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Professional Forces of Magnetism and Patient Safety Culture at Suez Canal University Hospitals

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Abstract: Background: Attainment of the forces of magnetism improves the recruitment and retention of nurses. Also, the higher levels of nurses' autonomy and empowerment in magnet hospitals improve patient safety culture. The need for assessing patient safety culture within hospitals and determining the areas of improvement become urgent. **The aim of the study:** This study aims to identify the relationship between the fourteen forces of magnetism and patient safety culture at Suez Canal University hospitals. **Subject and method:** A descriptive co relational design was utilized to carry out this study. A sample of 324 staff nurses was included in this study. The study was conducted in Suez Canal University Hospitals. **Tools:** two tools were used. **Tool1:** "Forces of magnetism questionnaire" was developed by the researcher. **Tool2:** "Hospital survey on patient safety culture" was adopted from Agency for healthcare research and quality (AHRQ) and modified by the researcher. **Results:** There are positive correlations between all forces of magnetism and patient safety culture at Suez Canal University Hospitals. There is a highly significant positive correlation between total magnetism and patient safety culture at Suez Canal University Hospitals. **Conclusion:** Suez Canal University Hospitals were evaluated by the majority of studied nurses as moderate magnetic hospitals. Only five dimensions of patient safety culture were considered as areas of potential improvement at Suez Canal University Hospitals. **Recommendations:** Modification of hospital policies of remaining and recruiting nurses and establishing a climate of communication openness, teamwork and non-punitive response to errors

Key words: Magnetism, Magnet forces, patient safety culture

INTRODUCTION

In 1981 the governing council of AAN established a task force to study the work environment of health care organizations to determine the essential factors of recruiting and retaining nursing staff (Smith, 2013). Only 41 hospitals of 163 hospitals had specific characteristics that are essential in recruiting and retaining nursing staff (ANCC, 2012).

After AAN task force completed this original magnet study, AAN challenged ANA to develop a mechanism that enables hospitals to be recognized as magnet hospital (Baloga-Al Tieri, 2008). In 1990 ANCC which is an organization affiliated by ANA took on the supervision of magnet recognition program (Kelly et al., 2011; McHugh et al., 2013). In 1994, the University of Washington Medical Center became the first magnet designated hospital (ANCC, 2016).

The characteristics of the original 41 magnet hospital became the ANCC fourteen forces of magnetism which are the framework of magnet recognition program (Sellars, 2012). Those forces are the quality of nursing leadership, organizational structure, management style, personnel policies and programs, professional models of care, quality of care, quality improvement, consultation and resources, autonomy, community and the hospital, nurses as teachers,

image of nursing, interdisciplinary relationships and professional development (Solomita, 2009).

Many studies proved that overall characteristics of magnet organizations are significantly related to a patient safety culture in the work setting (Drenkard, 2010). Characteristics of magnet hospitals are a positive predictor of patient safety culture (Stone et al, 2007). The high levels of nurses' autonomy and empowerment in magnet hospitals improve patient safety culture in these hospitals (Sellars, 2012).

Patient safety culture can be defined as the part of the organizational culture that expressed in the form of values, beliefs and attitudes of the organization's employees about the concept of safety (Joint Comission, 2009). In nursing the patient safety culture is defined as the outcomes of nurses' shared beliefs and values regarding the patient safety (Burke, 2014).

Patient safety culture composites of 12 dimensions which are communication openness, feedback and communication about error, frequency of events reported, handoff and transitions, management support for patient safety, non punitive response to errors, organizational learning, overall perceptions of patient safety, staffing, supervisor expectations and actions promoting patient safety, teamwork across units and teamwork within units (AHRQ, 2016).

SIGNIFICANCE OF THE STUDY

Nurses are considered the backbone of the health care and an important part of the health care team. Unfortunately, there is a big shortage of nurses. Also, there is a large percentage of absenteeism and turnover among nurses so that, the study of the forces of magnetism is very important.

There is a great effect of good work environment on patient safety, so the study of the relation between the fourteen forces of magnetism and patient safety culture is very important. The results of this study can be used to develop and improve the fourteen forces of magnetism and patient safety culture at Suez Canal University hospitals.

SUBJECT AND METHODS

The aim of the study:

This study aims to: identify the relationship between the fourteen forces of magnetism and patient safety culture at Suez Canal University Hospitals

Objectives of the study:

1. Assess the fourteen forces of magnetism at Suez Canal University hospitals.
2. Assess the patient safety culture at Suez Canal University hospitals.
3. Find out the relationship between the fourteen forces of magnetism and patient safety culture at Suez Canal University hospitals

Research question:

Is there a relationship between the fourteen forces of magnetism and patient safety culture at Suez Canal University Hospitals?

