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The Relationship between the Attitudes toward Nurse-Physician Collaboration and Safety Culture

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Abstract*: Lack of nurse-physician collaboration in any health organizations leads to serious consequences including the increase in the rate of medical errors which cause an unsuccessful patient safety culture. Otherwise, ineffective nurse-physician collaboration and poor patient safety culture will increase the cost of healthcare. Study Aim: To assess the relationship between the attitudes toward nurse-physician collaboration and safety culture. Study Objectives: • To identify the nurse-physician collaboration attitude. • To examine the nurse and physician safety attitude toward a safety culture. • To assess the relationship between the attitudes toward nurse-physician collaboration and safety culture. Methodology: The study is quantitative following descriptive correlation cross-sectional approach. Sample and Setting: Data were obtained through a self-report scale from a convenience by strata technique. Total sample size (n=270) nurses and physicians. From two general hospitals affiliated by MOH of Saudi Arabia in Jeddah city. Tools: Two valid and reliable tools were used the first tool is the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration (JSAPNC) and the second tool is Safety Attitude questionnaire (SAQ). Results: Total mean score of nurse-physician collaboration attitude was 3.11. While an overall mean score of patient safety culture was 2.76. (P-value) > (0.01) of the correlation between the nurse-physician collaboration attitude and the patient safety culture. Conclusion: A moderate to a strong positive relationship between nurse-physicians collaboration attitude and patient safety culture. Recommendations: There are some suggestions based on a current study finding for nursing educational, healthcare organizations, nursing practice, and future nursing researches.

***Keywords*: healthcare professions, healthcare providers, interprofessional collaboration, Nurse, Nurse-physician attitude towered collaboration, Nurse-physician collaboration, patient outcome, safety attitude, patient safety, patient safety culture, physician, safety culture.**

I. INTRODUCTION

Background

Healthcare organizations are having essential components for success. One of the significant components, is human resources and their interaction, especially between different professions. In order to work collaboratively as an effective team is considering as a big challenge for healthcare organizations to achieve their goals [24].

In 2007 Joint commission on accreditation of healthcare organizations (JCAHO) reported that 60% of sentinel events occurred due to failures in communication between healthcare provider team members [21]. The annual number of deaths from medical errors in the United States may approach 200,000 and a high volume of medical errors have been connected to failure communication and a deficiency of coordination among healthcare professionals [25].

Furthermore, a study revealed that the dysfunctional collaboration and communication between nurses and physician have many consequences that directly affect the safety and quality of patient care level and patient outcomes such as increasing medication errors, length of stay, hospital-acquired infections and the cost of healthcare [40]

Additionally, Morin and his colleagues (2017)[34] in Canadian study stated that there are many studies and evidences reported that the lack of collaboration and communication among healthcare providers leads to an undesirable and serious influence on healthcare delivery and patient outcomes such as increasing in adverse events like medication errors and failure to rescue.

The interprofessional collaboration in healthcare could be implemented in several aspects like learning, education, research, and practice. Interprofessional research collaboration "occurs when researchers from more than one profession working together to achieve the common goal of producing new scientific knowledge"[19]. While the interprofessional collaboration in learning is defined as " a philosophical stance, embracing lifelong learning, adult learning principles, and an ongoing, active learning process, between different cultures and health care disciplines[26].

The third edition of Nursing Scope and Standards of Practice of ANA (2015)[8] defined the interprofessional collaboration practice as “Integrated enactment of knowledge, skills, and values and attitudes that define working together across the professions, with other health care workers, and with patients, along with families and communities, as appropriate to improve health outcomes”.

The curriculum-based on Interprofessional Education (IPE) has recommended by different American nursing schools [31]. A Canadian study revealed that this kind of education between nurses and physicians could be used as a strategy to improve the collaboration practice in a clinical setting. This strategy may lead to enhance the quality of care provided and patient safety [36]. According to WHO (2010)[49] “IPE occurs when two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes”.

Actually, one of the main parts of interprofessional collaboration in a healthcare organization is the nurse-physician collaboration because they are considering as the largest portion of healthcare providers [9]. Nurse-physician collaboration means “the joint decision-making process in which nurses and physicians share objectives and the responsibility of results” [43].

However, systematic review study of 36 randomized controlled trials conducted in Canada stated that as a result of the implementation of the interprofessional collaboration especially between nurses and physicians, the risk of hospital readmission decreased by 19% [46]. Moreover, the interprofessional collaboration has an important role in maintaining and enhancing the quality of patient care according to several reports of the American Institute of Medicine [25].

As noticed the collaboration and communication between different professions within healthcare worker can influence the healthcare outcomes including patient outcome which is affect the patient safety. A German study found that one of the essential methods to implement an effective and efficient patient safety system is by assessing and developing a constructive patient safety culture [10].

