

CHAPTER 2

Literature Review

For purposes of the study, the literature review included the following topics:

1. Leader-Member exchange
 - 1.1 Definition of leader-member exchange
 - 1.2 Conceptual models of leader-member exchange
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2. Patient safety culture
 - 2.1 Definition of patient safety culture
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4. Situations related to leader-member exchange and patient safety culture in tertiary hospitals, Kunming, the People's Republic of China
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Leader-Member Exchange

Definition of Leader-Member Exchange

Dansereau, Graen, and Haga (1975) initially introduced it as the Vertical Dyad Linkage, which refers to a relationship focuses upon the vertical dyad and the relationship between a leader and a subordinate contained in a dyad. Graen and Uhl-Bien (1995) explained LMX is a unidimensional concept based on leadership theory and defined LMX as the quality of work exchange relationship between leader and each employee and high quality of LMX is characterized by trust, respect, and mutual obligation. Liden and Maslyn (1998) explained LMX development process based on integrated multiple theory such as role theory, leadership theory and social exchange and defined LMX as the quality of social exchange relationship between a leader and each subordinate and the quality is characterized by a sense of affect, loyalty, contribution and professional respect that generates influence and motivates the subordinate to act in a manner valued by the leader.

In conclusion, almost scholars defined LMX as the quality of relationship between leader and each employee and explained the LMX process development based on different views of theoretical basis. In this study, the definition of LMX defined by Liden and Maslyn (1998) was used, because the establishment of the senses of mutual affect, contribution, professional respect and loyalty are essential elements of interpersonal relationships between head nurses and nurses in P. R. China (Yang et al., 2013).

Conceptual Models of Leader-Member Exchange

LMX initially introduced by Dansereau et al. (1975) as an alternative leadership style called Vertical Dyad Linkage (VDL). The central reason of leader develop different relationship with each subordinate resulted from leader has limited resource and time, so leaders have to develop trusted effective assistant in complementing task in work unit (Graen & Uhl-Bien, 1995). When leaders and followers develop a mature partnership, it means an effective leadership occurs and provides benefits to organizations (Graen & Uhl-Bien, 1991). Characteristics of high quality relationships

between leaders and subordinates include mutual affect, trust, loyalty, professional respect and contribution (Graen & Uhl-Bien, 1995; Liden & Maslyn, 1998). The quality of relationship between leaders and subordinates is classified into “in-group”-high quality of LMX and “out-group”-low quality of LMX depend on the quality of relationship. In-group exchange, dyad members turn to exchange not only job description but beyond it including both material and non-material resource, which, in turn, would result in subordinates work harder, more commitment to achieve objective and loyal to their leader; Conversely, in out-group exchanges, leaders and subordinates mostly exchange resource only based on employment contrast (Liden, Sparrowe, & Wayne, 1997). Recently, researchers suggested study LMX at a group level is more suitable for understanding the role of LMX in a group than an individual level analysis where people work as a team (Gerstner & Day, 1997; Henderson, Liden, Glibkowski, & Chaudhry, 2009; Yammarino & Dansereau, 2008). Henderson et al. (2009) stated that generally, employees work in a group share a common leader, therefore LMX is nested in work group. According to literature review, three models describe the LMX development process were listed as below:

Role Making Model (1987). This model stated LMX consists of three phases: role taking, role making, and role routinization (Graen & Scandura, 1987). The relationship begins with role taking phase, when leader offers a role to subordinate by making a request or assigning a task, then leader makes evaluation about member’s response and decides whether move to next episode, in this step, leader evaluates employee’s competency and motivation. In the role making phase, the nature of leader-member relationship becomes defined. The leader provides opportunities to subordinate informal assignment, unspoken benefits and resource exchange with member’s loyalty and responsibility. The LMX relationship is high if leader and employee contribute resource valued by the other party and each party thinks this exchange is fair. This is a critical stage because dyads that do not develop may revert to the initial stranger phase. The final phase, role routinization, a “mature partnership” was established between two parties, resulting from collaborating on informal assignments. Subordinate becomes an in-group member and work harder to sustain exchange not only behavioral but also emotional-mutual trust, respect, and obligation with leader.

Leadership Making Model (1991). This model indicated that achieving a mature relationship between leaders and subordinates includes three stages: stranger stage, acquaintance stage, and mature stage (Graen & Uhl-Bien, 1991). The “stranger” stage is the beginning of leadership making, leaders and subordinates come together as strangers and they are interdependent however job description content was exchanged. The second stage is “acquaintance” stage. The roles of leaders and subordinates turn to acquaintances share personal and work level resource and information beyond only contractual content, however, the exchanges are still limited. This is a part of “testing stage”, leaders and subordinates exchange equitable favors with a limited time period. Then this relationship move to next stage-“mature” stage, in the end of process, exchange between leader and subordinates are highly developed. Leader and subordinates can trust each other for loyalty and support. Additionally, exchanges are not only behavioral but also emotional. The level of incremental influence between leaders and subordinates is extremely high which means a high quality leadership occurs.

Multidimensional LMX Model (1986, 1998). Multidimensional LMX Model stated that LMX is the quality of social exchange between leader and subordinator and argued that social exchange relationships were not only material but also non-material goods, thus multi-dimensions should be involved in LMX (Dienesch & Liden, 1986). The model integrated multiple theories, including attribution theory, role theory, leadership theory, social exchange, and upward influence to generate the multidimensionality of LMX. Liden and Maslyn (1998) proved Dienesch and Liden’s model and found that the characteristics of quality of LMX includes affect, loyalty, contribution and professional respect, each of them was listed as below:

Affect. It refers to mutual affect for others mainly depend on interpersonal attraction instead of job or specialized value. Such affect may result in expecting for/or product of a relationship which characterized personal rewarding component and outcomes such as friendship.

Loyalty. It refers to expressions of members reflect public support of goals and individual character of other members in LMX dyad relationship. Loyalty includes faithfulness which individual express general consistency in variety situation.

Contribution. It refers to perception of each member within dyad relationship devotes to either explicit or implicit mutual goals according to perceive recent work-oriented activity. Assessment of work-oriented activity is not limited to responsibility and completing tasks but beyond the job description and/or employment contract; as well beyond the resources and opportunities supplying for the activity.

Professional respect. It refers to a reputation, within and/or outside the organization, of surpass his or her professional work. Perception of the level to which participant of dyad linkage has established professional respect. The perception may depend on his previous data concerning the person, such as personal experience with individual; comments made about the person from individuals within or outside the organization; and awards or other professional recognition achieved by the person. Therefore, it has possibility to have created a perception of professional respect before working with or making contact with the person.

In multidimensional LMX, Dienesch and Liden (1986) claimed four steps of LMX development process. First stage is *Initial Interaction*. Both leader and subordinate interact first time in present position, each of members bring their individual characteristics and background to meeting. The characteristics may have strong influence on whole process of LMX development and the premier interaction. Subordinate is not only to be a member in a new leader-member exchange but also to be socialized in new organization, thus manager plays a role to provide support and information for members understanding organization context. If leader perceives characteristics of a member is greatly impressed, they may make an immediate judgment and neglect the behavior or attribution step. However, behavioral factors typically will be the main factors determining the LMX development. The second step is *Leader Delegation*. Leaders will select then assign trial task or duty to individual in order to test dimensions of LMX development. In next stage, *Member Behavior and Attributions*, members adopt behaviors to response leader's deligation of a assignment, task and duty. Notably, these behaviors components are more than performance alone, dimmensional relationship of LMX (affect, loyalty, contribution, and professional respect) were involved as well. The final step is *Leader's Attributions for Member's Behavior*. Leaders attempt to make attributions and explain the behavior of members

response, which can clearly implicate the type of exchange develop between leader and subordinate.

In summary, multidimensional LMX model posited that leaders would develop relationships with staff within the same work unit based on staff needs, behaviors, and style, and characterized by the desire to achieve mutual goals. When relationships are positive, staff members create high senses of mutual affect, loyalty, contribution and professional respect, resulting in respond by performing in a manner desired by the leader. In contrast, when negative relationships exist, staff members tend to respond by meeting minimal job requirements due to having low senses of mutual affect, loyalty, contribution and professional respect.

From the literature review, LMX theory explains dyadic procedure of a leader creates and fosters working relationship with each subordinate over time. The researcher selected Liden and Maslyn (1998) Multidimensional LMX Model as a conceptual framework of the study because it is relevant with the definition of LMX in this study. Moreover, Multidimensional LMX Model integrated several theories which focuses on the different aspects of exchange between a leader and each subordinate than unidimensional model, which is consistent with Chinese culture (Law, Wang, & Hui, 2010).