Research design:

A descriptive co relational design was utilized to carry out this study.

Study setting:

This study was carried out in Suez Canal University Hospitals.

Study subject:

This study was conducted on a sample of 324 nursing staff

Tools of data collection:

Data for the study were collected by using two tools:

First tool (forces of magnetism questionnaire):

A self-administrated questionnaire which was developed by the researcher based on the review of related literatures (Abd Elkader, 2009; AORN, 2006; Kramer & Schmalenberg, 2004; Aiken & Patrician, 2000). It includes two parts:

Part I: It included demographic data of the studied nurse (name, age, gender, marital status, academic qualification, years of experience and usual shift of work).

Part II: This part included statements to assess forces of magnetism. It consists of 144 sub items which grouped under 14 items which are quality nursing leadership (27 sub items), organizational structure (12 sub items), management

style (13 sub items), personnel policies and programs (14 sub items), professional models of care (11 sub items), quality of care (14 sub items), quality improvement (6 sub items), consultation and resources (3 sub items), autonomy (7 sub items), community and the hospital (9 sub items), nurses as teachers (6 sub items), image of nursing (7 sub items), interdisciplinary relationships (5 sub items), professional development (10 sub items)

Scoring system:

Responses of the participants were measured on 5 points Likert- scale ranged from 1-5. "1" denotes strongly disagree whereas "5" denotes strongly agree.

Subjects' responses ranged according to the scoring system from low magnet hospital (<33%), moderate magnet hospital (33%-66%) and high magnet hospital (>66%). Also, this scoring system was applied to each magnetic force (Abd Elkader, 2009).

Second tool (hospital survey on patient safety culture):

This tool was adopted from AHRQ, (2004) and modified by the researcher based on reviewing the related literatures. It includes two parts:

Part I: This part included demographic data of the studied nurse (name, age, gender, marital status, academic qualification, years of experience and usual shift of work).

Part II: This part included statements to assess patient safety culture. It consists of 65 items which grouped under 14 dimensions as follow: teamwork within units (4 sub items), supervisor/manager expectations and actions promoting patient safety (4 sub items), organizational learning-continuous improvement (6 sub items), management support for patient safety (3 sub items), overall perceptions of patient safety (5 sub items), feedback & communication about error (4 sub items), communication openness (4 sub items), frequency of events reported (3 sub items), teamwork across units (4 sub items), staffing (4 sub items), handoffs & transitions (3 sub items), non-punitive response to error (3 sub items), patient care and patient safety (11 sub items), medication and patient safety (7 sub items).

Scoring system:

The responses of nine from the previous 14 mentioned dimensions of patient safety culture were measured by the scoring system ranging from strongly agree (5) to strongly disagree (1). These dimensions are: Supervisor/manager expectations & actions promoting safety, organizational learning - continuous improvement, team work within the unit, non-punitive response to error, staffing, hospital management support for patient safety, teamwork across hospital units, hospital handoffs and transitions and overall perception of safety. The five other dimensions were measured by scoring system ranging from always (5) to never (1) (AHRQ, 2004).

The area of strength is identified when 75% of participants answer or more using "agree/strongly agree" with the positive worded items or when 75% of the participants or more "disagreed/strongly disagree" with the negatively worded items. The area for potential improvement is

identified when 50% - <75% of participants answer using "disagree/strongly disagree" with the positive worded items or when 50%- <75% of the participants "agreed/strongly agree" with negatively worded items (AHRQ, 2004).

Field work:

The data collection took about four months from the beginning of January 2016 to the end of April 2016. The researcher explained the aim of the study and the questionnaires to the nursing staff, and assured them that the information would be only used for scientific research, and would be strictly confidential. Then, each nurse received a copy of the questionnaires and completed it in the presence of the researcher to provide explanation for any ambiguous or confusing items. The data collected from nurses within three shifts (morning, afternoon, night).

Administrative design:

An official request was submitted from the dean of the Faculty of Nursing, Suez Canal University to the director of Suez Canal University Hospitals to obtain the permission to do the study. This was followed by an official letter containing the aim of the study, which was directed by the director of the hospitals to the nursing director to request her approval and cooperation for data collection.

Ethical consideration:

Consent was obtained to participate in the study after clarifying the aim of the study and its procedures. The researcher assured voluntary participation, anonymity and confidentiality of the information collected.