Patient safety defined as “freedom from accidental or preventable injuries produced by medical care” [2]. While patient safety culture is known as” the attitudes, beliefs, perceptions, competencies, and values that determine an organization's health and safety management and are held in common by employees in relation to safety” [31]. Like any culture, the patient safety culture will be attributed directly by the attitudes of healthcare workers upon the safety, this is known as safety attitude [13].

However, there are key contributors of patient safety culture including commitment and visible leadership at the organization and team levels, Patient and family engagements, effectiveness and openness of teamwork and communication and organizational resources for patient safety [38]. Safety culture of healthcare workers could be influenced by six organizational factors. These factors included teamwork climate; job satisfaction; managerial supportive; safety climate; working condition Lastly; is the stress recognition factor and how the stressors will affect the work [18].

Indeed, in different studies about patient safety culture assessment conducted in the Middle East such as Oman, Palestine, Jordan, and Egypt found that there is some area of weaknesses like communication and teamwork especially across hospital units and professions [5 28 30 13].

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In Saudi Arabia, a study was conducted about patient safety culture assessment through examining the healthcare providers safety attitude found that there are deficiencies in certain points such as a poor perception and lowest safety attitude of collaboration between different healthcare workers in many professions including nurses and physicians [12].

The Significance of the study

One of the directions of Saudi Arabia is providing cost-effective healthcare services according to 2030 vision (2016)[47]. Many researchers showed that successful nurse-physician collaboration can improve patient outcomes and minimize healthcare cost [24]. As Robert Wood Johnson Foundation report [27] stated interested results of implementing nurse-physician collaboration model such as reduction in length of stay by 0.6 days, and before noon discharge improved from 10 to 30 percent.

In addition, regarding the 15th strategic objective of national transition program "to improve quality and safety principles as well as skills of service providers". The specific goal to achieve this objective by increasing the percentage of hospitals that meet the United States median for patient safety culture from 10% to 50% by the end of 2020 [47]. To establish a high level of patient safety culture in a Saudi healthcare organization, the health workers safety attitude needs to be positive [4].

Furthermore, with the amplitude number of papers that believe on the significance of patient safety culture assessments, still, there are insufficient studies handled this issue in the Middle East world and specifically in the Kingdom of Saudi Arabia (KSA) [6].

It is hope from this study to determine the level of nurse-physician collaboration and safety culture through their attitude and in which extent they ready for interprofessional collaboration education application. Also, to clarify the strength and weaknesses points in order for further improvement.

Research Aim

The aim of this study to assess the relationship between the attitudes toward nurse-physician collaboration and safety culture.

Research Objectives

• To identify the nurse-physician collaboration attitude.

• To examine the nurse and physician safety attitude toward a safety culture.

• To assess the relationship between the attitudes toward nurse-physician collaboration and safety culture.

Research question

What is the relationship between the attitudes toward nurse-physician collaboration and safety culture?

Conceptual Framework

The variables conceptualized using the integrative conceptual framework linking organizational learning, teamwork, patient safety culture and outcomes developed by Goh, Chan &Kuziemsky (2013)[20] as shown in Figure.1. This conceptual framework was built depending on the literature review that focused on each concept individually. It suggested that there is a direct effect on the patient safety culture by organizational learning and teamwork and collaboration [20].

In this study, the researcher will focus on two main study variables that will be used in the research which are the patient safety culture and the collaboration among healthcare provider, especially between nurse and physicians. The conceptual framework stated that teamwork and a collaborative work environment will develop a safe group environment that dealing with medical errors and reporting by sharing knowledge. Consequently, the teamwork and collaboration will affect patient safety culture in a positive manner.

II. SUBJECTS AND METHOD

Design

A descriptive, correlational, cross-sectional design utilized to address the research question.

Setting

This study conducted in two general hospitals affiliated to Saudi MOH. The critical units and inpatient wards were selected in East Jeddah General Hospital (EJGH) and King Abdullah Medical complex – Jeddah (KAMC-J).

Sample/Participants

The convenience by strata sampling technique was applied. The total sample size (270) divided into 144 of staff nurses 126 physicians It was calculated electronically by using Raosoft web site[39] it was including all bedside nurses in mentioned settings and the in-charge nurses who have at least one year of experience or more. Also, all physicians including consultants, specialists, and residents who have experience at least one year or more, were selected.

Data Collection

A structured self-report was utilized as a tool to collect the data, hard copies of the two tools were distributed among the study subjects personally contained a consent and study overview.

Instrumentation

The instrument in the current study contained two valid tools. The first tool is the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration (JSAPNC) and the second tool is Safety Attitude questionnaire (SAQ).

Tool I:

Has two parts part I for sociodemographic data while part II (JSAPNC).

Part I

The sociodemographic data was developed by the researcher. It consists of nine questions to assess general sociodemographic characteristics including working hospital, years of experience, age, gender, working unit, nationality profession, nurse's qualification and, the primary specialty for the physician.