Measurement of Leader-Member Exchange

Leader-member exchange has been measured in various instruments. Based on the literature review, the following instruments are commonly used to measure leader-member exchange in different settings:

Scandura and Graen's 7-Item LMX Scale (LMX-7) (Scandura & Graen, 1984). The LMX-7 instrument developed by Scandura and Graen (1984) was derived from prior LMX scale and based on unidimensional LMX theory. The LMX-7 consist of 4 point (1= strongly disagree to 4 = strongly agree) 7 items, the possible score range from 7 to 28. Higher mean score revels higher LMX exist. The reliability of instrument has been tested. Cronbach's alpha ranges from .86 to .84 in study (Scandura & Graen, 1984). In Trybou and colleagues' study, the reliability showed Cronbach's alpha

coefficient of LMX-7 was 0.88 and total correlations (r) of the items range from .71 to .83 (Trybou, Gemmel, Pauwels, Henninck, & Clays, 2013). However, validity of LMX-7 has not been mentioned.

Graen and Uhl-Bien's 7 Item LMX Instrument (LMX-7) (Graen & Uhl-Bien, 1995). LMX-7 was developed by Graen and Uhl-Bien (1995) based on unidimensional LMX theory. The questionnaire includes seven items used a 5-point scale to response. LMX-7 contains 7 items and it is the most commonly used instrument by researchers. Graen and Uhl-Bien classified score of LMX into different level: very high (score ranges from 30 to 35), high (score ranges from 25 to 29), moderate (score ranges from 20 to 24), low (score ranges from 15 to 19), and very low (score ranges from 7 to 14). Higher-quality leader-member exchanges indicates participants are in-group members; conversely, lower score of LMX illustrates subordinates are out-group. Gerstner and Day (1997) showed the reliability (Cronbach's alpha) of LMX was .89 and stated LMX-7 has the best psychometric properties among all the instruments reviewed. However, validity of LMX-7 has not been mentioned.

The Multidimensional Leader-Member Exchange Scale (LMX-MDM) (Liden & Maslyn, 1998). The questionnaire was developed by Liden and Maslyn (1998) based on Dienesch and Liden's Multidimensional LMX Model (1986) which includes three dimensions: affect, loyalty and contribution. Liden and Maslyn (1998) added "professional respect" as the fourth dimension and developed LMX-MDM aims to accordingly measure LMX under multidimensional model. LMX-MDM consists of four dimensions and 12 items, each item is rated using a 7-point scale from "strongly disagree"=1 to "strongly agree"=7.

The initial questionnaire includes eleven items, the validity has been tested by using exploratory factor analysis (Affect: 3 items factor loading were .91, .80, and .72; Loyalty: 3 items factor loading were .91, .74 and .70; Contribution: 2 items factor loading were .86 and .81; Professional respect: 3 items factor loading were .97, .91 and .79). Confirmatory factor analysis showed 4 factors indicated a good model fit (CFI=.986; GFI=.960; AGFI=.930). Internal consistency reliabilities were tested. Coefficient alphas of the affect, loyalty, contribution, professional respect were .90, .78, .60, and .92, respectively among student samples; while coefficient alphas of the affect, loyalty,

contribution, professional respect were .90, .74, .57, and .89, respectively among organizational employees. Moreover, researcher modified one item of “contribution” and added a new item to “contribution” since this dimension showed a low reliability. Then consistency reliability of contribution was tested and coefficient alpha was .74 among students and .77 among production workers and engineers.

The LMX-MDM was translated by Hu and Liden (2013). The reliability of LMX-MDM was tested, which showed coefficient Cronbrach alpha of .96 (Hu & Liden, 2013). In this study, Chinese LMX-MDM was chosen since the dimensions of LMX-MDM can provide understanding elements of leaders and subordinates developing a good relationship in Chinese organizations both for work and social exchange. Moreover, majority of Chinese studies have adopted LMX-MDM to measure quality of LMX among nurses. Furthermore, the LMX-MDM showed a good internal consistency in Chinese healthcare organizations which Cronbach’s alpha was .84 and .87 respectively (Feng et al., 2012; Yang et al., 2013).

Studies Related to Leader-Member Exchange

According to literature review, there are two approaches to study LMX, including individual and unit level analysis. Therefore, contents of this study below would be presented by grouping as the studies using individual level analysis and unit level analysis.

Regarding to unit level analysis, a study was carried out by Ferris (1985). Subjects consisted 68 registered nurse and their supervisors from 18 nursing subunits of a midwestern hospital. A 5-point LMX (Graen, Liden, & Hoel, 1982) was employed to collect data. The purposes of this study were to examine the relative contribution of between-unit (averaged unit level) variance and within-unit (individualized) variance to explaining turnover. The result showed LMX within unit was a stronger predictor of turnover than average leadership style. However, the exact score of LMX have not been showed.

Laschinger et al. (2009) tested a multilevel model link unit-level LMX and structural empowerment to nurses’ psychological empowerment and organizational

commitment. A 7-point LMX-MDM (Liden & Maslyn, 1998) was rated by 3,156 nurses from 217 hospital units in Canada. Results showed a moderate level of LMX as perceived by nurses ($\bar{X}=4.41$, $SD = .68$).

Thompson et al. (2011) conducted a study to explore LMX in an academic medical center in U.S. Participants consisted of 711 nursing staff from 34 units. LMX was rated by using 5-point modified LMX scale and was analyzed in a unit level. Units were classified into tertiles based on the distribution of the mean LMX scores. The low tertile (LMX $\bar{X}=3.27$, $SD\pm.15$) included 11 units, the middle tertile (LMX $\bar{X}=3.69$, $SD \pm.085$) included 12 units and the high tertile (LMX $\bar{X}=4.08$, $SD \pm.11$) included 11 units.

One unit level analysis of LMX has been done to test a multilevel model in Canada. Participants were 3,156 staff nurses from 217 units. A 7-point LMX-MDM (Liden & Maslyn, 1998) was used to measure LMX level. The mean score of LMX ($\bar{X}=4.41$, $SD=.69$) was at a moderate level (Laschinger et al., 2011).

In terms of individual level analysis, Laschinger, Purdy, and Almost (2007) examined effects of LMX, empowerment, and core-evaluation on managers' job satisfaction. There were 141 nurse managers from one provincial hospital rated the LMX-MDM (Liden & Maslyn, 1998), the result showed LMX had a positive direct effect on structural empowerment ($r = .42$) and core self-evaluation had a positive effect on quality of LMX ($r = .18$).

Another study conducted by Davies, Wong, and Laschinger (2011) in Canada. Participants consisted of 234 RNs from an urban tertiary hospital. The LMX-MDM (Liden & Maslyn, 1998) was used to measure the quality of LMX. The finding showed that LMX was at a moderate level as perceived by nurses ($\bar{X}=4.45$, $SD = 1.33$).

One research study was carried out in 3 medical centers and 3 regional hospitals in Taiwan including 200 valid supervisor-subordinate dyads (14 head nurses - 200 nurses). A 5-points rating scale LMX-MDM (Liden & Maslyn, 1998) was used in the study. The finding revealed LMX was at a high level ($\bar{X}=3.91$, $SD = .45$) (Chen et al., 2008).

Cheng et al. (2012) conducted a study in mainland of P. R. China in order to explore longitudinal effects of job insecurity on employees' outcomes. LMX and emotional intelligence were as moderating roles. Total 395 nurses from three hospitals took part in the survey. The LMX-MDM (Liden & Maslyn, 1998) was applied to assess quality of LMX. The results reported that there was a moderate level of LMX ($\bar{X}= 3.35$, $SD=.83$) perceived by nurses.

Yang et al. (2013) conducted a study in mainland of P. R. China to reveal the relationship between LMX and organizational citizenship behaviors among nurses. The participants consisted of 402 staff nurses from 2 tertiary hospitals. A 7-pints LMX-MDM (Liden & Maslyn, 1998) was employed to measure nurses' perception of LMX. The finding indicated there was a moderate level of LMX ($\bar{X}= 4.55$, $SD = 1.10$) in Chinese tertiary hospitals.