Statistical design:

Data obtained coded and transformed into coding sheets then statistical analysis was done by using SPSS system files (SPSS package version 22). Descriptive statistics including frequency, distribution mean and standard deviation used to describe different characteristics. Tests of significance applied to test the study questions, i.e., Spearman correlation for testing the correlation between numeric nonparametric variables. Significance level values considered at $p < 0.05$.

RESULTS

Part I: Fourteen forces of magnetism:

Table (1) reveals that only five forces (quality nursing leadership, nurses as teachers, consultation and resources, autonomy and interdisciplinary relationships) were evaluated as high magnet forces by the majority of studied nurses.

Table (1): Forces of magnetism as perceived by studied nurses at Suez Canal University Hospitals (n=324)

Forces of magnetism	Level of magnetism as perceived by studied nurses		
	Low	Moderate	High
Quality nursing leadership	0.90%	39.80%	59.30%
Organizational structure	3.00%	80.60%	16.40%
Management style	2.80%	68.50%	28.70%
Personnel policies and programs	6.50%	75.90%	17.60%
Professional models of care	3.10%	59.60%	37.30%
Quality of care	1.20%	69.80%	29.00%
Quality improvement	5.20%	64.20%	30.60%
Consultation and resources	2.80%	46.60%	50.60%
Autonomy	1.80%	45.10%	53.10%
Community and the hospital	2.20%	68.80%	29.00%
Nurses as a teacher	2.80%	26.20%	70.90%
Image of nursing	3.10%	61.40%	35.50%
Interdisciplinary relationships	3.40%	28.70%	67.90%
Professional development	5.90%	67.90%	26.20%

Part II: Patient safety culture:

Table (2) shows that teamwork within units, supervisor expectations and actions promoting patient safety, organizational learning, patient care and patient safety and

medication and patient safety are areas for potential improvement regarding patient safety culture in the Suez Canal University Hospitals.

Table (2): Areas of potential improvement regarding patient safety culture in Suez Canal University Hospitals (n=324)

Item	Percentage of positive response %
Teamwork within units	72.63%
Manager actions promoting patient safety	58.10%
Organizational learning	52.47%
Management support for patient safety	28.67%
Overall perceptions of patient safety	37.92%
Feedback & communication about errors	44.48%
Communication openness	49.23%
Frequency of events reported	47.93%
Teamwork across units	38.80%
Staffing	22.45%
Handoffs & Transitions	44.47%
Non punitive response	14.83%
Patient care and patient safety	50.17%
Medication and patient safety	61.26%

Part III: The relation between forces of magnetism and patient safety culture:

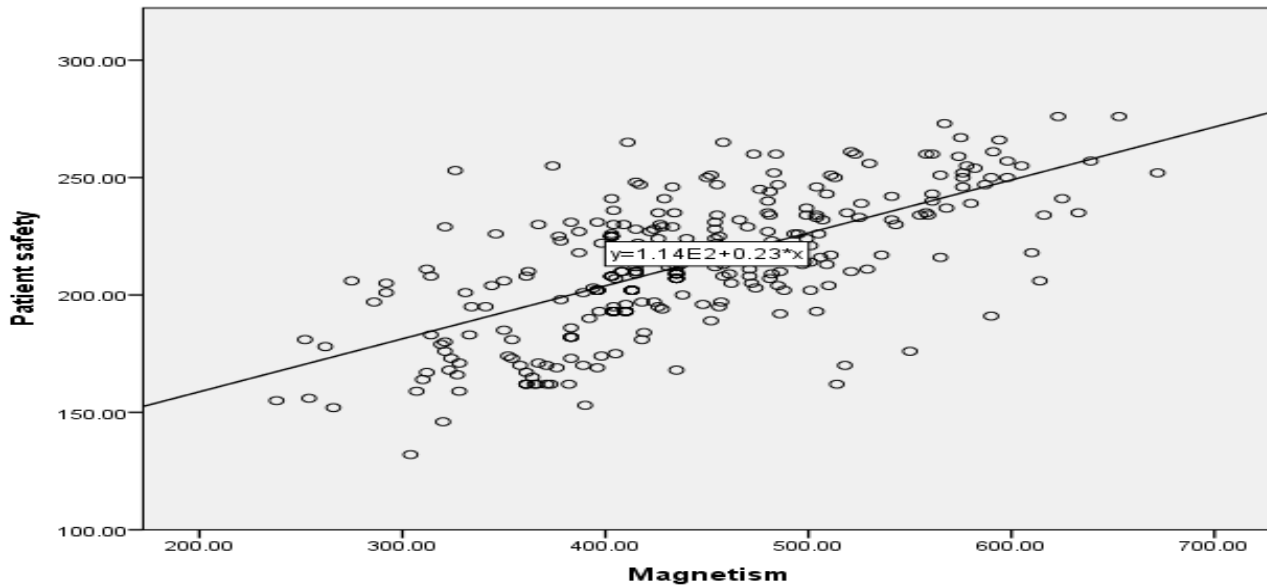
Table (3) shows that there are positive correlations between all the magnetic forces and patient safety culture

