Lang, Z.; Liu, X. (2022). The research of regulatory effect of emotional intelligence on the relationship between medical staff satisfaction and patient satisfaction. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 22(88.1), 106-126.
DOI: https://doi.org/10.15366/rimcafd2022.22.88.1.009

ORIGINAL

THE RESEARCH OF REGULATORY EFFECT OF EMOTIONAL INTELLIGENCE ON THE RELATIONSHIP BETWEEN MEDICAL STAFF SATISFACTION AND INJURED PLAYERS SATISFACTION

Zhao Lang[1], *, Xiaotong Liu[1]

[1]Spine Surgery Department, Peking University 4th Clinical Medical College, Beijing Jishuitan Hospital, Beijing 100035, China
*Corresponding author: (Zhao Lang)
Email: 160108242@stu.cuz.edu.cn

Received April 30, 2020
Accepted June 26, 2020

ABSTRACT

Through literature review and empirical investigation, this thesis selects emotional intelligence as moderator variable to establish a theoretical model of regulatory effect of doctor's emotional intelligence on the doctor-patient satisfaction. We use structural equation modeling to investigate the relationship, take samples from five public hospitals in Beijing to perform an empirical investigation, and design the theoretical model of regulatory effect of emotional intelligence on the doctor-injured players satisfaction. The following hypotheses are made: H1 medical staff satisfaction has a direct impact on injured player's satisfaction; H2 emotional intelligence of medical staff has a regulatory role in medical staff-injured player's satisfaction. The results show that the medical staff overall satisfaction has a direct positive influence on the overall satisfaction of injured players. The medical staff overall satisfaction has significantly positive relationship with the following dimensions of the injured player's satisfaction, e.g. medical technology, service attitude, doctor-patient communication and medical ethics. Emotional intelligence of medical staff has a regulatory role in medical staff-patient satisfaction, reflected in patient satisfaction with medical technology, with the service attitude of the medical staff, and with doctor-patient communication.

KEYWORDS: medical staff satisfaction; patient satisfaction; emotional intelligence; the hospital management.

1. RESEARCH BACKGROUND

In China, Patients' increasing demand for healthcare services is influencing their satisfaction not only in terms of good treatment results, but also in terms of the psychological experience of visiting a doctor. Johno Malley's research has shown that although high medical staff satisfaction produces high levels of medical skill and can have a positive effect on patient satisfaction, according to a large number of clinical surveys (Katz, 1999), injured players or their families are very sensitive to changes in the mood of medical staff during medical visits, and some even believe that changes in the mood of medical staff indicate the priority of their illness, so when the mood of the doctor changes, the mood of the patient will also change, thus affecting satisfaction (O'Malley, 2002). Therefore, as a health worker, you must not only have high medical ethics and excellent medical skills, but also be good at managing your own emotions as well as learning to see and understand the emotions of others in order to take the lead in a tense atmosphere and stabilise the situation so that the patient feels a sense of belonging and can protect himself or herself from harm (Rajendrababu, Puthuran, Alia, Uduman, & Wijesinghe, 2022; Sun, Wang, Linghu, Li, & Zhang, 2022).

Therefore, while we advocate patient-centered and humanistic care to improve patient satisfaction, we should also pay more attention to the satisfaction of medical staff and the moderating role of their emotional intelligence EI (commonly known as emotional intelligence) in doctor-patient satisfaction.

2. STUDY DESIGN AND DESIGN OF THE SURVEY QUESTIONNAIRE

In studies of physician satisfaction and patient satisfaction, there are few studies that introduce moderating variables to argue for a relationship between the two, and even fewer relevant studies that use the emotional intelligence of medical staff as a moderating variable to argue for a relationship between the two. This study constructs a theoretical model of the moderating effect of medical staff's emotional intelligence on medical patient satisfaction by selecting medical staff satisfaction, medical staff emotional intelligence and patient satisfaction, as shown in Figure 2-1.

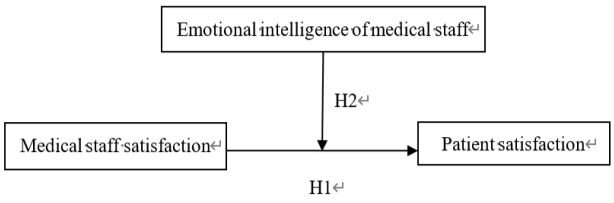

Figure 2-1 Theoretical model of the moderating role of emotional intelligence in doctor-patient satisfaction

In this theoretical model (Hoy & Miskel, 1987), the direct effect of staff satisfaction on patient satisfaction and the moderating effect of staff emotional intelligence on patient satisfaction will be examined.

2.1 Research Hypothesis and Rationale

(1). Medical staff satisfaction has a positive effect on patient satisfaction

Medical work is a special, complex and creative production work, the interaction between doctors and injured players are the main content of medical work, as the main body of medical work, doctors' job satisfaction will affect the normal operation of the medical institution system by influencing their level of work commitment (Gül, Kobat, Çelik, Aydin, & Akkoç, 2022; Schermerhorn Jr, Osborn, Uhl-Bien, & Hunt, 2011).

One study found that health workers with high job satisfaction were more likely to deliver better health services and better patient outcomes than those with low job satisfaction, and that there was a direct correlation between health worker satisfaction and patient satisfaction. Lower doctor satisfaction can lead to patient dissatisfaction with the medical services they provide, inefficient medical services and low output rates of medical services, thus affecting the proper functioning of the healthcare delivery system as a whole. This paper uses the above research to propose the following hypothesis: medical staff satisfaction has a significant positive effect on patient satisfaction.