Part II

The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration (JSAPNC) tool, the English version developed by Mohammad Hojat (2001)[23] to measure the attitudes toward physician-nurse collaboration. Whereas the valid Arabic version was translated by Elsous and their colleagues (2017)15. The scale contains 15 items categorized into four dimensions which are shared education and teamwork has (7items), caring versus curing includes (3 items), nurse's autonomy (3 items) and physician's dominance (2 items). The responses were measured on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). The higher the score, the more positive attitudes toward physician-nurse collaboration.

Tool II:

Safety attitude questionnaire (SAQ) the valid English version tool developed by Sexton and his colleagues (2006)[41] to measure safety culture through healthcare providers toward safety attitude was modified. While the valid Arabic version was applied by Suliman and his colleague (2017)[44].

SAQ has six dimensions which are: teamwork climate (6 items), safety climate(7items), stress recognition (4 items), job satisfaction (5 items), perceptions of management (10 items) and work condition (4 items).

Scoring System

The scoring system initiated by the statistician for two tools calculated by the mean. Moreover, negative statements for both tools were reverse coding. Point one of Likert scale for (strongly disagree) with mean limit 1.00-1.75 indicated very low agreement and sever negatively attitude. When pointing two of Likert scale for (disagree) at mean limit 1.76-2.50 indicated low agreement and negative attitude. While point 3 of the Likert scale for (agree) with mean range 2.51-3.25 indicated high agreement and positive attitude. Also, point 4 of Likert scale for (strongly agree) in mean range 3.26-4.00 indicated very high agreement and highly positive attitude.

Pilot Study

Pilot study sample considered as 10% of the studied sample (n=270) is equal to 27 participants from the same study population. When nurses (n=17) and physicians (n=10). The pilot study sample was excluded from the main study sample. It was done over two weeks to test the questionnaire feasibility, clarity, simplicity, and estimate the time required to fill the tool. All responses and feedback of the participants about the clarity of sentences, meaning understanding and the easiness of tool structures were positive, and no modifications required, indicated that the tool was understandable and easy to answer.

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Ethical consideration

The ethical approval for data collection, in the beginning, was received by the researcher from the ethical committee at King Abdulaziz University than from researches department in Health Affairs Directorate in Jeddah for each hospital. In addition, the tools permission taken from the tools' authors.

Moreover, the purpose of the study explained to the participants to obtain their cooperation to answer the questionnaire and they had the right to withdraw from participation at any time and all participants treated equally. Data collected anonymous, no personal identification data from the subjects was known and confidentiality conducted. All filled questionnaires were coded for analyzing purposes and kept secure and limited access to maintain the participants' privacy will be destroyed. However, ethical codes of current research strictly adhered at all stages of project [37].

Validity and reliability

The tools validity was assessed by five experts in the fields of nursing administration and faculty members from nursing and medicine college before distribution to the participants. The total Cronbach's alpha value coefficient for the study tools was 0.88 which is very high and close to one. This means that the reliability of the tools was high.

Data analysis

Descriptive statistic test was done for sociodemographic data by presenting the frequency and the percentage.

The first and second objectives achieved by measuring the mean, standard deviation, agreement degree, and ranking.

Spearman Correlation Factor test was used to calculate the third study objective.

For analyzing the relationship between the sociodemographic data and the study variables, One – Way ANOVA test and Independent sample t-test was used.

III. RESULTS

The questionnaire was distributed to 270 nurses and physicians in critical units and inpatient wards for two hospitals. A total of 270 (100%) completed questionnaires that were returned by the end of the data collection period.

Table 1: Frequency, Percentage of Sociodemographic Data

	SOCIODEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE%
YEARS OF EXPERIENCE	1-5 Years	110	40.7
	> 5-10 Years	143	53.0
	> 10 Years	17	6.3
GENDER	Male	65	24.1
	Female	205	75.9
AGE	20-30 Years	83	30.8
	> 30 - 40 Years	175	64.8
	> 40 Years	12	4.4
NATIONALITY	Saudi	169	62.6
	Non -Saudi	101	37.4
WORKING UNIT	Inpatient Wards	196	72.6
	Critical Care Units	74	27.4
PROFESSION	Nurse	144	53.3
	Physician	126	46.7
	Total	270	100.0
NURSE EDUCATIONAL LEVE	Diploma in Nursing	57	40.0
	Bachelor of Nursing	87	60.0
	Total of Nurse	144	100.0
PHYSICIAN POSITION TITLE	Resident	60	7.6
	Specialist	55	43.7
	Consultant	11	8.7
	Total of Physician	126	100.0

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Table (1) showed the descriptive statistic of sociodemographic data for study participants. Approximately half of the participants (53%) the working years of experience range between five to ten years and 6.3% of them were working for more than ten years. While the third quarter (75.9%) of the participants from the two hospitals were female and 24.1% were male. Two third (64.8%) of them their age range between 31 to 40 years old, whereas 4.4 % of the participants were above 40 years old. Approximately two third (62.6%) of the total number of participants were Saudi and 37.4% were non-Saudi. Moreover, 72.6% of participants were working in inpatient wards, but 27.4% of the participants were working in critical care units. However, half of the participants (53.3%) were nurses and 46.7% were physicians. Most of the nurses (60%) were having a bachelor's degree in nursing, while 40% of them were nursing with a diploma. According to the physicians, slightly below the half of them (47.6%) were residents and 8.7%were consultants.

