 population was lower than the WHO standard of 2.28 per 1000 population.¹⁸
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5 127 Excessive workloads lead to lower job satisfaction in nurse staff across tertiary
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7 128 hospitals in comparison to other types of health facilities.^{17,19} Under such
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9 129 environments, the patient satisfaction in tertiary hospitals needs more attention.
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11 130 Ministry of Health of China formulated the " Standards for Implementing Quality
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13 131 Nursing Services in Hospitals (Trial)" in 2010, which aimed to provide patients with
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15 132 safe and high-quality nursing services.²⁰ With these standards, " high quality nursing
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17 133 service project" was carried out at a national level. By the end of 2015, all tertiary
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19 134 hospitals in China had carried out high-quality nursing services, with 87.0 % of them
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21 135 being tertiary A-class hospitals and 82.6 % were B-class.²¹
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26 136 At present, the survey on the satisfaction of hospitalized patients with nursing
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28 137 service in China is confusing. On one hand, patients in different facilities reported
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30 138 high satisfaction about nursing service. A survey in 71 Chinese hospitals showed
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32 139 patient satisfaction in 80% of the hospitals to be more than 90%.²²In other hospitals
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34 140 78% of patients were satisfied.²³ A study in Shandong Province showed 79.8% of
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36 141 patients to be satisfied with nursing care, with patients' position, culture, income and
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38 142 reason for choosing the hospital being the main factors affecting satisfaction.²⁴ Jiao's
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40 143 study found that 82.9% of inpatients were satisfied with the overall nursing service,
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42 144 and age, education level, self-perceived health status and department had influence on
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44 145 satisfaction.²⁵ These indicated that Chinese nursing service continues to be improved
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46 146 with the implementation of the high-quality care project. However, unfaithful reports
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48 147 by the media and continuous occurrence of disputes and violence are inconsistent with
49
50 148 the results of the satisfaction survey. An analysis of workplace violence shows that
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52 149 40.8% of hospital nurses in China have experienced different types of workplace
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54 150 violence.²⁶Zou et al study showed there is a high incidence(59.7 %) of workplace
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3 151 violence among nurses in Chinese tertiary hospitals.²⁷ In Wang et al's study 6.67% of
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5 152 nurses suffered violence in the workplace.²⁸ Violence in these workplaces will affect
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8 153 nurses' mental health, leading to job burnout,²⁹ and thus reduce the quality of nursing
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10 154 services. The frequent occurrence of workplace violence in hospitals directly reflects
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12 155 the dissatisfaction of patients with the quality of medical care. Thus, hospital-specific
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14 156 data are still required to provide evidence for cross-country and cross-cultural
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17 157 comparisons of satisfaction and factors affecting satisfaction using standardized tools.

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19 158 Gansu province is located in north-west of China. Affected by region, the
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21 159 development of economy, culture and information is relatively backward there.
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24 160 According to China's economic comprehensive competitiveness development report,
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26 161 Gansu Province ranks 27th among the 31 provinces in China.³⁰ With continuous
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28 162 development in the overall scale of Hospitals in Gansu, the scope of service is getting
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30 163 larger, and the number of patients received is also gradually increasing. Hospital
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32 164 managers pay more attention to the satisfaction survey of patients and incorporate the
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34 165 survey results into the staffs' performance evaluation index system of clinical
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37 166 departments. ²⁴According to our review of the satisfaction survey questionnaire in use,
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39 167 the questionnaire has always followed the older design scheme and focuses on the
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41 168 overall medical treatment experience, which cannot fully reflect the patient's nursing
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43 169 experience in detail. Hu's study, which assessed inpatients' satisfaction in one
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45 170 hospital in Gansu, showed patient satisfaction to be 80.9% with environment being
46
47 171 the main factor affecting patients satisfaction.³¹Xing et al evaluated satisfactory
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49 172 degree of inpatients in some hospitals in Northwest region to nursing services and
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51 173 found the whole satisfactory degree of nursing service as 82.49%. The influence
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53 174 factors of satisfactory degree were age, degree of education, average income per
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56 175 person in family, and self-feeling of health status. ³² With the continuous
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3 176 improvement of people's requirements for service level, especially for some high-end
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5 177 customers, the traditional mode of medical service cannot meet their diversified needs.
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7 178 As a result, complaints and complaints from patients occur frequently³². In light of
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9 179 this situation, hospital managers urgently need to understand the gap between the
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11 180 changes in customer care needs and the capabilities of the hospital to providing care
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13 181 in a timely and dynamic manner, as well as know what factors are affecting patients
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15 182 satisfaction. This enables nurses managers to carry out individualized nursing
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17 183 according to the characteristics of different patients, thus achieving customer needs
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19 184 through continuous self-improvement and improving the patient's nursing experience.
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24 185 Gansu Provincial Hospital is a comprehensive hospital integrating medical
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26 186 service, scientific research, clinical teaching and preventive health care in Lanzhou,
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28 187 Gansu. In recent years, it has maintained a relatively high development speed. The
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30 188 development of Gansu Provincial Hospital represents the development status of most
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32 189 public medical institutions, especially in the underdeveloped areas in northwest China.
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34 190 The hospitalized patients received by the hospital mainly come from residents and the
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36 191 people in the surrounding cities and states. Choosing the hospital to carry out the
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38 192 satisfaction survey of the related hospitalized patients can better understand the
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40 193 expectations of patients from different social strata in Gansu area on the nursing
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42 194 quality. To our knowledge, this is the first study in Gansu to use NSNS to measure
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44 195 satisfaction with nursing care. Thus, this study has two aims: (1) to assess patient
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46 196 satisfaction with nursing care using NSNS instrument, so as to find out the gap
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48 197 between patients' expectations and the hospital's service provision. (2) to investigate
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50 198 the factors affecting patient satisfaction with nursing care, so as to provide more
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52 199 accurate reference for hospital managers and relevant regulatory agencies.
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58 200 **Methods**

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3 **201 Study design**
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6 202 This study was a cross-sectional survey.
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8 **203 Study setting and the participants**
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10 204 This study was conducted at Gansu Provincial Hospital(GPH), a tertiary hospital with
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12 205 1700-beds. The services at GPH include ear, nose and throat, surgery, outpatients
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14 206 clinic, emergency, gynaecology and obstetrics, paediatrics and neonatal intensive care
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16 207 unit, maternal and child health, physiotherapy, dental, radiology, traditional Chinese
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18 208 medicine, rehabilitation, and internal medicine. GPH is also a teaching hospital for
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20 209 nursing, health officer, medicine, midwifery and pharmacy undergraduate and
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22 210 graduate students. The hospital has a total of 4070 employees, 1200 of which are
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24 211 nurses who provide health care in 60 nursing units. The average outpatient per day
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26 212 was approximately 4500 with 250 of them being admitted to different wards.
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30 213 The sample of the study was determined using simple random sampling. The
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32 214 number of open beds in GPH is about 1500, after excluding departments such as
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34 215 paediatrics, intensive care units, emergency wards and VIP wards (about 200).The
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36 216 population of the study was calculated using the formula $N = Z^2.P(1-P)/E^2$.⁵ In the
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38 217 formula, the symbols represent the following: a margin of error (E)= 5%.In order to
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40 218 narrow the interval, and make the estimation of effect quantity more accurate, we
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42 219 chose 99% as the confidence level, $Z=2.58$. 90% patient satisfaction with nursing
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44 220 care.¹⁶ We calculated the sample using the following: $Z^2.P(1-P)/ E^2= (2.58*2.58)$
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46 221 $0.90(1-0.90)/ (0.05*0.05)= 6.65*0.09/ 0.0025= 239$.Then we added 20% to the
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48 222 sample size for non-response or for selection bias, thus making the sample size = 288
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50 223 approximately. Patients should meet the following inclusion criteria: (1) ≥ 18 years old;
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52 224 (2)admitted in the wards at least for 48h; (3)capable of independent communication;
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54 225 (3)voluntary participation. Patients were excluded on any one of the following:
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3 226 patients in intensive care unit; pediatric patients; emergency observation ward patients;
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5 227 VIP patients in selected wards. Medical, surgical, gynaecology and obstetrics and ear,
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8 228 nose and throat wards were purposefully selected and based on the calculated sample
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10 229 size, the required number of patients from each ward was proportionally allocated.
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12 230 The study started on August 2018. At the time of admission, each new patient to those
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14 231 wards was informed about the purpose of the survey and then a lottery method was
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16 232 adopted to randomly select patients to be considered by the nurse manager. Then, the
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18 233 nurse manager informed trained students who met the requirements. Subsequently,
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20 234 the students made records and attended to patients 48h later from their
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23 235 admission. Finally, 32 patients were excluded with 12 of them being younger than 18
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25 236 years old and 20 who disagreed to participate. 291 patients were included for further
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28 237 analysis.

238 **Instruments**

239 The questionnaire included: (1) general demographic characteristics: age, gender,
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241 educational status, marital status, monthly family income, history of admission,
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243 hospital length of stay, admission ward, professional title of patients' nurse in charge.
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245 (2) NSNS to measure satisfaction with nursing care. The NSNS was developed by
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247 Thomas et al.³³ The scale has been translated into different languages and has been
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249 applied in many studies. The Chinese version of the scale was tested for its validity
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251 and reliability by Jiao with Cogent Validity index is 0.98 and Cronbach's alpha is
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253 0.97.²⁵ The NSNS includes two subscales: the Experience of Nursing Care Scale
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255 (ENCS) and the Satisfaction with Nursing Care Scale (SNCS). These two subscales
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257 can be applied either together or separately. In this study, the SNCS was applied,
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259 consisting of a total of 19 items and using a 5-point Likert scale. For assessing the
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261 degree of satisfaction, 'not at all', 'barely', 'satisfied', 'very', 'completely' scored

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3 251 from 1- 5 respectively. Patient responses across all items are summed and transformed
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5 252 to yield an overall satisfaction score between 0–95, which denotes none or complete
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8 253 satisfaction with all aspects of nursing care.

9 10 254 **Patient and Public Involvement**

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12 255 Before the survey, the nurse manager explained the purpose of the study. Patients
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14 256 have the right to refuse to participate in the study and to withdraw at any time during
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17 257 the study. Patients are required to provide detailed and accurate information as much
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19 258 as possible during the investigation to ensure the accuracy of the results. The
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21 259 questionnaire did not indicate the patient's identification information. No patient
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24 260 participated in the recruitment and implementation of the study.

25 26 261 **Institutional Review Board approval**

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28 262 Consent was acquired from the nurse director of each ward and verbal approvals
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30 263 were obtained from patients. This study was also approved by Gansu Provincial
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33 264 Hospital Research Ethics Committee.

34 35 36 265 **Data collection**

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39 266 Five nursing students were trained previously by one of the authors(ZJX). The
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41 267 training lasted for two days. On the first day, students were trained to understand the
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43 268 meaning of each item of the questionnaire. On the second day, students were shown
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46 269 how to communicate with patients. After that, each student selected a patient in a
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48 270 specified department to conduct a pre-survey using the questionnaire, and gave
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51 271 feedback regarding the survey process, so that the trainers could answer them in a
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53 272 timely manner. After training, the students attended wards from Monday to Friday to
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55 273 collect data. The selected patients who had at least 2 days inpatient experiences in
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58 274 each ward were approached by the students. A private room at the department was
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60 275 used to interview patients. Family members were present during some of the

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3 276 interviews at the request of patients. If the patient could not fill in the form due to
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5 277 various factors, the student would ask the question and gave a certain amount of time
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8 278 for patients to make statements for each question. After each question, the student
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10 279 helped to fill in the questionnaire according to patients answer. In addition, medical
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12 280 records were reviewed for certain variables such as hospital length of stay and history
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14 281 of admission. Untill November of 2018, there were 291 patients who completed the
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17 282 survey.

19 283 **Data analysis**

21 284 The data were collected and analyzed with SPSS version 21.0. Patient satisfaction
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23 285 with nursing service was described by the mean, standard deviation, frequency and
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25 286 percentage. As the missing data was less than 5% in some items, we used listwise
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28 287 deletion to deal with them. Considering the study by Ahmed et al,¹³ we used the same
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30 288 method to use mean satisfaction score as a cut point to dichotomise satisfaction into
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32 289 ‘satisfied’ and ‘not satisfied’. Based on the years of experience, the profession title of
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34 290 nurses were divided into junior(1-5 years) and senior(above 5 years). In addition to
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36 291 hospitalization, we also checked whether patients had a history of hospitalization in
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38 292 the past. Binary logistics regression analysis and backward stepwise method was used
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40 293 to screen variables which affect patient satisfaction. The strength of the associations
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42 294 was described using OR and 95% CI.

47 295 **Results**

50 296 **Patients’ characteristics**

52 297 Of the participants, the mean age is 45.59 ± 15.96 . As seen in table 1, 54.6% were
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54 298 male, 87.6% were married and 23.7% were primary school graduates; 33.7% were
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56 299 admitted in medical department, 43.6% had monthly family incomes between 3000-
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58 300 4999 RMB(related to 436-726 USD). More than three-quarters (79%) of patients
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301 knew the name of their nurse in charge of their nursing care and more than half(61,7%)
 302 were cared by junior registered nurses. Patients had variations in the duration of their
 303 hospital stays (2 - 36 days) with a mean of 7.20 ± 5.69 days. The hospital length of
 304 stay of inpatients in surgery ward (an average of 11 days) was longer than that for
 305 medical inpatients (an average of 7 days). See table 1.

