Nurses' Performance about Isolation Precautions regarding Covid-19 patients in Intensive Care Units

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Abstract

Background: Corona virus was spread almost all over the world and was seen in thousands of people and caused thousands of people to die. Isolation precautions are intended to prevent transmission of infectious agents, yet health care provider (HCP) adherence remains suboptimal. **This study aimed** to assess nurses' performance about isolation precautions regarding Covid-19 patients in intensive care units. **Design:** A descriptive exploratory research. **Subjects:** A purposive subjects composed of (60) nurses who work in covid-19 Intensive Care Unit. **Tools:** 1) Nurses' knowledge questionnaire about Isolation Precautions, 2) Observation checklists and 3) Nurses' attitude questionnaire regarding Isolation Precautions. **Results**: less than three fifths of the studied nurses had a satisfactory level of knowledge. Moreover, vast majority of the studied nurses had unsatisfactory practices. Additionally, more than half of the studied nurses had a positive attitude regarding corona virus and isolation precautions. **Conclusion:** there was a positive correlation between nurses' knowledge and nurses' practice. **The study Recommendations:** Continuous nursing education and in- service training programs of nurses should be organized to upgrade the knowledge, practice and attitude of nurses.

Keywords: Nurses' Performance, Isolation precautions, Covid-19.

Introduction:

Since March 2020, the world has faced a severe threat called COVID-19(Corona Virus Disease, 2019). According to the World Health Organization, the COVID-19 pandemic is currently the most critical health crisis in the world and the most significant challenge and threat facing the world and humanity. This disease is a public health problem that has claimed the lives of many men, women, and children worldwide (**Mohammad et al., 2022**).

Until August 6, 2021, over 201 million people worldwide had been diagnosed with the disease, and 4, 284, 467 had died, as confirmed by the WHO. The sudden increase in the demand for health care led to overload and the collapse of health systems. COVID-19 is an emerging disease with unknown clinical and therapeutic symptoms transmitted through close person-to-person contact. Infection control experts consider patient isolation an essential and straightforward way to control the infection and spread of the disease; therefore, hospitalized COVID-19 patients are isolated in separate wards. However, using such a precaution may not be totally safe. Isolation for infection control (WHO, 2020).

The WHO recommends prevention of spread by protecting nurses and patient's close contacts. Primary preventive measures include regular hand washing, social distancing, and respiratory hygiene (covering mouth and nose while coughing or sneezing). Nurses are at the frontline of COVID- 19 pandemic defense and are exposed to, not only infection with COVID-19 due to their frequent exposure to infected individuals, but also psychological distress, long working hours, fatigue, occupational stigma and physical violence (**World Health Organization, 2020**).

The transmission of the disease among nurse is exaggerated by overcrowding, absence of isolation facilities, contaminated environment and is likely enhanced by insufficient knowledge and awareness of infection control practices among nurses. That inadequate knowledge, practice and the incorrect attitudes

among nurses can directly influence practices and lead to delayed diagnosis, poor infection control practice, and spread of disease. Understanding nurses knowledge, practice and attitudes, and possible perception of risk of infection helps to predict the outcomes of COVID-19 in Egypt (**Abdel Wahed et al., 2020**).

Significant of the study:

Globally, there have been 755 786 confirmed deaths and 21 026 758 confirmed cases within the COVID-19 pandemic (**WHO, 2020**). In Egypt, changes every day of life have been rapid, with virus outbreaks, and an increasing death rate. COVID-19 considered a pandemic in Egypt as part of an ongoing worldwide COVID-19 pandemic. The Ministry of Health and Population Egypt confirmed that the first case of COVID-19 in Egypt was on February 14, 2020. As of the evening of June 15, there were 46289 confirmed cases of Covid-19 and 1672 deaths in Egypt (**Ministry of Health and Population Egypt, 2020**).