Table 2: Mean, Standard Deviation, Agreement Degree, and Ranking of Nurse-Physician Collaboration Attitude Descriptive Statistic (n=270).

Item	1st Dimension: Shared Education and Teamwork	Mean	±SD	Agree deg.	Ranking
1	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant.	3.28	±.624	Strongly Agree	1
2	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles.	3.12	±.555	Agree	2
3	There are many overlapping areas of responsibility between physicians and nurses.	3.11	±.543	Agree	3
4	Physicians and nurses should contribute to decisions regarding the hospital discharge of patients.	3.04	±.599	Agree	7
5	Nurses should also have responsibility for monitoring the effects of medical treatment	3.06	±.616	Agree	6
6	Physicians should be educated to establish collaborative relationships with nurses.	3.09	±.587	Agree	4
7	Interprofessional relationships between physicians and nurses should be included in their educational programs.	3.07	±.600	Agree	5
		3.11	±.534		Total
2nd Dimension: Caring Versus Curing					
8	Nurses are qualified to assess and respond to psychological aspects of patients' needs	3.04	±.599	Agree	3
9	Nurses should be involved in making policy decisions affecting their working conditions	3.06	±.598	Agree	2
10	Nurses have special expertise in patient education and psychological counseling.	3.08	±.583	Agree	1
		3.06	±.495		Total
3rd Dimension: Nurse's autonomy					
11	Nurses should be accountable to patients for the nursing care they provide.	3.09	±.599	Agree	3
12	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends.	3.02	±.598	Agree	2
13	Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient.	3.23	±.583	Agree	1
		3.06	±.495		Total
4th Dimension: Physician's dominance					
14	Doctors should be the dominant authority in all health care matters.	3.05	±.765	Disagree	2
15	The primary function of the nurse is to carry out the physician's orders.	3.23	±.633	Disagree	1
		3.14	±.630		Total
Nurse-physician collaboration attitude		**3.11**	**high average agreement**		

Table (2) present the result of the descriptive statistical analysis for nurse-physician collaboration attitude, the overall average agreement score was high at mean =3.11. While the highest agreement scores for (Physician's dominance) dimension at mean=3.14 and the lowest agreement score for (Nurse's autonomy) and (Caring Versus Curing) at mean= 3.06. As shown the first dimension is (Shared Education and Teamwork) had mean =3.11(±.534) consisting of seven

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items and item number one (A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant) got the first ranking with mean =3.28(±.624) and item number four (Physicians and nurses should contribute to decisions regarding the hospital discharge of patients) had the last ranking with mean=3.04(±.599) . Regarding the second dimension (Caring Versus Curing) had mean=3.06 (±.495) has three items (8,9 and 10). Item number ten (Nurses have special expertise in patient education and psychological counseling) had the highest mean =3.08 (±.583) while item number eight had the lowest mean =3.04 (±.599). The third dimension (Nurse's autonomy) with mean= 3.06 (±.495) contains three item from11-13 the first ranking in this dimension is item 13 (Nurses should

clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient) by mean=3.23 (±.583) and item 11(Nurses should be accountable to patients for the nursing care they provide) got the last ranking for the third dimension by mean=3.09 (±.599). The last dimension is (physician's dominance) had mean=3.14 (±.630) including two items 14 and 15, item 15 (The primary function of the nurse is to carry out the physician's orders) had the highest mean=3.23 (±.633) and the mean of item 14 (Doctors should be the dominant authority in all health care matters) was the lowest mean=3.05 (±.765).

Table 3: mean, standard deviation, agreement degree, and ranking of nurse-physician collaboration attitude descriptive statistic (n=270).

