Knowledge, Risk Perception, Preventive Behavior and Emotional Regulation regarding COVID-19 among Nurses Working in Isolation Hospitals

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Abstract

Background: COVID-19 is an infectious illness caused by a newly discovered corona virus now called severe acute respiratory syndrome. Nurses are providing front-line care for patients with COVID-19 that require hospitalization. So, studying of nurses' knowledge of the COVID-19, risk perception, preventive behaviors and emotional regulation is necessary since COVID-19 is currently spreading in hospitals and all over the world. **Aim:** assess nurses' knowledge, risk perception, preventive behaviors and emotional regulation regarding COVID-19. **Design:** A descriptive exploratory research design was used to achieve the aim of this study. **Settings**: This study was conducted at seven isolation hospitals in seven Egyptian governorates. **Study subjects:** a purposive sample of 140 nurses working in isolation hospitals in Egypt Governorates. **Tools:** Nurses' demographic characteristics assessment questionnaire, nurses' self-administered assessment questionnaire, nurses' preventive behavior assessment tool, nurses' risk perception assessment tool and nurses' emotional regulation scale. **Results:** more than two thirds of nurses were females; the majority of the nurses had satisfactory level of knowledge regarding COVID-19. Concerning preventive behavior, the majority of nurses had good preventive behavior regarding COVID-19, while more than one third of nurses had poor level of risk perception. Regarding emotional regulation more than two thirds of nurses had good level of emotional regulation. **Conclusion**: The majority of the nurses had satisfactory levels of knowledge, good level of preventive behavior and risk perception of dealing with COVID-19 patients, and they also have good levels of emotional regulation, which are reflected positively in dealing and caring COVID-19 patients in isolation hospitals. **Recommendations:** Infection control courses should be implemented for all the nurses working in isolation hospitals before dealing with COVID 19 patients. Providing emotional and psychological support for nurses should be done to increase the emotional regulation.

Keywords: Knowledge- Risk Perception- Preventive Behavior- Emotional Regulation COVID-19 - Isolation Hospitals- Nursing.

Introduction:

Coronavirus disease 2019 (COVID-19) is an infectious illness caused by a newly discovered corona virus now called severe acute respiratory syndrome coronavirus 2 (SARS-COV-2; formerly called 2019-nCOV) which was first identified in China. It is totally new and has no vaccine or known effective treatment. Therefore, there is high uncertainty regarding probability of getting the

disease, its potential severity and chances of controlling it by known preventive measures **(Chen *et al*., 2020; WHO, 2020).** At times of pandemics like COVID-19, understanding the risk perception of the health care workers, preventive behaviours and finding out the sources of information are vital to enable effective intervention, communication and respond efficiently **(Reintjes et al., 2016).**

The battle against COVID-19 is still continuing in China. To guarantee the ultimate success, people's adherence to these control measures is essential, which is largely affected by their knowledge, attitudes, and practices (KAP) towards COVID-19 in accordance with KAP theory **(Tachfouti et al., 2012; Ajilore et al., 2017).**

It seems that the current widespread outbreak has been partly associated with a delay in diagnosis and poor infection control procedures. As protection of healthcare workers is an important step during the epidemic, the understanding or having enough information regarding sources, clinical manifestations, transmission routes, and prevention ways among nurses can play vital roles for this assessment **(Omrani & Shalhoub, 2015).**

COVID-19 in Egypt: As of the evening of July 22, there were 89745 confirmed cases of Covid-19 and 4440 deaths in Egypt. Egypt is implementing 14-days Quarantine periods and other preventative measures in all cases. **Curfew and Other Measures:** All of the curfew and other precautionary measures announced by the Government of Egypt starting on March 25, 2020 remain in effect. Details of those measures are here: https://eg.usembassy.gov/u-s-citizen-services/covid-19-information/.

The updated changes announced by the Government for Ramadan include shortening the curfew, from 9:00 PM to 6:00 AM, and allowing all shops to open every day until 5:00 PM. Normal commercial air passenger service remains suspended.