Worldwide, there is no consistent record of the number of healthcare workers and nurses who have COVID19 infection. But the International Council of Nurses' analysis, depend on data from National Nursing Associations, media reports, and official figures from different countries, designates that more than 230, 000 healthcare workers have constricted the disease, and more than 600 nurses have died from the virus. International Council of Nurses' analysis displays that on a regular 7% of all Covid-19 cases worldwide are among healthcare workers, which means that nurses are at great risk, and the patients they care for (**International Council of Nurses, 2020**).

Nurses are the frontline healthcare professionals who have multiple roles and functions during the COVID-19 pandemic, which include: 1) providing health education, screening services, and support for the public and individuals in high-risk groups**.** 2) Nosocomial infection prevention and surveillance, 3) Implementing standard precautions (hand hygiene, personal protective equipment, respiratory hygiene, medication storage, and injection safety); and educate, train

patients, families, and healthcare workers. 4) deliver direct life-sustaining care to patients with COVID-19 who are in an acute or critical condition. 5) Provide emotional and psychological support to individuals required home quarantine restrictions (**Ammar & Ramadan, 2020**).

Aim of the study:

The aim of the study is to assess Nurses' Performance about Isolation Precautions regarding Covid-19 patients in Intensive Care Units.

Research questions:-
1- What is the nurses' level of knowledge about Isolation Precautions regarding Covid-19 patients in Intensive Care Units?
2- What is the nurses' level of practice and attitude about Isolation Precautions regarding Covid-19 patients in Intensive Care Units?

Subjects and Methods

Subjects and methods of this study were portrayed under four main topics as follows:

I. Technical Design:

The technical design includes research design, setting, subject and tools for data collection.

Research design:

Descriptive exploratory design was utilized in this study to fulfill the aim of the study, and answer the research questions.

Setting:

The study was carried out in two covid-19 isolation ICUs at Nasser general hospital in Beni-Suef governorate, one of them contains ten patient beds, ten monitors, one crash cart, one direct current shock, bath room for patients and the other contains eight patient beds, eight monitors, one crash cart, one direct current shock.

Subjects:

Convenience sample of all available nurses (60 nurses) in the previously mentioned setting from different age groups, gender,

qualifications and different years of experience and agreed to participate in this study.

Tools for data collection:

Three tools were used to collect data of the current study and fulfill the study aim as following:

Tool {1}: Nurses' knowledge questionnaire about Isolation Precautions:

It was developed by the investigator after reviewing current and relevant literatures and translated into simple Arabic language, which included two parts:

- **Part I**: concerned with demographic characteristics of nurses such as age, gender, level of education, marital status, years of experience.
- **Part II**: concerned with the nurses' level of knowledge about isolation precautions regarding covid-19 patients in intensive care units, which included two sections:
- **Section one: -**To assess the level of **knowledge about isolation precautions** (hand hygiene, personal protective equipment and environment) based on*(WHO and CDC, 2020)*.
- **Section two**: - To assess the level of **knowledge about corona virus** (as definition, mode of transmission, Symptoms, incubation period, group of the most at risk with corona virus, how to confirm infection, prevention *(WHO and CDC, 2020)*.

❖ **Scoring system: -**

The nurses' total level of knowledge about isolation precautions regarding covid-19 patients in intensive care units was consisted of (34) items. Each item was given 0 for (no) answer and 1 for (yes) answer.

A subtotal and total mean for nurses' knowledge was categorized into unsatisfactory or satisfactory knowledge level as follows:-
- -<85% was considered unsatisfactory.
- - ≥ 85%was considered satisfactory.

Tool {2}: Observation checklist:

It was developed by the investigator after reviewing current and relevant literatures into English language to evaluate nurses 'level of practice regarding isolation precautions. The observation checklist will include such procedures as (hand hygiene, wearing and removing ppe) based on **(WHO and CDC, 2020)**.