Item	1st Dimension: Teamwork climate	Mean	±SD	Agree deg.	Ranking
1	Nurse input is well received in this clinical area.	3.33	±.660	Strongly Agree	1
2	In this clinical area, it is difficult to speak up if I perceive a problem with patient care.	2.88	±.418	Disagree	5
3	Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient).	2.90	±.381	Agree	3
4	I have the support I need from another person to care for patients.	2.90	±.391	Agree	4
5	It is easy for personnel here to ask questions when there is something that they do not understand.	2.78	±.467	Agree	6
6	The physicians and nurses here work together as a well-coordinated team.	2.94	±.496	Agree	2
		2.96	±.317		Total
2nd Dimension: Safety Climate					
7	I would feel safe being treated here as a patient.	2.37	±.515	Disagree	7
8	Medical errors are handled appropriately in this clinical area.	2.72	±.512	Agree	5
9	I know the proper channels to direct questions regarding patient safety in this clinical area.	2.82	±.454	Agree	2
10	I receive appropriate feedback about my performance.	2.80	±.453	Agree	3
11	In this clinical area, it is difficult to discuss errors.	2.70	±.549	Disagree	6
12	I am encouraged by my colleagues to report any patient safety concerns I may have.	2.83	±.460	Agree	1
13	The culture in this clinical area makes it easy to learn from the errors of others.	2.79	±.501	Agree	4
		2.72	±.317		Total
3rd Dimension: Job satisfaction					
14	I like my job.	3.06	±.531	Agree	1
15	Working here is like being part of a large family.	2.63	±.607	Agree	4
16	This is a good place to work	2.69	±.553	Agree	2
17	I am proud to work in this clinical area.	2.66	±.548	Agree	3
18	Morale in this clinical area is high.	2.52	±.570	Agree	5
		2.71	±.514		Total
4th Dimension: Stress recognition					
19	When my workload becomes excessive, my performance is impaired.	3.02	±.600	Agree	1
20	I am less effective at work when fatigued.	3.01	±.588	Agree	2
21	I am more likely to make errors in tense or hostile situations.	2.99	±.610	Agree	3
22	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure).	2.56	±.743	Agree	4
		2.9	±.530		Total

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Table (3) present the highest overall agreement score belonged to (Teamwork climate) dimension at mean 2.96 whereas the lowest overall agreement scores for (Working condition) Dimension at mean 2.59. Table 4.4.1 represents the result for first, second, third and fourth dimension. (Teamwork climate) is the first dimension with mean=2.96 (±.317) consist of six items, the highest mean=3.33(±.660) for the item number one (Nurse input is well received in this clinical area) and the last ranking at mean=2.78 (±.467) for item number five (It is easy for personnel here to ask questions when there is something that they do not understand). The second dimension (safety climate) had mean=2.72 (±.317) has seven items the first ranking was for item 12 at mean=2.83(±.460) for item 12 (I am encouraged by my colleagues to report any patient safety concerns I may have) while the item number 7 (I would feel safe being treated here as a patient) had the last ranking and its mean =2.37(±.515). In the third dimension (Job satisfaction) with mean=2.71 (±.514) five items the highest mean =3.06 (±.531) for item 14 (I like my job), however, the lowest mean =2.52 (±.570) for item 18 (Morale in this clinical area is high). Regarding the fourth dimension (Stress recognition) with mean=2.9 (±.530) contains four items. The first ranking mean=3.02 (±.600) belong to item 19 (When my workload becomes excessive, my performance is impaired) and the last ranking mean=2.56 (±.743) go to item 22 (Fatigue impairs my performance during emergency situations).

Table 4: mean, standard deviation, agreement degree, and ranking of the first three safety culture dimensions descriptive statistic. (n=270)

Item	5th Dimension: Working Condition	Mean	±SD	Agree deg.	Ranking
23	The levels of staffing in this clinical area are sufficient to handle the number of patients.	2.04	±.537	Disagree	4
24	This hospital does a good job of training new personnel.	2.68	±.521	Agree	3
25	All the necessary information for diagnostic and therapeutic decisions is routinely available to me.	2.84	±.420	Agree	1
26	Trainees in my discipline are adequately supervised.	2.80	±.464	Agree	2
		2.59	±.420		Total
6th dimension: Perception of Management					
27	Direct manager supports my daily efforts.	2.84	±.443	Agree	1
28	Direct manager doesn't knowingly compromise patient safety.	2.82	±.465	Agree	2
29	Direct manager is doing a good job	2.81	±.467	Agree	3
30	Problem personnel are dealt with constructively by our direct manager.	2.61	±.532	Agree	8
31	I get adequate, timely information about events that might affect my work to maintain patient safety, from the direct manager.	2.66	±.546	Agree	7
32	Top management supports my daily efforts.	2.49	±.530	Disagree	9
33	Top management doesn't knowingly compromise patient safety.	2.77	±.463	Agree	5
34	Top management is doing a good job.	2.78	±.465	Agree	4
35	Problem personnel are dealt with constructively by our top management.	2.76	±.480	Agree	6
36	I get adequate, timely information about events that might affect my work to maintain patient safety, from the top management.	2.46	±.542	Disagree	10
		2.7	±.411		Total
Safety Culture		2.76	High average agreement		

Table (4) displayed the result of the fifth and the sixth dimensions of safety attitude questionnaire were displayed. According to the fifth dimension with mean=2.59 (±.420) there are four items, the highest mean=2.84 (±.420) belongs

to item 25 (All the necessary information for diagnostic and therapeutic decisions is routinely available to me) and the lowest mean=2.04 (±.537) for item 23 (The levels of staffing in this clinical area are sufficient to handle the number of patients). The last dimension (Perception of Management) with mean=2.7 (±.411) has ten items, the mean of the first ranking was 2.84 (±.443) for item 27 (Direct manager supports my daily efforts) while the last ranking mean=2.46 (±.542) related to item 36 (I get adequate, timely information about events that might affect my work to maintain patient safety, from the top management).