The uncertainty and low predictability of COVID-19 do not only threaten people's physical health, but also affect people's mental health, especially in terms of emotions and cognition. People are likely to develop negative emotions (e.g., aversion, anxiety, depression, etc.) and negative cognitive assessment for self-protection. Faced with potential disease threat, people tend to develop avoidant behaviours (e.g., avoid contact with people who have pneumonia-like symptoms) and comply with social norms strictly (e.g., conformity) **(Kiecolt-Glaser, 2002).**

These negative emotions keep people away from potential pathogens when it refers to the disease. However, long term negative emotions may reduce the immune function and psychological immunity of people and destroy the balance of their normal physiological and psychological mechanisms. Therefore, it is essential to understand the potential psychological changes caused by COVID-19 in a timely manner **(Murray & Bangerter, 2016).**

There is no doubt that fears and anxiety are justified, especially when talking about a dangerous virus that threatens human life. Unfortunately, this fear and anxiety is capable for increasing; especially if society

misunderstood the nature of the disease and misjudged the magnitude of the risk resulting from it **(Kobayashi et al., 2020; Lin, 2020).**

Nurses are central to COVID-19 prevention and response efforts. Nursing is the largest healthcare profession in the US and the world, with approximately 3.8 million nurses in the US and over 20 million nurses worldwide. Nurses are providing front-line care in the most patient-facing role to complex COVID-19 cases that require hospitalization. Individuals who have pre-existing health vulnerabilities are at greatest risk for COVID-19 infection, complications or mortality and nursing resources are critical to managing this population **(Jiang et al., 2020; Pan et al., 2020).**

As one of the most trusted health professional groups, nurses also play a key role in providing public education on disease prevention and reducing the spread of misinformation around the outbreak. There has been widespread misinformation on how COVID-19 is transmitted, who is at risk of transmitting or receiving the virus and where outbreaks are occurring. The nurses should have satisfactory level of knowledge regarding COVID-19 to understand the nature of the disease, mode of transmission and it's prevention methods **(Wen et al., 2020).**

Risk perceptions of nurses refer to nurses' intuitive evaluations of hazards that they are or might be exposed to, including a multitude of undesirable effects that nurses associate with a specific cause. Risk perceptions are interpretations of the world. The evaluation of risks is influenced by numerous individual and societal factors, and different social, cultural, and contextual factors influence risk perception. These go beyond the classic hazard attributes and are based on experiences, beliefs, attitudes, judgments, misconceptions, and feelings, as well as wider social, cultural, and institutional processes **(Renner et al., 2008).**

Emotion regulation as a process by which individuals influence what emotions they have, when they have them, and how they experience and express them. Emotion regulation can be aimed at reducing, strengthening, or maintaining the experience of either positive or negative emotions depending on the current needs or goals of an individual. The emotion regulation of nurses who working in isolation hospital caring for COVID-19 patients should be positive regarding desired behaviors or goals for implementing an effective care **(Kobylińska & Kusev, 2019).**

Nurses who work in isolation hospitals and wear protective gear for long hours, which causes dehydration and discomfort have an increased workload which may affect their physical, emotional and social status **(Han et al., 2018).** Working in isolation hospitals are required effective preventive behavior, risk perception and emotional regulation So, studying of nurses' knowledge of the COVID-19, risk perception, preventive behaviors and emotional regulation is necessary since COVID-19 is currently spreading in hospitals and all over the world.

Aims of study:

The current study was conducted for assessing nurses' knowledge, risk perception, preventive behaviors and

emotional regulation regarding COVID-19.

Research questions:

-What are the levels of knowledge regarding COVID-19 among Egyptian nurses working in isolation hospitals?

-What are the levels of risk perception prevention regarding COVID-19 among Egyptian nurses working in isolation hospitals?

-What are the levels of preventive behavior regarding COVID-19 among Egyptian nurses working in isolation hospitals?

-What are the levels of emotional regulation regarding COVID-19 among Egyptian nurses working in isolation hospitals?

-Are there a relation between level of knowledge, risk perception, preventive behavior and emotional regulation regarding COVID-19 among Egyptian nurses working in isolation hospitals?

Subjects and Methods:

- **Research design:**

The study was conducted through using a descriptive exploratory research design.

- **Setting:**

A web-based study was conducted at isolation hospitals in seven Egyptian governorates included Cairo, Alexandria, El-Qalyobia, El-Monoufia, El- Sharkia, El-Fayoum and Luxor governorates based on nurses' filling and submission of questionnaire through questionnaire's URL link.

- **Subjects**

A purposive sampling technique was used to select the study nurses. A total of 140 nurses working in isolation hospitals in Egypt Governorates participated in this study, agreed to participate in the study and responded to the study questionnaire.

Tools for data collection:

The current study depended on the following tools:

I- Nurses' demographic characteristics assessment questionnaire.

II- Nurses' knowledge self-administered questionnaire.

III- Nurses' preventive behavior assessment tool.

IV- Nurses' risk perception assessment tool.

V- Nurses' emotional regulation scale.

I-**I-Nurses' demographic characteristics** assessment questionnaire**:**

It was developed by researchers in Arabic language after reviewing related literatures **(Nemati & Ebrahimi, 2020; Olapegba et al., 2020)** to assess nurses' demographic characteristics. It included 11 items to assess demographic characteristics of nurses. It included age, gender, educational level, marital status, years of experience, residence, source of information, education, work, training courses, place of isolation hospital and exposure to COVID 19 investigations.