306 **Table 1** Sociodemographic characteristics and NSNS calculated score for example(N=291)

Variables	Categories	Frequency	NSNS score
		n(%)	Mean (SD)
Sex	Male	159(54.6)	79.00±4.44
	Female	132(45.4)	77.12±4.85
Monthly family income(CNY)*	<100	1(0.3)	78.0±0.35
	<1000	17(5.7)	77.52±4.05
	1000-2999	103(34.6)	85.0±0.05
	3000-4999	130(43.6)	78.56±4.37
	≥5000	39(13.1)	77.0±6.45
	≥10000	1(0.3)	78.52±4.05
Marital status	Single	20(6.9)	78.5±2.35
	Married	255(87.6)	77.98±4.95
	Others	16(5.5)	80.4±1.59
Educational status	Primary school	69(23.7)	78.27±4.01
	High school	146(50.2)	77.90±4.53
	Advanced diploma	40(13.7)	77.82±6.15
	Bachelor's degree	35(12.0)	79.11±4.96
	Master degree	1(0.3)	85.0±0.05
Admission ward	Medicine	99(33.7)	78.62±4.93
	Surgery	78(26.5)	77.63±2.97
	Obstetrics and gynecology	42(14.4)	74.5±5.5
	Ophthalmology and otorhinolaryngology	18(6.2)	79.77±3.13
	Rehabilitation department	22(7.6)	80.86±5.13
History of admission	Yes	146(50.2)	78.76±4.57
	No	145(49.8)	77.53±4.82
Patients know the nurse in charge of his/her care	Yes	221(75.9)	78.47±4.65
	No	70(24.1)	77.14±4.82
Living area	urban	146(50.2)	77.98±4.08
	rural	145(49.8)	78.31±5.28
Title of staff nurse	Junior RN	177(61.7)	79.15±4.25
	Senior RN	114(38.3)	76.56±4.98
Mean satisfaction score			78.15 ± 4.74

307 NSNS, Newcastle Satisfaction with Nursing Scale.*USD1 is 7.4 Chinese Yuan (CNY).

308 Satisfaction with nursing care

309 As shown in Table 1, the average satisfaction score of patients is 78.15 ± 4.74 .

310 Regarding nursing care, as shown in table 2, patients reported the highest satisfaction

311 when nurses treated them as an individual(67.7%) and respected their privacy (60.8%).
 312 Patients were least satisfied with the type of information nurses gave to them(11.7%)
 313 and a lack of awareness in the patient's needs(9.6%). As showed in table 3, after
 314 dichotomising satisfaction into 'satisfied' and 'not satisfied', 60.5% of the study
 315 participants were satisfied with the care provided by nurses(Figure 1).

316 **Table 2** Percentage distribution of items for satisfaction with nursing care in admitted patients at GPH.

Item	Not at all satisfied n (%)	Barely satisfied n (%)	Quite satisfied n (%)	Very satisfied n (%)	Completely satisfied n (%)
1.The amount of time nurses spent with patient	0	4(1.4)	42(14.4)	179(61.5)	66(22.7)
2.How capable nurses were at their job	0	1(0.3)	16(5.5)	156(53.6)	118(40.5)
3.There always being a nurse around when needed	0	2(0.7)	58(19.9)	164(56.4)	67(23.0)
4.The amount nurses knew about patient care	0	1(0.3)	38(13.1)	193(66.3)	59(20.3)
5.How quickly nurses came when patient called them	0	1(0.3)	30(10.3)	123(42.3)	137(47.1)
6.The way the nurses made patient feel at home	0	1(0.3)	47(16.2)	187(64.3)	56(19.2)
7.The amount of information nurses gave to patient about their condition and treatment	0	5(1.7)	124(42.6)	102(35.1)	60(20.6)
8.How often nurses checked to see if patients were well	0	1(0.3)	27(9.3)	176(60.5)	87(29.9)
9.Nurses' helpfulness	0	1(0.3)	26(8.9)	192(66.0)	72(24.7)
10.The way nurses explained things to patient	1(0.3)	0	29(10.0)	166(57.0)	95(32.6)
11.How nurses helped put patient relatives' or friends' minds at rest	0	0	41(14.1)	161(55.3)	89(30.6)
12.Nurses' manner in going about their work	0	0	12(4.4)	111(38.1)	167(57.4)
13.The type of information nurses gave to patient about his/her condition and treatment	0	3(1.0)	97(33.3)	157(54)	34(11.7)
14.Nurses' treatment of patient as an individual	0	1(0.3)	14(4.8)	78(26.8)	197(67.7)
15.How nurses listened to patient worries and concerns	0	1(0.3)	55(18.9)	196(67.4)	39(13.4)
16.The amount of freedom patient was given on the ward	0	0	83(28.5)	170(58.4)	38(13.1)
17.How willing nurses were to respond to patient requests	0	2(0.7)	51(17.5)	177(60.8)	61(21)
18.The amount of privacy nurses gave patient	0	0	36(12.4)	78(26.8)	177(60.8)
19.Nurses' awareness of patient needs	0	3(1.0)	130(44.7)	130(44.7)	28(9.6)

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318 **Factors influencing satisfaction**

319 Previous history of hospitalization and surgery were significant factors influencing
 320 patient satisfaction with nursing care. A higher level of patient satisfaction was found
 321 to exist in married patients with history of admission($P<0.05$). Patients admitted in
 322 medical wards showed the highest satisfaction compared to those in other wards. The
 323 score without surgery was higher than that with($p=0.045$, $OR=0.64$, $95\% CI=0.38-$
 324 1.07). The higher the nurse's professional title, the lower the score. The patient who

325 did not know the nurse in-charge had the lower score($p=0.028, OR=1.77, 95\%$
 326 $CI=0.98-3.19$)(Table 4).

327 **Table 3** Level of inpatients satisfaction with nursing services in a tertiary hospital of Gansu, China

Variables	Level of satisfaction		OR
	Satisfied (score ≥ 78),N(%)	Dissatisfied (score < 78),N(%)	
Gender			
Male	105(59.66)	54(46.05)	1.16
Female	71(40.34)	61(53.04)	
Marital status			
Single	12(6.82)	8(6.96)	0.25
Married	158(89.77)	97(84.35)	
Others	16(9.09)	0	
Admission ward			
Medicine	69(39.20)	29(25.22)	0.97
Surgery	41(23.29)	36(31.30)	
Obstetrics and gynecology	11(6.25)	31(26.96)	
Ophthalmology and Rehabilitation department	13(7.39)	5(4.35)	
	16(9.09)	6(5.22)	
History of admission			
Yes	95(53.98)	51(44.33)	1.25
No	81(46.02)	64(55.65)	
History of surgery			
Yes	81(43.02)	66(57.39)	0.64
No	95(53.98)	49(42.61)	
Know the nurse in charge			
Yes	140(79.55)	81(70.43)	1.77
No	36(20.45)	34(29.56)	
Title of nurse in charge			
junior	121(68.75)	56(48.69)	2.39
senior	55(31.25)	59(51.30)	
Educational status			
Primary school	43(24.43)	26(22.61)	0.87
High school	87(49.43)	59(51.30)	
Advanced diploma	22(12.50)	18(15.65)	
Bachelor's degree	23(13.07)	12(10.43)	
Master degree	1(0.57)	0	
Total	176(60.50)	115(39.50)	

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329 **Table 4** Factors influencing patients' satisfaction with nursing care.

Variables	B	S.E	Sig.	95%CI
Gender	0.15	0.32	0.640	0.61,2.19
Marital status	-1.08	0.51	0.037	0.13,0.93
Admission ward	-0.02	0.12	0.839	0.76,1.24
History of admission	0.29	0.38	0.045	0.67,2.29
History of surgery	-0.60	0.29	0.049	0.30,0.98
Know the nurse in charge	0.79	0.34	0.021	1.13,4.35
Title of nurse in charge	0.99	0.30	0.001	1.49,4.89

	Educational status	-0.13	0.19	0.486	0.59,1.27
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331 Discussion

332 Patient satisfaction with nursing service is a response to the quality of nursing, an
 333 important means of nursing quality evaluation, and an effective measure to monitor
 334 structural quality, process quality and result quality of nursing.¹¹ The overall
 335 satisfaction of patients with nursing services is the overall evaluation of the nursing
 336 services received during hospitalization. The results of this study show that the
 337 patient's overall satisfaction score for nursing service is 78.15±4.74 points (95 points
 338 are completely satisfied) with the overall satisfaction of 60.5%. This is higher than the
 339 results obtained in Taiwan(35%),³⁴ Ethiopia(49.2%).³⁵ However, it is lower than that
 340 in Lebanon,¹⁶ Beijing, China,³⁶ Spain³⁷ and Australia.³⁸ However, this might be
 341 related to differences in sample size and region and therefore it is difficult to make
 342 absolute comparison of research results. Nevertheless, these results show that there
 343 are still many factors leading to dissatisfaction amongst patients with hospital nursing
 344 services, and nursing managers need to analyze the reasons to formulate
 345 corresponding management strategies for the problems. Patients' satisfaction with
 346 hospital care are significantly associated with better patient safety, clinical
 347 effectiveness,³⁹ health outcomes⁴⁰ and less medical resource utilization.⁴¹ Therefore,
 348 nurses should be aware of the importance and the role of patients' satisfaction.

349 Although overall patient satisfaction was moderate in this study, the findings
 350 identified two problems which are in need of improvement: (1) the type of
 351 information given to patients and (2) the awareness of patient needs. Patients' needs
 352 assessment is important to define the target areas in which resources and efforts
 353 should be concentrated.³² However, the study indicated that nurses did not stress the
 354 importance of patients care needs. It could be inferred from the research that, first of

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2
3 355 all, nurses may not have enough knowledge reserves to fully answer patients' various
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5 356 questions. Second, due to the heavy workload, more time is spent on completing
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7 357 doctor's orders and other nursing and therapeutic work, and less time is spent on
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9 358 communicating with patients and conducting health education. This may also result
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11 359 from the fact that in most Chinese hospitals there are no nurse assistants whose main
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13 360 tasks are the performance of basic nursing activities such as bathing, oral toilet,
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15 361 changing, ect.⁴² Nurse staff of all different statuses need to perform all types of direct
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17 362 and indirect nursing activities in China. Meanwhile, the nurse to patient ratio is one of
18
19 363 the impressive nursing care features whereas 0.42:1 in GPH, it was an increase in the
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21 364 number of patients each nurse to provide more direct attention. With such workload,
22
23 365 nurses were eager to educate patients and therefore providing incomplete information
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25 366 or information that unmet patients' needs.⁴³ The findings regarding low patient
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27 367 satisfaction scores related to hospital staff responding to patient needs and
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29 368 information are consistent with the outcomes of other studies.^{44,45} Belayneh stated that
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31 369 patients were least satisfied when the least amount of information was given by the
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33 370 nurses.⁴⁶ With the increasing demands of medical knowledge, health science
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35 371 knowledge and rehabilitation knowledge, whether patients can acquire enough
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37 372 knowledge becomes an important condition for evaluating nursing services. Chan's
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39 373 study showed that patients who communicated with nurse and doctors about
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41 374 medicines and discharge information were more satisfied with their healthcare
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43 375 provider.⁴⁷ In various clinical settings, information is the decisive factor for good
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45 376 patient experience.⁴⁸ Poor communication between health care professionals and their
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47 377 patients is a key problem in the growing number of complaints against health care
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49 378 professionals worldwide.⁴⁹ Therefore, investigating all aspects of patients' needs and
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3 379 providing them with care and information to meet their needs through communication
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5 380 plays an important role in patients' satisfaction.
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9 381 Patient perception of service quality is a key indicator of hospital care,⁵⁰ which
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11 382 also happens to be one of the main determinants of patients' trust.⁵¹ Therefore, a
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13 383 better understanding of the factors affecting care quality can help hospital managers
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15 384 implement effective plans to improve service quality.⁵² In the current study, married
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17 385 patients were more satisfied than others. This finding was in accordance with a study
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19 386 conducted at three public hospitals in the Amhara Region⁵³ which used the NSNS
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21 387 scale, and in a hospital in China²⁰ which used other scale to assess patients
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23 388 satisfaction. This could be that married patients are accompanied by their spouses
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25 389 who provides life care and communicates with them. Therefore, they have relatively
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27 390 less care demand from nursing staff. Our study also found those admitted to medical
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29 391 departments were more satisfied with nursing. These may be patients admitted in
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31 392 medical wards are affected by chronic diseases, with relatively frequent
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33 393 hospitalization, more opportunities to contact and communicate with nurses, and more
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35 394 knowledge about the progress and outcome of their own diseases due to long-term
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37 395 illness. These was also revealed in other study which showed patients receiving
38
39 396 chronic disease management to report high levels of enablement.³⁸ Stress from
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41 397 surgery and postoperative recovery will have a significant impact on patient's
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43 398 physiology and psychology. Prevalence of preoperative anxiety ranged between 60–
44
45 399 80% in population,⁵⁴ and these will lead to an increase in patient's demand for nursing
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47 400 services and the expectation of the quality of nursing service. Any unmet of their
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49 401 expectations during hospitalization will cause dissatisfaction. However, preoperative
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51 402 anxiety is commonly neglected by clinicians.⁵⁵ Study has shown that patients who are
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53 403 well-informed and understand the process have a better surgical experience.³⁷
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3 404 However, these may not did well in our study as patients with surgery showed less
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5 405 satisfied with nursing services. It is suggested that patients need to be assessed
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7 406 regularly for anxiety during the preoperative visit and appropriate anxiety reducing
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9 407 methods should be introduced. Nursing staff should attach importance to nurse-patient
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11 408 communication through assessing patient needs to provide health related information
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13 409 and care services so as to meet patients' needs, increasing their satisfaction.
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18 410 Another aspect in this study is that patients with previous history of
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20 411 hospitalisation were found to be more satisfied than their counter parts, similar result
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22 412 was found in other study conducted in Ethiopia³⁵ and China.²⁰ This could be because
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24 413 patients who are hospitalized for first time are unfamiliar with nursing staff and
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26 414 hospital environment. They may have more requirements in communication with
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28 415 nurse regarding their disease and nursing services. For patients with previous history
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30 416 of admission, they have a certain understanding of their own diseases and health
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32 417 conditions, and are familiar with the hospital environment and the nurses in-charge,
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34 418 and have a stronger sense of security than patients hospitalized for the first time. Our
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36 419 finding also showed patients who knew their nurse in-charge were significantly
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38 420 satisfied with nursing than those who were not. Study showed patients receiving
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40 421 continuity of care with the same nurse were more satisfied than those who not.²⁹ The
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42 422 findings provide evidence for the value of nursing in nursing practice. Patients
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44 423 require more individualized care from nurses regarding education, communication
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46 424 and comfort² which will improve their well-being through reducing anxiety and
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48 425 depression, and also indirectly, by building trust and social support.⁵⁶
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55 426 Research shows that nurses' work experience is related to patient satisfaction. So
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57 427 it is helpful to provide guidance for rational allocation of nursing human resources to
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59 428 discuss whether the composition of professional titles affect patient satisfaction.
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3 429 Tarja's research shows that the working years of nurses are positively correlated with
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5 430 satisfaction.⁵⁷ In China, the level of nurses is divided into professional titles which
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7 431 correspond to junior(1-5), intermediate(5-10), and senior(more than 10 years). The
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9 432 more nurses with solid professional knowledge and rich working experience among
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11 433 nursing staff, the better the effect of nursing work.²⁰Research by Wang shows that
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13 434 patients' satisfaction with nursing professional skills is positively correlated with the
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15 435 proportion of nurses working for more than 5 years, and satisfaction with health
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17 436 education is positively correlated with the proportion of competent nurses.²⁸Han's
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19 437 survey shows that patients are most satisfied with nurses who have worked for 2-5
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21 438 years.⁵⁸ Our findings also showed the same as the patients in-charged by junior nurse
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23 439 who worked as nurse for less than 5 years were more satisfied than those by senior.
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25 440 The reason may be that nurses who have worked for more than 5 years have rich
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27 441 clinical experience and better operating skills, but most of them have a sense of job
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29 442 burnout, which has a negative impact on patient satisfaction.⁵⁸On the other hand, due
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31 443 to the different division of labor in GPH, nurses working for less than 5 years are
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33 444 mainly engaged in first-line clinical nursing, while senior nurses are engaged in some
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35 445 work related to ward organization and management. Therefore, senior nurses have
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37 446 less communication with patients, thus affecting patients' satisfaction with their work.
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39 447 It indicated that nurse-patient communication plays an important role in the
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41 448 evaluation of patients' satisfaction with nursing work.