(2). The moderating role of medical staff emotional intelligence in the influence of medical staff satisfaction on patient satisfaction

John0'Malley study shows that high medical staff satisfaction leads to high levels of medical skill and can have a positive effect on patient satisfaction. However, studies have also shown that factors such as low mood, hard attitude, poor conversation and lack of observation skills among medical staff can easily lead to tension in the doctor-patient relationship. Many scholars believe that a doctor's emotional intelligence determines the degree of harmony in the doctor-patient relationship. By treating injured players with kindness and goodwill, by listening to injured player’s descriptions of their symptoms, by doing their best to meet injured players reasonable needs, by encouraging patients to rebuild their confidence, and by using clever communication skills, medical practitioners can achieve win-win results in terms of doctor-patient satisfaction. Based on the above research, this paper proposes the following hypothesis: the emotional intelligence of medical staff has a moderating role in the influence of medical staff satisfaction on patient satisfaction.

2.2 Operationalised definition of variables

(1). Medical staff satisfaction：

The dimensions selected for this paper and the corresponding questions

are shown in Table 2-1 Dimensions of the Physician Satisfaction Scale.

Table 2-1 Dimensions of the Medical Staff Satisfaction Scale

	5 dimensions	Corresponding titles
Overall satisfaction of doctors	Compensation satisfaction	1、2、3、4
	Promotion satisfaction	5、6、7、8
	Managerial satisfaction	9、10、11、12
	Interest satisfaction	13、14、15、16
	Rewarding satisfaction	17、18、19、20

(2). Patient satisfaction

The dimensions selected for this paper and the corresponding questions are shown in Table 2-2 Dimensions of the Patient Satisfaction Scale.

Table 2-2 Dimensions of the Patient Satisfaction Scale

Tier 1 indicators	Secondary indicators (8)	Corresponding titles
Overall patient satisfaction	Medical facilities ward environment 5	1、2、3、4、5
	Logistic services 5	6、7、8、9、10
	Medical technology 3	11、12、13
	Service attitude 2	14、15
	Doctor-Patient Liaison 7	16、17、18、19、20、21、22
	Medical charges 6	23、24、25、26、27、28
	Medical ethics and ethics 2	29、30
	Current treatment results 2	31、32
	Comprehensive Satisfaction Program	33

(3). Emotional intelligence of medical staff

The dimensions selected for this paper and the corresponding topics are shown in Table 2-3 Dimensions of the Emotional Intelligence Scale.

Table 2-3 Dimensions of the Emotional Intelligence Scale

	4 dimensions	Corresponding titles
Emotional Intelligence	Assessment and expression of self-emotions	1、2、3、4
	Evaluating and identifying the emotions of others	5、6、7、8
	Using emotional self-motivation	9、10、11、12
	Self-regulation of emotions	13、14、15、16

2.3 Sample Selection and Sampling Method

2.3.1 Sample selection

In this study, five Beijing public hospitals were selected as the survey sample, three Grade IIIA hospitals and two Grade IIA hospitals, and their doctors and inpatients were surveyed and studied. This is because inpatients have longer access to doctors than outpatients or emergency patients and injured players can more objectively reflect the aims of this study.

2.3.2 Sampling method

As this paper is a study of the relationship between two subjects, medical staff and injured players, the number of medical staff and injured players were matched in a ratio of 1:2 when the questionnaire was administered (Pascoe, 1983; Wang et al., 2022). Finalised: 100 questionnaires for medical staff satisfaction and emotional intelligence and 200 questionnaires for patient satisfaction. Considering the return rate of the questionnaires and the efficiency of the returned questionnaires, the number of medical staff and injured players who received the survey was finally determined to be 120 and 240 in this study by adding 20% of the number of personnel to the sample size obtained.

The pre-test and the formal trial were conducted in November 2013. Both trials were conducted by random sampling, with self-administered questionnaires filled in, or if the patient had mobility problems, the patient's family or chaperone helped to fill in the questionnaire, which was collected on the spot. A total of 45 questionnaires were distributed in the pre-survey, 45 questionnaires were returned, and the number of valid matching groups was 15; in the formal survey, a total of 120 questionnaires were distributed: 120 for medical staff and 240 for injured players; 114 questionnaires were returned: 114 for medical staff and 231 for injured players; the recovery rate was: 95% for medical staff and 96.25% for injured players; the valid questionnaires: 105 for medical staff and 210 for injured players; the effective rate was; 92.1% for medical staff and 90.9% for injured players. 92.1%, 90.9% for injured players, of which 105 groups of questionnaires were matched with 1:2 ratios of medical and nursing staff to injured players.

3. RELIABILITY AND VALIDITY TESTS OF THE SCALE

3.1 Scale Reliability Test

In this study, the Cronbach's alpha coefficient was used to test the reliability of the medical staff satisfaction questionnaire, the medical staff emotional intelligence questionnaire and the patient satisfaction questionnaire (Berry, Unwin, Ross, Peacock, & Juma, 2007), and the following results were obtained: the reliability of the overall satisfaction questionnaire for doctors was 0.832 > 0.7, indicating a better reliability of the questionnaire; the reliability of the emotional intelligence questionnaire was 0.820 > 0.7, indicating a better reliability of the questionnaire; the reliability of the overall satisfaction questionnaire for fitness player was 0.755 > 0.7, indicating a better reliability of the questionnaire. The reliability of the patient's overall satisfaction questionnaire was 0.755 > 0.7, indicating a good reliability of the questionnaire (Comstock, Hooper, Goodwin, & Goodwin, 1982). The Cronbach'S alpha coefficients are detailed in Table 3-1.

Table 3-1 Reliability of the questionnaire

Questionnaire	Cronbach's Alpha
Overall satisfaction of doctors	0.832
Emotional Intelligence	0.820
Overall patient satisfaction	0.755

3.2 Scale validity tests

Factor analysis is a method of reducing multiple measured variables to fewer variables. Factor analysis presupposes correlation between variables, and is only appropriate when the correlation between variables is high.