II- **Nurses' knowledge self-administered assessment questionnaire regarding COVID-19**: This tool was developed by the researchers in Arabic language based on related literatures **(Olapegba et al., 2020; Hou et al., 2020 and Serwaa et al., 2020)** to assess nurses' knowledge regarding COVID-19. This tool consisted of 15 true and false questions; it included knowledge regarding signs and symptoms of Coronavirus infection, mode of transmission, incubation period, risk factors, complications and management.

Scoring system:

The responses for each question were divided into three responses "True, false or don't know". The correct answer took 1 mark, the wrong answer and don't know took zero. Total scores of knowledge ranged from 15 to zero. The nurses' knowledge is classified as satisfactory: more than 80% (score >12), or unsatisfactory: ≤80% (score ≤ 12).

III- Nurses' preventive behavior assessment tool regarding COVID-19:

This tool was developed by the researchers in Arabic language based on related literatures **(Saqlain et al., 2020; Serwaa et al., 2020 and Taghrir, Borazjani & Shiraly, 2020)** to assess nurses' preventive behaviors regarding COVID-19. This tool was composed of 19 items included hand washing practice, wearing personal protective equipment, and isolation precautions, each statement had five responses (always, often, sometimes, rarely and never).

Scoring system:

The Likert scale responses for each statement were five responses ranged from 5-1 (5 always, 4 often, 3 sometimes, 2 rarely and 1 never). The total score ranged from 19-95. The higher the score is, the higher level of preventive behavior. The nurses' preventive behavior is classified as good: more than 80% (score >75), or poor: ≤80% (score ≤ 75).

IV- Nurses' risk perception assessment tool regarding COVID-19:

This tool was developed by the researchers in Arabic language based on related literatures **(Renner et al., 2008; Olapegba et al., 2020; Saqlain et al., 2020; Serwaa et al., 2020)** to assess nurses' risk perception regarding COVID-19. This scale was composed of 10 statements such as being afraid to be infected with COVID-19 more easily than others, awareness of the importance of nurses role in the agency and awareness of the importance of readiness to training and education, each statement had five responses (always, often, sometimes, rarely and never).

Scoring system

The likert scale responses for each statement were five responses ranged from 5-1 (5 always, 4 often, 3 sometimes, 2 rarely and 1 never). The total score ranged from 50-10. The nurses' risk perception is classified as positive: more than 80% (score >39), or negative: ≤80% (score ≤ 39).

V- Nurses' emotional regulation scale:

This tool was adopted from **Gross and John (2003)** and translated into Arabic language and back translation was done by the researchers. This tool was used to assess emotional

regulation and control regarding COVID 19 and working in isolation hospital stress. It was composed of 10 statements such as "When I want to feel more positive emotion, I change what I'm thinking about", "I keep my emotion to myself and I control my emotions by not expressing them, each statement had five responses (always, often, sometimes, rarely and never).

Scoring system

The Likert Scale responses for each statement were five responses ranged from 5-1 (5 always, 4 often, 3 sometimes, 2 rarely and 1 never). The total score ranged from 50-10. The total score ranged from 50-10. The nurses' emotional regulation is classified as good: more than 80% (score >39), or poor: ≤80% (score ≤ 39).

Ethical considerations:

The researchers clarified the objective and aim of the study to the nurses included in the study by brief explanation at the beginning of the questionnaire. All data was confidential, anonymous and used only for the research benefit and purpose. The submission of the questionnaire's answers by the nurses was considered as consent to participate in the study.

Validity of the study tools:

Validity of the study tools was tested to identify the degree to the used tools measure what was supposed to be measured. The tools were reviewed by a panel of five experts of different specialties (two professors of Medical Surgical Nursing, two professors of Clinical Psychology and one professor of Psychiatric Mental Health Nursing) to test face and content validity. The jury reviewed the tools for objectivity, comprehensiveness, representativeness, clarity and simplicity through scale of 1-3 (1 agree, 2 agree with modification and 3 disagree). Based on the opinion of the jury, some modifications were done in nurses' knowledge tool. The modification was rephrasing of three sentences. 80% of the experts agreed that this scale was valid for testing nurses' knowledge regarding COVID-19.