In summary, numbers of studies have explored the relationship between LMX and interested outcomes out of healthcare organizations, however, social exchange framework only have been applied on few studies in nursing setting (Trybou et al., 2013). Recently, LMX has been found plays a significant role in healthcare context as well, it contributes to favorable outcomes among nurses such as job satisfaction (Laschinger et al., 2011), empowerment (Davies et al., 2011; Laschinger et al., 2007; Laschinger et al., 2009, 2011), personal knowledge transfer (Davies et al., 2011), organization citizenship behaviors (Chen et al., 2008; Yang et al., 2013), and commitment (Chen et al., 2008; Laschinger et al., 2009).

LMX was explored in both western and eastern countries by using different instruments. However, only four studies which surveyed LMX at a unit level analysis were found among nurses in healthcare organizations, even researchers highlighted LMX study analyzed in a group level is a more appropriate approach (Gerstner & Day, 1997; Henderson et al., 2009; Yammarino & Dansereau, 2008). A moderate level of LMX was found in Canada (Laschinger et al., 2009, 2011). Moreover, another study categorized units into low tertile (n=11), middle tertile (n=12) and high tertile (n=11) depend on LMX score (Thompson et al., 2011).

However, almost studies of LMX were analyzed in individual level. Results showed a moderate level of LMX in Canada (Davies et al., 2011). Likewise, LMX showed a moderate level in P. R. China (Cheng et al., 2012; Yang et al., 2013) and a high level of LMX was showed in Taiwan (Chen et al., 2008). The quality of LMX were not consistent among different countries. In P. R. China, LMX was found at a moderate level and LMX was studied focus on an individual level and no any study of LMX using unit level analysis was found. Thus, further studies should be carried out at a unit level analysis.

Patient Safety Culture

Definition of Patient Safety Culture

Kizer (1998) has defined patient safety culture as shared beliefs and values of the healthcare system take safety into consideration during care delivery process.

Mustard (2002) defined patient safety culture as a product of social learning, ways of thinking and behaving that are shared and that work to meet the primary objective of patient safety.

Nieva and Sorra (2003) defined patient safety culture as the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's safety management.

Patient safety culture as an environment which encourages reporting errors, adapt non-punitive means, involved senior leadership participation, and concentrate on safety system establishment (Association of periOperative Registered Nurses, 2006).

Feng, Bobay, and Weiss (2008) defined patient safety culture as an environment that encourage collecting and reporting errors, decreasing blame and involving leadership participate in or paying attention on safety system building.

Patient safety culture refers to regarding safety, the willingness and ability of an organization to understand both safety and risk also the willingness and ability to handle safety management (Reiman, Pietikainen, & Oedewald, 2010).

Patient safety culture refers to an integrated pattern of individual and organizational behavior, based upon shared beliefs and values that continuously seeks to minimize patient harm, which may result from the processes of care delivery (European Union Network for Patient Safety and Quality of Care, 2010).

Patient safety culture refers to comprehensive product of the thinking and practice concerning safety into clinical activities and works (Bahrami et al., 2013).

Patient safety culture is one component of organizational culture which including the shared beliefs, attitudes, values, norms, and behavioral characteristics of staffs then impact employees attitudes and behaviors as regards ongoing performance in their organization (Morello et al., 2013).

From literature review, definition of PSC developed by Nieva and Sorra (2003), which defined PSC refers to the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's safety management, was the one predominant used definition and its dimensions overs main components in patient safety culture building. Recently, it also has been adopted in many Chinese studies (Fujita et al., 2013; Zhou et al., 2015). Therefore, it was used in this study since it can better reflect meaning of PSC and cover main aspects of organization safety management, which is fit to Chinese organizations. Moreover, the definition adjust is not only focus on individual and also group level, which adapted to a group level analysis in this study.

Conceptual Model of Patient Safety Culture

Based on literature review, there was no theory of patient safety culture. However, many conceptual models of patient safety culture were shown as follows:

Sammer et al.'s Conceptual Culture of Safety Model (2010) . This model was developed based on literature review regarding safety culture and stated seven subscales of PSC.

Leadership. it means leaders regard healthcare environment as a high risk environment and bring vision/mission, staff competency, and fiscal and human resources in frontline in accordance with boardroom.

Teamwork. It means executives, staff, and independent practitioners work in a way of collegiality, collaboration, and cooperation and produce an open, safe, respectful, and flexible relationship.

Evidence-based. It means evidence guide patient care practice. Standardization decrease variation occurs at every opportunity. Processes are designed based on high reliability.

Communication. It means that an environment exists, which individual worker within has right and responsibility to speak up on behalf a patient not depends on job description.

Learning. It means that a hospital regard mistake as a learning resource and search new opportunities for performance improvement. All staff consider learning is valuable.

Just. It means a culture that acknowledges mistake as system failures instead of individual failures, meanwhile, does not shrink from holding individuals accountable for their actions.

Patient-centered. It means that patient care is focus on patient and family. Patients are not only active participants in their own care, but also act as a liaison between the hospital and the community.

Manchester Patient Safety Assessment Framework (Mapsaf) (2005). This Manchester framework was developed by Ashcroft et al. (2005) based on Westrum (1993) stage model of organizational culture maturity including pathological, reactive, calculative, proactive and generative level. The framework helps organizations reflects on its progress towards developing a mature safety culture, There are eight dimension including: 1). commitment to patient safety, 2). perceptions of the causes of incidents and their reporting, 3) investigating incidents, 4). learning following an incident,

5) communication within the pharmacy, 6) staff management, 7) staff education and training about risk management, and 8) team working.

Sorra and Nieva's Patient safety culture conceptual model (2004). This model was based on a review of the literature sponsored by Agency for Health Research and Quality (AHRQ) and found out twelve dimensions of PSC. Dimensions were listed as below:

Frequency of events reported. It means that mistakes are reported. The types of mistakes include mistakes caught and corrected before affecting the patient, mistakes with no potential to harm the patient, and mistakes that could harm the patient, but do not.

Perceptions of patient safety. It means that procedures and systems are good at preventing errors and there is a lack of patient safety problems.

Supervisor/manager expectations and actions promoting safety. It means that supervisors/managers consider staff suggestions for improving patient safety, praise staff for following patient safety procedures, and do not overlook patient safety problems

Organizational learning–continuous improvement. It means that there is a learning culture in which mistakes lead to positive changes and changes are evaluated for effectiveness.

Teamwork within units. It means that staff support one another, treat each other with respect and work together as a team.

Communication openness. It means that staff freely speak up if they see something that may negatively affect a patient, and feel free to question those with more authority.

Feedback & communication about error. It means that staff are informed about errors that happen, given feedback about changes implemented, and discuss ways to prevent errors.

Non-punitive response to error. It means that staff feel that their mistakes and event reports are not held against them, and that mistakes are not kept in their personnel file.

Staffing. It means that there are enough staff to handle the workload and work hours are appropriate to provide the best care for patients.

Management support for patient safety. It means that hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority.

Teamwork across hospital units. It means that hospital units cooperate and coordinate with one another to provide the best care for patients.

Handoffs and transitions. It means that patient care information is transferred across hospital units and during shift changes.

In sum, Sorra and Nieva (2004) Patient Safety Culture Model was used to guide this study, because twelve dimensions clearly cover component of PSC development, which is similar with Chinese healthcare context. Moreover it has been applied both in western and eastern countries which including P. R. China (e.g. Feng et al., 2012, Wang et al., 2014).

Measurement of Patient Safety Culture

Based on literature review, several instruments used to measure patient safety culture were shown as follows:

The Safety Attitudes Questionnaire (SAQ) (2006). The Safety Attitudes Questionnaire (SAQ) was developed by Sexton et al. (2006) in US, which modified instrument from the Intensive Care Unit Management Attitudes Questionnaire that was derived from Flight Management Attitude Questionnaire. It was commonly used to assess healthcare employees' perceptions of patient safety related attitudes in clinical areas and healthcare settings. It was developed based on Vincent's framework for analyzing risk and safety and Donabedian's conceptual model for assessing quality. Six factors are included in the scale: teamwork climate, job satisfaction, perceptions of management, safety

climate, working conditions, and stress recognition. The questionnaire constitutes 60 items which used 5-Likert scale to present agreement (from “Disagree Strongly” to “Agree Strongly”). Both negative, positive and open-ended questions are included. It has been adapted in a variety of unit setting including ICU, operating room, general inpatient unit, and ambulatory clinic. SAQ shows a strong reliability which Raykov’s rho was 0.90. For validity, CFI and RMSEA of SAQ were 0.90 and 0.90 respectively.

