

Perspective of Safety Climate Adaption in Day Surgery Under the Belt & Road Initiative

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Abstract—*The Belt & Road economic development initiative brings out new definition, connotation, and denotation of day surgery. This study discusses whether different leadership behaviors have different impacts on the creation of safety climate in the day surgery projects in different situations. Based on the contingency theory of management and in combination with the characteristics of safety management in the medical industry, this paper screened out the factors of transformational leadership and transactional leadership affecting the surgical safety climate on the basis of a large number of literature researches and actual survey results. With this point, this paper systematically analyzed the factors of transformational leadership and transactional leadership affecting the safety climate of the day surgery projects, and then put forward a series of constructive improvement measures.*

Keywords: *day surgery, transformational leadership, transactional leadership, safety climate*

I. INTRODUCTION

The Belt & Road Initiative not only brings out economic growth, but also increases opportunities for day surgery. Based on the contingency theory of management, this study discusses whether different leadership behaviors have different impacts on the creation of safety climate in the day surgery projects in different situations,

Healthcare reform in China is a major social reform, and a top-down reform on the health systems and mechanisms, goal positioning, and organizational function management. Healthcare reform involves all medical and health institutions, but in essence, it is a reform on the government's ideas, system, mechanism leadership as well as connotation and ability of leadership. The development of pharmaceutical and healthcare fields concerns the well-being of all families, and it is a major livelihood project benefiting 1.3 billion people, and also an important sign of the national soft power. Healthcare reform is not only a matter of the health sector, but also requires cooperation and joint efforts of relevant government departments and institutions. Healthcare reform is a worldwide problem and will not accomplish at one go, so the government and relevant institutions should have clear goals, carry out positive construction, make continuous improvement and long-

term efforts.

II. LITERATURE REVIEW

A. Safety Management theory

Zeng Min (2013) thinks that we should build a set of safety management processes for the perioperative period, so as to strengthen the management in the three important links - preoperative, intraoperative and postoperative; we should strictly implement the checking system and improve the accuracy of the medical workers' identification about the patients, and we should avoid mistakes in identity of surgery patients, operative site and surgical method, so as to ensure the patient safety during the perioperative period. Yin Jie (2016) uses the node control concept to make a risk assessment on the high-risk links during the perioperative period to determine 8 key nodes affecting the surgery quality and safety, from the patient application for surgery to returning to the ward or ICU after the surgery. And information technology and manual assistance are combined to carry out node control and process control, realize procedure-based and controllable safety supervision and seamless link, so as to ensure the execution of the core medical care system, reduce the incidence of errors during the perioperative period, improve the surgery efficiency and realize the goal of surgery safety management.

B. Leadership Behavior

Burns (1978) first systematically proposed the theory of transformational leadership and transactional leadership. In the past 20 years, the theory of transformational leadership and transactional leadership has become the basic model and research focus of researches on leadership, and numerous research results have been obtained (Avolio, Bass & Jung, 1999; Judge & Piccolo, 2004). At present, there are still great debates on the concept and structure of transformational leadership and transactional leadership (Chen Wenjing, Shi Kan, 2007).

C. Safety Climate

Zohar (1980) first proposes the concept of safety climate, which was defined as employees' perception of the safety

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environment of the organization. Later, when studying safety climate, scholars give a variety of definitions (Guldenmund, 2000), such as employees' perception of features that can reduce or eliminate dangerous behaviors in the organization (Glennon, 1982), employees' common perceptions and beliefs about workplace safety (Cooper & Philips, 1994), and their attitudes and perceptions to objectively measure occupational health and safety issues (Cove et al., 1995). Based on the concept of organizational climate (Schneider, 1990), Zohar (2000) proposes that the common perception of employees is safety climate when the organization's strategy focuses on high-risk operation performance. This perception will guide and influence employees to follow safety regulations and procedures to carry out production operations (Neal & Griffin, 2006).

III. THEORY DEVELOPMENT

A. Transformational Leadership and Safety Climate

Some scholars proposed the concept of "leadership creating climate", but after that, there were not many empirical studies on it. Leadership style can affect subordinates' attention to safety, which is an important source of safety climate perception (Zohar, 2002). In the researches on leadership theory, the researches on transformational leadership theory are the most sufficient. Some scholars studied the transformational leadership and safety climate, pointing out that there is a positive correlation between them. Zohar believes that transformational leader can affect the safety climate.

Based on the current situation of China, this study divides the safety climate into three research dimension: safety management, safety perception and safety attitude. The following hypotheses are put forward according to the dimensions:

Hypothesis 1a: In the preoperative preparation phase, transformational leadership has a positive impact on safety management.

Hypothesis 1b: In the preoperative preparation phase, transformational leadership has a positive impact on safety perception.

Hypothesis 1c: In the preoperative preparation phase, transformational leadership has a positive impact on safety attitude.