Reliability of the study tools:

The suitable reliability test was carried out to test tools reliability using internal consistency method. It was obtained by applying this scale to a sample consisted of (30) nurses working in isolation hospitals and were not included in the basic sample. They proved a high degree of reliability with Alpha Cronbach test. Regarding nurses' knowledge alpha=0.815, and by split half method and correcting the length of the scale by using the Guttman equation to correct the length of the scale because the two halves of the scale were not equal, it was (0.722). Regarding preventive behavior scale Alpha Cronbach, which was (0.844), and by the split-half method were (0.784). Regarding risk perception, Alpha =0.715, and by the split-half method using Spearman-Brown Coefficient; it was (0.785). Regarding emotional regulation, alpha = 0.869, and by the split-half method using Spearman-Brown Coefficient; it was (0.747). These results revealed a high reliability coefficient for this scale.

- **Pilot study:**

A pilot study was performed among 10% of nurses (14 nurses) to assess the feasibility and applicability, clarity, relevance, and acceptability of the study tools. The probability and time required to answer the survey were

also evaluated. No modifications were done, and these nurses were included in the study.

- **Field work**

Due to lockdown in Egypt in this critical period to achieve social distance, the researchers used the online data collection method. A Google form was created, and nurses were invited to complete and submit it. A questionnaire link was shared with groups for nurses on Facebook and WhatsApp. Data of the current study was collected during 30 days from 1 to 30 May 2020. The purpose of the study was explained at the beginning of questionnaire to the study subjects. Filling the tools by nurses took about 20-30 minutes then submission was done.

The nurses who filled through URL link were 140 nurses from seven Egyptian Governorates (76 in Cairo, 18 in Alexandria, 7 in El-Qalyobia, 13 in El-Monoufia, 11 in El-Sharkia, 13 in El-Fatoum and three in Luxor).

The researchers used social media such as WhatsApp and Facebook which include more than 110 post graduate nurses and the Facebook group named "Nursing Specialist" that include more than 2060 nurses working in different governorates in Egypt to communicate with nurses who working in isolation hospital during this critical period.

- **Statistical analysis:**

The data were coded and analyzed using the Statistical Package for Social Sciences (SPSS), version 20 (Inc., Chicago, Illinois, USA). Descriptive statistics were done using mean and standard deviation (SD) for the quantitative and frequency and percentage for the qualitative data. Inferential statistics were done using the appropriate statistical tests: t-test, ANOVA test and Number & Percentage. Pearson's Correlation Coefficient (r) test was used to assess the degree of association between the two sets of variables. The observed differences and associations were considered as follows: Non-significant (NS) $P>0.05$, Significant $P<0.05$, and highly Significant (HS) $P<0.01$. Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables. The observed differences and associations were considered as follows: Non-significant (NS) $P>0.05$, significant $P<0.05$ and highly significant (HS) $P<0.01$.

Results:

Table (1) revealed some demographic characteristics of the studied nurses; the mean age of nurses was 29.06 years old, 73.57% of them were females, 47.86% of them were single, 62.2% of them live in urban areas. Regarding to the level of education 52.1% of them had a bachelor's degree in nursing. While, 44.3% worked as head nurses, 40% of them had less than 5 years of experience, and 57.86% had training courses regarding dealing with COVID-19. 60% of the nurses did not expose to COVID-19 investigation in their workplace. Finally, Egyptian Ministry of health was the source of information about COVID-19 for 35.71% of them.

Figure (1) shows that, regarding workplace; 54.29% of nurses was working in Cairo Governorate and 12.86% was working in Alexandria Governorate.

Table (2) shows that good nurse's knowledge regarding COVID-19 appeared in responses of the questions related to symptoms of infection, risk factors of infection, onset of symptoms, and diagnosis of COVID-19 as follows (100%, 95.7%, 87.9%, & 87.1% respectively). In relation to the poor score of knowledge; it was related to the treatment protocol, the number of white blood cells as a response to infection and method of transmission of infection (65 %, 62.1% & 40.7% respectively).

Table (3) clarifies that 88.6% of the nurses always wash their hands before and after handling the patient or belongings, and 85.7% of them wash hands before wearing and after removing personal protective equipment. While 31.4 % of them reduce using public transport. The majority of the nurses did the preventive behavior related to COVID 19 infection.

Table (4) shows that 81.5 of the nurses always realized the importance of education and training in dealing with cases; 70% of them realized the importance of their role in the hospital; 68.6% knew their duties toward the patients with COVID 19; and 52.2% of them were afraid to be infected with COVID-19 more easily than others.

Table (5) presents that, 32.9% of the nurses expressed that "When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm"; and 27.8% of them expressed that, "I keep my emotion to myself"; whereas, 19.3% expressed that, "I control my emotions by changing the way I think about the situation I'm in".

Table (6) it was observed that, 91.43% of the nurses had satisfactory level of knowledge regarding COVID-19. Concerning preventive behavior, 85% of the nurses had good preventive behavior regarding COVID-19. Besides, 62.87% of the nurses had positive risk perception. Regarding emotional regulation 70.71% of the nurses had good level of emotional regulation.