Manchester Patient Safety Culture Assessment Tool (2006). The Manchester Patient Safety Culture Tool was developed by Parker (2006) used to measure level of patient safety culture in organizations and healthcare teams based on Parker and Hudson’s (2001) application of Westrum’s (1993) stage model of organizational culture maturity. There are five levels of culture maturity (A = Pathological, B = Reactive, C = Bureaucratic, D = Proactive, E = Generative). Ten dimensions comprise of commitment to overall continuous improvement, priority given to safety, system errors and individual responsibility, recording incidents and best practice, evaluating incidents and best practice, learning and effecting change, communication about safety issues, personnel management and safety issues, staff education and training, and team working. This tool has various versions to suit for acute, ambulance, primary care, mental health organizations. It has been largely used in UK, however, most organizations used it but have not published the finding (The Health Foundation, 2011).

Hospital Survey on Patient Safety Culture (HSOPSC) (2004). Sorra and Nieva (2004) developed Hospital Survey on Patient Safety Culture for the AHRQ in the U.S.A. HSOPSC is one of the most frequently used instruments to measure PSC in Healthcare setting (Hammer et al., 2011). HSOPSC has good psychometric criteria testing including item analysis, exploratory factor analysis, confirmatory factor analysis and inter-correlation and reliability analysis (Ammouri, Tailakh, Muliira, Geethakrishnan, & Al Kindi, 2015). HSOPSC has been widely used in both western and eastern countries (read literature review).

The HSOPSC instrument consists 12 dimensions of PSC based on literature review comprising a unit-level aspect (seven dimensions: supervisor/manager expectations & actions promoting safety, organizational learning-continuous improvement, teamwork within units, communication openness, feedback & communication

about error, non-punitive response to error, staffing), a hospital-level aspect (three dimensions: hospital management support for patient safety, teamwork across units, hospital handoff & transition), two outcome dimensions (frequency of events reporting, overall perceptions of safety) and two single outcome items (patient safety grade and number of incidents reported). Total 42 items contains both positive and negative items rating on a 5-point Likert scale (from 1 = strongly disagree to 5 = strongly agree or from 1 = never to 5 = always). The construct validity the HSOPSC instrument showed correlations range was from .23 to .66. Sorra and Nieva (2004) stated the correlation less than .20 would show two dimensions were weakly related. Cronbach's alpha was used to reflect internal consistency reliability of HSOPSC, dimensions of frequency of event reporting, perception of safety, supervisor/manager expectations & actions promoting safety, organizational learning-continuous improvement, teamwork within hospital units, communication openness, feedback and communication about error, non-punitive response to error, staffing, hospital management support for patient safety, teamwork across hospital units, and hospital handoffs and transitions were .84, .74, .75, .76, .83, .72, .78, .79, .63, .83, .80, and .80, respectively. Sorra and Nieva (2004) stated twelve dimensions have acceptable levels of reliability (defined Cronbach's alpha equal or greater than .60). Result can be classified into three areas based on positive response percentage (PRP). PRP of each dimension equal 75% or higher is identified as a strength area and regarding PRP equal or less than 50% as an areas needing improvement.

Multihospital Survey Examine the Safety Culture (2004). This instrument was developed based a survey of front-line employees and literature review by Weingart, Farbstein, Davis, and Phillips (2004) includes four aspects of safety culture: leadership, salience, non-punitive environment, reporting and communication, and workplace safety and global assessments of quality and safety. The survey includes 34 items contains a 5-point Likert scale and binary (yes/no) responses. The face validity has been test by pilot-test. The reliability of instrument has been tested by pre-test and post-tested, result showed no statistically significant difference between initial and follow-up responses to any question.

In summary, HSOPSC was used in this study because quality of the questionnaire has been assessed and very popular to be used for patient safety culture survey. Moreover, reliability of Chinese version HSOPSC showed a good internal consistency: Cronbach's alpha were .889 and .853 respectively (Li & Liu, 2009; Xiang, Liu, You, & Zhang, 2012). Additionally, components of HSOPSC provides a better understanding of PSC for health care organizations and extent to patient safety attitudes are presented in P. R. China (Nie et al., 2013). Furthermore, its dimensions provided comprehensive aspects of PSC establishment for health care organizations and Smits et al. (2009) showed this instrument can be applied in both individual and group level analysis.

Studies Related to Patient Safety Culture

According to literature review, there are two approaches to measure PSC which include individual level and unit level analysis. Therefore, contents of this study below would be presented by grouping as individual level analysis and unit level analysis.

In terms of unit level analysis, Pronovost and Sexton (2005) carried out a unit level analysis study of PSC by using Safety Attitude Questionnaire in U.S.A. The purpose of study was to explore PSC variance in unit level and hospital level. The result showed more variability of PSC between work units within a hospital than between hospitals.

In U.S.A., Moody et al. (2006) conducted a study in order to explore effects of human performance and system factors on PSC in nursing units. HSOPSC (Sorra & Nieva, 2004) was rated by 158 registered nurses and license practice nurses who worked in 6 medical/surgical departments from two hospitals. Finding was analyzed by the unit level analysis which showed strength areas were hospital management support for safety, organizational learning, and teamwork within units. Nevertheless, dimensions of openness of communication, non-punitive response to error, positive-reporting norms, frequency of event reporting, teamwork across units, and hospital handoffs and transitions were areas needing improvement.

Another unit level analysis study of PSC has been done in four ICUs within a single university hospital in U.S.A. by using a Safety Attitudes Questionnaire-ICU

version (Sexton et al., 2006). Participants were 318 subjects consisted of nurses and physicians. Overall factor scores were low to moderate across all dimensions (range across ICUs: 43.4-74.9 mean scores, 8.6-69.4 percent positive). Moreover, mean and percent-positive scores differed significantly ($p < .0083$, Bonferroni correction) across ICUs (Huang et al., 2007).

A study has been done in order to determine the most appropriate level (individual, unit or hospital level) for interventions. Participants consisted of 1889 hospital workers who worked in 87 units in 19 hospitals in Netherland. HSOPSC (Sorra & Nieva, 2004) was used to measure PSC. The unit level analysis showed mean score of each level analysis and suggested PSC should be measured at a unit level (Smits et al., 2009).

Thompson et al. (2011) conducted a unit level analysis study on PSC in an academic medical center U.S.A. by using HSOPSC (Sorra & Nieva, 2004). Participants consisted 711 nursing professionals representing 34 units. The founding showed PSC was significantly different in subscales of supervisor expectations and actions promoting safety, organizational learning-continuous improvement, communication openness, feedback and communication about error, and non-punitive response to error among low, moderate and high level of LMX groups.

Ballangrud, Hedelin, and Hall-Lord (2012) carried out one study to explore registered nurses' perceptions of PSC in intensive care units in Norway. HSOPSC (Sorra & Nieva, 2004) was used to assess PSC in this study. Participants were 220 nurses worked in ten intensive care units in six hospitals. The study found PSC dimensions were different in subscale of frequency of incident reporting, feedback and communication about error, staffing, and hospital management support for patient safety between general intensive care units (G-ICU, $n=144$ nurses) and coronary care units (CCU, $n=96$ nurses) based on mean score comparison.

One unit level analysis of PSC was conducted in Japan in order to clarify the characteristics of unit-level PSC in hospitals. HSOPSC (Sorra & Nieva, 2004) was employed to measure PSC. Subjects included 8,700 respondents (The respondents, 9.2% were physicians, 46.4% were nurses, 14.4% were administrative workers and

30.0% had other roles) from 440 units in 18 hospitals. Each unit had 5-115 respondents. The 440 units were classified into two clusters: high-PSC units (n =184) and low-PSC units (n=256). Percent positive scores for all PSC sub-dimensions for high-PSC units were significantly higher than for low-PSC units. The average positive scores of each dimension of PSC were 66% for frequency of event reporting, 53% for perception of safety, 61% for supervisor/manager expectations and actions promoting safety, 51% for organizational learning-continuous improvement, 70% for teamwork within hospital units, 49% for communication openness, 53% for feedback and communication about error, 43% for non-punitive response to error, 40% for staffing, 51% for hospital management support for patient safety, 44% for teamwork across hospital units, and 36% for hospital handoff & transitions (Fujita et al., 2014).

Regarding individual level analysis of PSC, studies have been widely done both in developing and developed countries. One study was carried out by Mohammadreza, Sogand, and Omid (2010) to investigate PSC in an Iranian hospital. Participants consisted of 239 nurses rating HSOPSC (Sorra & Nieva, 2004). Finding revealed that supervisor expectations and actions promoting patient safety (70.0%) and teamwork within units (71.4%) were the most positive dimensions. Conversely, negative dimensions were non-punitive response to error (22.8%), hospital management support for patient safety (32.2%), staffing (38.1%), and teamwork across hospital units (43.2%).