It included (4) parts as following:

- **Part {1} Hand hygiene checklist**
Consist of {42 steps}**:** (Hand antisepsis using an instant alcohol waterless antiseptic rub **{**14steps**}** **and** Hand washing Using Soap and Water {28 steps}).
- **Part {2} Gowning Checklist** consist of {13 steps}**:** (Steps of wearing gown {5 steps} and Steps of removing gown {8 steps}).
- **Part {3} Gloving Checklist** Consist of {17 steps}**:** (Steps of wearing gloves {11steps} and Steps of removing gloves {6 steps}).
- **Part {4} Personal Protective Equipment Checklist** Consist of {19steps}**:** (Steps of wearing PPE {12 steps} and Steps of removing PPE {7 steps}).

Scoring system: -

This part is consisted of {91} steps. Each step was given (0) for not done and (1) for done correctly.

A subtotal and total mean for nurses' practice was categorized into unsatisfactory or satisfactory practice as following:-
- **-**<85% was considered unsatisfactory.
- **-** ≥ 85% was considered satisfactory.

Tool {3}: Nurses' attitude questionnaire regarding Isolation Precautions:

This tool was adapted from *(ShumilaFaryad, etal.,2018, AbubakrAbd Elkader, 2018)* and modified by the investigator into simple Arabic language for assessment of Nurses' attitude regarding isolation precautions.

Scoring system: -

This part is consisted of (19) statement, responses were given (0) for disagree and (1) for agree. The higher the score, the higher positive attitudes of the nurses under the study.

A subtotal and total mean for nurses' attitude was categorized into negative or positive practice as following:-
- <85% was considered negative.
- ≥ 85% was considered positive.

II.   Operational design

The operational design includes preparatory phase, content validity and reliability**,** pilot study, and field work.

A-Preparatory phase:

The investigator reviewed current and past, local and international related literature and theoretical knowledge of various aspects of standard precautions and corona virus using books, articles, journals, and internet to develop the tools of data collection.

B-Content Validity:

Testing Validity of the proposed tools by using face and content validity.

Face validity aimed to inspect the items to determine whether the tools measure what it supposed to measure. While content validity was conducted to determine whether the tools covered the aim of the study through a jury of seven experts from Medical Surgical Nursing Department at the Faculty of Nursing, Ain Shams University. The experts review tools for clarity, relevance, comprehensiveness, simplicity and applicability, minor modifications were done.

-Testing Reliability:

It was done by Cronbach's alpha test to examine whether the tools had internal consistency. The reliability was found (0. 976) for the observational checklists, (0.650) for interview questionnaire and (0.720) for attitude tool.

C-Pilot Study

A pilot study was conducted on 10% of the nurses under study to test the feasibility, applicability of the developed tools, clarity of included questions, to identify obstacles during data collection and to estimate the time needed for filling the forms. There were no needed modifications for the final developed tools, so the study nurses who shared in pilot study were included in the study subjects.

D-Field work:

Field work was included the following:
- Interviewing with nurses caring for isolated patient in the previously mentioned setting to explain the aim of the study and what is the effect of this study on their performance and take their approval to participate in the study prior to any data collection.
- Data collection was done through two days per week for 3 months by the investigator in the two covid-19 isolation ICUs at Nasser general hospital in Beni-Suef governorate in May to July 2022, **as following**:

- Nurses' knowledge questionnaire about isolation precautions tool and nurses' attitude questionnaire regarding isolation precautions were filled by the nurses.
- The investigator filled the observational check list in the morning and afternoon shifts during clinical work. Nurses were observed while working, it took about (15-30) minutes for every nurse personnel.

III.   Administrative design:

An official permission was obtained from medical director of Nasser general hospital in Beni-Suef governorate based on a letter that issued to him from Dean of Faculty of Nursing at Ain- Shams University and. The official permission would include the aim of the study, tools of data collection and characteristics of the study subjects. The nurses included in the study were informed about the aim of the study, an oral permission was obtained from them, and confidentiality was assured.