Table (7) presents that, there were no statistically significant differences between all study variables with regard to years of experience (P-value >0.05), while there was a difference between knowledge and emotional regulation concerning the level of education of the participants (P-value<0.001). Furthermore, the participants' knowledge and risk perception had statistically significant differences as regards marital status (P-value<0.001), while other variables were non-significant (P-value >0.05).

Table (8) shows the following: there was a statistically significant positive correlation at the 0.05 level between knowledge and demographic variables such as years of experience, residence and training courses, and there was a statistically significant positive correlation at the 0.01 level between knowledge and the level of education. There was a statistically significant positive correlation at the 0.01 level between preventive behavior and (years of experience and training courses); while there was a statistically significant positive correlation at the 0.05 level between preventive behavior and the level of education. There was a statistically significant positive correlation at the 0.01 level between risk perception, and the level of education; while there was a statistically significant positive correlation at the 0.05 level between risk perception and training courses. There were statistically significant positive correlations at the

0.01 level between emotional regulation and (residence, training courses and the level of education).

Table (9) reveals that there was a statistically significant positive correlation between nurses' knowledge and their preventive behavior, and emotional regulation (p-value at the 0.05 level). While, regarding the correlation between nurses' knowledge and risk perception, the current table revealed a statistically significant positive correlation (P-value at the 0.01 level).

Discussion:

Since the novel corona virus was discovered and started its journey around the world and the WHO declared the disease as a Public Health Emergency of International Concern, **(WHO, 2020)**; there has been great fear among all people about the possibility of a pandemic **(Day, 2020).** Health professionals, especially nurses, who are the mainstay of healthcare workers in quarantine hospitals, have always been at risk of infectious diseases, and the spread of the novel virus has increased the risk several times **(Depoux, et al., 2020).** Therefore, it is important to assess the knowledge, risk perception, preventive behaviour and emotional regulation of the nurses working in Isolation hospitals, regarding COVID-19. With such information, health policy makers can make the proper planning. The findings of the present study revealed that about three quarters of the study sample were females and more than half of them had a bachelor's degree in nursing. These findings were supported by **Nemati and Ebrahimi, (2020),** in their study about the "Assessment of Iranian Nurses' Knowledge and Anxiety toward COVID-19 during the Current Outbreak in Iran."

Regarding the marital status, the present study indicated that about half of the study samples were single and more than half of them lived in urban areas. These results agreed with **Ferdous et al., (2020),** in his study about "Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh": An online-based cross-sectional study. The result of the present study revealed that less than half of the study sample had less than 5 years of experience and more than half of them were not exposed to COVID -19 investigation in their workplace. This study in the same line with **Nemati and Ebrahimi (2020),** in their study about the "Assessment of Iranian Nurses' Knowledge and Anxiety toward COVID-19 during the Current Outbreak in Iran." Additionally, Egyptian Ministry of health was the source of information about COVID-19 for more than one third of the nurses, and more than half of them had training courses regarding dealing with COVID-19. This is in accordance with **Taghrir et al., (2020),** who carried out a study about "COVID-19 and Iranian Medical Students.

The results of the present study showed that, satisfactory level of nurse's **knowledge** regarding COVID-19 appeared in responses of the questions related symptoms of infection, risk factors of infection, onset of symptoms, and diagnosis of COVID-19. In relation to the poor score of knowledge; it was related to the treatment protocol, the number of white blood cells as a response to infection and the method of transmission of infection. These results agreed with **Abdelhafiz et al., (2020); Bhagavathula et al**., (**2020**), in their

study about knowledge and perceptions of COVID-19 among healthcare workers.

Concerning the **preventive behavior** regarding COVID-19 among nurses, the researchers found that the majority of the nurses always wash their hands before and after handling the patient or belongings and the majority of them wash hands before wearing and after removing personal protective equipment. While nearly one third of them reduce using public transport. The majority of the nurses did the preventive behavior related to COVID-19 infection. These findings were compatible with the study which was carried out by **Khader et al., (2020**), in their study about "Dentists' awareness, perception, and attitude regarding COVID-19 and infection control**.**

As regards **risk perception** regarding COVID-19 among nurses, the finding shows that the majority of the nurses always realized the importance of education and training in dealing with cases; more than two thirds of them realized the importance of their role in the hospital; more than two thirds knew their duties toward the patients with COVID-19; and more than half of them were afraid to be infected with COVID-19 more easily than others. These results agreed with **Olapegba, et al**., (**2020**), in their study about "Survey data of COVID-19-related Knowledge, Risk Perceptions and Precautionary Behavior among Nigerians", in which he revealed that most Nigerians had sufficient knowledge on COVID-19, and perceived it as a threat and engaged in precautionary behavior.