One study has been done in adult critical care units in United States, 257 RNs from a tertiary hospital were investigated to explore the relationship between structural empowerment and PSC. HSOPSC (Sorra & Nieva, 2004) was distributed and the result indicated that the most positive dimensions were supervisor/manager expectations (68.88%) and organizational learning (68.37%). On the other hand, the most negative dimension was non-punitive response to error (21.09%). Most participants (69.74%) reported a good grade of PSC in their workplace; about 62.5% of nurses did not report an event within past 12 months. The study suggested that managers should provide structural empowerment to improve PSC perception (Armellino, Griffin, & Fitzpatrick, 2010).

Ballangrud et al. (2012) measured PSC among 220 RNs who worked in ICU units from six hospitals in Norway by applying the HSOPSC (Sorra & Nieva, 2004). The result revealed that total average PRP of all dimensions was 55% which was at a moderate level. The strength areas were teamwork within hospital units (80.6%) and non-punitive response to error (78.8%). Nevertheless, dimensions need to be improved were frequency of incident reporting (18%), hospital management support for patient safety (26.3%), teamwork across hospital units (37.5%), and feedback and communication about error (42.1%). About 50% of respondents reported no incident reporting, while 36% reported one to two incidents over the last 12 months. Majority of RNs (71.6%) considered the patient safety grade as “very good”.

Abdolazadeh, Zamanzadeh and Boroumand (2012) conducted a study aims to explore factors related to PSC. The HSOPSC (Sorra & Nieva, 2004) was used to rate PSC among 900 nurses from four training university hospitals in Iran. PRP of all dimensions of PSC was 55.34% which was at a moderate level. According to instrument design, the PRP was 58.82% for 7 unit level dimensions (supervisor/manager expectations and actions promoting safety, organizational learning-continuous improvement, teamwork within hospital units, communication openness, feedback and communication about error, non-punitive response to error, and staffing), PRP was 54.95% for 3 hospital level dimensions (hospital management support for patient safety, teamwork across hospital units, and hospital handoff and transitions) and PRP of 2 outcome dimensions was 52.27% (frequency of event reporting and overall perception of safety).

Another study has been done in two Iranian teaching hospitals aims to identify challenges of PSC facing by hospitals. The HSOPSC (Sorra & Nieva, 2004) questionnaire were rated by 270 nurses. The study demonstrated that staffing was the lowest (PRP = 19.45%) and the second lowest positive dimension (PRP = 25.00%) in the two hospitals respectively, followed by non-punitive response to error (21.46%; 25.00%). Dimensions rated at average score compared with AHRQ report data (Sorra et al., 2012) were organizational learning (continuous improvement) (71.86%), teamwork within hospital units (68.87%), overall perception of patient safety (66.22%), hospital handoff and transition (58.35%), and teamwork across hospital units (55.55%).

Moreover, in other one hospital, strength area was organizational learning (continuous improvement) (75.00%). PSC was need to be improved (Bahrami et al., 2013).

Ammouri et al. (2015) carried out a study to explored PSC as perception by nurses using the HSOPSC (Sorra & Nieva, 2004) in four Oman governmental hospitals. Participants consisted of 414 RNs. The strength dimensions were teamwork within units (83.4%) and organizational learning-continuous improvement (81.1%). On the other hand, dimensions rated low positive response were non-punitive response to error (21.4%), hospital management support (25.2%) and staffing (27.0%).

Günes, Gürlek, and Sönmez (2015) used the HSOPSC (Sorra & Nieva, 2004) to investigate 554 nurses perception of PSC from one university and three general hospitals in Turkish. The finding revealed that strength area was teamwork within units with 78.5% positive response rate. Moreover, problematic dimensions were teamwork across hospital units (48.8%), communication openness (47%), handoff and transitions (45%), staffing (35%), frequency of event reporting (28%) and non-punitive response to errors (24%). The mean score of overall PSC was 52 ± 13 . About 50.2% of nurses reported PSC was at a good or excellent grade, while 80.4% of nurses indicated that they had never reported errors.

Yilmaz and Goris (2015) has focused on perception of PSC by nurses at intensive care units in Turkey. Respondents consisted 316 nurses by reporting the HSOPSC (Sorra & Nieva, 2004). Study demonstrated that teamwork within units was the most strength area which rated 80.3% positive response percentage. Nevertheless, non-punitive response to error was the lowest dimension (25.1%) followed by staffing (33.8%), management support for patient safety (38.7%), manager expectations and actions (40.8%), communication openness (44.9%), and teamwork across hospital units (49.4%). Almost of nurses (43%) perceived PSC in their units as an “acceptable” level.

Several studies of PSC has been conducted in P.R. China. Li and Liu (2009) distributed the HSOPSC (Sorra & Nieva, 2004) in one Chinese hospital, 472 nurses were involved in study. The average PRP was 58.4% (moderate level). The strength arears were organizational learning–continuous improvement (80.5%), supervisor/manager expectation and action promoting safety (77.2%), and team work

within hospital units (75.8%). Weak areas have potential to improve were staffing (34.7%), non-punitive response to error (41.1%), teamwork across units (41.4%), and frequency of events reported (45.5%). In past 12 months, the percentage of events reporting frequency was low (26.1%).

Shen, Hu, Wang, and Chen (2009) conducted a study aims to compare difference of PSC perception between tertiary and secondary hospitals among six hospitals in Shanghai, P. R. China. HSOPSC (Sorra & Nieva, 2004) was employed and respondents consisted of 514 nurses. The strength areas in two types of hospitals were feedback and communication about error (87.37%, 85.37%), teamwork within hospital units (87.98%, 84.68%), supervisor expectation and actions promoting patient safety (82.28%, 76.88%), and organizational continuous—learning and improving (75.43%, 75.33%). On the other hand, staffing (34.10%, 36.03%) and none-punitive response to error (21.50%, 24.67%) were areas with potential for improvement in tertiary and secondary hospitals. Percentages of events report were 61% and 55.30% in tertiary and secondary hospital respectively.

Chen and Li (2010) conducted a study to explore PSC in Taiwan. Respondents consisted of 788 healthcare workers from 50 hospitals (16 medical centers, 18 regional hospitals and 16 community hospitals). Among participants, 478 nurses were involved. The HSOPSC (Sorra & Nieva, 2004) was applied in this study. The result showed that overall average PRP of twelve dimensions was 64% which was at a moderate level. The strength areas were teamwork within units (94%), followed by supervisor/manager expectations and actions promoting patient safety (83%), and organizational learning-continuous improvement (84%). However, the lowest positive dimension was staffing (39%). Other dimensions rated lower PRPR were hospitals handoffs and transitions (48%) and non-punitive response to error (45%).

Feng et al. (2012) conducted a survey to examine factors related PSC by using HSOPSC (Sorra & Nieva, 2004). Participants comprised 248 nurses from one university hospitals in P. R. China. The finding indicated that more than half of respondents (61.3%) rated positive perceptions of all dimensions of PSC. The strength areas were teamwork within units (88.8%), organizational learning (82.4%), and supervisor/manager expectations and actions promoting safety (77.3%). The areas

need to be promoted were staffing (36%), communication openness (39.1%), non-punitive response to errors (40.6%), and feedback and communication about errors (47.6%). There was a low rate (27.5%) of reporting events frequency within past 12 months.

Xiang et al., (2012) studied PSC among 535 nurses by rating the HSOPSC (Sorra & Nieva, 2004) in seven Harbin hospitals, P. R. China. Dimensions rated higher PRP were organizational learning-continuous improvement (90.04%) and teamwork within hospital units (87.22%). While dimensions need to be improved were staffing (24.40%), non-punitive response to error (32.56%), and communication openness (40.47%).

Wang et al. (2014) explored the relationship between PSC and adverse events in seven tertiary hospitals in Guangzhou, P. R. China. Total 463 nurses reported the HSOPSC questionnaire (Sorra & Nieva, 2004). Result indicated that average PRP of all dimensions was 57.4%. Two dimensions rated high PRP were organizational learning-continuous improvement (89.7%) and teamwork within units (PRP = 86.5%). Conversely, the most negative dimension was staffing (23.6%) followed by non-punitive response to error (32.0%), communication openness (38.5%), and frequency of event reporting (44.2%).