449 **Conclusion**

450 In conclusion, the current study explored the level of patient satisfaction with nursing
451 services and its associated factors. It shows that the care needs of hospitalized patients
452 are still not satisfied to some extent. Meanwhile, patients' married status, history of

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3 453 hospitalization and surgery, professional title of in-charged nurses when providing
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5 454 care are main factors effecting patients satisfaction with nursingcare. The current
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7 455 finding will have direct implication towards nurse professionals and nursing
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9 456 administrators. Nurses should establish a good relationship with patients through
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11 457 more communication. In daily nursing work, nurses should formulate corresponding
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13 458 nursing plans according to the personal characteristics and care needs of patients so as
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15 459 to sufficiently meet patients' expectations.

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17 460 Of course, besides nursing, there are many factors that will affect the patient's
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19 461 satisfaction, including patient staffing ratio, the use of health information technology,
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21 462 the amount of surgery in the hospital and the health teaching situation. Based on our
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23 463 experience, we suggest to conduct interviews with patient as a first step to learn what
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25 464 patients are most concerned with when seeking nursing services.

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38 39 40 468 **List of abbreviations**

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43 469 GPH: Gansu Provincial Hospital.

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45 470 NSNS: Newcastle Satisfaction with Nursing Scale.

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49 50 472 **Declarations**

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53 473 **Ethics approval :** This study was approved by Gansu Provincial Hospital's Ethic
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55 474 Commission.

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58 475 **Consent for publication:** Not applicable.

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4 476 **Availability of data and material** : The datasets used and/or analysed during the
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7 477 current study are available from the corresponding author on reasonable request.
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10 478 **Competing interests** : The authors declare that they have no competing interests
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18
19 481 interpretation of data and in writing the manuscript.
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24
25
26 483 interpreted the patient data regarding satisfaction and effective factors. ZJX
27
28 484 performed the was a major contributor in writing the manuscript. DJ and SWJ
29
30 485 collected data. All authors read and approved the final manuscript.
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36 487 questionnaire survey.
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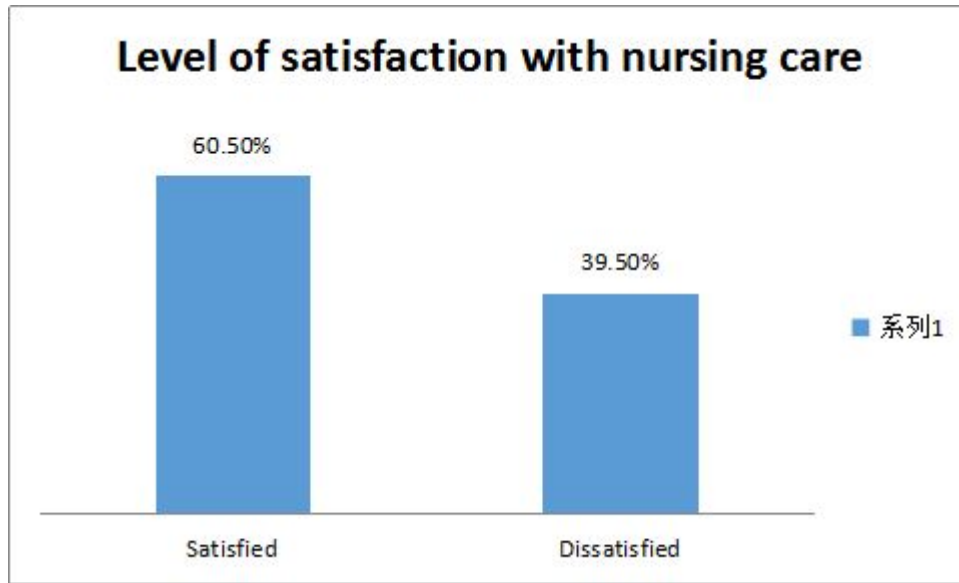


Figure 1. Level of inpatients satisfaction with nursing services in a tertiary hospital of Gansu, China

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Title, paragraph 1-2 Abstract, paragraph 30-50
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Background, paragraph 79-131
Objectives	3	State specific objectives, including any prespecified hypotheses	Background, paragraph 132-133
Methods			
Study design	4	Present key elements of study design early in the paper	Study design, paragraph 150
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Setting, paragraph 136-138
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	sample, paragraph 153-171
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	paragraph 177-186
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	paragraph 192-201
Bias	9	Describe any efforts to address potential sources of bias	paragraph 165-171
Study size	10	Explain how the study size was arrived at	Sample, paragraph 153-160
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Data Analysis, paragraph 158-161
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Data Analysis, paragraph 203
		(b) Describe any methods used to examine subgroups and interactions	Data Analysis, paragraph 204-209
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	Sample, paragraph 153-160
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	General characteristics, paragraph 214-222
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	General characteristics, paragraph 214-222
		(b) Indicate number of participants with missing data for each variable of interest	Result, paragraph 224-229

Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(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	Result, paragraph 234-241
		(b) Report category boundaries when continuous variables were categorized	Result, paragraph 234-241
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion, paragraph 251-253
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	paragraph 54-60
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion, paragraph 249-342
Generalisability	21	Discuss the generalisability (external validity) of the study results	Conclusion, paragraph 334-350
Other information			
Funding	22	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	Funding, paragraph 368-370

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Inpatients' satisfaction with nursing care in the backward region: a cross-sectional study from Northwestern China

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1 **Inpatients' satisfaction with nursing care in the backward region:**
2 **across-sectional study from Northwestern China**

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29 Abstract

30 **Objectives** The aim of the study was to examine the level of patient satisfaction with
31 nursing care and identify the factors affecting satisfaction from the in-patients'
32 viewpoints in backward region of China.

33 **Design** This was a cross-sectional study.

34 **Setting** The study was conducted at a tertiary hospital located in Northwest China.

35 **Participants** Patients who were admitted to the ward for at least 48 hours were
36 chosen to undertake the survey.

37 **Primary outcome measure** The Newcastle Satisfaction with Nursing care Scale was
38 used. Data were collected from 219 patients.

39 **Results** The overall inpatient satisfaction with nursing care was 78.15 ± 4.74 . Patients
40 were more satisfied with nurses who respected their privacy and treated them as
41 individuals (67.7%). Patients were least satisfied with the type of information nurses
42 gave to them (11.7%) and awareness of their needs. Patients who were married,
43 having a history of hospitalization, surgery and in-charged by junior nurses had higher
44 satisfaction with nursing.

45 **Conclusions** The overall level of patient satisfaction was moderates. There is a need
46 for nurses to be aware of patients' individualized care needs and provide more
47 information. This study may urge hospital administrators, policy makers and nurses
48 to be more sensitive with patients' married status, history of hospitalization and
49 surgery, professional title of in-charged nurses when providing care.

50 **Keywords:** Inpatient, Nursing care, Satisfaction, Backward region, China

51

52

53 **Strengths and limitations of this study**

- 54 ● This study is the first to evaluate inpatients' satisfaction with nursing care using
55 NSNS instrument in less developed and more economically burdened Chinese
56 areas.
- 57 ● The sample of the study was recruited from one hospital in northwest China. As
58 such, its social background and current situation of healthcare disturbance may be
59 different from other areas.
- 60 ● The study sample was small, so it is not likely to be representative of the patients
61 in all Chinese hospitals. Larger samples across multiple sites are needed in future
62 research.
- 63 ● The study adopted self-reported questionnaires, so all answers were based on the
64 respondents' own perception. Hence, there is a possibility that their responses
65 were influenced by social desirability, leading to response bias.

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77 **Background**

78 Patient satisfaction have been defined by scholars from different aspects. Swarupa
79 defined it as people's expectation for health care services due to the requirements of
80 health, disease, quality of life and other aspects.¹ Berkowitz suggested that patient
81 satisfaction is an individual's evaluation of the degree to which the medical services
82 provided are in line with their expectations and preferences.² Ahmed believes that
83 patient satisfaction is the result of patients filtering medical service experience and
84 evaluating the degree to which medical service experience meets their needs from
85 their own unique perspective.³ Among them, most scholars believe that the best
86 definition of patient satisfaction is the evaluation of medical services by patients
87 based on the degree to which their expectations are met.⁴ Based on this expectation,
88 the evaluation of patient satisfaction objectively reflect the quality of health care
89 services which becomes the gold standard and widely used metric to measure hospital
90 quality management.^{5,6}

91 Patient satisfaction with nursing service is an important component of patient
92 satisfaction.⁷ Risser defines patient satisfaction with nursing as the degree to which
93 the patient's expectation of ideal care is consistent with the actual care.⁸ Eriksen
94 defines it as the subjective evaluation made by patients according to their own
95 expectations of nursing and their cognitive and emotional reactions to the interaction
96 of actual receiving nursing services.⁹ The American Nurses Association (ANA) is
97 defined as a patient or his family staff's evaluation of the nursing care received.¹⁰ The
98 above definitions are slightly different, and the consistent point is that patients'
99 satisfaction with nursing is a subjective feeling, which is closely related to their
100 expectation and perception of nursing quality. From the time of admission until
101 discharge, nurses provide care for patients every day without fail and are involved in

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3 102 almost every aspect of patient care. Therefore, as main healthcare providers, nurses
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5 103 have a significant impact upon patients' perceptions about their hospital experience.⁷
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8 104 If healthcare organization managers are able to identify patient expectations, they
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10 105 could accordingly adjust the performance of services that they offer to meet these
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12 106 expectations.^{11,12} Therefore, it is urgently needed to carry out surveys in health
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14 107 services to measure patient health care satisfaction constantly, to learn their
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16 108 expectations, suggestions and feedbacks, so as to guide health care workers which
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18 109 items should be prioritized and which require alteration in the service.¹³
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21 110 In order to achieve the goal of high-care quality, decision makers should not only
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23 111 know whether the patient is satisfied, but also, more importantly, why the patient is
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25 112 not satisfied. That is, they should identify the factors that affect the patient's
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27 113 satisfaction with nursing services, so as to carry out care that meets patients' needs.
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29 114 According to previous studies, factors such as age,^{14,15} gender¹⁵⁻¹⁷, educational
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31 115 level,^{18,19} length of stay, type of admission²⁰ previous history of admission, patients'
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33 116 income level, type of admission rooms.²¹ monthly household income and frequency of
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35 117 admission had significant association with level of satisfaction.²² To foster better
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37 118 individualized care, the factors influencing hospitalized patients' perception of
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39 119 individualized care should be identified.
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44 120 In China, there are 20918 hospitals in different levels with 20 million registered
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46 121 nurses. The average bed to nurse ratio is about 1:0.45. Of them, the 2232 tertiary
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48 122 public hospitals account for only 7.66% of the all-types health facilities, yet provide
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50 123 nearly half (42.5%) of the inpatient care.²³ On average, the rate of one nurse per 1000
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52 124 population was lower than the WHO standard of 2.28 per 1000 population.²⁴
53
54 125 Excessive workloads lead to lower job satisfaction in nurse staff across tertiary
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56 126 hospitals.^{23,25} Under such environments, the patient satisfaction in tertiary hospitals
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127 needs more attention. Ministry of Health of China formulated the " Standards for
 128 Implementing Quality Nursing Services in Hospitals (Trial)" in 2010, which aimed
 129 to provide patients with safe and high-quality nursing services.²⁶ With these
 130 standards, "high quality nursing service project" was carried out at a national level.
 131 By the end of 2015, all tertiary hospitals in China had carried out high-quality nursing
 132 services, with 87.0 % of them being tertiary A-class hospitals and 82.6 % were B-
 133 class.²⁷

134 At present, the survey on the satisfaction of hospitalized patients with nursing
 135 service in China is confusing. On one hand, patients in different facilities reported
 136 high satisfaction about nursing service. As show in table 1.