Ethical Consideration:

1-The research approval was obtained from scientific ethical committee and Dean of faculty of nursing at Ain Shams University before starting the study.

2-The investigator clarified the objective and aim of the study to the nurses included in the study before starting the study and an oral permission was obtained from them. They were given an opportunity to withdraw from the study without reason and they were assured that anonymity and confidentiality of knowledge was protected. Ethics, values, culture and belief were respected.

IV. Statistical design:

Data obtained were organized, categorized and analyzed using statistical package for the social science (SPSS) version 26. Data were presented as number, percentage means and standard deviation. Pearson Chi-square was used to show relation between variables. P-value considered statistically significant when p< 0.05.Pearson Correlation was used to show correlation between variables

Results:

Table (1) shows that 70% of the studied nurses had age group 20-30 years, 88.3% of the studied nurses were females, 56.7% of the studied nurses were married, also 63.4% of the studied nurses had technical institute diploma degree. Regarding years of experience, 33.3% of the studied nurses had work experience from 1-5 years.

Figure (1): demonstrated that 41.7% of the studied nurses had unsatisfactory knowledge, and 58.0% of them had a satisfactory level of knowledge.

Figure (2): demonstrated that the vast majority 95% of the studied nurses had unsatisfactory practices, and only 5% of them had a satisfactory level of practices.

Figure (3): demonstrated that 51.7% of the studied nurses had a positive attitude regarding corona virus and isolation precautions, and 48.3% of them had a negative attitude regarding corona virus and isolation precautions.

Table (2): showed that there was positive significant correlation between total knowledge, total practices, and total attitude. Also there was positive significant correlation between total practices and total attitude.

Table (1): Frequency and distribution of the studied nurses according to their demographic characteristics (n=60).