Concerning **emotional regulation,** the researchers found that less than one third of the nurses expressed that "When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm," and less than one third of them expressed that "I keep my emotions to myself". Moreover, less than one third of them expressed that "I control my emotions by changing the way I think about the situation I'm in." This is in accordance with **Li et al., (2020),** who carried out a study about "The Impact of COVID-19 Epidemic Declaration on Psychological Consequences". A Study on Active Weibo Users that found an increase in negative emotions (anxiety, depression, and indignation) and sensitivity to social risks, as well as a decrease in positive emotions (Oxford happiness) and life satisfaction after declaration of COVID-19 in China. Also these results agreed with **Hou et al., (2020),** in their study about "Assessment of public attention, risk perception, emotional and behavioral responses to the COVID-19 outbreak".

The results of the present study showed that the majority of the nurses have good levels of information, preventive behaviour and risk perception of dealing with COVID-19 patients, and they also have good levels of emotional organization, emotional flexibility and emotional control, which is reflected positively in dealing with and caring for COVID-19 patients in isolation hospitals. This finding is in contrast with the results of the study conducted by **Rubin et al., (2009)**, in their study about "Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak, and **Renner (2008),** who carried out a study about "Risk perception, risk communication and health behaviour change." These results revealed that the majority of the nurses had good levels

of information, preventive behavior and risk perception of dealing with COVID-19 patients. In addition, they had good levels of emotional organization, emotional flexibility and emotional control, which are reflected positively in dealing with and caring for COVID-19 patients in isolation hospitals.

Regards the differences in the years of experience, the level of education and marital status among nurses; there were no statistically significant differences between all study variables and years of experience, whereas there was a difference between knowledge and emotional regulation with the level of education of the nurses. Besides, the nurses' knowledge and risk perception had statistically significant differences with marital status, while other variables were non-significant. These results agreed with **Nemati and Ebrahimi (2020),** in their study about the "Assessment of Iranian Nurses' Knowledge and Anxiety toward COVID-19 during the Current Outbreak in Iran", and **Li et al., (2020)** who carried out a study about "The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users".

Concerning the correlation between the study variables and demographic variables among the nurses the current study revealed that there was a statistically significant positive correlation between knowledge and demographic variables such as years of experience, residence, training courses, and the level of education. The researchers think that people who are educated are more likely to read from several online articles, newsletters and other viral information on COVID-19 outbreak. These findings are in the same line with **Serwaa et al., (2020),** in his study about "Knowledge, risk perception and preparedness towards coronavirus disease-2019 (COVID-19) outbreak among Ghanaians".

Moreover, there was a statistically significant positive correlation between preventive behavior and (years of experience, training courses and level of education). This finding was in the same line with **Saqlainet al., (2020); Hussain et al. (2018), and Ivey et al. (2019).**

There was a statistically significant positive correlation between risk perception and level of education and training courses. Such results demonstrate that the higher level of education among nurses, leads to increasing in the level of awareness, knowledge and awareness of the danger to them, and thus insight into the nature of patients and the disease they deal with. These results agreed with a lot of previous studies, **Wu et al., (2009)** indicated that in their study their positive a statistically significant correlation between risk perception and level of education, so the high level of education leads to a high level of risk perception in nurses who deal with serious infectious diseases such as SARS. Also **Broxton (2014)** showed that nurses who obtained higher education had the ability to feel satisfied with the job in which they work and have the ability to understand the tasks and duties required in this job, added to that the ability to recognize the risks resulting from dealing with patients with infectious diseases. **Zarzeka et al., (2016)** showed that the high level of education among nurses working with infectious disease patients leads to an

increased ability to perceive the risk in addition to the high level of awareness and knowledge of the nature of the disease and the patients who deal with them. In addition, there was a statistically significant positive correlation between emotional regulation and (residence, training courses and level of education). Health service providers, including nurses who have close and close contact with patients suffering from infectious diseases, including the Corona virus, play an important role in controlling infection and the spread of infectious diseases, and the higher the level of education they have, the more it leads to increased awareness, knowledge and control of this infection, thus increasing the level of organization and stability They have an emotional reaction and are considered warm when dealing with patients with the Coronavirus **(Ahmed et al. 2020)**. It is known that the nursing profession is considered a profession filled with psychological pressures, and the high level of these pressures has a negative impact on the mental health of nurses (Wu et al., 2010). It is known also that the emotional organization includes all the conscious and unconscious strategies that the individual uses to increase, maintain and reduce the cognitive, behavioral and emotional components resulting from the emotional response **(Aazami et al., 2013).**

Donoso et al., (2015) in their study indicated that high rates of emotional regulation among nurses increase their ability to work and motivate in order to face problems that facing them at work, and this positive impact extends to help these nurses to face the stresses, life problems and daily life events, even those events that occur at home and from Here, the emotional regulation of the nurse contributes providing her with a state of emotional stability, especially in dangerous situations and dealing with infectious diseases.