The correlation test was first performed, and in this paper the KMO (Kaiser-Meyer-Olkin) and Bartlett's sphericity tests were used. KMO values are taken between 0 and 1. When the KMO value is close to 1, it means that the sum of squares of simple correlation coefficients between all variables is much greater than the sum of squares of partial correlation coefficients (Carter, Inui, Kukull, & Haigh, 1982), and when the KMO value is close to 1, it means that the correlation between variables is very strong and the original variables are suitable for factor analysis; when the KMO value is close to 0, it means that the sum of squares of simple correlation coefficients between all variables is close to 0 (i.e. the correlation between variables is weaker) and the original variables are not suitable for factor analysis. Kaiser gives common kmo measures: over 0.9 - perfectly suitable; 0.8 - suitable; 0.7 - fair; 0.6 - not very suitable; below 0.5 - extremely unsuitable.

(1). Physician Satisfaction Scale

As can be seen in Table 3-2, the KMO value is 0.811. Also, the Bartlett sphericity test shows a statistic of 1263.000 with a companion probability value of 0.000, which is less than the significance level of 0.05, therefore the null hypothesis of the Bartlett sphericity test is rejected and deemed appropriate for factor analysis.

Table 3-2 KMO sample measures and Bartlett's sphere test

Kaiser-Meyer-Olkin Sample measurements		**0.811**
Bartlett sphere inspection	Approx. Chi-Square	1263.000
	df	190
	Companion probability values	0.000

Table 3-3 is a table of the main component information and factor loadings. Based on the principle that the characteristic root is greater than 1 and the cumulative contribution is greater than 70%, the questionnaire was rotated by the maximum variance method to obtain the factor loadings of 20 indicators on 5 factors, at which point the cumulative contribution was

72.844% and the characteristic root of each factor was greater than 1; the details are shown in the table below.

Table 3-3 Table of principal component information and factor loadings

Factor naming	Title number	Ingredients					Characteristic roots	Contribution rate (%)
		1	2	3	4	5		
Compensation satisfaction	Q1	.634					4.122	30.609
	Q2	.501						
	Q3	.598						
	Q4	.503						
Promotion satisfaction	Q5		.765				3.232	16.161
	Q6		.615					
	Q7		.860					
	Q8		.714					
Managerial satisfaction	Q9			.658			2.155	10.777
	Q10			.548				
	Q11			.623				
	Q12			.681				
Interest satisfaction	Q13				.652		1.734	8.668
	Q14				.547			
	Q15				.551			
	Q16				.588			
Rewarding satisfaction	Q17					.561	1.326	6.629
	Q18					.608		
	Q19					.541		
	Q20					.747		

The gravel plot is used to show the importance of each factor, with the horizontal axis indicating the factor ordinal number and the vertical axis representing the size of the characteristic root. The steeper ones at the front correspond to the larger characteristic roots, which have an obvious effect; the platforms at the back correspond to the smaller characteristic roots, whose effect is not obvious. The following principal component gravel plot (see Figure 6-1), with the inflection points of the characteristic root curves and the characteristic root values, illustrates from another side that it is appropriate to take the first five principal components.

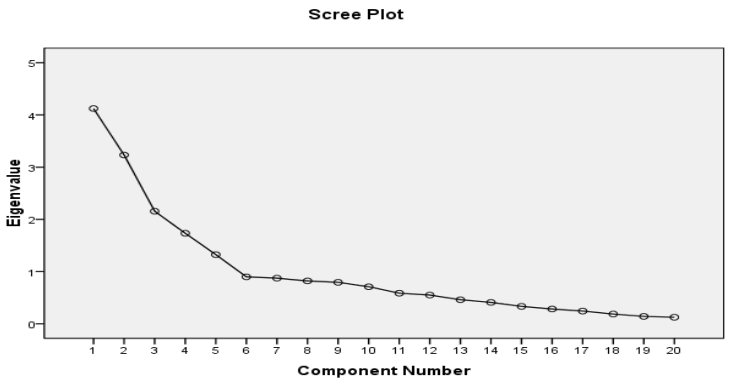

Figure 3-1 Principal component gravel map

(2). Emotional Intelligence Scale Scale

As can be seen in Table 3-4, the KMO value is 0.875. also, from the Bartlett's sphere test, the statistic is 1818.000 with a companion probability value of 0.000, which is less than the significance level of 0.05, therefore the null hypothesis of the Bartlett's sphere test is rejected and considered suitable

for factor analysis.

Table 3-4 KMO sample measures and Bartlett's sphere test

Kaiser-Meyer-Olkin Sample measurements		**0.875**
Bartlett sphere inspection	Approx. Chi-Square	1818.000
	df	190
	Companion probability values	0.000

Table 3-5 presents the main component information and factor loadings. Based on the principle that the characteristic root is greater than 1 and the cumulative contribution is greater than 70%, the maximum variance method of rotation of the questionnaire yielded factor loadings for 16 indicators on 4 factors, at which point the cumulative contribution was 76.419% and the characteristic root of each factor was greater than 1; the details are shown in the table below.

Table 3-5 Table of principal component information and factor loadings

Factor naming	**Title number**	**Ingredients**				**Contribution rate（%）**	**Characteristic roots**
		1	2	3	4		
Assessment and expression of self-emotions	Q1			.615		39.633	4.741
	Q2			.848			
	Q3			.764			
	Q4			.551			
Evaluating and identifying the emotions of others	Q5		.765			14.232	2.277
	Q6		.772				
	Q7		.742				
	Q8		.696				
Using emotional self-motivation	Q9				.745	12.736	2.038
	Q10				.818		
	Q11				.599		
	Q12				.763		
Self-regulation of emotions	Q13	.793				9.818	1.571
	Q14	.836					
	Q15	.900					
	Q16	.805					

The following principal component gravel plot (see Figure 6-2), with characteristic root curve inflection points and characteristic root values, illustrates another aspect of the desirability of taking the first four principal components.