Table (3): Correlation between forces of magnetism and patient safety culture and forces of magnetism (n=324)

Forces of Magnetism	Patient safety culture	
	P value	R
Quality nursing leadership	0.013*	0.567
Organizational structure	0.008*	0.423
Management style	0.004*	0.512
Personnel policies and programs	0.002*	0.402
Professional models of care	0.022*	0.518
Quality of care	0.013*	0.499
Quality improvement	0.011*	0.404
Consultation and resources	0.033*	0.281
Autonomy	0.024*	0.312
Community and the Hospital	0.001*	0.477
Nurse as a teacher	0.016*	0.475
Nursing image	0.004*	0.546
Interdisciplinary relationships	0.001*	0.441
Professional development	0.048*	0.443

* Statistically significant at $p < 0.05$

Part IV: The relation between magnetism and patient safety culture:



$r = 0.66$ $p = 0.001$

* Statistically significant at $p < 0.05$

Figure (1): Relation between magnetism and patient safety culture at the Suez Canal University Hospitals (n = 324)

Figure (1) shows that there is a strong positive correlation ($r = 0.66$) between magnetism and patient safety culture at the Suez Canal University Hospitals. Also, there is a statistically significant relation ($p = 0.001$) between magnetism and patient safety culture at the Suez Canal University Hospitals

educated, visible and accessible to all nursing staff and have all necessary leadership skills. Contrary, only third of the studied nurses in Mansura International Specialized hospital evaluated this force as a high magnetic force (**Abd ElKader, 2009**).

DISCUSSION

The result of this study revealed that more than half of the studied nurses evaluated quality nursing leadership as a high magnetic force at Suez Canal University hospitals. From the researcher point of view, this result is due to that nursing leaders in Suez Canal University hospitals are highly

Also, the study revealed that there is a strong positive correlation between quality nursing leadership and patient safety culture. From the researcher point of view, this result is due to that two dimensions of patient safety culture (management support for patient safety - supervisor/manager expectations and actions promoting patient safety) are based on leadership in addition to other dimensions (communication openness – feedback and communication about errors –teamwork within units – teamwork across units – non punitive to errors) in which the

leadership plays an important role. In the same line, **Ring & Fairchild, (2013)** reported that effective visionary leadership plays an important role in developing a positive safety culture. Effective support from leadership improves the adherence of staff to the patient safety practice (**Weaver et al., 2013**). Also, **Wong and Cummings, (2007)** found a significant association between leadership behaviors and the reduction in adverse events.

Regarding consultation and resources, the highest proportion of the studied nurses evaluated it as a high magnetic force at Suez Canal University hospitals. From the researcher point of view, this result is due to that nurses at Suez Canal University hospitals continuously found the consultation from physicians, head nurses and older nurses. Contrary, the highest proportion of the studied nurses at Mansura International Specialized hospital evaluated consultation and resources at their hospital as a low magnetic force (**Abd ElKader, 2009**).

Also, the study revealed that there is a positive correlation between this force and patient safety culture. From the researcher point of view, this result is due to that adequacy and availability of personnel resources is very important to achieve this force also it meets the staffing which is one of the patient safety culture dimensions. Another requirement to achieve this force is peer support inter and intra nursing division. This requirement meets two dimensions of patient safety culture (teamwork within the units and teamwork across units). In the same line, **Clarke & ward, (2006)** reported that there is a positive correlation between consultation and patient safety climate.