137 Table 1 Outcomes of patients satisfaction in different provinces of China

author	Survey date	Province	Hospital included	instrument	satisfaction		Effecting factors
					n	%	
Guo YH, et al ²⁸	2007	24 Provinces	71 Hospitals	Self-designed	4338	93.69	age, education level
Jiao J, et al ²⁹	2008	Beijing	4 A-class hospitals	NSNS	1496	82.9	age, education level health status, department
Fu WJ ³⁰	2010	Henan	1 Children hospital	NSNS	110	85	age, education level
Nie SM, et al ³¹	2013	Shandong	1B-class hospital	Self-designed	626	78	Department, age, education level, occupation, payment method, ADL
Shan LH, et al ³²	2013	Heilongjiang	30 Hospitals	CNHSSs	1200	76	medical insurance
Hu ³³	2013	Gansu	1A-class hospital	Self-designed	400	80.9	environment
Guo M, et al ³⁴	2014	Shandong	1A-class hospital	Self-designed	298	79.8	age, patients' position, culture, income and reason for choosing
Xing Y, et al ³⁵	2015	Gansu	1A-class hospital	Self-designed	138	82.4	age, degree of education, average income per person in family, and self-feeling of health status
Liu XJ, et al ³⁶	2017	Jiangxi	2 A-class hospital	IAPSQGH	844	82.1	age, degree of education, average income per person in family
Liu JL, et al ³⁷	2019	11 provinces in Western China	33 county-level hospitals, 33 township hospitals	CNHSSs	9811	60	waiting time, medical expenses
138	CNHSSs : Questionnaires of the China National Health Service Surveys; IAPSQGH:						
139	Improvement and Assessment of Patient Satisfaction Questionnaire in General Hospitals; ADL:						
140	Ability of Daily Life; NSNS: Newcastle Satisfaction with Nursing Scale.						

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3 141 These indicated that Chinese nursing service continues to be improved with the
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5 142 implementation of “the high-quality care project”. However, unfaithful reports by the
6
7 143 media and continuous occurrence of disputes and violence are inconsistent with the
8
9 144 results of the satisfaction survey. An analysis of workplace violence shows that 40.8%
10
11 145 of hospital nurses in China have experienced different types of workplace violence.³⁸
12
13 146 Zou et al study showed there is a high incidence(59.7 %) of workplace violence
14
15 147 among nurses in Chinese tertiary hospitals.³⁹ In Wang et al’s study 6.67% of nurses
16
17 148 suffered violence in the workplace.⁴⁰Violence in these workplaces will affect nurses'
18
19 149 mental health, leading to job burnout,⁴¹ and thus reduce the quality of nursing
20
21 150 services. The frequent occurrence of workplace violence in hospitals directly reflects
22
23 151 the dissatisfaction of patients with the quality of medical care. Thus, hospital-specific
24
25 152 data are still required to provide evidence for cross-country and cross-cultural
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27 153 comparisons of satisfaction and factors affecting satisfaction using standardized tools.

28
29 154 Gansu province is located in North-west of China. Affected by region, the
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31 155 development of economy, culture and information is relatively backward. According
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33 156 to China's economic comprehensive competitiveness development report, Gansu
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35 157 province ranks 27th among the 31 provinces in China.⁴² With continuous development
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37 158 in the overall scale of hospitals in Gansu, the scope of service is getting larger, and the
38
39 159 number of patients received is also gradually increasing. With the continuous
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41 160 improvement of people's requirements for service level, complaints from patients
42
43 161 occur frequently⁴³. In light of this situation, hospital managers urgently need to
44
45 162 understand the gap between patients care needs and the capabilities of the hospital to
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47 163 providing care in a timely and dynamic manner. To our knowledge, this is the first
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49 164 study in Gansu to use Newcastle Satisfaction with Nursing Scale (NSNS) to
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51 165 measure satisfaction with nursing care. Thus, this study has two aims: (1) to assess
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53 166 patient satisfaction with nursing care using NSNS instrument, so as to find out the gap
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55 167 between patients' expectations and the hospital's service provision. (2) to investigate
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57 168 the factors affecting patient satisfaction with nursing care, so as to provide more
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59 169 accurate reference for hospital managers and relevant regulatory agencies.

170 **Methods**

171 **Study design**

172 This study was a cross-sectional survey held in 2018. For the reporting purpose,

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3 173 STROBE(Strengthening the Reporting of Observational Studies in Epidemiology)

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5 174 checklist was used in this study.

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8 175 **Study setting and the participants**

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10 176 This study was conducted at Gansu Provincial Hospital(GPH), a tertiary hospital with
11
12 177 1700-beds. The services at GPH include ear, nose and throat, surgery, outpatients
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14 178 clinic, emergency, gynaecology and obstetrics, paediatrics and neonatal intensive care
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16 179 unit, maternal and child health, physiotherapy, dental, radiology, traditional Chinese
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18 180 medicine, rehabilitation, and internal medicine. GPH is also a teaching hospital for
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20 181 nursing, health officer, medicine, midwifery and pharmacy undergraduate and
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22 182 graduate students. The hospital has a total of 4070 employees,1200 of which are
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24 183 nurses who provide health care in 60 nursing units. The hospitalized patients mainly
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26 184 come from residents and the people in the surrounding cities and states. Choosing the
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28 185 hospital to carry out the survey can better understand the expectations of patients from
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30 186 different social strata in Gansu.

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35 187 The number of open beds in GPH is about 1500, after excluding departments such
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37 188 as paediatrics, intensive care units, emergency wards and VIP wards (about 200).The
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39 189 population of the study was calculated using the formula $N = Z^2.P(1-P)/E^2$.⁵ In the
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41 190 formula, the symbols represent the following: a margin of error (E)= 5%.In order to
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43 191 narrow the interval, and make the estimation of effect quantity more accurate, we
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45 192 chose 99% as the confidence level, $Z=2.58$. 90% patient satisfaction with nursing
46
47 193 care.¹⁶ We calculated the sample using the following: $Z^2.P(1-P)/ E^2= (2.58*2.58).$
48
49 194 $0.90(1-0.90)/ (0.05*0.05)= 6.65*0.09/ 0.0025= 239$.Then we added 20% to the
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51 195 sample size for non-response or for selection bias, thus making the sample size = 288
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53 196 approximately. Patients should meet the following inclusion criteria: (1) ≥ 18 years old;
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55 197 (2)admitted in the wards at least for 48h; (3)capable of independent communication;
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3 198 (3)voluntary participation. Patients were excluded on any one of the following:
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5 199 patients in intensive care unit; pediatric patients; emergency observation ward patients;
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7 200 VIP patients in selected wards. Medical, surgical, gynaecology and obstetrics and ear,
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9 201 nose and throat wards were purposefully selected and based on the calculated sample
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11 202 size, the required number of patients from each ward was proportionally allocated.
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14 203 Finally, 291 patients were included for further analysis,32 patients were excluded
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16 204 with 12 of them being younger than 18 years old and 20 who disagreed to participate..
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19 205 **Instruments**

20 206 The questionnaire included: (1) general demographic characteristics: age, gender,
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22 207 educational status, marital status, monthly family income, history of admission,
23
24 208 hospital length of stay, admission ward, professional title of patients' nurse in charge.
25
26 209 (2)NSNS checklist. The NSNS was developed by Thomas et al.⁴⁴ The scale has been
27
28 210 translated into different languages and has been applied in many studies. The Chinese
29
30 211 version of the scale was tested for its validity and reliability by Jiao with Cogent
31
32 212 Validity index is 0.98 and Cronbach's alpha is 0.97.²⁹ The NSNS includes two
33
34 213 subscales: the Experience of Nursing Care Scale (ENCS) and the Satisfaction with
35
36 214 Nursing Care Scale (SNCS). The two subscales can be applied either together or
37
38 215 separately. In this study, the SNCS was applied, consisting of a total of 19 items and
39
40 216 using a 5-point Likert scale. For assessing the degree of satisfaction, 'not at all',
41
42 217 'barely', 'satisfied', 'very', 'completely' scored from 1- 5 respectively. Patient
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44 218 responses across all items are summed and transformed to yield an overall satisfaction
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46 219 score between 0–95, which denotes none or complete satisfaction with all aspects of
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48 220 nursing care.
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54 221 **Patient and Public Involvement**

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3 222 Before the survey, the nurse manager explained the purpose of the study. Patients
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5 223 have the right to refuse to participate in the study and to withdraw at any time during
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7 224 the study. Patients are required to provide detailed and accurate information as much
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9 225 as possible during the investigation to ensure the accuracy of the results. The
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11 226 questionnaire did not indicate the patient's identification information. No patient
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13 227 participated in the recruitment and implementation of the study.
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17 228 **Institutional Review Board approval**

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19 229 Consent was acquired from the nurse director of each ward and verbal approvals were
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21 230 obtained from patients. This study was also approved by Gansu Provincial Hospital
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23 231 Research Ethics Committee.
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27 232 **Data collection**

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30 233 Five nursing students were trained previously by one of the authors(ZJX). The
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32 234 training lasted for two days. On the first day, students were trained to understand the
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34 235 meaning of each item of the questionnaire. On the second day, students were shown
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36 236 how to communicate with patients. After that, each student selected a patient in a
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38 237 specified department to conduct a pre-survey using the questionnaire, and gave
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40 238 feedback regarding the survey process, so that the trainers could answer them in a
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42 239 timely manner.
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46 240 At the time of admission, a lottery method was adopted by the nurse manager to
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48 241 randomly select patients. Then, the students made records and attended to patients 48h
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50 242 later since their admission. A private room at the department was used to interview
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52 243 patients. Family members were present during some of the interviews at the request of
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54 244 patients. If the patient could not fill in the form due to various factors, the student
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56 245 would ask the question and gave a certain amount of time for patients to make
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58 246 statements for each question. After each question, the student helped to fill in the
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3 247 questionnaire according to patients answer. In addition, medical records were
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5 248 reviewed for certain variables such as hospital length of stay and history of admission.
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8 249 The study started on August 2018,till November of 2018, there were 291 patients who
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10 250 completed the survey.

11 251 **Data analysis**

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14 252 The data were collected and analyzed with SPSS version 21.0. Patient satisfaction
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17 253 with nursing service was described by the mean, standard deviation, frequency and
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19 254 percentage. As the missing data was less than 5% in some items, we used listwise
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21 255 deletion to deal with them. Considering the study by Ahmed et al,²¹ we used the same
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24 256 method to use mean satisfaction score as a cut point to dichotomise satisfaction into
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26 257 ‘satisfied’ and ‘not satisfied’. Based on the years of experience, the profession title of
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28 258 nurses were divided into junior(1-5 years) and senior(above 5 years). In addition to
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30 259 hospitalization, we also checked whether patients had a history of hospitalization in
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33 260 the past. Binary logistics regression analysis and backward stepwise method was used
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35 261 to screen variables which affect patient satisfaction. The strength of the associations
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37 262 was described using OR and 95% CI.

38 263 **Results**

39 264 **Patients’ characteristics**

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44 265 Of the participants, the mean age is 45.59 ± 15.96 . As seen in table 2, 54.6% were
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47 266 male, 87.6% were married and 23.7% were primary school graduates; 33.7% were
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49 267 admitted in medical department, 43.6% had monthly family incomes between 3000-
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51 268 4999 RMB(related to 436-726 USD). More than three-quarters (79%) of patients
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54 269 knew the name of their nurse in-charge of their nursing care and more than
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57 270 half(61,7%) were cared by junior registered nurses. Patients had variations in the
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271 duration of their hospital stays (2 - 36 days) with a mean of 7.20 ± 5.69 days. The
 272 hospital length of stay of inpatients in surgery ward (an average of 11 days) was
 273 longer than that for medical inpatients (an average of 7 days). See table 2.

274 **Table 2** Socio demographic characteristics and NSNS calculated score for example(N=291)

Variables	Categories	Frequency	NSNS score
		n(%)	Mean (SD)
Gender	Male	159(54.6)	79.00±4.44
	Female	132(45.4)	77.12±4.85
Monthly family income(CNY)*	<100	1(0.3)	78.0±0.35
	<1000	17(5.7)	77.52±4.05
	1000-2999	103(34.6)	85.0±0.05
	3000-4999	130(43.6)	78.56±4.37
	≥5000	39(13.1)	77.0±6.45
Marital status	≥10000	1(0.3)	78.52±4.05
	Single	20(6.9)	78.5±2.35
	Married	255(87.6)	77.98±4.95
Educational status	Others	16(5.5)	80.4±1.59
	Primary school	69(23.7)	78.27±4.01
	High school	146(50.2)	77.90±4.53
	Advanced diploma	40(13.7)	77.82±6.15
	Bachelor's degree	35(12.0)	79.11±4.96
Admission ward	Master degree	1(0.3)	85.0±0.05
	Medicine	99(33.7)	78.62±4.93
	Surgery	78(26.5)	77.63±2.97
	Obstetrics and gynecology	42(14.4)	74.5±5.5
	Ophthalmology and otorhinolaryngology	18(6.2)	79.77±3.13
	Rehabilitation department	22(7.6)	80.86±5.13
History of admission	Yes	146(50.2)	78.76±4.57
	No	145(49.8)	77.53±4.82
Patients know the name of nurse in-charge	Yes	221(75.9)	78.47±4.65
	No	70(24.1)	77.14±4.82
Living area	Urban	146(50.2)	77.98±4.08
	Rural	145(49.8)	78.31±5.28
Title of staff nurse	Junior RN**	177(61.7)	79.15±4.25
	Senior RN	114(38.3)	76.56±4.98
Mean satisfaction score		78.15(Max. 95) ± 4.74	

275 NSNS, Newcastle Satisfaction with Nursing Scale.*USD1 is 7.4 Chinese Yuan (CNY).**RN, Registered Nurse.

276 Satisfaction with nursing care

277 As shown in Table 2, the average satisfaction score of patients is 78.15 ± 4.74 .
 278 Regarding nursing care, as shown in table 3, patients reported the highest satisfaction
 279 when nurses treated them as an individual(67.7%) and respected their privacy (60.8%).
 280 Patients were least satisfied with the type of information nurses gave to them(11.7%)

281 and a lack of awareness in the patient's needs(9.6%). As showed in table 4, after
 282 dichotomising satisfaction into 'satisfied' and 'not satisfied', 60.5% of the study
 283 participants were satisfied with the care provided by nurses.