Demographic characteristics	N	%
-Age:		
20-30	**42**	**70.0**
>30-40	17	28.3
More than 40 years	1	1.7
Age mean ±SD	**28.75±4.9**	
-Gender:		
Male	7	11.7
Female	**53**	**88.3**
-Marital Status:		
Single	23	38.3
Married	**34**	**56.7**
Widows	1	1.7
divorced	2	3.3
-Qualification:		
Diploma	2	3.3
Technical Institute Diploma	**38**	**63.4**
Bachelor's degree	20	33.3
Postgraduate studies	0	0.0
-Years of experience:		
less than 1 year	19	31.7
From 1 year: 5 years	**20**	**33.3**
>5 years: 10 years	15	25.0
more than 10 years	6	10.0
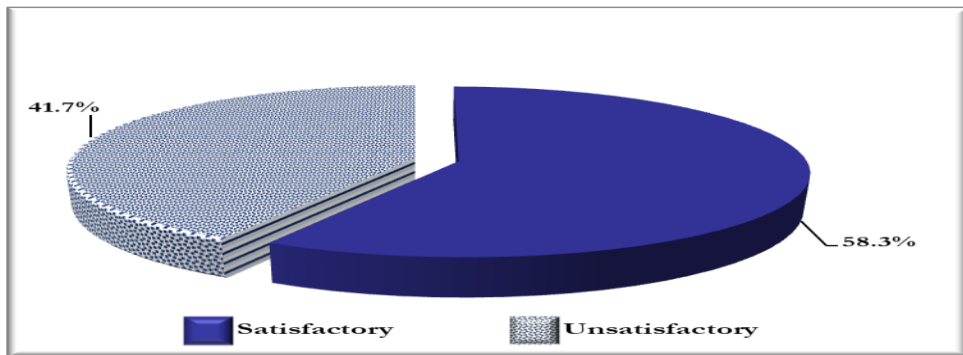
Figure (1): Total knowledge of the studied nurse regarding coronavirus and isolation precautions (n=60).
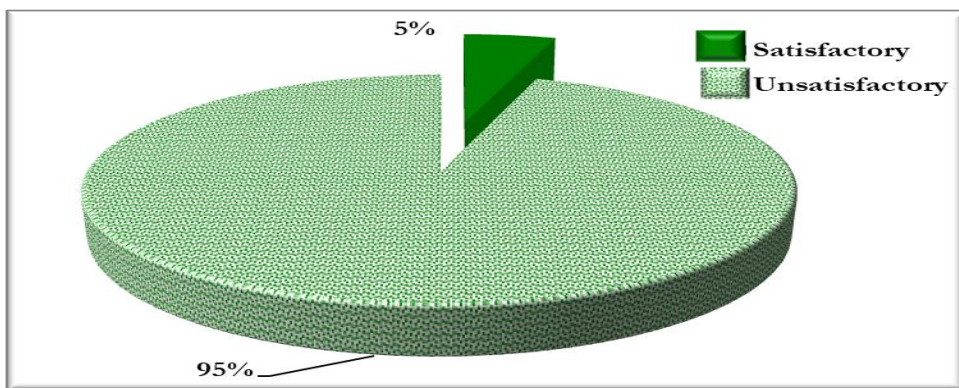
Figure (2): Total practices score of the studied nurse regarding coronavirus and isolation precautions (n=60).
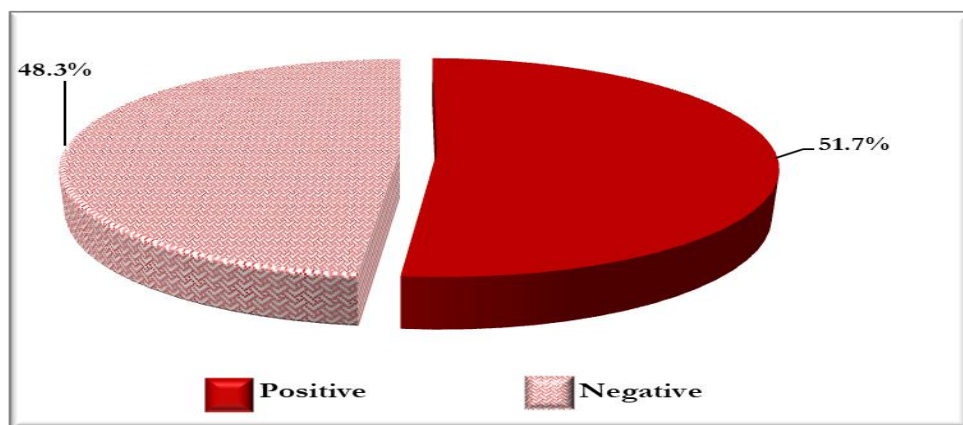
Figure (3): Total attitude of the studied nurse regarding coronavirus and isolation precautions (n=60).

Table (2) : Correlation between total knowledge, total practice and total attitude of the studied nurses (n=60).

		Total knowledge	Total practice	Total attitude
Total knowledge	Pearson Correlation	1	.438**	.314*
	Sig. (2-tailed)		.000	.015
Total practice	Pearson Correlation	.438**	1	.336**
	Sig. (2-tailed)	.000		.009
Total attitude	Pearson Correlation	.314*	.336**	1
	Sig. (2-tailed)	.015	.009	

Correlation is significant at the 0.01 level (2-tailed).
Correlation is significant at the 0.05 level (2-tailed).

Discussion:

COVID-19 was declared a pandemic by the World Health Organization (WHO), which emerged in late 2019, spread almost all over the world and was seen in thousands of people and caused thousands of people to die. The professional practice of infection prevention and control has long been a responsibility of health-care facilities, although typically considered in relation to patient protection (Kurt et al., 2022).

Infection prevention and control aims to prevent healthcare facility acquired infections, whether transmitted through inhalation or contact with body fluids or tissue. Nurses are primarily responsible for implementing daily patient care activities in health care facilities and other health institutions that involve more contact with patients than other healthcare workers (HCWs). Consequently, nurses are more exposed to various infections and play a vital role in transmitting it (Alrubaiee et al., 2021).