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Table 5: mean, the standard deviation of Spearman Correlation Factor test matrix (n=270)

	Shared Education and Teamwork	Caring Versus Curing	Nurse's autonomy	Physician's dominance	Teamwork climate	Safety Climate	Job satisfaction	Stress recognition	Perception of Management	Working Condition	Dimensions of Attitudes Toward Nurse-Physician collaboration	Dimensions of Safety Culture	Mean (±SD)
Shared Education and Teamwork	1												3.11(±.534)
Caring Versus Curing	.899**	1											3.06 (±.495)
Nurse's autonomy	.895**	.854**	1										3.11(±.531)
Physician's dominance	.695**	.695**	.666**	1									3.14 (±.630)
Teamwork climate	.577**	.586**	.575**	.600**	1								2.96 (±.317)
Safety Climate	.511**	.503**	.517**	.403**	.601**	1							2.72 (±.445)
Job Satisfaction	.353**	.382**	.330**	.358**	.425**	.400**	1						2.71 (±.514)
Stress recognition	.596**	.620**	.615**	.466**	.569**	.574**	.581**	1					2.90 (±.530)
Perception of Management	.477**	.468**	.484**	.362**	.618**	.704**	.428**	.604**	1				2.70 (±.411)
Working Condition	.490**	.484**	.482**	.448**	.670**	.663**	.390**	.578**	.743**	1			2.59 (±.420)
All dimensions of Attitudes Toward Physician-Nurse Collaboration	.967**	.918**	.914**	.730**	.568**	.509**	.364**	.595**	.473**	.486**	1		3.11(±.522)
All dimensions of the Safety Culture	.500**	.495**	.493**	.423**	.665**	.747**	.450**	.582**	.742**	.873**	.496**	1	2.76 (±.383)

**Correlation is significant at the 0.01 level (2-tailed).

Table (5) displayed a positive correlation between each dimension of the nurse-physician collaboration attitude and each dimension of the safety attitude. Whereas the (P-value) > (0.01) and this relationship level ranges from moderate to strong. Accordingly, any increase in nurse-physician collaboration attitude leads to an increase in safety culture. Also, any increase in safety culture leads to an increase in nurse-physician collaboration attitudes.

Table 6: T-test for sociodemographic data (gender, Nationality, profession, working unit) and nurse-physician collaboration attitude (mean, standard deviation and p-value, n=270)

Attitudes Toward Physician-Nurse Collaboration	Gender	Mean ±SD	Sig. P. value	Nationality	Means ±SD	Sig. P. value	profession	Mean ±SD	Sig. P. value	Working units	Mean ±SD	Sig. P. value
	Male	2.95 ±.292	.000*	Saudi	3.11 ±.517	.193	Nurse	3.30 ±.624	.000	Inpatient wards	3.00 ±.494	.003*
	Female	3.26 ±.556		non-Saudi	3.20 ±.530		Physician	2.91 ±.245	.000	Critical care units	3.21 ±.567	

Table (6) present the relation between the gender, nationality, profession and working unit for the participants and the nurse-physician collaboration attitude. In spite of gender, the result found that the means of the female in each dimension more than the means of the male. Which mean that female agree with nurse-physician collaboration attitudes more than male. There are no statistically significant differences in agreement with the nationalities of the studied sample towards all dimensions of Physician-Nurse Collaboration attitude. In order to compare between means of the physicians and nurses, found that the mean of nurse's agreement more than the mean of the physician, towards each dimension of nurse-physician collaboration. Additionally, there were significant differences in studied participants responses according to the working unit and found that the means of participants working in (Critical Care units) is more than the means of those are working in (Inpatient Wards).

Table 7: One-way ANOVA test for sociodemographic data (years of experience, Age, nurse level of education physician position title) and nurse-physician collaboration attitude (mean, Standard deviation and p-value) (n=270)

	Years of Experience	Mean ±SD	Sig. P. value	Age	Means ±SD	Sig. P. value	Nurse educational level	Mean	±SD	Sig. P. value	Physicians position title	Mean	±SD	Sig. P. value
Attitudes Toward Physician-Nurse Collaboration	1-5 y	3.10 ±.558	.320	20-30 y	3.36 ±.490	.000*	Diploma in Nursing	3.09	±.623	.000*	Specialist	2.87	±.290	.537
	> 5-10 y	3.19 ±.503		>30-40 y	3.01 ±.507		Bachelor of nursing	3.51	±.568		Consultant	2.96	±.000	
	> 10 y	3.06 ±.429		> 40 y	2.97 ±.426		Total of nurses	3.30	±.522		Total of Physicians	2.91	±.258	
	Total	3.11 ±.522		Total	3.11									