284 **Table 3** Percentage distribution of items for satisfaction with nursing care in admitted patients at GPH.

Item	Not at all satisfied n (%)	Barely satisfied n (%)	Quite satisfied n (%)	Very satisfied n (%)	Completely satisfied n (%)
1.The amount of time nurses spent with patient	0	4(1.4)	42(14.4)	179(61.5)	66(22.7)
2.How capable nurses were at their job	0	1(0.3)	16(5.5)	156(53.6)	118(40.5)
3.There always being a nurse around when needed	0	2(0.7)	58(19.9)	164(56.4)	67(23.0)
4.The amount nurses knew about patient care	0	1(0.3)	38(13.1)	193(66.3)	59(20.3)
5.How quickly nurses came when patient called them	0	1(0.3)	30(10.3)	123(42.3)	137(47.1)
6.The way the nurses made patient feel at home	0	1(0.3)	47(16.2)	187(64.3)	56(19.2)
7.The amount of information nurses gave to patient about their condition and treatment	0	5(1.7)	124(42.6)	102(35.1)	60(20.6)
8.How often nurses checked to see if patients were well	0	1(0.3)	27(9.3)	176(60.5)	87(29.9)
9.Nurses' helpfulness	0	1(0.3)	26(8.9)	192(66.0)	72(24.7)
10.The way nurses explained things to patient	1(0.3)	0	29(10.0)	166(57.0)	95(32.6)
11.How nurses helped put patient relatives' or friends' minds at rest	0	0	41(14.1)	161(55.3)	89(30.6)
12.Nurses' manner in going about their work	0	0	12(4.4)	111(38.1)	167(57.4)
13.The type of information nurses gave to patient about his/her condition and treatment	0	3(1.0)	97(33.3)	157(54)	34(11.7)
14.Nurses' treatment of patient as an individual	0	1(0.3)	14(4.8)	78(26.8)	197(67.7)
15.How nurses listened to patient worries and concerns	0	1(0.3)	55(18.9)	196(67.4)	39(13.4)
16.The amount of freedom patient was given on the ward	0	0	83(28.5)	170(58.4)	38(13.1)
17.How willing nurses were to respond to patient requests	0	2(0.7)	51(17.5)	177(60.8)	61(21)
18.The amount of privacy nurses gave patient	0	0	36(12.4)	78(26.8)	177(60.8)
19.Nurses' awareness of patient needs	0	3(1.0)	130(44.7)	130(44.7)	28(9.6)

285 GPH.,Gansu Provincial Hospital

286 **Factors influencing satisfaction**

287 Previous history of hospitalization and surgery were significant factors influencing
 288 patient satisfaction with nursing care. A higher level of patient satisfaction was found
 289 to exist in married patients with history of admission($P<0.05$). Patients admitted in
 290 medical wards showed the highest satisfaction compared to those in other wards. The
 291 score without surgery was higher than that with($p=0.045$, $OR=0.64$, 95% $CI=0.38-$
 292 1.07). The higher the nurse's professional title, the lower the score. The patient who
 293 did not know the nurse in-charge had the lower score($p=0.028$, $OR=1.77$, 95%
 294 $CI=0.98-3.19$)(Table 5).

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Table 4 Level of inpatients satisfaction with nursing services in a tertiary hospital of Gansu, China

Variables	Level of satisfaction	
	Satisfied (score ≥ 78), N(%)	Dissatisfied (score < 78), N(%)
Gender		
Male	105(59.66)	54(46.05)
Female	71(40.34)	61(53.04)
Marital status		
Single	12(6.82)	8(6.96)
Married	158(89.77)	97(84.35)
Others	16(9.09)	0
Admission ward		
Medicine	69(39.20)	29(25.22)
Surgery	41(23.29)	36(31.30)
Obstetrics and gynecology	11(6.25)	31(26.96)
Ophthalmology and Rehabilitation department	13(7.39)	5(4.35)
	16(9.09)	6(5.22)
History of admission		
Yes	95(53.98)	51(44.33)
No	81(46.02)	64(55.65)
History of surgery		
Yes	81(43.02)	66(57.39)
No	95(53.98)	49(42.61)
Know the nurse in charge		
Yes	140(79.55)	81(70.43)
No	36(20.45)	34(29.56)
Title of nurse in charge		
junior	121(68.75)	56(48.69)
senior	55(31.25)	59(51.30)
Educational status		
Primary school	43(24.43)	26(22.61)
High school	87(49.43)	59(51.30)
Advanced diploma	22(12.50)	18(15.65)
Bachelor's degree	23(13.07)	12(10.43)
Master degree	1(0.57)	0
Total	176(60.50)	115(39.50)

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Table 5 Factors influencing patients' satisfaction with nursing care.

Variables	B	S.E	Sig.	95%CI
Gender	0.15	0.32	0.640	0.61,2.19
Marital status	-1.08	0.51	0.037	0.13,0.93
Admission ward	-0.02	0.12	0.839	0.76,1.24
History of admission	0.29	0.38	0.045	0.67,2.29
History of surgery	-0.60	0.29	0.049	0.30,0.98
Know the nurse in charge	0.79	0.34	0.021	1.13,4.35
Title of nurse in charge	0.99	0.30	0.001	1.49,4.89
Educational status	-0.13	0.19	0.486	0.59,1.27

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299 **Discussion**

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3 300 Patients' satisfaction with hospital care are significantly associated with better patient
4 301 safety, clinical effectiveness,⁴⁵ health outcomes⁴⁶ and less medical resource
5 302 utilization.⁴⁷ In the current reform of China's health - care system, we need to have a
6 303 better understanding on what is associated with patient satisfaction, and what we can
7 304 do to improve it. Comparably no study on patient satisfaction in Northwest of China
8 305 are reported in English. The international research community has limited access to
9 306 and understanding of patient satisfaction in this area. In this study, we use NSNS to
10 307 investigated the level of inpatients satisfaction with nursing care and its associated
11 308 factors in Northwest of China. The results showed that the patient's overall
12 309 satisfaction in nursing is 78.15+4.74 (95 points are completely satisfied), and 60.5%
13 310 of inpatients were satisfied with nursing services at GPH.. Marital status, history of
14 311 admission, history of surgery, know the nurse in-charge and title of nurse in-charge
15 312 were significantly associated with patient satisfaction.

16 313 The level of patient satisfaction(60.5%) in our study was higher than the results
17 314 obtained in other area China, such as in Taiwan(35%)⁴⁸ Malaysia²² and 11 Western
18 315 provinces in China(60%),³⁷ however, it is lower than that in Shandong,³¹ Jiangxi,
19 316 ³⁶,and other cities in Gansu China,^{33,35}also in Spain⁴⁹ and Australia.⁵⁰ This might be
20 317 related to differences in sample size, region and the use of a different survey scale,
21 318 therefore it is difficult to make absolute comparison of these results. When the
22 319 research findings were compared with studies conducted using the same scale
23 320 internationally, the average score was higher than Turkey(62.08+20.94),⁵ Ethiopia
24 321 (63.9+17),²¹ Polish(74.98),¹⁵ Jordan(77.1+12.52),⁵¹ and Pakistan(51%),⁵² but lower
25 322 than studies conducted in Beijing²⁹ and Henan province³⁰ in China. A study from
26 323 rural Western China showed that patients in primary health care were relatively less
27 324 satisfied with medical service than developed areas.⁵³ Our study may indicated this.
28 325 Although overall patient satisfaction was moderate, this study revealed that patients
29 326 were mostly satisfied with nurse's attitude treating them as an individual and
30 327 respected their privacy. However, least patients in the study were satisfied with the
31 328 type of information nurses gave to them(11.7%) and a lack of awareness in the
32 329 patient's needs(9.6%). The findings are consistent with the outcomes of other
33 330 studies.^{54,55,56,57} It could be that, first of all, due to the heavy workload, nurses spend
34 331 more time on completing doctor's orders and therapeutic work, less time is spent on
35 332 communicating with patients and conducting health education. This may also result

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3 333 from the fact that in most Chinese hospitals there are no nurse assistants whose main
4 334 tasks are the performance of basic nursing activities such as bathing, oral toilet,
5 335 changing, ect.⁵⁸ Nurse staff in different professional layer need to perform various
6 336 direct and indirect nursing activities. Moreover, hospital in less developed area may
7 337 face a larger proportion of patients with lower education level.⁵³ They may have more
8 338 demands of medical knowledge. However, with such workload, nurses were eager to
9 339 educate patients and therefore providing incomplete information that unmet patients'
10 340 needs.⁵⁹ In various clinical settings, information is the decisive factor for good patient
11 341 experience.⁶⁰ Poor communication between health care professionals and their
12 342 patients is a key problem in the growing number of complaints against health care
13 343 professionals worldwide.⁶¹ Therefore, investigating all aspects of patients' needs and
14 344 providing them with care and information to meet their needs through communication
15 345 plays an important role in patients' satisfaction.⁶²

16 346 A better understanding of the factors affecting care quality can help hospital
17 347 managers implement effective plans to improve service quality.⁶³ In the current study,
18 348 we find that married patients were more satisfied than others. This finding was in
19 349 accordance with a study conducted in Amhara Region⁶⁴ which used the NSNS scale,
20 350 and a hospital in China²⁶ which used other scale to assess patients satisfaction. This
21 351 could be that married patients are accompanied by their spouses who provides daily
22 352 care and communicates with them. Therefore, they have relatively less demand from
23 353 nurses. Prevalence of preoperative anxiety ranged between 60–80% in population,⁶⁵
24 354 which have been commonly neglected by clinicians.⁶⁶ Study has shown that patients
25 355 who are well-informed and understand the process have a better surgical experience.
26 356⁴⁹ However, these may not did well in our study as patients with surgery showed less
27 357 satisfied with nursing services. It is suggested that patients need to be assessed
28 358 regularly for anxiety during the preoperative visit and appropriate anxiety reducing
29 359 methods should be introduced. Nursing staff should attach importance to nurse-patient
30 360 communication through assessing patient needs to provide health related information
31 361 and care services so as to meet patients' needs,⁶² increasing their satisfaction.

32 362 Another factor that needs to be emphasized is that patient with history of
33 363 hospitalization were found to be more satisfied than their counter parts, similar result
34 364 was found in other study conducted in Ethiopia⁶⁷ and China.²⁶ This could be because
35 365 patients who are hospitalized for first time are unfamiliar with nursing staff and

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3 366 hospital environment. They may have more requirements in communication with
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5 367 nurse regarding their disease and nursing services. For those with previous history of
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7 368 admission, they have a certain understanding of their own diseases and health
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9 369 conditions, and are familiar with the hospital environment and the ward nurses, and
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11 370 have a stronger sense of security than patients hospitalized for the first time. Our
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13 371 finding also showed patients who knew their nurse in-charge were significantly
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15 372 satisfied with nursing than those who were not. Study showed patients receiving
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17 373 continuity of care with the same nurse were more satisfied than those who not.⁴¹ The
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19 374 findings provide evidence for the value of nurses in nursing practice. Patients require
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21 375 more individualized care from nurses regarding education, communication and
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23 376 comfort² which will improve their well-being through reducing anxiety and
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25 377 depression, and also indirectly, by building trust and social support.⁶⁸

26 378 Research shows that nurses' work experience is related to patient satisfaction. So
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28 379 it is helpful to provide guidance for rational allocation of nursing human resources to
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30 380 discuss whether the composition of professional titles affect patient satisfaction.
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32 381 Tarja's research shows that the working years of nurses are positively correlated with
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34 382 satisfaction.⁶⁹ In China, the level of nurses is divided into professional titles which
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36 383 correspond to junior(1-5), intermediate(5-10), and senior(more than 10 years). The
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38 384 more nurses with solid professional knowledge and rich working experience among
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40 385 nursing staff, the better the effect of nursing work.²⁶ Research by Wang shows that
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42 386 patients' satisfaction with nursing professional skills is positively correlated with the
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44 387 proportion of nurses working for more than 5 years, and satisfaction with health
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46 388 education is positively correlated with the proportion of competent nurses.⁴⁰ Han's
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48 389 survey shows that patients are most satisfied with nurses who have worked for 2-5
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50 390 years.⁷⁰ Our findings also showed the same as the patients in-charged by junior nurse
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52 391 who worked as nurse for less than 5 years were more satisfied than those by senior.
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54 392 The reason may be that nurses who have worked for more than 5 years have rich
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56 393 clinical experience and better operating skills, but most of them have a sense of job
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58 394 burnout, which has a negative impact on patient satisfaction.⁷⁰ On the other hand, due
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60 395 to the different division of labor in GPH, nurses working for less than 5 years are
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397 mainly engaged in first-line clinical nursing, while senior nurses are engaged in some
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399 work related to ward organization and management. Therefore, senior nurses have
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401 less communication with patients, thus affecting patients' satisfaction with their work.