As regards the **correlation between the study variables among the nurses,** our study reveals that there was a statistically significant positive correlation between isolation nurses' knowledge and their preventive behavior, and emotional regulation. While, regarding the correlation between nurses' knowledge and risk perception, there was a statistically significant positive correlation. These findings are contradictory to **Taghrir et al., (2020);** who clarified that there was a significant negative correlation between preventive behaviors and risk perception in their study about "COVID-19 and Iranian medical students: A survey on their related-knowledge, preventive behaviors and Risk Perception". Moreover, this finding is in the same line with the results of the study conducted by **Rubin et al (2009),** in which the two variables were concordant in their study about "Public perceptions, anxiety, and behavior change in relation to the swine flu outbreak: cross sectional telephone survey".

Table (1): Distribution of demographic characteristics of nurses (n=140)

Variables		N	%
1-Age	**Range: 20 to 45**	**M 29.06 S ± 6.17**	
2-Gender	**Male**	37	26.43
	Female	103	**73.57**
3- Marital status	**Single**	67	**47.86**
	Married	58	41.42
	Divorced	15	10.72
4-Residence	**Rural**	53	37.8
	Urban	87	**62.2**
5-Education	**Diploma**	16	11.4
	Institute	18	12.9
	Bachelor	73	**52.1**
	Postgraduate	33	23.16
6- Work	**Nurse**	78	55.7
	Supervisor	62	**44.3**
7-Years of experience	**Less than 5 years**	56	**40**
	From 5 to less than 10 years	41	29.3
	From 10 to 15 years	43	30.7
8- Training Courses	**Yes**	81	**57.86**
	No	59	42.14
9-Exposure to COVID 19 investigations	**Yes**	56	40
	No	84	**60**
10- Sources of information	**World Health Organization**	35	25
	Ministry of Health	50	**35.71**
	Social Media	37	26.43
	Mass Media	12	8.57
	Colleagues	6	4.29

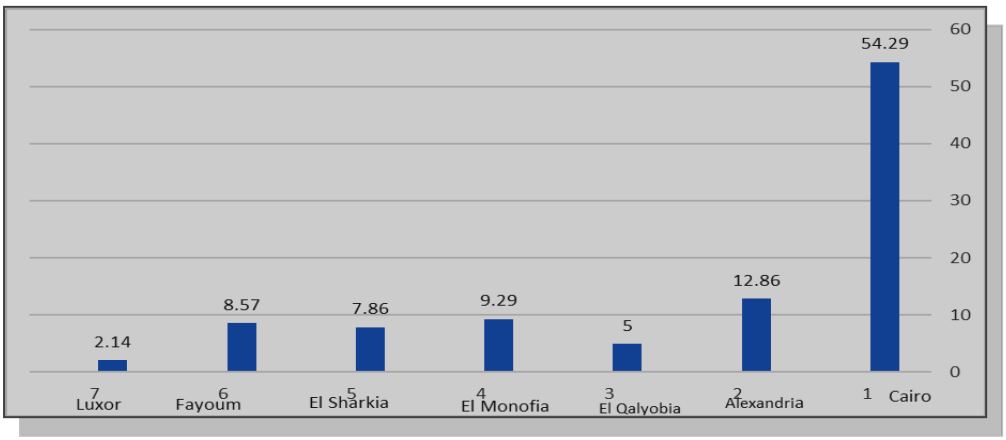

Figure 1: Percentage distribution of nurses in isolation hospitals.

Table 2: Distribution of nurses' knowledge regarding COVID 19 (n=140)