Table (7) showed the relation between years of experience, age, nurse education level and physician position title with the nurse-physician collaboration attitude. In terms of years of experience, there is no statistically significant difference in agreement of the studied sample towards physician-nurse collaboration attitude and the P-value of them < 0.05. However, there is a statistically significant difference in agreement of the studied sample and the age towards Physician-Nurse Collaboration attitude. The nurses and physicians at (Age 20-30 years) agreed with attitudes toward physician-nurse collaboration attitude more than the participants with Age (> 30-40 years & > 40 years) by mean difference 0.346 & 0.386. Also, there are statistically significant differences in agreements of the nurse regarding nurse educational level with P-value> (0.05) for all dimension and the means of nurses with bachelor's degree more than means of diploma nurses.

Table 8: T-test for sociodemographic data (gender, nationality, profession, working units) and Safety attitude of safety culture (mean, standard deviation and p-value) (n=270)

	Gender	Mean	±SD	Sig. P. value	Nationality	Mean	±SD	Profession	Mean	±SD	Sig. P. value	Working units	Mean	±SD	Sig. P. value
safety culture	Male	2.71	±.484	.086	Saudi	2.74	±.413	Nurse	2.78	±.332	.373	inpatient wards	2.76	±.392	.912
	Female	2.81	±.343		Non-Saudi	2.78	±.325	Physician	2.73	±.434		Critical care units	2.75	±.358	

Table 9: One-way ANOVA test for Sociodemographic data (years of experience and Age) and Safety attitude of safety culture (mean, Standard deviation and p-value) (n=270)

	Years of Experience	Mean	±SD	Sig. P. Value	Age	Mean	±SD	Sig. P. Value
safety culture	1-5 years	2.78	±.425	.094	20-30 years	2.82	±.377	.070
	> 5-10 years	2.85	±.330		>30- 40 years	2.88	±.369	
	> 10 years	2.66	±.470		> 40 years	2.57	±.515	
	Total	2.76	±.383		Total	2.76	±.383	

Table 10: One-way ANOVA test for Sociodemographic data (nurse educational level and physician position title) and Safety attitude of safety culture (mean, Standard deviation and p-value) (n=270)

	Nurse education level	Mean	±SD	Sig. P. Value	Physicians position title	Mean	±SD	Sig. P. Value
safety culture	Diploma in nursing	2.72	.3±98	.046*	Resident	2.80	±.430	.589
	Bachelor of nursing	2.83	±.274		Specialist	2.73	±.447	
	Total of nurse	2.78	±.332		Consultant	2.67	±.452	
					Total of Physicians	2.73	±.438	

Table (8), (9) and (10) showed the relation between the sociodemographic data and safety culture attitude. According to the result, there is no statistically significant difference in agreement of the studied participants towards safety culture with gender, nationality, profession, working units, years of experience, age and physician position title. While the mean of nurses with a bachelor's degree more than the mean of nurses with the diploma.

IV. DISCUSSION

The current study question is (what is the relationship between the attitudes toward nurse-physician collaboration and safety culture?) while its answer, there was a positive relationship between nurse-physician collaboration attitude and patient safety culture. This finding is consistent with other studies revealed that the existence of nursing physician collaboration leading to positive patient safety culture [22] [32]. Further analysis shows that higher scores of nurse-physician collaboration perception did not affect their perceptions of safety culture [1].

In regard of this study result if the nurses and physicians have a successful collaboration by sharing knowledge understanding and appreciating the role and the skills of each other and working effectively as a team that will enhance providing safe patient care which creates a positive patient safety culture.

Moreover, in current research found that the general nurse-physician collaboration attitude was positive. In other studies, had a similar result which reported that the physicians and nurses have positive attitudes toward physician-nurse collaboration [17] [11].

According to this study findings the responses of younger participants had a higher score of positive attitudes toward nurse-physician collaboration. This finding is congruent with another study found that younger respondents had a better attitude towards nurse-doctor collaboration[16]. This finding may be the younger staff tend to be submissive to older members of the team. Conversely in Palestinian study stated that the more positive attitude toward collaboration is correlated with the age of the nurses and physicians [15].

The finding of this study showed significant differences in attitude toward physician-nurse collaboration between nurses' level of education, nurses with higher education have a better attitude. This result was compatible with two different studies [33] [50]. Could be that components of advanced nursing education promoted the development of positive attitudes towards IPC also nurses with a bachelor's degree were very interested in communicating with the physicians of their department and are more willing to participate in collaborative teams when assignment of roles, knowledge, and skills exist, as they feel equal members and they tend to use a more interprofessional language, unlike those with diploma.