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3 399 It indicated that nurse-patient communication plays an important role in the
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5 400 evaluation of patients' satisfaction with nursing work.
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8 401 **Conclusion**
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11 402 In conclusion, the current study explored the level of patient satisfaction with nursing
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13 403 services and its associated factors. It shows that the care needs of hospitalized patients
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15 404 are still not satisfied to some extent. Meanwhile, patients' married status, history of
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17 405 hospitalization and surgery, professional title of in-charged nurses when providing
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19 406 care are main factors effecting patients satisfaction with nursing care. The current
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21 407 finding will have direct implication towards nurse professionals and nursing
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23 408 administrators. Nurses should establish a good relationship with patients through
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25 409 more communication. In daily nursing work, nurses should formulate corresponding
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27 410 nursing plans according to the personal characteristics and care needs of patients so as
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29 411 to sufficiently meet patients' expectations.
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34 412 Of course, besides nursing, there are many factors that will affect the patient's
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36 413 satisfaction, including patient staffing ratio, the use of health information technology,
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38 414 the amount of surgery in the hospital and the health teaching situation. Based on our
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40 415 experience, we suggest to conduct interviews with patient as a first step to learn what
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42 416 patients are most concerned with when seeking nursing services.
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3 **423 Declarations**
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6 **424 Ethics approval :** This study was approved by Gansu Provincial Hospital's Ethic
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9 **425** Commission.

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12 **426 Consent for publication:** Not applicable.
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16 **427 Availability of data and material :** The data sets used and/or analysed during the
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19 **428** current study are available from the corresponding author on reasonable request.
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23 **429 Competing interests :** The authors declare that they have no competing interests
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29
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32 **432** interpretation of data and in writing the manuscript.
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36 **433 Authors' contributions :** YLM and WXY performed the survey. WJC analyzed and
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38
39 **434** interpreted the patient data regarding satisfaction and effective factors. ZJX
40
41 **435** performed the was a major contributor in writing the manuscript. DJ and SWJ
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43 **436** collected data. All authors read and approved the final manuscript.
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49 **438** questionnaire survey.
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For peer review only

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Title, paragraph 1-2 Abstract, paragraph 30-50
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Background, paragraph 79-131
Objectives	3	State specific objectives, including any prespecified hypotheses	Background, paragraph 132-133
Methods			
Study design	4	Present key elements of study design early in the paper	Study design, paragraph 150
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Setting, paragraph 136-138
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	sample, paragraph 153-171
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	paragraph 177-186
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	paragraph 192-201
Bias	9	Describe any efforts to address potential sources of bias	paragraph 165-171
Study size	10	Explain how the study size was arrived at	Sample, paragraph 153-160
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Data Analysis, paragraph 158-161
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Data Analysis, paragraph 203
		(b) Describe any methods used to examine subgroups and interactions	Data Analysis, paragraph 204-209
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	Sample, paragraph 153-160
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	General characteristics, paragraph 214-222
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	General characteristics, paragraph 214-222
		(b) Indicate number of participants with missing data for each variable of interest	Result, paragraph 224-229

Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(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	Result, paragraph 234-241
		(b) Report category boundaries when continuous variables were categorized	Result, paragraph 234-241
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion, paragraph 251-253
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	paragraph 54-60
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion, paragraph 249-342
Generalisability	21	Discuss the generalisability (external validity) of the study results	Conclusion, paragraph 334-350
Other information			
Funding	22	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	Funding, paragraph 368-370

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Inpatient' s satisfaction with nursing care in a backward region: a cross-sectional study from northwestern China

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1 **Inpatient' s satisfaction with nursing care in a backward region: a**
2 **cross-sectional study from northwestern China**

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3 **29 Abstract**
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6 **30 Objectives** The aim of the study was to examine the level of patient satisfaction with
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8 **31** nursing care and identify the factors affecting satisfaction from the in-patient's
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11 **32** perspective in a backward region of China.
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13 **33 Design** This was a cross-sectional study.
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15 **34 Setting** The study was conducted at a tertiary hospital located in northwest China.
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17 **35 Participants** Patients admitted to the ward for at least 48 hours were chosen to
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20 **36** participate the survey.
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22 **37 Primary outcome measure** The Newcastle Satisfaction with Nursing Care Scale was
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25 **38** used. Data were collected from 219 patients.
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27 **39 Results** The overall inpatient satisfaction with nursing care was 78.15 ± 4.74 . Patients
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30 **40** were more satisfied with nurses who respected their privacy and treated them as
31
32 **41** individuals (67.7%). Patients were least satisfied with the type of information nurses
33
34 **42** gave them (11.7%) and with the sufficient awareness of their needs. Patients who
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36 **43** were married, had a history of hospitalization, surgery and were taken charge of by
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38 **44** junior nurses had higher satisfaction.
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41 **45 Conclusions** The overall level of patient satisfaction was moderate. Patient centered
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43 **46** individualized care and providing sufficient information model of care are needed.
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45 **47** There was a need for nurses to be aware of patients' individualized care needs and to
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47 **48** provide them with more information. This study may suggesturge hospital
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49 **49** administrators, policy makers and nurses to be more sensitive with patients' married
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51 **50** status, history of hospitalization and surgery, the professional title of in-charged
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53 **51** nurses when care is provided. Ultimatly to achieve better outcome of patients
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55 **52** hospitalization.
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3 53 **Keywords:** Inpatient, Nursing care, Satisfaction, Backward region, China
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56 **Strengths and limitations of this study**

57 ● The current study utilized a valid and standardized instrument.

58 ● This is the first study to evaluate inpatients' satisfaction using NSNS in a
59 backward region of China.

60 ● The small sampling might not likely to represent the patients in all Chinese
61 hospitals.

62 ● There is a possibility that patient' s responses were influenced by social
63 desirability.

76 **Background**

77 Patient satisfaction has been defined by scholars from different aspects. Swarupa
78 defines it as people's expectation for health care services due to the requirements of
79 health, disease, quality of life and other aspects.¹ Berkowitz suggested that patient
80 satisfaction is an individual's evaluation of the degree to which the medical services
81 provided are in line with their expectations and preferences.² Ahmed believes that
82 patient satisfaction is the result of patients filtering medical service experience and
83 evaluating the degree to which medical service experience meets their needs from
84 their own unique perspective.³ Among them, most scholars believe that the best
85 definition of patient satisfaction is an evaluation of medical services by patients based
86 on the degree to which their expectations are met.⁴ In view of this expectation, the
87 evaluation of patient satisfaction objectively reflects the quality of health care services
88 which becomes a gold standard and widely used metric to measure hospital quality
89 management.^{5,6}

90 Patient satisfaction with nursing service is an important component of patient
91 satisfaction.⁷ Risser defines patient satisfaction with nursing as the degree to which
92 the patient's expectation of ideal care is consistent with the actual care.⁸ Eriksen
93 defines it as a subjective evaluation made by patients according to their own
94 expectations of nursing and their cognitive and emotional reactions to the interaction
95 of actual receiving nursing services.⁹ The American Nurses Association (ANA)
96 defines it as a patient or his family staff's evaluation of the nursing care received.¹⁰
97 The above definitions are slightly different, but the consistent point is that patients'
98 satisfaction with nursing is a subjective feeling, closely related to their expectation
99 and perception of nursing quality. From the time of admission until discharge, nurses
100 provide care for patients every day without fail and are involved in almost every

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3 101 aspect of a patient's care. Therefore, as main healthcare providers, nurses make a
4
5 102 significant impact upon patients' perceptions about their hospital experience.⁷ If
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7 103 healthcare organization managers are able to identify patient expectations, they could
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9 104 accordingly adjust the performance of services that they offer, in order to meet these
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11 105 expectations.^{11,12} Therefore, it is urgently necessary to carry out surveys in health
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13 106 services to constantly measure patient health care satisfaction, to learn about their
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15 107 expectations, suggestions and feedbacks, so as to guide health care workers as to
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17 108 which items should be prioritized and which require alterations in the service.¹³

21 109 In order to achieve the goal of high-care quality, decision makers should not only
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23 110 know whether a patient is satisfied but, more importantly, why the patient is not
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25 111 satisfied. That is, they should identify the factors affecting the patient's satisfaction
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27 112 with nursing services, so as to carry out care that meets the patient's needs. According
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29 113 to previous studies, factors such as age,^{14,15} gender,¹⁵⁻¹⁷ educational level,^{18,19} length
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31 114 of hospital stay, type of admission,²⁰ previous history of admission, patient's income
32
33 115 level, type of admission rooms,²¹ monthly household income and frequency of
34
35 116 admission, etc. had a significant association with the level of satisfaction.²² To foster
36
37 117 better individualized care, the factors influencing hospitalized a patient's perception
38
39 118 of individualized care should be identified.

44 119 In China, there are 20,918 hospitals of different levels with 20 million registered
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46 120 nurses. The average bed to nurse ratio is about 1:0.45. Of them, the 2,232 tertiary
47
48 121 public hospitals account for only 7.66% of the all-type health facilities, yet they
49
50 122 provide nearly half (42.5%) of the inpatient care.²³ On average, the rate of one nurse
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52 123 per 1,000 population is lower than the WHO standard of 2.28 per 1000 population.²⁴
53
54 124 Excessive workloads lead to a lower job satisfaction in nurse staff across tertiary
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56 125 hospitals.^{23,25} In such an environment, the patient satisfaction in tertiary hospitals
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126 needs more attention. The Ministry of Health of China formulated the "Standards for
 127 Implementing Quality Nursing Services in Hospitals (Trial)" in 2010, which was
 128 aimed at providing patients with safe and high-quality nursing services.²⁶ With these
 129 standards, the "high quality nursing service project" was carried out nation-wide. By
 130 the end of 2015, all tertiary hospitals in China had carried out the project, with 87.0 %
 131 of them being tertiary A-class hospitals and 82.6 % were B-class.²⁷

132 At present, the results of surveys on the satisfaction of hospitalized patients with
 133 nursing service in China have rather been confusing. On one hand, patients in
 134 different facilities reported a high satisfaction about nursing service, as shown in table
 135 1.

136 Table 1 Outcomes of patients satisfaction in different provinces of China

Author	Survey date	Province	Hospital included	Instrument	Satisfaction		Effecting factors
					n	%	
Guo YH, et al ²⁸	2007	24 Provinces	71 Hospitals	Self-designed	4338	93.69	age, education level
Jiao J, et al ²⁹	2008	Beijing	4 A-class hospitals	NSNS	1496	82.9	age, education level health status, department
Fu WJ ³⁰	2010	Henan	1 Children hospital	NSNS	110	85	age, education level
Nie SM, et al ³¹	2013	Shandong	1 B-class hospital	Self-designed	626	78	Department, age, education level, occupation, payment method, ADL
Shan LH, et al ³²	2013	Heilongjiang	30 Hospitals	CNHSSs	1200	76	medical insurance
Hu ³³	2013	Gansu	1 A-class hospital	Self-designed	400	80.9	environment
Guo M, et al ³⁴	2014	Shandong	1 A-class hospital	Self-designed	298	79.8	age, patients' position, culture, income and reason for
Xing Y, et al ³⁵	2015	Gansu	1 A-class hospital	Self-designed	138	82.4	age, degree of education, average income per person in family, and self-feeling of
Liu XJ, et al ³⁶	2017	Jiangxi	2 A-class hospital	IAPSQGH	844	82.1	health status, age, degree of education, average income per person in family
Liu JL, et al ³⁷	2019	11 provinces in Western China	33 county-level hospitals, 33 township hospitals	CNHSSs	9811	60	waiting time, medical expenses

137 CNHSSs: Questionnaires of the China National Health Service Surveys; IAPSQGH: Improvement
 138 and Assessment of Patient Satisfaction Questionnaire in General Hospitals; ADL: Ability of Daily
 139 Life; NSNS: Newcastle Satisfaction with Nursing Scale.

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3 140 These indicated that Chinese nursing services have continued to be improved with the
4
5 141 implementation of the “high-quality care project”. However, untruthful reports by the
6
7 142 media and continuous occurrence of disputes and violence are inconsistent with the
8
9 143 results of the satisfaction surveys. An analysis of workplace violence shows that 40.8%
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11 144 of hospital nurses in China have experienced different types of workplace violence.³⁸
12
13 145 Zou et al’s study showed that there was a high incidence (59.7 %) of workplace
14
15 146 violence among nurses in Chinese tertiary hospitals.³⁹ In Wang et al’s study indicated
16
17 147 that 6.67% of nurses had suffered violence in the workplace.⁴⁰ Violence in these
18
19 148 workplaces affects nurses' mental health, leading to job burnout,⁴¹ and thus reduces
20
21 149 the quality of nursing services. The frequent occurrence of workplace violence in
22
23 150 hospitals directly reflects the dissatisfaction of patients with the quality of medical
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25 151 care. Thus, hospital-specific data are still required to provide evidence for cross-
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27 152 country and cross-cultural comparisons of satisfaction and factors affecting
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29 153 satisfaction using standardized tools.

30
31 154 The backward region studied in this manuscript is the Gansu province, located in
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33 155 the northwest of China. Affected by the regional conditions, the development of
34
35 156 economy, culture and information has been relatively less developed. According to
36
37 157 China's comprehensive economic competitiveness development report, Gansu
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39 158 province was ranked 27th among the 31 provinces in China.⁴² With continuous
40
41 159 development in the overall scale of hospitals in Gansu, the scope of service has been
42
43 160 getting larger, and the number of patients received also gradually increasing. With the
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45 161 continuous improvement of people's requirements for service level, complaints from
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47 162 patients occur frequently⁴³. In light of this situation, hospital managers urgently need
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49 163 to understand the gap between patients care needs and the capabilities of their hospital
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51 164 to providing care in a timely and dynamic manner. To our knowledge, ours is the first
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53 165 study in Gansu to use the Newcastle Satisfaction with Nursing Scale (NSNS) to
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55 166 measure satisfaction with nursing care. Thus, this study has two aims: (1) to assess
56
57 167 patient satisfaction with nursing care using the NSNS instrument, so as to find out the
58
59 168 gap between patients' expectations and hospitals’ service provision. (2) to investigate
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169 into the factors affecting patient satisfaction with nursing care, so as to provide more
170 accurate reference for hospital managers and relevant regulatory agencies.