According to literature, PSC has been paid significant attentions in western and eastern countries. However, in terms of unit level analysis, 7 previous studies used unit analysis approach to explore PSC, but using different instruments. Participants included both nurses and physicians (Fujita et al., 2014; Huang, et al., 2007; Pronovost & Sexton, 2005; Smits et al., 2009) or only nursing staffs (Ballangrud et al., 2012; Moody et al., 2006; Thompson et al., 2011). On the other hand, numerous studies which adopted a individual level analysis were found. Among them, HSOPSC is one of the most frequently used questionnaires used to measure PSC. In mainland of P. R. China, there was no previous study explored PSC at a unit-level. Moreover, perception of PSC worldwide is not consistent. In P. R. China, areas needed improvement were non-punitive response to error, staffing, communication openness, teamwork across hospital units, and feedback and communication about error. Therefore, further studies are

necessary to enhance body of PSC development. Up to now, there was no study of PSC was found neither at a unit level nor individual level in Yunnan Province, P. R. China.

Relationship Between Leader-Member Exchange and Patient Safety Culture

There is growing recognition that leader behaviors and the relationships of these leaders with staff, including nursing, influence safety behaviors and outcomes (Hofmann & Morgeson, 1999; Hofmann et al., 2003; Zohar, 2002; Zohar & Luria, 2003). One of leader behaviors that related to successful safety outcome in the organization is leader-member exchange. Leaders would develop relationships with staff within the same work unit based on staff needs, behaviors, and style, and characterized by the desire to achieve mutual goals (Dienesch & Liden, 1986). Liden and Maslyn (1998) concluded that when staff perceived high LMX, they tend to exchange mutual affect, loyalty, contribution and professional respect, resulting in respond by performing in a manner desired by the leader. In contrast, when negative relationships exist, staff members tend to respond by meeting minimal job requirements due to having low senses of mutual affect, loyalty, contribution and professional respect. Because safety is a major concern in high-risk environments, if relationships between leaders and staffs are positive, staff members develop behaviors valued in their work environment by demonstrating safety role behavior (Hofmann & Morgeson, 1999).

There are previous studies examining the relationship between LMX and safety environment in variety settings. In the industrial study, a study was done by Hofmann and Morgeson (1999) in a U.S. manufacturing facility, the result showed that LMX was significantly related to safety communication, safety commitment, accidents and a structural model link of LMX and safety communication, safety commitment, and accidents. LMX was positively related to safety communication ($r = .47$) and safety commitment ($r = .29$); safety communication and safety commitment were negatively related to accidents ($r = -.28$, $r = -.26$, respectively). This result suggested individuals who perceived high quality of LMX are willing to pay more attention to safety, engage in safety-related communication, commit to safety and share information to prevent accidents; staffs who perceived such higher safety communication and commitment were associate with fewer accidents. In army organization, Hofmann et al. (2003)

found the different perceptions of safety culture among LMX levels ($t_{23} = 3.29, p < .01$) in U.S. army. Explanation of the different relationship is due to LMX social exchange. When staffs perceive high-quality relationships with leader, they will presence of expanded safety role behaviors and a strong safety culture (Hofmann et al., 2003).

In terms of healthcare setting, a few studies have attempted to explore the association between LMX and PSC. One study has been done by Thompson et al., (2011) to explore the linkage between LMX and PSC in U.S.A. They conducted a cross-sectional survey on nursing personnel ($n = 711$) and unit directors from 34 inpatient units in an academic medical center. PSC was measured using the HSOPSC whereas LMX was measured by modified LMX-7. This study explored the association between two variable in a group level analysis. LMX scores in the 34 units were divided into 3 groups, i.e., low, middle and high quality of LMX. Result found that nursing staffs perceived different safety culture related to level of LMX in their unit ($Z = 2.67, p = .004$). The nurses staff groups who perceived positive high quality relationship was related to high level of PSC in dimensions of supervisor expectations and actions promoting safety ($F = 26.65, P < .001$), communication openness ($F = 4.05, p = .027$), feedback and communication about error ($F = 5.16, p = .012$), organizational learning-continuous improvement ($F = 3.79, p = .034$), and non-punitive response to error ($F = 6.28, p = .005$).

Another study was carried out by Feng et al., (2012) explored the linkage between LMX and PSC in a tertiary university in Sichuan Province, P. R. China and found contrast findings from Thompson and colleagues' study. In Feng's study, HSOPSC instrument (Sorra & Nieva, 2004) was used to measure PSC and 12-terms LMX-MDM (Liden & Maslyn, 1998) was used to measure LMX. They collected data in a single hospital and analyzed data at individual level. The study showed no relationship between LMX and PSC.

The inconsistent findings in two studies may be drawn from the different designs of the studies. Feng's study collected data in a single hospital and analyzed data at the individual level. In contrast, Thompson's study collected data in one hospital but analyzed data at the group level. As mentioned before that PSC is a product of values,

perception, attitudes and patterns of behavior with regard to patient safety shared by members of the organization, it is possible that nurses working in the same hospital would perceive PSC in the same line. Therefore, unit analysis is better fit in PSC study than individual analysis.

In conclusion, the linkage between LMX and PSC is supported by Liden and Maslyn (1998), who proposed that when staff perceived high LMX, they tend to exchange mutual affect, loyalty, contribution and professional respect, resulting in respond by performing in a manner desired by the leader. However, there were a few studies about the linkage between LMX and PSC and findings were inconsistent. Therefore, further study in this issue is needed.

Situations Related to Leader-Member Exchange and Patient Safety Culture in Tertiary Hospitals, Kunming, the People's Republic of China

In P. R. China, healthcare system adopted reform transform from a state-planned economy into an autonomous marketing-oriented mode (The World Bank, 2010). Government budgetary contributions have been declined from more than 30 percent at the beginning of the 1980s to less than 8 percent in 2007 and private hospitals were allowed enter into and operate within markets (The World Bank, 2010). According to statistics of Ministry of Health, there were 985, 000 healthcare facilities nationwide by end of 2014 in P. R. China. Among these, 2, 6000 were hospitals (1, 3343 public hospitals and 1, 2166 private hospitals) (National Health and Family Planning, 2015a).

In P. R. China, population and their needs of care are very huge. According to statistic of National Health and Family Planning (2015b), in 2014, there were 6.77 billion clinic visits in P. R. China with an average of 4.6 visits per person per year. The number of hospitalizations was about 134.892 million. Occupancy rate for tertiary hospital beds was 102% which was higher than other levels of hospitals (89.7% and 63.5% in secondary and primary hospitals respectively). The average length of a hospital stay was 9.6 days among tertiary hospitals (National Health and Family Planning, 2015b). Therefore, hospitals work should ensure efficiency, quality and cost control through variety of improvements in internal management and implementing policies (Swedish Agency for Growth Policy Analysis [SAGPA], 2013).

Quality care is the priority in the reform of China's healthcare system and poor quality care is viewed as the root causes contribute to medical error (SAGPA, 2013). Quality care promotion emphasized not only preventing medical complications and the number of unnecessary services, but also decreasing medical errors and increasing patients' satisfaction about care (SAGPA, 2013). Health policies have been drastically changed and interventions have been taken to handle this issue.

By 2014, the number of tertiary, secondary and primary hospitals were 1898, 6807 and 995, respectively (National Health and Family Planning, 2015a). Since 1989, the Ministry of Health (MOH) has developed a hospital accreditation classified Chinese hospitals into three levels including primary, secondary and tertiary hospitals based on hospital functions, facilities, professional construction, healthcare quality and safety, scientific management and so forth (Li, Dong, & Liu, 2014). Each rank hospital has three grades: A, B and C. Additionally, tertiary hospital has additional superfine grade. The level was determined by the score meet criteria on basis of function and mission of hospitals accreditation (full mark is 1000 points). The primary hospital bed number ranges from 20 to 99. This sort hospital is responsible for preventing disease and providing basic medical service, healthcare, rehabilitation and healthcare education for local community population. The secondary hospital bed ranges from 100 to 499, it refers to regional hospitals. The hospital provides medical services for multiple communities, which including comprehensive medical care, emergency care, health education and responsible for referral patient, clinic education, training and research. Tertiary hospital is the most advanced hospital in a given region which targets multiple-regional population. The criterion of bed number is more than 500, the hospital provides advanced, specialized medical services, medical education, scientific research and responsible for referral patients (Ministry of Health of China, 1989).