So the current study aimed to assess Nurses' Performance about Isolation Precautions regarding Covid-19 patients in Intensive Care Units

As regard to age of the studied nurses, the current study result showed that more than two thirds of the studied nurses had age group 20-30 years with a mean± SD of 28.75±4.9.This result was supported with **Saqlain et al., (2020),** who applied study entitled " knowledge, attitude, and practice regarding COVID-19

among health care workers in Pakistan" and denoted that highly percentage of the studied nurses were aged less than 30 years.

As regard to gender of the studied nurses, the present study result showed that the majority of them were females. This result was in accordance with **Semerci et al., (2020)** who conducted study entitled "Assessed Turkish Oncology Nurses' Knowledge Regarding Novel Coronavirus (COVID-19) During the Current Outbreak in Turkey" and reported that the most of the study sample were females.

As regard to marital status of the studied nurses, the current study result presented that more than one half of them were married. This result was supported with **Elhadi et al.,. (2021)** who conducted study entitled "Knowledge, attitude, and acceptance of healthcare workers and the public regarding the COVID-19" and found that more than half of the studied subject were married

Regarding to level of education of the studied nurses, the current study result demonstrated that about more than three fifths of the studied nurses had institute degree. This result was contrasted with **Nemati et al., (2020)** who conducted study entitled "Assessed the Knowledge, Attitude, and Behavior of the Nurses Concerning COVID-19" and denoted that more than half of the studied nurses had a bachelor's degree.

Regarding years of experience of the studied nurses, the present study result showed that one third of them had work experience

from 1-5 years. This result was in disagreement with **Adane et al., (2022)** who applied study entitled "Knowledge, attitudes, and perceptions of COVID-19 vaccine and refusal to receive COVID-19 vaccine among healthcare workers in northeastern Ethiopia" and found that, highly percentage of the healthcare workers had work experience 10 years or less.

As regard to total knowledge score of the studied nurse regarding coronavirus and isolation precautions, the present study result demonstrated that more than two fifths of the studied nurses had unsatisfactory knowledge, and less than three fifths of them had a satisfactory level of knowledge. This result reflect the studied nurses need to educational program and workshop to enhance their knowledge regarding coronavirus and isolation precautions

This result was in agreement with **Qadah, (2020**) who applied study entitled "Knowledge and attitude among healthcare workers towards COVID-19: a cross sectional study from Jeddah city, Saudi Arabia" and showed that, highly percentage of participants displayed positive knowledge towards COVID-19. Also this result was in the same line with **Reuben et al., (2020)** who applied study entitled "Knowledge, attitudes and practices towards COVID-19: an epidemiological survey in North-Central Nigeria" revealed that highly percentage of health care workers had sufficient knowledge towards COVID-19.

While this result was in disagreement with **Mbachu et al., (2020)** who conducted study entitled "COVID-19 infection: Knowledge, attitude, practices, and impact among healthcare workers in a South-Eastern Nigerian state" mentioned that most of the participants had good knowledge of COVID-19. Also this result was contrasted with **Suliman et al., (2019)** who applied study entitled "Knowledge and practices of isolation precautions among nurses in Jordan" and showed that the majority of the nurses have a good knowledge of isolation precautions, whereas only one tenth of them demonstrated acceptable or poor knowledge. Nurses mainly demonstrated lack of knowledge about disease-specific isolation precautions.

Regarding to total practices score of the studied nurse about coronavirus and isolation precautions, the current study result demonstrated that the vast majority of the studied nurses had unsatisfactory practices, and minority of them had a satisfactory level of practices.

From the researcher point of view, up to date knowledge and nursing skills can play important roles in improve nurses practice and improve infection control. Nurses should have the opportunity to practice infection control on a day-to-day basis as an integral part of patients' care.