Regarding autonomy, the study revealed that about half of the studied nurses evaluated it as a high magnetic force at Suez Canal University hospitals. From the researcher point of view, this result may be due to that the nurses are satisfied with the level of autonomy that is available to them. This level of autonomy is appropriate to their level of education and experience. Another contributor to this result is that there are many units in the hospital without head nurses and head nurses are only available at morning and late shifts so the nurses feel they are autonomous in the absence of the head nurses. In the same line, **Gheith & Zakaria, (2012)** reported that autonomy is one of the most important factors that enhance magnetism at Pediatric Hospital of Mansoura University. Contrary, the majority of the studied nurses at Alexandria German Hospital evaluated autonomous nursing practice at their hospital as a moderate magnet force (**El-Bialy & Abd Elaa, 2013**). Also, approximately half of the studied nurses at a tertiary care centre in Beirut, Lebanon reported that they don't possess autonomy (**Kaddourah et al, 2013**).

Also, the study revealed that there is a positive correlation between autonomy and patient safety culture. From the researcher point of view, this result is due to that most of strategies that are used to increase autonomy of nursing staff meet dimensions of patient safety culture, for example: collaborative physician-nurse relationship is very important for safe autonomous practice in interdisciplinary issues and this strategy meets teamwork across units which is one of patient safety culture dimensions, education and training are

one of the strategies that are used to improve the autonomous decisions of nurses and this strategy meets organizational learning-continuous improvement which is one of patient safety dimensions. Finally, constructive accountability is very important strategy to improve the autonomous practice of nurses and this meets non-punitive response of errors which is one patient safety culture dimensions. In the same line, **Elsayed & Mahmoud, (2016)** reported that there is a positive correlation between autonomy and patient safety culture. Also, **Weston, (2010)** reported that autonomy has been identified as important work environment attributes for enhancing patient safety.

Regarding nurses as teachers, this study revealed that the majority of the studied nurses evaluated it as a high magnetic force at Suez Canal University hospitals. From the researcher point of view, this result is due to that, nurses in these hospitals perform their roles as teachers not only for patients but also to the new hired nurses and nursing students. This apparent teaching role of nurses increases their self esteem and increases their job satisfaction. Contrary, the highest proportion of the studied nurses at Mansura International Specialized hospital evaluates this force in their hospital as a low magnetic force (**Abd ElKader, 2009**).

Also, the study revealed that there is a positive correlation between this force and patient safety culture. From the researcher point of view, this result is due to that the teaching role of nurse toward their peers encourages the culture of learning and allows learning from errors. This meets the dimension of the patient safety culture of organizational learning- continuous improvement. In the same line, **Fillmore, (2010)** reported that teaching nursing rounds improve compliance with regulations and standards of the environment and infection rate.

Regarding interdisciplinary relationships, it was evaluated by the majority of the studied nurses at Suez Canal University Hospitals as a high magnetic force. From the researcher point of view, this result is due to that there is cooperation, coordination and respect among all health care providers. All disciplines at Suez Canal University Hospitals facilitate the work of each other. Contrary, this force was evaluated as a low magnetic force at Mansura International Specialized hospital (**Abd ElKader, 2009**). Also, Weak interdisciplinary relationships were one of the most important factors hindering hospital magnetism at Pediatric Hospital of Mansoura University (**Gheith & Zakaria, 2012**).

Also, the study revealed that there is a positive correlation between this force and patient safety culture. From the researcher point of view, this result is due to that this force meets the dimension of the patient safety culture of teamwork across units. In the same line, **Manser, (2009)** reported that collaboration among providers at various levels of the organization appears to affect safety of patient care. **Thuente & Friedrich, (2008)** reported that the lack of collaboration may be responsible for as much as 70% of the adverse events currently reported. Also, **Lancaster, (2014)** reported that clinicians can address many of conditions that perpetuate errors by working as a team.

Regarding teamwork within units, it got the highest percentage and was considered an area of potential improvement. From the researcher point of view, this is due to higher levels of harmony, cooperation and coordination among nurses in the same unit. Also, head nurses do their best efforts to develop teamwork among nurses in their units. In the same line, nurses at three Northern Virginia magnet hospitals had the highest perception regarding this dimension and it was perceived as an area of strength (**Al-Ateeq, 2008**). **Ibrahim, (2013)** reported that nurses at El Salama New Hospital had the highest perception concerning teamwork within units and it was considered an area of strength. **Bagnasco et al., (2010)** reported that this dimension was an area of potential improvement in the Italian hospitals included in their study. Also, **Drake, (2015)** in his study reported that nurses had the highest perception regarding teamwork within units and it was an area of strength. Contrary, **Aboul-Fotouh, (2012)** and **Falco, (2013)** found low levels of teamwork within units among care providers.