B. Transactional Leadership and Safety Climate

Transactional leaders usually reach agreements with their subordinates, explain expectations to them, and provide support of various resources. When the subordinates achieve a predetermined level of performance, the leaders will give them certain rewards.

In the hospital surgery phase and postoperative rehabilitation phase, patients should follow the doctor's advice strictly, take medicine on time and cooperate with the hospital's diagnosis and treatment. The attending physician should make correct clinical decisions in accordance with the requirements of clinical pathways and clinical guidelines. Therefore, based

on the above statement, the following hypotheses are put forward:

Hypothesis 2a: In the hospital surgery phase and postoperative rehabilitation phase, transactional leadership has a positive impact on safety management.

Hypothesis 2b: In the hospital surgery phase and postoperative rehabilitation phase, transactional leadership has a positive impact on safety perception.

Hypothesis 2c: In the hospital surgery phase and postoperative rehabilitation phase, transactional leadership has a positive impact on safety attitude.

Through the new definition of day surgery, this paper give the connotation: safety climate is a new type of expatriates to day surgery in response to the Belt&Road Initiative, we can conclude that in the day surgery projects, leadership has impact on safety climate of the staff in the day surgery project, and transformational leadership has a significantly positive impact on the safety attitude under the safety climate in the project.

IV. METHODOLOGY

This study uses the contingency management model to verify the relationships between two dimensions of leadership (transformational leadership and transactional leadership) and three dimensions of safety climate (safety management, safety perception and safety attitude), and analyzes the relationships between different leadership behaviors and safety climate in the life cycle of a day surgery project. Starting with the analysis on transformational leadership and transactional leadership, this study discusses their impact on three dimensions of safety climate (safety management, safety perception and safety attitude) in different situations.

A. Research Methods

The quantitative analysis method is first employed in this study. This method is to analyze the quantity characteristics, quantity relation and quantity change of social phenomena. It is hoped that in this study, from a more rigorous perspective, the statistical information collected about the day surgery project was used as the basis to prove the viewpoint that leadership has a positive impact on the safety climate by establishing an analysis system.

B. Data Collection

The sample size of a given group is determined according to the table of Krejcie & Morgan (1970). Of the target population of 800, 260 or more are recommended as the sample size (confidence level = 95%, margin of error = 5%) (N=278 participants). In this study, 18 observation variables were involved, and SPSS software was used for quantitative research. According to the sample size formula of the sampling survey : $n \geq \frac{k}{\alpha} 2p(1-p)$ (Uchida Osamu, 2007); 0.05 is considered to be the critical value for significance, so the research group should collect at least 73 valid samples. From January to June, 2018, a questionnaire survey was conducted in this study, involving 12 surgical departments, including Orthopedics Department I, Orthopedics Department II, Gastrointestinal Surgery, Hand and Foot Surgery,

Hepatobiliary Surgery, Gynecology, Obstetrics, Urology Surgery, Brain Surgery, Heart Surgery, Vascular Surgery and Thoracic Surgery. 250 questionnaires were issued and 200 valid questionnaires were returned, with a recovery rate of 80%. The data were from the content that the participants of the surgery departments filled in the questionnaire.

V. DATA ANALYSIS AND RESULTS

A. Relationship between Transformational Leadership and Safety Climate in the Preoperative Preparation Phase

This regression analysis was conducted with "safety management", "safety perception" and "safety attitude" under the safety climate in the preoperative preparation phase in the day surgery projects as the dependent variables and "transformational leadership" of the staff participating in the day surgery projects as the independent variable.

From the table, we can see that in the variance analysis and F test on the model, F value is 15.218 and the significance level $P < 0.01$, reaching the significance level. This means that matched regression line is meaningful. Namely, the impact of at least one regression coefficient on criterion variable is significant.

Therefore, the unstandardized regression equation is: $\text{transformational leadership} = 1.849 + 0.801 * \text{safety attitude}$

B. Relationship between Transactional Leadership and Safety Climate in the Preoperative Preparation Phase

This regression analysis was conducted with "safety management", "safety perception" and "safety attitude" under the safety climate in the preoperative preparation phase in the day surgery projects as the dependent variables and "transactional leadership" of the staff participating in the day surgery projects as the independent variable. The result of Table 9 shows that R^2 of the model is 0.356, which means that the joint degree of explanation of independent variable is 35.6%.