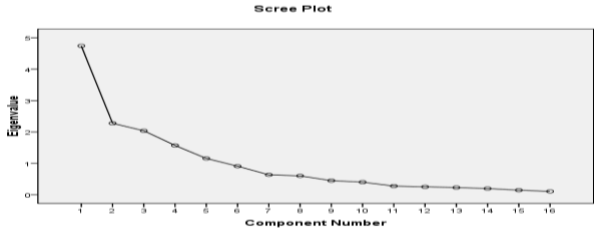

Figure 3-2 Principal component gravel map

(3). Patient Satisfaction Scale validity

As can be seen in Table 3-6, the KMO value is 0.725. Also, the Bartlett

sphere test shows a statistic of 2869.000 with a companion probability value of 0.000, which is less than the significance level of 0.05, so the null hypothesis of the Bartlett sphere test is rejected and deemed appropriate for factor analysis.

Table 3-6 KMO sample measures and Bartlett's sphere test

Kaiser-Meyer-Olkin Sample measurements		**0.725**
Bartlett sphere inspection	Approx. Chi-Square	2869.000
	df	528
	Companion probability values	0.000

Table 3-7 is a table of the main component information and factor loadings. Based on the principle that the characteristic root is greater than 1 and the cumulative contribution is greater than 70%, the questionnaire was rotated by the maximum variance method to obtain the factor loadings of 33 indicators on 9 factors, at which point the cumulative contribution was 72.870% and the characteristic root of each factor was greater than 1; the details are shown in the table above.

Table 3-7 Table of principal component information and factor loadings

Factor naming	Title number	Ingredients									Contribution rate（%）	Characteristic roots
		1	2	3	4	5	6	7	8	9		
Medical Facilities Ward Environment	Q1			.779							21.469	5.435
	Q2			.537								
	Q3			.723								
	Q4			.738								
	Q5			.710								
Logistic services	Q6						.565				14.552	3.152
	Q7						.266					
	Q8						.657					
	Q9						.821					
	Q10						.762					
Medical technology	Q11		.661								7.331	2.419
	Q12		.730									
	Q13		.725									
Service attitude	Q14									.610	6.921	2.284
	Q15									.655		
Doctor-Patient Liaison	Q16					.655					5.342	1.763
	Q17					.768						
	Q18					.749						
	Q19					.682						
	Q20					.773						
	Q21					.803						
	Q22					.702						
Medical charges	Q23								.794		4.919	1.623
	Q24								.826			
	Q25								.655			
	Q26								.670			
	Q27								.645			
	Q28								.610			
Medical ethics and ethics	Q29	.793									4.578	1.511
	Q30	.788										
Current treatment results	Q31				.801						4.233	1.397
	Q32				.609							
Comprehensive Satisfaction Program	Q33							.615			3.524	1.163

The following principal component gravel plot (see Figure 3-3), with characteristic root curve inflection points and characteristic root values, provides another indication of the desirability of taking the first nine principal components.

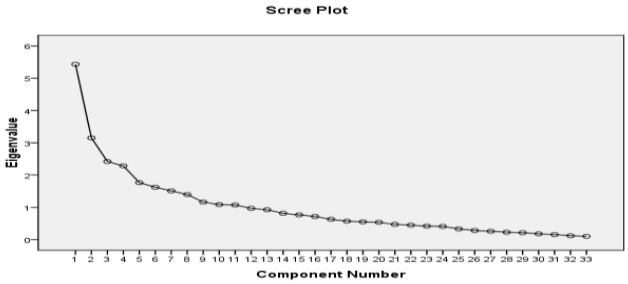

Figure 3-3 Principal component gravel map

After factor analysis, the medical staff satisfaction scale yielded a total of five factors: satisfaction with compensation, satisfaction with promotion, satisfaction with managers, and satisfaction with rewards. The Emotional Intelligence Scale has four factors: assessment and expression of self-emotions, evaluation and recognition of others' emotions, use of emotions for self-motivation, and regulation of self-emotions (Domingues, Brunale, Bruniera, & Senne, 2019; Roter, 1989; Schey et al., 2022; Williams & Calnan, 1991). A total of 9 factors were obtained from the patient satisfaction scale, namely: medical facilities ward environment, logistic services, medical technology, service attitude, doctor-patient communication, medical charges, medical ethics, current treatment results, and overall satisfaction items.

3.3 Analysis of correlations between variables

Correlation analysis focuses on the degree of closeness of association between variables, and the correlation coefficient is an indicator of the degree and direction of this linear relationship.

Table 3-8 Correlation analysis of the dimensions of physician and patient satisfaction

	Compensation satisfaction	Promotion satisfaction	Managerial satisfaction	Interest satisfaction	Rewarding satisfaction	Overall satisfaction of doctors
Medical Facilities Ward Environment	-.067	-.094	-.046	-.215	-.043	-.160
Logistic services	-.169	.045	.071	-.034	-.006	-.026
Medical technology	.344**	.350**	.268**	-.111	.030	.337**
Service attitude	.188**	.174*	.157*	.114	.060	.252**
Communication between doctors and patients	.377**	.336**	.221**	.084	.001	.375**
Medical charges	.012	-.078	-.040	-.050	.013	-.053
Medical ethics and ethics	.022	.236**	.080	.170*	.149*	.235**
Current treatment results	-.026	.138*	.072	.074	.003	.096
Overall satisfaction	.117	.044	.121	.079	-.055	.111
Overall patient satisfaction	.186**	.255**	.193**	-.012	.026	.246**

Note：*P<0.05，**P<0.01.

The data show that

Satisfaction with remuneration was positively correlated with medical

technology, service attitude, doctor-patient collusion and overall patient satisfaction, with correlation coefficients of 0.344, 0.188, 0.377 and 0.186 respectively.

Promotion satisfaction was positively correlated with medical technology, service attitude, doctor-patient communication, medical ethics, current treatment outcome and overall patient satisfaction, with correlation coefficients of 0.350, 0.174, 0.336, 0.236, 0.138 and 0.255 respectively.