Regarding supervisor/manager expectations & actions promoting patient safety, it was an area of potential improvement in Suez Canal University Hospitals. From the researcher point of view, this result may be due to that middle and first level managers at Suez Canal University Hospitals usually encourage their staff to follow safety procedures, but there is some neglect from the top management to safety problems. In the same line, **Al-Ishaq, (2008)**, reported that this dimension is an area of potential improvement at Hamad Medical Corporation in Qatar State. **Abdel El Hamed, (2013)** reported that supervisor/manager expectations & actions promoting patient safety at Damanhur National Medical Institute is perceived as an area of potential improvement. In this respect, **Stone & Gershan, (2009)** reported that nurse managers play an important role in helping their staff to identify and implement improvements in patient safety field and ensure the understanding of their staff to the indicators of progress and improvement of patient safety procedures. On the other hand, **Drake, (2015)** reported that this dimension is an area of strength in the eight-hospital health system in Eastern North Carolina which are included in his study.

Regarding organizational learning- continuous improvement, it was perceived at Suez Canal University Hospitals by the studied nurses as an area of potential improvement. From the researcher point of view, this result is due to that sometimes the occurrence of errors lead to positive change, but at other times errors are repeated and don't lead to any change. In the same line, **Mowrey, (2013)** reported that this dimension is an area of potential improvement at the hospital in Northern Italy which included in his study. Also, the study of Henriksen and his colleagues reported that "organizational learning-continuous improvement" was an area of potential improvement (**AHRQ, 2008**). In the other hand **Abdel El Hamed, (2013)** reported that "organizational learning-continuous improvement" was perceived as an area of strength at Damanhur National Medical Institute. **Falco, (2013)** found low levels of "organizational learning-

continuous improvement" at Mike O'Callaghan Federal Medical Center.

Regarding the patient care and patient safety, the study revealed that this area was considered as an area of potential improvement at Suez Canal University Hospitals. From the researcher point of view, this result is due to that patient safety is usually considered during the delivering of nursing care. It is obvious in many procedures that are taken in the hospital such as procedures to prevent patient fall and bed sores. Sometimes, Patient safety is neglected in other areas of patient care such as using unknown abbreviations in documentation and application of infection control guidelines. In the same consistent, **Thomlow, (2007)** reported that impeding the patient safety practice into the patient care is the intent of many healthcare organizations. Many researched relate the patient safety to the quality of patient care and study the necessary changes in healthcare policies to allow nurses to provide safe patient care (**Al Rifai, 2008**)

Regarding medication and patient safety, the study revealed that this dimension is considered an area of potential improvement at Suez Canal University Hospitals. From the researcher point of view, this result is due to that to some degree patient safety guidelines are followed during prescription and administration of medication. Also, high alert drugs and look like drugs are separated and labeled. Contrary, **Camire et al., (2009)** reported that medication errors occur more frequently in ICU with the prevalence of 10.5 errors per100 patients/day. Studies conducted in Brazilian hospitals identified a high frequency of medication errors related to medication preparation and administration (**Silva et al, 2010**). Also, **Gimenes et al., (2016)** reported that medication errors are one of the most common adverse events that occur in Brazilian health care services.

Regarding the relation between magnetism and patient safety culture, this study revealed that there is a highly significant positive correlation between them at Suez Canal University Hospitals. From the researcher point of view, this result is due to that magnetism provides nurses with high levels of autonomy and empowerment which directly influence patient safety. Those high levels of autonomy and empowerment allow nurses to safely provide patient care in cooperation and collaboration with the medical team. Also, the nurses' ability in magnet hospitals to advocate patients' rights lead to improving patient safety. In the same line, **Stone et al, (2007)** reported that improving working conditions will promote patient safety. **Lin & Liang, (2007)** stated that improving work environment leads to great positive effect on patient safety. **Al-Ateeq, (2008)** reported that there is a positive correlation between essential of magnetism and dimensions of patient safety culture. **Kirwan et al, (2013)** reported that ward-level nursing factors such as work environment should be manipulated and recognized as important influences on the patient safety. Again, the results of the present study agreed with **Kvist et al., (2013)** who found that magnet work environment promotes patient safety. Also, **Kutney-Lee et al., (2015)** found that magnet status results in significant improvements in nursing workplace and consequently patient safety. Finally, **Elsayed & Mahmoud, (2016)** reported that there is

a strong positive correlation between total magnetism and patient safety culture. Contrary, **Trinkoff et al., (2010)** found that there is not significantly different score in patient safety culture between nurses working in non-magnet and magnet hospitals.

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