Five programs were provided in current Chinese nursing education system including secondary nursing program, associated degree program, baccalaureate degree program, master degree program and doctoral degree program. As many as 51.8% of nurses hold diploma degree or above; and only 8.8% of nurses received baccalaureate degree or above (Ministry of Health of China, 2012). That revealed education of nurses

ought to be improved. The avenue to be a register nurse is no matter what degree a nurse obtains is depended on taking a nursing professional examination.

Multiple dimensions direct China's healthcare system management including a range of laws, orders, regulations, ordinances, plans and individual policies (SAGPA, 2013). In order to handle patient safety, a great deal of interventions and strategies have been taken. The Ministry of Health underlines quality management and qualified treatment procedures in order to ensure patient safety. In September 2004, the first World Alliance for Patient Safety was held in Shanghai, P. R. China (Zhang & Li, 2008). The Health Administration Department pointed out the six challenges which P. R. China faced about patient safety and Chinese Hospital Association estimated 1.6 to 7.6 million adverse events may occur each year nationwide, which was calculated based on 46.68 million inpatients in 2004 (Cao, 2007). Chinese organizations still face great challenges since high risks exist during the procedure of health care and the common errors healthcare workers made are technical error (35%), ignore necessary information (16%), carelessness accounting for 11%, not follow guideline was 9%, and lack of knowledge was 1% (Cao, 2007).

Ministry of Health addressed obstacles of quality care through variety of strategies. The terms of "quality" and "safety" was the theme in China's healthcare development plans in order to direct and standardize medical service. "The outline of development plan for nursing in China" proposed "patient-centered" as the service concept, and improves the quality of clinical nursing services (The Central People's Government of the People's Republic of China, 2007). Ministry of Public Health of China issued "2010 high quality nursing service demonstration project" activities and applied it in 100 hospitals at the first stage, in order to provide patient-centered nursing care and improve quality of care in P. R. China (The People's Republic of China National Health and Family Planning Commission, 2010). Recently, "Compendium of Development Plan for Nursing in China (2011-2015)" identified China's nursing service and quality care should be constantly improved (Department of Medical Administration, 2012). Moreover, "Work Plan on Large Hospital Inspections (2015-2017)" inspection work has been conducting and quality care was emphasized and

concentrated on secure hospital establishment (The People's Republic of China National Health and Family Planning Commission, 2015).

At the same time, activities were conducted to ensure quality and safety of care. In 2005, “patient safety” was the theme of Chinese hospital management annual conference and launched research studies about patient safety issue; in 2006, some journals set special column for research related to patient safety and risk management; in 2007, patient safety was firstly written down into medicine textbook “Introduction to clinical medicine” and patient safety was regarded as a component of medicine tele-education in 2008 (Zhang & Li, 2008). Chinese Hospital Association presented annual patient safety goals and provided effective strategies for health professionals in 2007, it suggested that healthcare staff should be encouraged to actively report adverse events and relevant risk, create a non-punitive report system, learn from mistakes, find root causes from system management and participate in Chinese Medical Association voluntary non-punitive report system (DOC88, 2011). Setting up hospital accreditation depend on comprising hospitals benchmark of quality care (SAGPA, 2013). Activity “medical quality supervision in 10 thousand mile trip” has been conducted since 2009, which supervise quality of medical service in hospitals every year nationwide (SAGPA, 2013). Moreover, activity “Three Good and One Satisfaction” has been launched that refers to good service, good quality, good medical ethics and patients’ satisfaction in medical service (SAGPA, 2013). Its evaluation dimensions involved hospital quality assurance and quality control committee establishment, medical service system, medical safety and medical error, and quality of optimal nursing care (SAGPA, 2013).

It seems apparent that creating PSC guarantee patient safety and quality care is a critical role in China’s healthcare system. However, upon previous studies, PSC as perceived by nurses was not achieved as good as it should be. There are numbers of reasons to explain the problems related to PSC in P. R. China including nursing shortage (Liu et al., 2013), high turnover rate (Hao, Zhang, Lun, Lin, & Zhang, 2009; Liu et al., 2011), Chinese traditional punitive culture (Wang et al., 2014), lacking an effective adverse events reporting system (Dai et al., 2009).

First of all, China’s healthcare system has being face severe nursing shortage. By 2013, total number of health personnel were 9.791million nationwide (The Statistics

Portal, 2015). The number of physicians per thousand population was 2.06 and 2.05 of nurses (Fang, 2015). By the end of 2013, there were 2.78 million nurses in P. R. China (The Statistics Portal, 2015). However, this number just match a minimum standard of WHO that 1 nurse for every 500 population (Hu, Shen, & Jiang, 2010). Higher than half nurses felt there was insufficient staff to handle high workload and always complete task too quickly in P. R. China (Feng et al., 2012; Liu et al., 2013; Wang et al., 2014). Inadequacy of staffing would lead to heavy workload for healthcare workers and, in turn to, negatively relate to PSC development (Liu et al., 2013).

In the next, high turnover rate influenced PSC improvement. As many as 40.4 % nurses perceived turnover intention in P. R. China (Liu et al., 2011), this issue would cause instability of nursing team as a result of low quality care and safety (Hao et al., 2009). Additionally, safety in nursing education was at the initial stage, there is no standard about education content, teaching approach, study period, qualified teacher and evaluation course effectiveness of patient safety education (Liu & Jiang, 2015).

Employment of nurses also affects PSC promotion. There are temporary nurses and permanent nurse based on different employment. The number of temporary nurses has being increased as main force, one-third was temporary nurse and varieties of issues existed among them since policy setting (Zhang, 2006). Temporary nurses generally perceive more stress, higher turnover intention, less opportunities for career development and less salary or bonus than permanent nurses (Chen, Suo, & Han, 2011). Above problems significantly influence quality care and patient safety. Therefore healthcare managers are trying to apply “equal pay for same work” aims to achieve a stable nursing team (Chen et al., 2011).

Error is the most valuable resource for further patient safety improvement. However, Chinese nurses toward underreport or not report error. In Chinese traditional culture, reporting error would lose face and shame (Feng et al., 2012), people are shy away from discussing or reporting errors (Nie et al., 2013) rather than consider errors as important opportunities to prevent mistakes (Dai et al., 2009).

A blame environment may be another obstacle to achieve patient safety. A non-punitive response system creating is urgent on PSC development. However, managers

viewed punishing workers as an effective manner promote learning (Liu et al., 2013). Nurses worried about the approach manager treating error reporting may bring unwanted effect on their career development (Cai et al., 2006) or would be wrote in personal file (Nie et al., 2013). There were 68% (Wang et al., 2014), 59.4% (Feng et al., 2012), and 67.44% (Xiang et al., 2012) of nurses rated positive response on “non-punitive response to errors”.

More than half nurses reported negative response on communication openness (Feng et al., 2012; Wang et al., 2014). According to Cai et al. (2006) 69.6% of nurses were not willing to share and discuss mistakes with peers. On the other side, 30.86% of nurses regarded errors as disgraceful event and 60% think managers and peers would lose trust in them (Cai et al., 2006). Moreover, 8.64% of nurses were afraid punishment, these are barriers on communication openness (Cai et al., 2006). Majority nurses expect managers correct mistakes immediately rather than expose them to senior managers or in public (Cai et al., 2006). Moreover, lack of trust influenced health worker endorses idea in open communication environment creation and learning from incidences (Liu et al., 2013). Furthermore, Confucianism, the heart of Chinese cultural values, highlight individual should concern own social position (Khairullah & Khairullah, 2013). Decision-making in Chinese organization tends to be authoritative and Chinese employees rarely question formal authority (Khairullah & Khairullah, 2013).

Dai et al. (2009) stated that hospital administration department encourages errors reporting, however, P. R. China still lack of an effective adverse events reporting system which has good function of notification, monitoring and evaluation. Almost, hospitals set reporting system, but failed in data analysis, evaluation, and giving feedback about errors (Dai et al., 2009). More than half (52.4%) nurses rated negative of feedback and communication about errors (Feng et al., 2012). Moreover, rate of error reporting was low since a punitive response to error (Feng et al., 2012; Li & Liu, 2009; Liu et al., 2013; Wang et al., 2014; Xiang et al., 2012).

In term of “teamwork across hospital units”, more than half nurses rated a positive perception (Feng et al., 2012; Wang et al., 2014). However, this area is just in a moderate level. Nowadays, variety of projects have been conducted which based on

healthcare workers cooperation across units, such as multidisciplinary consultation and patient referral cross units. In the situation, cooperation among different units is very significant for patient safety. Cooperation across units is not as high as teamwork within units, which may associate with teamwork across hospital units is more complicated since more healthcare workers are involved and is difficult to find time to discuss solution with workers in other units.