171 **Methods**

172 **Study design**

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3 173 This study was a cross-sectional survey held in 2018. For the reporting purpose,
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5 174 STROBE (Strengthening the Reporting of Observational Studies in Epidemiology)
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7
8 175 checklist was used.

10 176 **Study settings and the participants**

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12 177 This study was conducted at Gansu Provincial Hospital (GPH), a tertiary hospital with
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14 178 1,700 beds. The services at GPH include ear, nose and throat, surgery, outpatients
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16 179 clinic, emergency, gynaecology and obstetrics, paediatrics and neonatal intensive care
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18 180 unit, maternal and child health, physiotherapy, dental, radiology, traditional Chinese
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20 181 medicine, rehabilitation, and internal medicine. GPH is also a teaching hospital for
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22 182 nursing, health officers, medicine, midwifery and pharmacy undergraduate and
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24 183 graduate students. The hospital has a total of 4,070 employees, 1200 of which are
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26 184 nurses who provide health care in 60 nursing units. The hospitalized patients mainly
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28 185 come from residents and people in the surrounding cities and counties. Choosing the
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30 186 hospital to carry out the survey can better understand the expectations of patients from
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32 187 different social strata in Gansu.

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37 188 The number of open beds in GPH is about 1,500, excluding departments such as
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39 189 paediatrics, intensive care units, emergency wards and VIP wards (about 200). The
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41 190 population of the study was calculated using the formula $N = Z^2 \cdot P(1-P)/E^2$,⁵ in which
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43 191 the symbols represent the following: a margin of error (E)= 5%. In order to narrow
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45 192 the interval and make the estimation of effect quantity more accurate, we chose 99%
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47 193 as the confidence level, with $Z=2.58$. 90% patient satisfaction with nursing care.¹⁶ We
48
49 194 calculated the sampling using the following: $Z^2 \cdot P(1-P)/ E^2 = (2.58 \cdot 2.58) \cdot 0.90(1-$
50
51 195 $0.90) / (0.05 \cdot 0.05) = 6.65 \cdot 0.09 / 0.0025 = 239$. Then we added 20% to the sample size
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53 196 for non-response or for selection bias, thus making the sample size = 288
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57 197 approximately. Patients should meet the following inclusion criteria: (1) ≥ 18 years old;

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3 198 (2) admitted in the wards for at least 48h; (3) capable of independent communication;
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5 199 (3)voluntary participation. Patients were excluded on any one of the following:
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8 200 patients in intensive care unit; pediatric patients; emergency observation ward patients;
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10 201 VIP patients in selected wards. Medical, surgical, gynecological and obstetrical and
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12 202 ear, nose and throat wards were purposefully selected and based on the calculated
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14 203 sample size, the required number of patients from each ward was proportionally
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16 204 allocated. Finally, 291 patients were included for further analysis, and 32 were
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18 205 excluded with 12 of them being younger than 18 years old and 20 who refused to
19
20
21 206 participate.

207 **Instruments**

208 The questionnaire included: (1) general demographic characteristics such as age,
209 gender, educational status, marital status, monthly family income, history of
210 admission, hospital length of stay, admission ward, professional title of the patient's
211 nurse in charge. (2) NSNS checklist. The NSNS was developed by Thomas et al.⁴⁴
212 The scale has been translated into different languages and has been applied in many
213 studies. The Chinese version of the scale was tested for its validity and reliability by
214 Jiao with the Cogent Validity index being 0.98 and Cronbach's alpha 0.97.²⁹ The
215 NSNS includes two subscales: the Experience of Nursing Care Scale (ENCS) and the
216 Satisfaction with Nursing Care Scale (SNCS). The two subscales can be applied either
217 together or separately. In this study, the SNCS was applied, consisting of a total of 19
218 items and using a 5-point Likert scale. For assessing the degree of satisfaction, 'not at
219 all', 'barely', 'satisfied', 'very', and 'completely' were scored from 1- 5 respectively.
220 Patient responses across all items were summed and transformed to yield an overall
221 satisfaction score between 0–95, which denotes none or complete satisfaction with all
222 aspects of nursing care.

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3 **223 Patient and Public Involvement**
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5 **224** The research questions and outcome measures were developed by the authors (ZJX
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8 **225** and WJC) based on the NSNS checklist and through consulting with ward nurse
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10 **226** managers who understood patients' priorities experiences and preferences. Patients
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12 **227** were recruited via their advisers (ward nurse managers) and were interviewed by the
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14 **228** trained nurse students to evaluate their level of satisfaction. No patient was involved
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16
17 **229** in the design and planning of the study. The main results will be disseminated to
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19 **230** patients by means of health education.
20

21 **231 Institutional Review Board approval**
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24 **232** Consent was acquired from the nurse director (or director nurse?) of each ward and
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26 **233** verbal approvals were obtained from patients. This study was also approved by Gansu
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28 **234** Provincial Hospital Research Ethics Committee.
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31 **235 Data collection**
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34 **236** Five nursing students were trained previously by one of the authors (ZJX). The
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37 **237** training lasted for two days. On the first day, the students were trained to understand
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39 **238** the meaning of each item of the questionnaire and, on the second, they were shown
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41 **239** how to communicate with patients. After that, each student selected a patient in a
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43 **240** specified department to conduct a pre-survey using the questionnaire, and gave
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45 **241** feedback regarding the survey process, so that the trainers could answer their
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47 **242** questions in a timely manner.
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51 **243** At the time of admission, a lottery method was adopted by the nurse manager to
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53 **244** randomly select patients. Then, the students made records and attended to the patients
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55 **245** 48h later after their admission. A private room at the department was used to
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57 **246** interview patients. Family members were present during some of the interviews at the
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59 **247** request of patients. If the patient could not fill in the form due to various factors, the
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3 248 student would ask the questions and gave a certain amount of time for patients to
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5 249 make statements for each question. After each question, the student assisted to fill in
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7
8 250 the questionnaire according to the patient's answer. In addition, medical records were
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10 251 reviewed for certain variables such as hospital length of stay and history of admission.
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12 252 The study started on August 2018 through November of the same year and 291
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15 253 patients completed the survey.

17 254 **Data analysis**

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19 255 The data were collected and analyzed with SPSS version 21.0. Patient satisfaction was
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21 256 described by the mean, standard deviation, frequency and percentage. As the missing
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23 257 data was less than 5% in some items, we used listwise deletion to deal with them.
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26 258 Considering the study by Ahmed et al,²¹ we adopted the same method to use the mean
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28 259 satisfaction score as a cut point to dichotomise satisfaction into 'satisfied' and 'not
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30 260 satisfied'. Based on the years of experience, the professional title of nurses was
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32 261 divided into junior (1-5 years) and senior (above 5 years). In addition to
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35 262 hospitalization, we also checked whether patients had a history of hospitalization in
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37 263 the past. Binary logistics regression analysis and backward stepwise method were
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39 264 used to screen variables that might affect patient satisfaction. The strength of the
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42 265 associations was described using OR and 95% CI.

44 266 **Results**

48 267 **Patients' characteristics**

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51 268 Of the participants, the mean age was 45.59 ± 15.96 . As seen in table 2, 54.6% were
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53 269 male, 87.6% were married and 23.7% were primary school graduates; 33.7% were
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55 270 admitted in a medical department, 43.6% had monthly family incomes between 3,000-
56
57 271 4,999 RMB (related to 436-726 USD). More than three-quarters (79%) of the patients
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272 knew the name of their nurse in-charge and more than half (61,7%) were cared by
 273 junior registered nurses. Patients had variations in the duration of their hospital stays
 274 (2 - 36 days) with a mean of 7.20 ± 5.69 days. The hospital length of stay of inpatients
 275 in a surgery ward (an average of 11 days) was longer than that for medical inpatients
 276 (an average of 7 days). See table 2.

277 **Table 2** Socio demographic characteristics and NSNS calculated score for example (N=291)

Variables	Categories	Frequency	NSNS score
		n(%)	Mean (SD)
Gender	Male	159(54.6)	79.00±4.44
	Female	132(45.4)	77.12±4.85
Monthly family income (CNY)*	<100	1(0.3)	78.0±0.35
	<1000	17(5.7)	77.52±4.05
	1000-2999	103(34.6)	85.0±0.05
	3000-4999	130(43.6)	78.56±4.37
	≥5000	39(13.1)	77.0±6.45
	≥10000	1(0.3)	78.52±4.05
Marital status	Single	20(6.9)	78.5±2.35
	Married	255(87.6)	77.98±4.95
	Others	16(5.5)	80.4±1.59
Educational status	Primary school	69(23.7)	78.27±4.01
	High school	146(50.2)	77.90±4.53
	Advanced diploma	40(13.7)	77.82±6.15
	Bachelor's degree	35(12.0)	79.11±4.96
	Master degree	1(0.3)	85.0±0.05
Admission ward	Medicine	99(33.7)	78.62±4.93
	Surgery	78(26.5)	77.63±2.97
	Obstetrics and gynecology	42(14.4)	74.5±5.5
	Ophthalmology and otorhinolaryngology	18(6.2)	79.77±3.13
	Rehabilitation department	22(7.6)	80.86±5.13
History of admission	Yes	146(50.2)	78.76±4.57
	No	145(49.8)	77.53±4.82
Patients know the name of nurse in-charge	Yes	221(75.9)	78.47±4.65
	No	70(24.1)	77.14±4.82
Living area	Urban	146(50.2)	77.98±4.08
	Rural	145(49.8)	78.31±5.28
Title of staff nurse	Junior RN**	177(61.7)	79.15±4.25
	Senior RN	114(38.3)	76.56±4.98
Mean satisfaction score		78.15(Max. 95) ± 4.74	

278 NSNS, Newcastle Satisfaction with Nursing Scale.*USD1 is 7.4 Chinese Yuan (CNY).**RN, Registered Nurse.

279 Satisfaction with nursing care

280 As shown in Table 2, the average satisfaction score was 78.15 ± 4.74 . Regarding
 281 nursing care, as shown in Table 3, patients reported the highest satisfaction when

282 nurses treated them as an individual (67.7%) and respected their privacy (60.8%).
 283 Patients were least satisfied with the type of information nurses gave them (11.7%)
 284 and with latter's lack of awareness of the patient's needs (9.6%). As shown in Table 4,
 285 after dichotomising satisfaction into 'satisfied' and 'not satisfied', 60.5% of the study
 286 participants were satisfied with the care provided by nurses.

287 **Table 3** Percentage distribution of items for satisfaction with nursing care in admitted patients at GPH.

Item	Not at all satisfied n (%)	Barely satisfied n (%)	Quite satisfied n (%)	Very satisfied n (%)	Completely satisfied n (%)
1. The amount of time nurses spent with patient	0	4(1.4)	42(14.4)	179(61.5)	66(22.7)
2. How capable nurses were at their job	0	1(0.3)	16(5.5)	156(53.6)	118(40.5)
3. There always being a nurse around when needed	0	2(0.7)	58(19.9)	164(56.4)	67(23.0)
4. The amount nurses knew about patient care	0	1(0.3)	38(13.1)	193(66.3)	59(20.3)
5. How quickly nurses came when patient called them	0	1(0.3)	30(10.3)	123(42.3)	137(47.1)
6. The way the nurses made patient feel at home	0	1(0.3)	47(16.2)	187(64.3)	56(19.2)
7. The amount of information nurses gave to patient about their condition and treatment	0	5(1.7)	124(42.6)	102(35.1)	60(20.6)
8. How often nurses checked to see if patients were well	0	1(0.3)	27(9.3)	176(60.5)	87(29.9)
9. Nurses' helpfulness	0	1(0.3)	26(8.9)	192(66.0)	72(24.7)
10. The way nurses explained things to patient	1(0.3)	0	29(10.0)	166(57.0)	95(32.6)
11. How nurses helped put patient relatives' or friends' minds at rest	0	0	41(14.1)	161(55.3)	89(30.6)
12. Nurses' manner in going about their work	0	0	12(4.4)	111(38.1)	167(57.4)
13. The type of information nurses gave to patient about his/her condition and treatment	0	3(1.0)	97(33.3)	157(54)	34(11.7)
14. Nurses' treatment of patient as an individual	0	1(0.3)	14(4.8)	78(26.8)	197(67.7)
15. How nurses listened to patient worries and concerns	0	1(0.3)	55(18.9)	196(67.4)	39(13.4)
16. The amount of freedom patient was given on the ward	0	0	83(28.5)	170(58.4)	38(13.1)
17. How willing nurses were to respond to patient requests	0	2(0.7)	51(17.5)	177(60.8)	61(21)
18. The amount of privacy nurses gave patient	0	0	36(12.4)	78(26.8)	177(60.8)
19. Nurses' awareness of patient needs	0	3(1.0)	130(44.7)	130(44.7)	28(9.6)

288 GPH., Gansu Provincial Hospital

289 **Factors influencing satisfaction**

290 Previous history of hospitalization and surgery were significant factors influencing
 291 patient satisfaction with nursing care. A higher level of patient satisfaction was found
 292 in married patients with a history of admission ($P < 0.05$). Patients admitted in medical
 293 wards showed the highest satisfaction compared to those in other wards. The score
 294 without surgery was higher than that with surgery ($p = 0.045$, $OR = 0.64$, $95\% CI = 0.38$ -
 295 1.07). The higher the nurse's professional title, the lower the score. The patient who

296 did not know the nurse in-charge had a lower score ($p=0.028, OR=1.77, 95\% CI=0.98-$
 297 3.19) (Table 5).