Managerial satisfaction was positively correlated with medical technology, service attitude, doctor-patient collusion and overall patient satisfaction, with correlation coefficients of 0.268, 0.157, 0.221 and 0.193 respectively；

Satisfaction with benefits is positively correlated with medical ethics, with a correlation coefficient of 0.170.

Reward satisfaction was positively correlated with medical ethics with a correlation coefficient of 0.149.

Overall satisfaction of doctors was positively correlated with medical technology, service attitude, doctor-patient communication, medical ethics and overall satisfaction of injured players, with correlation coefficients of 0.337, 0.252, 0.375, 0.235 and 0.246 respectively.

Table 3-9 Correlation analysis of the dimensions of physician satisfaction and emotional intelligence

	Assessment and expression of	Evaluating and identifying the	Using emotional self-motivation	Self-regulation of emotions	Emotional Intelligence
Compensation satisfaction	.202**	.338**	.052	.291**	.341**
Promotion satisfaction	.280**	.218**	-.071	.083	.196**
Managerial satisfaction	.018	.023	-.261**	-.119	-.118
Interest satisfaction	.194**	.143*	.062	.071	.174*
Rewarding satisfaction	.133	.144*	-.098	-.065	.045
Overall satisfaction of doctors	.292**	.306**	-.129	.085	.216**

Note：*P<0.05，**P<0.01.

The data show that

Managerial satisfaction was negatively correlated with the use of emotional self-motivation with a correlation coefficient of -0.261.

Satisfaction with reward was positively correlated with assessment and expression of self-emotions, evaluation and recognition of others' emotions,

regulation of self-emotions, and emotional intelligence, with correlation coefficients of 0.202, 0.338, 0.291, and 0.341, respectively.

Satisfaction with promotion was positively correlated with assessment and expression of self-emotions, evaluation and recognition of others' emotions, and emotional intelligence, with correlation coefficients of 0.280, 0.218, and 0.196, respectively.

Satisfaction with interests was positively correlated with assessment and expression of self-emotions, evaluation and recognition of others' emotions, and emotional intelligence, with correlation coefficients of 0.194, 0.143, and 0.174.

Reward satisfaction was positively correlated with evaluating and identifying the emotions of others, with a correlation coefficient of 0.144.

Physicians' overall satisfaction was positively correlated with self-assessment and expression of emotions, evaluation and recognition of others' emotions, and emotional intelligence, with correlation coefficients of 0.0.292, 0.306, and 0.216, respectively.

Table 3-10 Correlation analysis of the dimensions of injured players satisfaction and emotional intelligence

	Assessment and expression of self-emotions	Evaluating and identifying the emotions of others	Using self-emotional emotions	Self-emotion regulation	Emotional Intelligence
Medical Facilities Ward Environment	-.019	.074	.107	.089	.094
Logistic services	.139*	.219**	.104	.198**	.250**
Medical technology	.373**	.391**	.123	.319**	.457**
Service attitude	.239**	.149*	.096	.119	.223**
Doctor-Patient Liaison	.279**	.387**	.210**	.312**	.447**
Medical charges	-.031	.088	.061	.037	.058
Medical ethics and ethics	.340**	.148*	.166*	-.037	.215**
Current treatment results	.247**	.211**	.038	.259**	.290**
Overall satisfaction	.364**	.337**	.257**	.111	.389**
Overall injured players satisfaction	.368**	.439**	.247**	.333**	.519**

Note：*P<0.05，**P<0.01.

The data showed that logistic services were positively correlated with the

assessment and expression of self-emotions, evaluation and identification of others' emotions, regulation of self-emotions and emotional intelligence, with correlation coefficients of 0.139, 0.219, 0.198 and 0.250 respectively.

Medical technology was positively correlated with the assessment and expression of self-emotions, evaluation and recognition of others' emotions, regulation of self-emotions, and emotional intelligence, with correlation coefficients of 0.373, 0.391, 0.319, and 0.457, respectively.

Attitudes towards service were positively correlated with the assessment and expression of self-emotions, the evaluation and recognition of others' emotions, and emotional intelligence, with correlation coefficients of 0.239, 0.149, and 0.223 respectively.

Doctor-injured player communication was positively correlated with self-assessment and expression of emotions, evaluation and recognition of others' emotions, use of emotional self-motivation, regulation of self-emotions, and emotional intelligence, with correlation coefficients of 0.279, 0.387, 0.210, 0.312, and 0.447, respectively.

Medical ethics was positively correlated with self-assessment and expression of emotions, evaluation and recognition of others' emotions, use of emotional self-motivation, and emotional intelligence, with correlation coefficients of 0.340, 0.148, 0.166, and 0.215 respectively.

The current treatment effects were positively correlated with self-assessment and expression of emotions, evaluation and recognition of others' emotions, self-regulation of emotions, and emotional intelligence, with correlation coefficients of 0.247, 0.211, 0.259, and 0.290, respectively.

Overall satisfaction was positively correlated with the assessment and expression of self-emotions, the evaluation and recognition of others' emotions, the use of emotional self-motivation, and emotional intelligence, with correlation coefficients of 0.364, 0.337, 0.257, and 0.389, respectively.

3.4 Cause and effect analysis

3.4.1 Regression analysis of medical staff satisfaction on injured player satisfaction

Overall injured player satisfaction was positively correlated with self-evaluation and expression of emotions, evaluation and recognition of others' emotions, use of emotional self-motivation, regulation of self-emotions, and emotional intelligence, with correlation coefficients of 0.368, 0.439, 0.247, 0.333, and 0.519 respectively.

Table 3-11 Table of effects of regression models

Model	R	R^2	AdjustmentsR^2	Estimated standard error
1	.246	.060	.056	.23529

Table 3-12 Analysis of variance table for the regression model

	Square and	Freedom	Mean Square	F	*P*
Regression models	.739	1	.739	13.347	.000
Residuals	11.515	208	.055		
Total	12.254	209			

Table 3-13 Results of linear regression analysis of factors influencing injured player satisfaction.