About 37% to 22.7% nurses negatively perceived “managers expectations and actions promoting patient safety”; meanwhile, 17.72% to 48% nurses reported negative perception in “hospital manager support for patient safety” (Feng et al., 2012; Shen et al., 2009; Wang et al., 2014). The level of them range from moderate to strength level, inconsistent results revealed it still should be improved in among some nursing managers. Managers should improve communication with subordinates, clarify the priority of patient safety and identify needs of employees during PSC development.

More than half nurses perceived favorable levels on “hospital handoff and information transition” (Feng et al., 2012; Wang et al., 2014). However, there is still has a gap need to be overcome. Recently, SBAR handover application (Lan & Zhu, 2012), patient transport processes standard (Su & Yu, 2015), risk review in morning shift (Ma, 2015), and electronic handoff system (Wang, Li, & Wu, 2015) were applied in hospitals ensure comprehensive information transmission.

Chinese nurses perceived teamwork within hospital units was a strength area in PSC (Feng et al., 2012; Li & Liu, 2009; Wang et al., 2014; Xiang et al., 2012) which means nurses support each other to accomplish work. Harmony is the priority of in Chinese culture and it emphasizes on collaboration; meanwhile Chinese are warm and they are pleasure to help other people (Nie et al., 2013).

Nurses felt a favorable atmosphere on organization conducting learning activities to support PSC improvement. This could be linked with hospitals are required to set quality control group and create climate of learning from error according to hospital accreditation standard. Managers learned from outside and applied new tools such as Root Causes Analysis (Ding, Ye, Yuan, Ding, & Pan, 2015), PDCA and Sigma (He, Zhu, & Loo, 2005).

In terms of LMX is a new concept in Chinese nursing studies. LMX may be used by nursing managers to make a good relationship with subordinates to enhance more understanding about patient safety issue and may enhance patient safety culture among Chinese nurses. One study conducted by Cheng et al. (2012) showed a moderate level of LMX (\bar{X} = 3.35, SD = .83) existed among Chinese nurses. Moreover, Yang et al., (2013) have conducted a research study in tertiary hospitals which showed nurses perceived a moderate level (\bar{X} = 4.55, SD = 1.10).

Regarding affect, nurse staff expects nursing managers respect subordinates and accomplish work using a humanistic management approach (Wang, 2013). However, some nurse managers neglected it (Wang, 2013). Thus it may bring out negative effects on friendship building between subordinates and nursing managers.

For loyalty, head nurse is directed by unit director and nursing director. The director of clinical division in healthcare facilities who is a physician is responsible for whole task in department including comprises medical treatment and also nursing service (Ministry of Health, 1992). Nurses should ask permission from director such as advanced study. Unfortunately, parts directors place nursing in a circumstantial position compare with medical treatment (He, Gao, & Li, 2004), thus head nurse generally has limited power to support staff and nurses only acquire limited resource in healthcare organizations.

In term of contribution among Chinese nurses. Majority of nursing managers were selected from front-line clinical nurses who have substantial clinical experience in nursing, however, as many as 66.0 % of them did not receive any administration training before become managers in hospitals (Li, Wang, Su, & Zheng, 2006). At present, main issues of nursing management focus on performance but overlook humanistic care and motivation on subordinates these may contribute to nurses' psychological inversion and confrontation; and likewise, slashing nurses' motivation on job achievement (Zhao, Yang, Wang, Mi, & Zhou, 2014). Moreover, some nurses perceived abusive supervisors behavior at moderate level, this may negatively influence on nursing team performance and reduce responsibility of nurse providing help and cooperating between team member (Sun, Yan, Wang, & Sun, 2014). Further, it may

lead nurses merely want to finish but do not pay attention on quality of task (Hu et al., 2013). On the other side, Chinese healthcare system applied performance appraisal for nurses' payment, due to this, many nurses may try to accomplish task but limited in their job description.

For professional respect, people traditionally respect physicians but nurses, nurses are thought as assistants dependent on physicians in P. R. China. The low social status perceived by staff nurse and nursing managers as well (Sui, Zou, & Zhu, 2005). According to Wen and Xiao (2013) nursing staff always perceives unfair treatment such as opportunity for study or welfare; in addition, parts managers only think about nurse' problem when have some patient complaints, this may discourage nurses' enthusiasm. On nurses' side, they expect managers have good management skill, professional skill and personality (Wang, 2013). Additionally, head nurses tend to be younger and they may face insufficient experience, specialty knowledge and weak management skill (Yang & You, 2011). These could influence on recognition of head nurses work.

Yunnan province is located in the southwest of P. R. China. The economy of Yunnan Province is at Chinese moderate low level and health service development lags behind the national average. There are 7 tertiary hospitals in Kunming, Yunnan province including the First Affiliated Hospital of Kunming Medical University (1st AH), the Second Affiliated Hospital of Kunming Medical University (2nd AH), the Third Affiliated Hospital of Kunming Medical University (3rd AH), the Forth Affiliated Hospital of Kunming Medical University (4th AH), the Third People's Hospital of Yunnan Province (3rd Hospital of PHY), the First People's Hospital of Kunming (1st PHK) and the Yan'an Affiliated Hospital of Kunming Medical University (YAH). All the hospitals are government-run, non-profit hospitals, among these the 3rd AH is a specialized hospital responsible for tumor patients.

There are two types of hospitals: provincial and municipal hospitals in Kunming, Yunnan Province, according management department. The 1st AH, 2nd AH, 3rd AH, 4th AH, and 3rd PHY are provincial hospitals governed by Yunnan Provincial Health Bureau, which mainly serve people in Yunnan province. The YAH and 1st PHK are municipal hospitals governed by Kunming Public Health Bureau, which mostly serve people in Kunming.

By the end of 2013, there were 73,305 RNs in Yunnan Province (National Bureau of Statistics of China, 2014). The number of nurses per thousand population was 1.59 which was lower than minimum standard set by WHO and the average length of stay was 9.3 days (National Bureau of Statistics of China, 2014). Lin (2012) showed a high level fatigue on physical exertion, lack of energy, and lack of motivation dimensions and a moderate level on physical discomfort and sleepiness dimensions among Yunnan nurses. The study also reported a moderate level of task and contextual performance among nurses in tertiary hospitals of Yunnan (Lin, 2012). Nursing shortage leads high workload and is difficult for nurse dedicate time to task out of job description.

In Yunnan province, same as in other province, people sensitively discuss adverse events and view errors as dishonorable things. Moreover, communication about errors may damage interpersonal harmony which could lead to nurses view errors are “none of my business” and tend to keep quiet. Further, high workload contributes to nurses only concentrate on task limited to job description. These are barriers on PSC development.

In Yunnan Province, Yang et al. (2013) revealed LMX is a moderate level as perceived by nurses. Head nurse normally is directed by director of nursing department and director of clinical department under the director responsibility system. Therefore, head nurse insufficiently support nurses since weak power (Yang et al., 2013). Nurses have less opportunity to take part in decision-making due to low social status and they are viewed as less important than physicians. Recently, hospitals are required to provide high quality and effective care for patients, thus conflict is inevitable if head nurses only focus on the goal but neglect nurses needs and humanistic. Up to now, there is not study to explore PSC in Yunnan Province, P. R. China.

Conceptual Framework

Leader-member exchange is defined as the quality of social exchange relationship between a leader and each subordinate and the quality is characterized by a sense of affect, loyalty, contribution and professional respect that generates influence and motivates the subordinates to act in a manner valued by the leader (Liden & Maslyn, 1998). Patient safety culture is defined based on Nieva and Sorra (2003), as the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to and the style and proficiency of, an organization's health and safety management. The components of patient safety culture include communication openness, feedback and communication about error, frequency of events reported, handoffs and transitions, management support for patient safety, non-punitive response to error, organizational learning-continuous improvement, overall perceptions of patient safety, staffing, supervisor/manager expectations and actions promoting safety, teamwork across units, and teamwork within units (Sorra & Nieva, 2004). According to literature review, high quality of leader-member exchange can enhance the level of affect, loyalty, contribution, and professional respect, resulting in respond by performing safety communication, safety commitment and presence of expanded safety role behaviors and a strong safety culture (Hofmann & Morgeson, 1999; Hofmann et al., 2003). Therefore, the relationship between leader-member exchange and patient safety culture was examined in present study.

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