According to the significance test results of parameters and regression coefficients of the regression equation, the significance level values of "safety management", "safety perception" and "safety attitude" under the safety climate in a surgery project are 0.067, 0.255 and 0.130, all more than 0.05, which means they don't reach the significance level. This means that "transactional leadership" doesn't have a significant impact on the "safety management", "safety perception" and "safety attitude" of the staff in a surgery project.

	independent variable: transactional leadership			t	Sig.	Co-linear Statistics	
	B	Standard Error	Standardization			error tolerance	VIF
(constant)	1.849	0.688		2.687	0.009		
safety management	-0.259	0.134	-0.169	-1.924	0.067	0.872	1.121
safety perception	-0.134	0.125	-0.092	-1.075	0.255	0.971	1.052
safety attitude	0.801	0.119	0.589	6.744	0.130	0.906	1.104
R^2	0.356						
F	15.238**						

C. Relationship between Transformational Leadership and Safety Climate in the Hospital Surgery Phase

This regression analysis was conducted with "safety management", "safety perception" and "safety attitude" under the safety climate in the in the hospital surgery phase in the day surgery projects as the dependent variables and "transactional leadership" of the staff participating in the day surgery projects as the independent variable.

According to the significance test results of parameters and regression coefficients of the regression equation, the significance level values of "safety management" and "safety perception" under the safety climate in a surgery project are 0.053 and 0.661, both more than 0.05, which means they don't reach the significance level. This means that "transactional leadership" doesn't have a significant impact on the "safety management" and "safety perception" of the staff in a surgery project. But the unstandardized coefficient of "safety attitude" under the safety climate in a surgery project is 0.456 and the standard coefficient is 0.480, and the corresponding significance level is less than 0.01, reaching a great significance level. This means "transactional leadership" has a significant positive impact on "safety attitude".

Therefore, the unstandardized regression equation is: $\text{transactional leadership} = 1.220 + 0.456 * \text{safety attitude}$.

Then, Hypotheses 2a and 2b are not verified, while Hypothesis 2c is verified.

	independent variable: transactional leadership			t	Sig.	Co-linear Statistics	
	B	Standard Error	Standardization			error tolerance	VIF
(constant)	1.220	0.481		2.538	0.013		
safety management	0.183	0.094	0.172	1.955	0.053	0.892	1.121
safety perception	0.038	0.087	0.037	0.440	0.661	0.951	1.052
safety attitude	0.456	0.083	0.480	5.493	0.000	0.906	1.104
R^2	0.317						
F	15.309**						

D. Relationship between Transformational Leadership and Safety Climate in the Postoperative Rehabilitation Phase

This regression analysis was conducted with "safety management", "safety perception" and "safety attitude" under the safety climate in the in the postoperative rehabilitation phase in the day surgery projects as the dependent variables and "transformational leadership" of the staff participating in the day surgery projects as the independent variable. According to the significance test results of parameters and regression coefficients of the regression equation, the significance level values of "safety management", "safety perception" and "safety attitude" under the safety climate in a surgery project are 0.263, 0.691 and 0.250, all more than 0.05, which means they don't reach the significance level. This means that "transformational leadership" doesn't have a significant impact on the "safety management", "safety perception" and "safety attitude" of the staff in a surgery project.

	independent variable: transactional leadership			t	Sig.	Co-linear Statistics	
	B	Standard Error	Standardization			error tolerance	VIF
(constant)	1.20	0.481		2.538	0.013		
safety management	0.183	0.094	0.172	1.955	0.163	0.885	1.171
safety perception	0.038	0.087	0.037	0.440	0.661	0.951	1.652
safety attitude	0.476	0.083	0.490	5.493	0.000	0.976	1.174
R ²				0.337			
F				15.369**			

VI. DISCUSSION AND CONCLUSIONS

With the continuous progress of The Belt and Road initiative. The importance of safety climate in day surgery project has been improved. In this study, the quantitative method was employed, and the results were consistent with the research hypotheses. The process of a day surgery project includes three phases: admission, operation and discharge, so one leadership behavior cannot solve various troublesome problems in the whole life cycle of a day surgery project. But by applying the contingency theory, this difficulty can be well solved. Based on the contingency theory of leadership, this study studies which leadership behavior is more beneficial to the creation of safety climate in the day surgery projects in different situations: In the day surgery projects, transformational leadership and safety climate are positively correlated in the preoperative preparation phase; and transactional leadership and safety climate are positively correlated in the hospital surgery phase and postoperative rehabilitation phase.

The innovation on research perspective in this study is that the concept of safety climate was introduced into the day

surgery project in the medical field, and the analysis was carried out from the perspective of impact of leadership on safety climate. Thus feasible suggestions on the safety and quality management of a day surgery project were proposed.

Safety climate determines an organization's effectiveness. Cooper (1998) pointed out that how to create a positive safety culture and persuade people to improve safety is the most difficult part of creating a positive safety culture, and the difficulty psychology is not under the control of the organization. The concept of safety climate is widely used in western countries. However, in China, the researches related to safety climate are extremely scarce, and it is rare to apply it into the medical and healthcare project management field. In the study of this paper, the safety climate is applied in the safety and quality management of day surgery projects, which is the greatest idea innovation of this study.

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