	Non-standardized coefficients		Standardisation factor	t	*P*
	B	Std. Error	Beta		
(Constant)	3.037	.234		12.980	.000
Overall satisfaction of doctors	.217	.059	.246	3.653	.000

As seen in Table 3-12, the ANOVA results for the regression model of the factors influencing injured player satisfaction showed that the F-value = 13.347, p=0.000<0.05, indicating that the regression model of the factors influencing injured player satisfaction was statistically significant (Buetow, Jutel, & Hoare, 2009; Sakai et al., 2022). The regression model explains 6.0% of the total variation in the dependent variable injured players satisfaction.

Table 3-13 shows the results of the regression analysis of the factors influencing patient satisfaction. Overall satisfaction of doctors has an effect on patient satisfaction (p=0.000<0.05) and the regression coefficient is 0.217, which is a positive correlation, i.e. the greater the overall satisfaction of doctors, the greater the satisfaction of injured players; overall satisfaction of patients = 3.037 + 0.217* overall satisfaction of doctors.

3.4.2 Regression analysis of medical staff satisfaction on medical facilities and ward environment

By the same token, we can see that the ANOVA results of the regression model for the environmental impact factors of the medical facility wards showed that the F-value = 2.835, p = 0.057 > 0.05, indicating that the regression model for the environmental impact factors of the medical facility wards was not statistically significant.

3.4.3 Regression analysis of medical staff satisfaction on logistics services

By the same token, we can see that the ANOVA results of the regression model for the logistic service impact factors show that the F value = 0.145, p = 0.704 > 0.05, indicating that the regression model for the logistic service impact factors is not statistically significant.

3.4.4 Regression analysis of medical staff satisfaction on medical technology

By the same token, we can see that the ANOVA results of the regression model for the factors influencing medical technology showed that the F-value = 26.705, p=0.000<0.05, indicating that the regression model for the factors influencing medical technology was statistically significant. As shown by the coefficient of determination R^2 in Table 4-31, the regression model explains 11.4% of the total variation in the dependent variable medical technology. Table 4-39 shows the results of the regression analysis of the factors influencing medical technology, the overall satisfaction of doctors has an effect on medical technology (p=0.000<0.05) and the regression coefficient is 0.707, which is a positive correlation, i.e. the greater the overall satisfaction of doctors, the greater the medical technology.

Medical technology = 1.487 + 0.707* overall satisfaction of doctors.

3.4.5 Regression analysis of medical staff satisfaction on service attitude

By the same token, we can see that the ANOVA results of the regression model for the factors influencing service attitudes showed that the F-value = 14.109, p=0.000<0.05, indicating that the regression model for the factors influencing service attitudes was statistically significant. The regression model explains 6.4% of the total variation in the dependent variable service attitude as shown by the coefficient of determination R^2 in Table 4-40. Table 3-42 shows the results of the regression analysis of the factors influencing service attitude. Overall satisfaction of doctors has an effect on service attitude (p=0.000<0.05), and the regression coefficient is 0.511, which is a positive correlation, i.e. the greater the overall satisfaction score of doctors, the greater their service attitude score.

Attitude to service = 2.008 + 0.511* overall satisfaction of doctors.

3.4.6 Regression analysis of medical staff satisfaction on doctor-patient communication

By the same token, we can see that the ANOVA results for the regression

model of the factors influencing doctor-patient communication showed that the F-value = 34.011, p=0.000<0.05, indicating that the regression model of the factors influencing doctor-patient communication was statistically significant (Robbins et al., 1993). The regression model explained 14.1% of the total variance in the dependent variable, doctor-patient communication, as shown by the coefficient of determination, R^2, in Table 4-43. Table 3-45 shows the results of the regression analysis of the factors influencing doctor-patient communication. Overall doctor satisfaction had an effect on doctor-patient communication (p=0.000<0.05) with a regression coefficient of 0.584, which is a positive correlation, i.e. the greater the overall satisfaction score of the doctor, the greater the doctor-patient communication score.

Doctor-injured player communication = 1.782 + 0.584* overall satisfaction of doctors.

3.4.7 Regression analysis of medical staff satisfaction on medical fees

By the same token, we can see that the ANOVA results of the regression model for the factors influencing healthcare charges showed that the F value = 0.578, p = 0.448 > 0.05, indicating that the regression model for the factors influencing healthcare charges was not statistically significant.

3.4.8 Regression analysis of medical staff satisfaction on medical ethics

By the same token, we can see that the ANOVA results for the regression model of the factors influencing medical ethics and medical style showed that the F-value = 12.147, p=0.001<0.05, indicating that the regression model of the factors influencing medical ethics and medical style was statistically significant. The coefficient of determination R^2 in Table 3-49 shows that the regression model explains 5.5% of the total variation in the dependent variable medical ethics and medical style. Table 3-51 shows the results of the regression analysis of the factors influencing medical ethics and medical style (Inui, Carter, Kukull, & Haigh, 1982). The overall satisfaction of doctors has an effect on medical ethics and medical style (p=0.001<0.05) and the regression coefficient is 0.579, which is a positive correlation, i.e. the greater the overall satisfaction score of doctors, the greater the medical ethics and medical style score.

Medical ethics = 2.308 + 0.579* overall satisfaction of doctors.

3.4.9 Regression analysis of medical staff satisfaction on current treatment outcomes

By the same token, we can see that the ANOVA results for the current

regression model of factors influencing treatment outcome showed that the F value = 1.953, p = 0.164 > 0.05, indicating that the current regression model of factors influencing treatment outcome was not statistically significant.