On the other hand, females had a better attitude towards collaboration than males in the current study. The similar finding was presented by Falana colleagues (2016)[16]. This result implies by disproportionate gender distribution between physicians and nurses. Despite in Wang colleagues (2015)[48] study that found the gender not influenced the nurse-physician collaboration.

Nurses revealed a significantly more positive attitude toward physician-nurse collaboration than physicians. This finding is consistent with the results of the previous studies conducted in which nurses significantly demonstrate a more favorable attitude toward collaboration than physicians [11] [7] [16] [50] [15] and [17]. The possible reason for a dominant physician role might be due to medical training programs that lead to a hierarchical model of the professional role in which the nurses have a relatively submissive role [15] [17].

This could be the scenario in Middle East societies including Saudi Arabia in which a hierarchical model of the professional role is prevalent, and nurses are considered as subordinates of the physicians. nurses in this study have a greater orientation toward interdisciplinary education and inter-professional collaborations as well as a more positive view of nurses' contributions to psychosocial and educational dimensions of patient care [11].

In term of working unit in this study found that the participants working in (Critical units) had a more positive attitude toward nurse-physician collaboration than those are Working in (Inpatient Wards). Also, the same result was found in another study [24]. That could be the nurses and physicians on these units may perceive collaboration differently than nurses and physicians on other units who do not interact as frequently because of the complexity of patient care. Nevertheless, a study showed a high positive attitude in inpatient unit [15]. While in Greece study showed a low nurse-physician collaboration in ICU [35].

In regard to safety attitudes, the overall health care professionals had a positive attitude toward safety culture in this study. Further analysis agreed with the current study which had a positive attitude for all domains [10]. Whereas in Egyptian study presented a positive perception of five domains including job satisfaction, teamwork climate, working conditions, management, and safety climate. However, stress recognition had a negative perception (El-Gendi,2017).

According to the results of the current research, the dimension of (teamwork climate) in the safety attitude questionnaire had the highest score, while the lowest score was belonging to (working condition). In addition, another research had the highest score in (teamwork) [29]. Also, in Sabari colleagues' study (2017) showed that the (teamwork) domain has a second highest score but (working condition) had the lowest score. Regarding the result of another study found the highest safety attitude in (teamwork climate) and (safety climate) had the lowest responses [42].

The further analysis showed that the most perceived factor influencing patient safety was the (job satisfaction) followed by the (teamwork climate) and the (working condition) presented the biggest weakness in the professional evaluations [14]. Despite a negative perception in all SAQ except (job satisfaction) had a positive perception in Algahtani (2015) study[3].

As shown in the current study the (teamwork climate) was the highest score and accumulating findings have demonstrated the improvement in teamwork can significantly improve patient outcomes and decrease avoidable errors. However, the (working condition) was the lowest score and this result imply that many professionals encounter errors due to their heavy workload, which exhausts them and lowers their precision in presenting the [42].

In spite of nursing education level and safety attitude toward patient safety culture, this study found the nurses with higher education level had a higher score. That consist of Suliman (2015)[45] study that showed the nurses with bachelor's degree had a more positive perception of patient safety culture than nurses with a diploma. This is may be due to the educational curricula of the bachelor's degree as it contains the subjects that related to patient safety which led these nurses to have more awareness and properness to patient safety culture issues [45].

V. CONCLUSION

This is the first study conducted in Saudi Arabia to assess the relationship between the attitudes toward nurse-physician collaboration and safety culture. This study found a strong to moderate positive relationship between nurse-physician collaboration attitude and safety culture. Also, the nurse-physician collaboration attitude was generally highly positive scored. Furthermore, the overall attitude toward safety culture was highly positive. Also, there was a relationship between gender, profession, working unit, age, and nursing educational level of participants and nurse-physician collaboration. Regarding the safety culture, there was a significant difference with nursing educational level.

VI. NURSING IMPLICATION AND RECOMMENDATIONS

Based on the research findings, this study recommended apply for the interprofessional education program in nursing and medicine schools in order to improve the interprofessional collaboration practice according to the WHO framework (2010)[49].

Continue the nursing bridging program to upgrade the diploma degree nurses to a bachelor's degree and must be implemented in all nursing schools over Saudi Arabia to enhance the nurse-physician collaboration and safety culture [3].

Participating the nurses with a physician in making patient discharge plane including patient education, medication, and treatment methods or activate the multidisciplinary round [17].

Raise awareness regarding interprofessional collaboration practice and its relation to safety culture among nurses and physician by conducting lectures in different healthcare organizations [22].

Formulate specific policies for nurse-physician collaboration practice to regulate the sharing role and provide more authority for nurses to increase their role as decision maker [11].

Recommendation for Future Research

There is a necessary requirement to carried out a study for patient safety culture assessment annually for all Saudi healthcare organizations. Because the patient safety culture is considering an essential factor to enhance the patient safety system and quality of patient care [31].

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