From the researcher point of view despite satisfactory knowledge, the researcher showed factors impacting nurses' practices as lack of time, Lack of knowledge and awareness, Heavy workload, Ignorance and negative attitude of the healthcare providers. Resistance to changing habits, understaffing, lack of guidelines/ protocols, training programs sometimes negligence

This result was goes in the same line with **Abd ElAziz et al., (2021)** who applied study entitled "Effect of Nursing Educational Program on Nurses′ Knowledge and Practices regarding Pandemic Covid-19 in Isolation Unit" and showed that, highly percentage of the studied nurses had inadequate level of practice regarding Pandemic Covid-19 in Isolation Unit before educational program. Also this result was supported with **Youniss et al., (2021)** who conducted study entitled " Effect of Instructional Guidelines regarding COVID-19 on Nurses' Knowledge and Practices in Surgical unit" showed that highly percentage of the studied nurses had inadequate practice with COVID-19,

While this result was in disagreement with **Asemahagn, (2020)** who applied study entitled " Factors determining the knowledge and prevention practice of healthcare workers towards COVID-19 in Amhara region, Ethiopia" found that the studied participants had good COVID -19 practices.

Concerning total attitude score of the studied nurse regarding coronavirus and isolation precautions, the current study result demonstrated that more than half of the studied

nurses had a positive attitude regarding coronavirus and isolation precautions, and less than one half of them had a negative attitude regarding coronavirus and isolation precautions.

From the researcher point of view Nurses' knowledge is important where knowledge is a basic foundation on creating nurses practice and attitude on regarding Isolation Precautions regarding Covid-19 fast and right.

This result was supported with **Al-Dossary et al., (2020)** who applied study entitled "Awareness, Attitudes, Prevention, and Perceptions of COVID-19 Outbreak among Nurses in Saudi Arabia" and mentioned that More than half of the nurses had high positive attitudes toward caring for COVID-19 patients. Also was goes in the same line with **Kamacooko et al., (2021)** who conducted study entitled "Knowledge, Attitudes, and practices regarding COVID-19 among healthcare workers in Uganda" and showed that highly percentage of the studied nurses had a positive attitude

This result was contrasted with **Tufail et al., (2017)** who applied stud entitled "Knowledge, Attitude and Practice towards standard isolation precautions among registered Nurses" and found that the studied nurses had unsatisfactory attitude toward standard isolation precaution. Also this result was in disagreement with **Faryad et al., (2018)** who conducted study entitled " Knowledge, attitude and practice of standard isolation precautions among registered nurses of allied hospital Faisalabad" and showed that the studied nurses attitude were not satisfactory toward standard isolation precaution.

As regard to Correlation between total knowledge, total practice and total attitude of the studied nurses, the present study result showed that there was positive significant correlation between total knowledge, total practices, and total attitude. Also there was positive significant correlation between total practices and total attitude. This result was similar with **Saqlain et al., (2020)** who revealed significant positive correlations as follows: knowledge attitude knowledge practice and attitude practice.

Conclusion:

In the light of the current study findings, it can be concluded that,

Less than three fifths of the studied nurses had a satisfactory level of knowledge. Moreover, vast majority of the studied nurses had unsatisfactory level of practices. Additionally, more than half of the studied nurses had a positive attitude regarding corona virus and isolation precautions.

Additionally there was positive significant correlation between total knowledge, total practices, and total attitude. Also there was positive significant correlation between total practices and total attitude.

Recommendations:

Based on the current study finding the following recommendations were proposed:

Recommendations for nurses:

- Continuous nursing education program about isolation precautions regarding Covid-19 patient to upgrade the knowledge, practice and attitude of nurses, which will improve nursing care offered and patients' outcome.
- Nurses must follow evidence-based practices and guidance related to COVID-19 and these guidelines must be incorporated into patient care.

Recommendations for further studied:

This study results should be repeated with a larger probability sample size in a different geographic location to confirm the findings.

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