3.5 Analysis of moderating variables

Table 3-55 Results of the analysis of the moderating role of emotional intelligence in doctor-player satisfaction

		Dependent variable								
	Independent variable	Injured players satisfaction	Medical Facilities Ward Environment	Logistic services	Medical technology	Service attitude	Communication between doctors and injured players	Medical charges	Medical ethics and ethics	Current treatment results
Step 1	Doctor satisfaction	.034*	-.081**	-.040	.143**	.119**	.124**	-.024	.133	.020
	Emotional Intelligence	.118**	.058	.126**	.231**	.098*	.163**	.025	.116	.160**
	R^2	0.288	0.043	0.070	0.268	0.093	0.281	0.008	0.083	0.085
Step 2	Doctor satisfaction	-.056	.155	-.323	.278*	.010**	.222*	-.230	.509	-.456
	Emotional Intelligence	-.002	.375	-.254	.335**	.048*	.295**	-.252	.620	-.479
	Doctor satisfaction x emotional intelligence	.080	-.212	.254	.378*	.097*	.088**	.185	-.336	.427
	R^2	0.289	0.045	0.072	0.273	0.094	0.281	0.011	0.086	0.091
	$\triangle R^2$	0.001**	0.002*	0.002**	0.015**	0.011**	0.010**	0.003	0.003**	0.006**

Note：*P<0.05，**P<0.01.

The data show that：The regression coefficient of the second cross product term doctor satisfaction x emotional intelligence is significant in the moderating effect of emotional intelligence on doctor satisfaction on medical technology, so the moderating effect of emotional intelligence on doctor satisfaction on medical technology is significant (McCann & Weinman, 1996).

The regression coefficient of the second cross product term doctor satisfaction x emotional intelligence is significant in the moderating effect of emotional intelligence on doctor satisfaction on service attitudes, so the moderating effect of emotional intelligence on doctor satisfaction on service attitudes is significant.

The regression coefficient of the second cross product term doctor satisfaction x emotional intelligence is significant in the moderating effect of emotional intelligence on doctor-injured player communication, so the moderating effect of emotional intelligence on doctor satisfaction on doctor-injuredplayer communication is significant.

4. RESEARCH FINDINGS AND DISCUSSION

This paper uses medical staff satisfaction as the independent variable, patient satisfaction as the dependent variable and medical staff emotional intelligence as an intermediate moderating variable to argue that medical staff

emotional intelligence moderates the effect of medical staff satisfaction on patient satisfaction. The findings of the hypothesis test are as follows：

(1). Medical staff satisfaction has a direct impact on patient satisfaction

In order to test the hypothesis that medical staff satisfaction has a direct impact on patient satisfaction, correlation and regression analyses were conducted on each dimension of the two questionnaires.

The results of the correlation analysis showed that the medical skills, service attitude, communication skills and medical ethics of medical staff were positively correlated with the overall satisfaction of patients, with correlation coefficients of 0.337, 0.252, 0.375, 0.235 and 0.246 respectively. This will further improve the satisfaction of patients. Overall patient satisfaction is positively correlated with compensation, promotion, manager satisfaction and overall medical staff satisfaction, with correlation coefficients of 0.186, 0.255 and 0.193 respectively, which shows that only scientific compensation mechanisms, fair promotion opportunities and authoritative managers can help improve medical staff's sense of belonging to the organisation and increase their job satisfaction.

The results of the regression analysis showed that the overall satisfaction of doctors had a direct effect on patient satisfaction ($p=0.000<0.05$), and the regression coefficient was 0.217, which was a positive correlation, i.e. the greater the overall satisfaction of doctors, the greater the patient satisfaction. This is consistent with the results obtained in Wang Shimin's (2012) empirical study on the transmission mechanism of doctor-patient satisfaction in six public hospitals in Hangzhou.

Therefore, H1 medical staff satisfaction has a direct impact on patient satisfaction.

However, the results of both analyses show that there is no correlation between medical staff satisfaction and the dimensions of patient satisfaction such as medical facility ward environment, logistical services, medical fees and treatment outcomes, and the results of the ANOVA of the regression model of factors influencing medical facility ward environment show that：F value=2.835, $p=0.057>0.05$, indicating that the regression model of the factors influencing the environment of medical facilities wards is not statistically significant; the results of the ANOVA of the regression model of the factors influencing logistic services show that: F value=0.145, $p=0.704>0.05$, indicating that the regression model of the factors influencing logistic services is not statistically significant; the regression model of the factors influencing medical charges The results of the ANOVA for the regression model of the factors influencing medical fees showed that: F value = 0.578, $p=0.448>0.05$, indicating that the regression model of the factors influencing medical fees

was not statistically significant; the results of the ANOVA for the regression model of the factors influencing current treatment outcomes showed that: F value = 1.953, p=0.164>0.05, indicating that the regression model of the factors influencing current treatment outcomes was not statistically significant.

It may be because these four dimensions reflect more of the patient's evaluation of the hospital environment and other objective factors when they visit the doctor, not the patient's direct evaluation of the doctor himself, and furthermore, because medical knowledge is too specialized, the patient's satisfaction with the medical treatment is not judged from the medical professional perspective to judge the good or bad effect of this treatment. However, the discomfort caused by wound pain or minor infection due to the patient's age, personal constitution, etc. may cause a low psychological evaluation of the outcome of this surgery, which leads to low satisfaction. Therefore, the data results are negative.

(2). Emotional intelligence of medical staff plays a moderating role in medical staff satisfaction and injured players satisfaction

This paper uses moderated regression to analyse the moderating role of emotional intelligence in medical staff.

The regression coefficient of the second cross product of physician satisfaction x emotional intelligence was significant for the moderating effect of emotional intelligence on physician satisfaction with medical technology; the regression coefficient of the second cross product of physician satisfaction x emotional intelligence was significant for the moderating effect of emotional intelligence on patient satisfaction with service attitude; and the regression coefficient of the second cross product of physician satisfaction x emotional intelligence was significant for the moderating effect of emotional intelligence on total patient satisfaction with medical staff. The regression coefficient for the second cross product of doctor satisfaction x emotional intelligence was significant in the moderating effect of doctor-patient communication. However, if a doctor with high emotional intelligence does not bring his or her emotions into the treatment of patients, high medical skills, a friendly service attitude and good patient communication skills can still lead to high patient satisfaction.