298 **Table 4** Level of inpatients satisfaction with nursing services in a tertiary hospital of Gansu, China

Variables	Level of satisfaction	
	Satisfied (score ≥ 78), N(%)	Dissatisfied (score < 78), N(%)
Gender		
Male	105(59.66)	54(46.05)
Female	71(40.34)	61(53.04)
Marital status		
Single	12(6.82)	8(6.96)
Married	158(89.77)	97(84.35)
Others	16(9.09)	0
Admission ward		
Medicine	69(39.20)	29(25.22)
Surgery	41(23.29)	36(31.30)
Obstetrics and gynecology	11(6.25)	31(26.96)
Ophthalmology and Rehabilitation department	13(7.39)	5(4.35)
	16(9.09)	6(5.22)
History of admission		
Yes	95(53.98)	51(44.33)
No	81(46.02)	64(55.65)
History of surgery		
Yes	81(43.02)	66(57.39)
No	95(53.98)	49(42.61)
Know the nurse in charge		
Yes	140(79.55)	81(70.43)
No	36(20.45)	34(29.56)
Title of nurse in charge		
junior	121(68.75)	56(48.69)
senior	55(31.25)	59(51.30)
Educational status		
Primary school	43(24.43)	26(22.61)
High school	87(49.43)	59(51.30)
Advanced diploma	22(12.50)	18(15.65)
Bachelor's degree	23(13.07)	12(10.43)
Master degree	1(0.57)	0
Total	176(60.50)	115(39.50)

299

300 **Table 5** Factors influencing patients' satisfaction with nursing care.

Variables	B	S.E	Sig.	95%CI
Gender	0.15	0.32	0.640	0.61,2.19
Marital status	-1.08	0.51	0.037	0.13,0.93
Admission ward	-0.02	0.12	0.839	0.76,1.24
History of admission	0.29	0.38	0.045	0.67,2.29
History of surgery	-0.60	0.29	0.049	0.30,0.98
Know the nurse in charge	0.79	0.34	0.021	1.13,4.35
Title of nurse in charge	0.99	0.30	0.001	1.49,4.89

301	Educational status	-0.13	0.19	0.486	0.59,1.27
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302 Discussion

303 Patients' satisfaction with hospital care are significantly associated with better patient
 304 safety, clinical effectiveness,⁴⁵ health outcomes⁴⁶ and less medical resource
 305 utilization.⁴⁷ In the current reform of China's health-care system, we need to have a
 306 better understanding of what is associated with patient satisfaction, and what we can
 307 do to improve it. Comparably no study on patient satisfaction in northwest of China
 308 has been reported in English. The international research community has limited access
 309 to and understanding of patient satisfaction in this area. In this study, we use NSNS to
 310 investigate the level of inpatients satisfaction with nursing care and its associated
 311 factors in northwestern China. The results showed that the patient's overall
 312 satisfaction in nursing was 78.15+4.74 (95 points are completely satisfied), and 60.5%
 313 of inpatients were satisfied with nursing services at GPH. Marital status, history of
 314 admission, history of surgery, knowing the nurse in-charge and title of nurse in-charge
 315 were all significantly associated with patient satisfaction.

316 The level of patient satisfaction (60.5%) in our study was higher than the results
 317 obtained in other areas either in China or elsewhere, such as in Taiwan (35%)⁴⁸
 318 Malaysia²² and 11 western provinces in China (60%);³⁷ however, it was lower than
 319 that in Shandong,³¹ Jiangxi³⁶ and other cities in Gansu, China,^{33,35} and also in Spain⁴⁹
 320 and Australia.⁵⁰ This might have been related to differences in sample size, region
 321 and the use of a different survey scale. Therefore it is difficult to make an absolute
 322 comparison of these results. When the research findings were compared with studies
 323 conducted using the same scale internationally, the average score was higher than
 324 Turkey (62.08+20.94),⁵ Ethiopia (63.9+17),²¹ Poland (74.98),¹⁵ Jordan
 325 (77.1+12.52)⁵¹ and Pakistan(51%),⁵² but lower than studies conducted in Beijing²⁹
 326 and Henan province³⁰ in China. A study from rural western China showed that
 327 patients in primary health care were relatively less satisfied with medical services than
 328 developed areas.⁵³ Our study may have indicated this too.

329 Although the overall patient satisfaction was moderate, this study revealed that
 330 patients were mostly satisfied with nurses' attitude in treating them as an individual
 331 and respected their privacy. However, the fewest patients in the study were satisfied
 332 with the type of information nurses gave them (11.7%) and a lack of awareness in

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3 333 their needs (9.6%). The findings were consistent with the outcomes of other
4 334 studies.^{54,55,56,57} It could be that, first of all, due to their heavy workload, nurses spent
5 335 more time on completing doctor's orders and therapeutic work, less time is spent on
6 336 communicating with patients and conducting health education. This might also result
7 337 from the fact that in most Chinese hospitals there are no nurse assistants whose main
8 338 tasks are the performance of basic nursing activities such as bathing, oral toilet,
9 339 changing, etc.⁵⁸ Nurse staff in different professional layers need to perform various
10 340 direct and indirect nursing activities. Moreover, hospitals in a less developed area may
11 341 face a larger proportion of patients with a lower education level.⁵³ They may have
12 342 more demands of medical knowledge. However, with such a workload, nurses were
13 343 eager to educate patients and therefore provide incomplete information that could not
14 344 meet patients' needs.⁵⁹ In various clinical settings, information is the decisive factor
15 345 for good patient experience.⁶⁰ Poor communication between health care professionals
16 346 and their patients is a key problem in the growing number of complaints against
17 347 health care professionals worldwide.⁶¹ Therefore, investigating all aspects of patients'
18 348 needs and providing them with care and information to meet their needs through
19 349 communication plays an important role in improving patients' satisfaction.⁶²

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33 350 A better understanding of the factors affecting care quality can help hospital
34 351 managers implement effective plans to improve service quality.⁶³ In the current study,
35 352 we find that married patients were more satisfied than others. This finding was in
36 353 accord with a study conducted in Amhara Region⁶⁴ which used the NSNS scale, and
37 354 another study in China²⁶ which used another scale. This could be that married patients
38 355 were accompanied by their spouses who provided daily care and communicated with
39 356 them. Therefore, they had relatively less demand from nurses. Prevalence of
40 357 preoperative anxiety ranged between 60–80% in population,⁶⁵ which had been
41 358 commonly neglected by clinicians.⁶⁶ Study has shown that patients who were well-
42 359 informed and understood the process had a better surgical experience.⁴⁹ However,
43 360 this might have not been well revealed in our study as patients with surgery showed
44 361 less satisfied with nursing services. It is suggested that patients need to be assessed
45 362 regularly for anxiety during the preoperative visit and appropriate anxiety reducing
46 363 methods should be introduced. Nursing staff should attach importance to nurse-patient
47 364 communication through assessing patient needs to provide health related information
48 365 and care services so as to meet patients' needs,⁶² thus enhancing their satisfaction.

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3 366 Another factor that needs to be emphasized is that patients with a history of
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5 367 hospitalization were found to be more satisfied than their counterparts, and similar
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7 368 results were found in other studies conducted in Ethiopia⁶⁷ and China.²⁶ This could be
8
9 369 because patients who are hospitalized for first time are unfamiliar with the nursing
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11 370 staff and hospital environment. They may have more needs for communication with
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13 371 nurses regarding their diseases and nursing services. For those with a previous history
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15 372 of admission, they have a certain understanding of their own diseases and health
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17 373 conditions, and are familiar with the hospital environment and ward nurses, and have
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19 374 a stronger sense of security than patients hospitalized for the first time. Our findings
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21 375 also showed that patients who knew their nurse in-charge were significantly satisfied
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23 376 with nursing than those who did not. Study showed patients receiving continuity of
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25 377 care with the same nurse were more satisfied than those who did not.⁴¹ The findings
26
27 378 can provide evidence for the value of nurses in nursing practice. Patients require more
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29 379 individualized care from nurses regarding education, communication and comfort²,
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31 380 which will improve their well-being through reducing anxiety and depression, and
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33 381 also indirectly, through building trust and social support.⁶⁸

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33 382 Research shows that nurses' work experience is closely related to patient
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35 383 satisfaction. So it is helpful to provide guidance for rational allocation of nursing
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37 384 human resources to explore whether the composition of professional titles affect
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39 385 patient satisfaction. Tarja's research shows that the working years of nurses are
40
41 386 positively correlated with patient satisfaction.⁶⁹ In China, the level of nurses is
42
43 387 divided into professional titles corresponding to junior (1-5), intermediate (5-10) and
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45 388 senior (more than 10 years). The more nurses with a solid professional knowledge and
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47 389 rich working experience among nursing staff, the better the effect of nursing work.²⁶
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49 390 Research by Wang shows that patients' satisfaction with nursing professional skills is
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51 391 positively correlated with the proportion of nurses working for more than 5 years, and
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53 392 satisfaction with health education is positively correlated with the proportion of
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55 393 competent nurses.⁴⁰ Han's survey shows that patients are most satisfied with nurses
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57 394 who have worked for 2-5 years.⁷⁰ Our findings also showed the same as the patients in
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59 395 the charge of junior nurses who have worked for less than 5 years were more satisfied
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396 than those in the charge of senior nurses. The reason may be that nurses who have
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398 worked for more than 5 years have rich clinical experience and better operating skills,
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400 but most of them have a sense of job burnout, which has a negative impact on patient
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402 satisfaction.⁷⁰ On the other hand, due to the different divisions of labor in GPH, nurses

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3 400 working for less than 5 years are mainly engaged in first-line clinical nursing, while
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5 401 senior nurses in some work related to ward organization and management. Therefore,
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7 402 senior nurses have less communication with patients, thus affecting patients'
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9 403 satisfaction with their work. It indicated that nurse-patient communication plays an
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11 404 important role in the evaluation of patients' satisfaction with nursing work.

12 405 This study has several strengths: the use of a standardised patient satisfaction scale
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14 406 and the first to evaluate patients' satisfaction using the scale in a less developed area
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16 407 of China. However, certain limitations should be noted too. First, the present study was
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18 408 conducted in one hospital context, which might limit the external validity of the
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20 409 results in other healthcare contexts. Future research should therefore investigate
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22 410 whether the questionnaire has the ability to demonstrate significant differences across
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24 411 hospitals in terms of their caring culture. Second, potentially relevant factors
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26 412 influencing patient satisfaction such as medical diagnosis, severity and duration of
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28 413 illness, and medication history were not included. Third, the study adopted self-
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30 414 reported questionnaires, so all answers were based on admitted patients, who might be
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32 415 afraid to speak out their real feelings that they thought might affect further nursing
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34 416 care they received.

33 417 **Conclusion**

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37 418 The current study explored the level of patient satisfaction with nursing services and
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39 419 its associated factors in a backward region of China. It shows that the care needs of
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41 420 hospitalized patients are yet not satisfied to some extent. Meanwhile, patients'
42
43 421 married status, history of hospitalization and surgery, professional title of nurses in
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45 422 charge when providing care are main factors effecting patients satisfaction. The
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47 423 current finding will have direct implication for nurse professionals and nursing
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49 424 administrators. Nurses should establish a good relationship with patients through
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51 425 more communication. In daily nursing work, nurses should formulate corresponding
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53 426 plans according to the personal characteristics and care needs of patients so as to
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55 427 sufficiently meet patients' expectations.
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3 428 Of course, besides nursing, many factors may also affect the patient's satisfaction,
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5 429 including patient staffing ratio, the use of health information technology, the amount
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7 430 of surgery in the hospital and the health teaching situation. Based on our experience,
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9 431 we suggest to conduct interviews with patient as a first step to learn what patients are
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11 432 most concerned with when seeking nursing services.
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8 **Declarations**

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11 457 **Ethics approval:** This study was approved by Gansu Provincial Hospital's Ethic
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13 458 Commission.

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16 459 **Consent for publication:** Not applicable.

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20 460 **Availability of data and material :** The data sets used and/or analysed during the
21
22
23 461 current study are available from the corresponding author on a reasonable request.

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25
26 462 **Competing interests:** The authors declare that they have no competing interests

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29
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31
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33
34 465 interpretation of data and in writing the manuscript.

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37
38 466 **Authors' contributions:** YLM and WXY performed the survey. WJC analyzed and
39
40 467 interpreted the patient data regarding satisfaction and effective factors. ZJX was a
41
42 468 major contributor in writing the manuscript. DJ and SWJ were involved in
43
44 469 supervision during data collection and data entry. All authors read and approved the
45
46 470 final manuscript.

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STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Title, paragraph 1-2 Abstract, paragraph 30-50
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Background, paragraph 79-131
Objectives	3	State specific objectives, including any prespecified hypotheses	Background, paragraph 132-133
Methods			
Study design	4	Present key elements of study design early in the paper	Study design, paragraph 150
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Setting, paragraph 136-138
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	sample, paragraph 153-171
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	paragraph 177-186
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	paragraph 192-201
Bias	9	Describe any efforts to address potential sources of bias	paragraph 165-171
Study size	10	Explain how the study size was arrived at	Sample, paragraph 153-160
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Data Analysis, paragraph 158-161
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Data Analysis, paragraph 203
		(b) Describe any methods used to examine subgroups and interactions	Data Analysis, paragraph 204-209
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	Sample, paragraph 153-160
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	General characteristics, paragraph 214-222
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	General characteristics, paragraph 214-222
		(b) Indicate number of participants with missing data for each variable of interest	Result, paragraph 224-229

Outcome data	15*	Report numbers of outcome events or summary measures	
Main results	16	(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	Result, paragraph 234-241
		(b) Report category boundaries when continuous variables were categorized	Result, paragraph 234-241
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion, paragraph 251-253
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	paragraph 54-60
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion, paragraph 249-342
Generalisability	21	Discuss the generalisability (external validity) of the study results	Conclusion, paragraph 334-350
Other information			
Funding	22	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	Funding, paragraph 368-370

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.