At the same time, during the interviews with the patients, most of them mentioned among the factors influencing their overall satisfaction with the visit the doctor's emotions during the doctor-patient encounter, and after the concept of emotional intelligence was explained to them and explained to them, all the patients surveyed agreed that the doctor should have this ability. Due to the high level of medical expertise and the asymmetry in the level of literacy between the doctor and the patient, patients' satisfaction with their visit is not judged from a medical perspective, but is closely linked to the effectiveness of the doctor's communication during the treatment and

recovery process and to the doctor's emotional changes during the diagnosis process. Patients, especially those who have not yet made a definitive diagnosis of their illness or suspect an incurable disease, always try to find information about the diagnosis, changes and prognosis of their illness from the doctor's emotions, and their moods often fluctuate with the doctor's moods. Therefore, the greater the level of control that medical staff have over their own emotions and those of others, the greater the patient's satisfaction with their care and the better the outcome of their treatment.

Therefore, the hypothesis that H2: The emotional intelligence of medical staff moderates the role of medical staff satisfaction in relation to patient satisfaction is valid.

Funding Statement

This work was funded by Beijing Jishuitan Hospital Elite Young Scholar Programme [Grant Number XKGG202104].

REFERENCES

Berry, M., Unwin, J., Ross, G., Peacock, E., & Juma, A. (2007). A comparison of the views of patients and medical staff in relation to the process of informed consent. *The Annals of The Royal College of Surgeons of England, 89*(4), 368-373.

Buetow, S., Jutel, A., & Hoare, K. (2009). Shrinking social space in the doctor–modern patient relationship: A review of forces for, and implications of, homologisation. *Patient education and counseling, 74*(1), 97-103.

Carter, W. B., Inui, T. S., Kukull, W. A., & Haigh, V. H. (1982). Outcome-based doctor-patient interaction analysis: II. Identifying effective provider and patient behavior. *Medical Care*, 550-566.

Comstock, L. M., Hooper, E. M., Goodwin, J. M., & Goodwin, J. S. (1982). Physician behaviors that correlate with patient satisfaction. *Academic Medicine, 57*(2), 105-112.

Domingues, R., Brunale, F., Bruniera, G., & Senne, C. (2019). Assessment of cytological and biochemical parameters stability in cerebrospinal fluid. *Jornal Brasileiro de Patologia e Medicina Laboratorial, 55*, 258-266. doi:10.5935/1676-2444.20190021

Gül, F. C., Kobat, S. G., Çelik, F., Aydin, S., & Akkoç, R. F. (2022). Plasma and aqueous levels of alarin and adipsin in patients with and without diabetic retinopathy. *BMC ophthalmology, 22*(1), 176.

Hoy, W. K., & Miskel, C. G. (1987). *Educational administration: Theory, research, and practice*: Random House Trade.

Inui, T. S., Carter, W. B., Kukull, W. A., & Haigh, V. H. (1982). Outcome-based doctor-patient interaction analysis: I. Comparison of techniques. *Medical Care, 20*(6), 535-549.

Katz, A. (1999). Pilot project to enhance physician-patient communication.

Canadian Family Physician, 45, 218.

McCann, S., & Weinman, J. (1996). Encouraging patient participation in general practice consultations: effect on consultation length and content, patient satisfaction and health. *Psychology and Health, 11*(6), 857-869.

O'Malley, J. (2002). Smart thinking for challenged health systems. *Marketing Health Services, 22*(2), 24.

Pascoe, G. C. (1983). Patient satisfaction in primary health care: a literature review and analysis. *Evaluation and Program Planning, 6*(3-4), 185-210.

Rajendrababu, S., Puthuran, G. V., Alia, L. A., Uduman, M. S., & Wijesinghe, H. K. (2022). Intermediate-term outcomes of combined phacoemulsification and Aurolab aqueous drainage implant in eyes with refractory glaucoma and coexistent cataract. *International ophthalmology, 42*(8), 2609-2618.

Robbins, J. A., Bertakis, K. D., Helms, L. J., Azari, R., Callahan, E. J., & Creten, D. A. (1993). The influence of physician practice behaviors on patient satisfaction. *Family medicine, 25*(1), 17-20.

Roter, D. L. (1989). Which facets of communication have strong effects on outcome-a meta-analysis. *Communicating with medical patients*, 183-196.

Sakai, A., Tagami, M., Misawa, N., Yamamoto, M., Kohno, T., & Honda, S. (2022). Safety and efficacy of 27-gauge transconjunctival vitrectomy for the diagnosis of posterior uveitis or pan uveitis of unknown origin. *BMC ophthalmology, 22*(1), 1-7.

Schermerhorn Jr, J. R., Osborn, R. N., Uhl-Bien, M., & Hunt, J. G. (2011). *Organizational behavior*: john wiley & sons.

Schey, K. L., Gletten, R. B., O'neale, C., Wang, Z., Petrova, R., & Donaldson, P. (2022). Lens aquaporins in health and disease: Location is everything! *Frontiers in Physiology*, 677.

Sun, N., Wang, C., Linghu, W., Li, X., & Zhang, X. (2022). Demographic and clinical features of pediatric uveitis and scleritis at a tertiary referral center in China. *BMC ophthalmology, 22*(1), 1-11.

Wang, J. D., Zhang, J. S., Li, M., Mao, Y. Y., Mayinuer, Y., & Wan, X. H. (2022). Comparison of different pupil dilatation methods for phacoemulsification in eyes with a small pupil. *BMC ophthalmology, 22*(1), 1-6.

Williams, S. J., & Calnan, M. (1991). Key determinants of consumer satisfaction with general practice. *Family practice, 8*(3), 237-242.