Items of knowledge	True		False		Don't know	
	N	%	N	%	N	%
COVID-19 infection is a viral infection affects the human circulatory system.	119	85	21	15	-	-
The infection is transmitted by indirect contact with respiratory secretions.	108	77.1	32	22.9	-	-
The infection can be transmitted through the stool of the affected person.	74	52.9	57	**40.7**	9	6.4
The incubation period of the virus ranges from two to four days.	115	82.1	25	17.9	-	-
COVID-19 remains alive on the surfaces for several days.	120	85.7	14	10	6	4.3
Symptoms of infection with the COVID-19 include dry cough and dyspnea.	140	**100**	-	-	-	-
COVID-19 symptoms occur gradually.	123	**87.9**	7	5	10	7.1
The symptoms of the COVID-19 appear for everyone who becomes infected.	122	87.1	18	12.9	-	-
Infection is limited to age group more than 55 years.	134	95.7	6	4.3	-	-
Heart disease and diabetes are risk factors for infection with COVID-19.	134	**95.7**	6	4.3	-	-
A complication of the COVID-19 is thrombus formation.	94	67.2	24	17.1	22	15.7
The confirmed diagnosis of the virus is made by chest x-ray.	122	**87.1**	18	12.9	-	-
The number of white blood cells increases in response from the body when infection with COVID-19.	53	37.9	87	**62.1**	-	-
The treatment of COVID-19 is giving the patient antibiotic and antipyretic.	39	27.9	91	**65**	10	7.1
Diphtheria-tetanus-pertussis vaccine leads to prevention of infection with the COVID-19.	108	77.1	12	8.6	20	14.3

Table 3: Distribution of nurses' preventive behaviors regarding COVID 19 (n=140)

Preventive behaviors	Always		often		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%	N	%
I protect myself from illness by hand washing and personal hygiene.	111	79.3	22	15.7	7	5	-	-	-	-
I wash my hands more often.	74	52.9	41	29.2	25	17.9	-	-	-	-
I wash hands before and after handling the patient or belongings.	124	**88.6**	13	9.3	3	2.1	-	-	-	-
I wash hands before wearing and after removing personal protective equipment.	120	**85.7**	17	12.2	3	2.1	-	-	-	-
I ask for the provision of hygiene and protective equipment in the hospital	119	85	11	7.9	10	7.1	-	-	-	-
I wear appropriate personal protective equipment.	100	71.4	22	15.7	14	10	-	-	4	2.9
I wear N95 mask only during intubation, suction and cardio-pulmonary resuscitation.	68	48.6	29	20.7	16	11.4	6	4.3	21	15
I make sure that the patient wears the medical mask to prevent the spread of respiratory droplets while coughing.	104	74.3	22	10.7	11	7.9	3	2.1	-	-
I wear safety glasses or face protection when entering the patient's room or care area.	108	77.1	12	8.6	13	9.3	-	-	7	5
I wear clean gloves when entering the patient's room or care area.	96	68.5	29	20.7	11	7.9	4	2.9	-	-
I wear a clean isolation gown when entering the patient's room or care area.	93	66.5	31	22.1	9	6.4	3	2.1	4	2.9
I avoid actions related to direct contact with patients such as shaking hands or kissing.	110	78.6	23	16.4	7	5	-	-	-	-
I clean and disinfect items that can be easily touched with two hands (i.e. door handles and surfaces).	85	60.7	32	22.9	23	16.4	-	-	-	-
I avoid meeting friends or sitting in crowded places.	77	55	39	27.9	24	17.1	-	-	-	-
I reduce using public transport.	44	**31.4**	30	21.4	43	30.7	19	13.6	4	2.9
I reduce going for shopping.	39	27.9	55	39.2	27	19.3	12	8.6	7	5
I cover my mouth and nose during coughing.	107	76.4	26	18.6	7	5	-	-	-	-
I advise those who suspect that they are suffering from COVID-19 to stick to home isolation.	89	63.6	19	13.6	26	18.6	3	2.1	3	2.1
I encourage the isolation and treatment of people with COVID-19 to limit its spread.	117	83.6	13	9.3	10	7.1	-	-	-	-

Table 4: Distribution of nurses' risk perception regarding COVID 19 (n=140)

Risk perception	Always		often		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%	N	%
1. I am afraid to be infected with COVID-19.	60	42.9	23	16.4	38	27.2	16	11.4	3	2.1
2. I am afraid to be infected with COVID-19 more easily than others.	73	**52.2**	30	21.4	20	14.3	14	10	3	2.1
3. My current health status is the same compared to my health status before the outbreak.	67	47.9	38	27.1	28	20	4	2.9	3	2.1
4. I am worried about COVID-19.	49	35	59	42.2	29	20.7	-	-	3	2.1
5. I listen to incorrect news related to the COVID-19.	19	13.6	22	15.7	46	32.8	32	22.9	21	15
6. I can report the risks which I am exposed to effectively.	42	30	34	24.3	47	33.6	9	6.4	8	5.7
7. I know my duties toward the patients with COVID 19.	96	**68.6**	34	24.3	10	7.1	-	-	-	-
8. I realize the importance of my role in the hospital.	98	**70**	36	25.7	6	4.3	-	-	-	-
9. I realize the importance of education and training in dealing with cases.	114	**81.5**	23	16.4	3	2.1	-	-	-	-
10. I see that COVID-19 will be successfully controlled in the end.	56	40	48	34.4	24	17.1	9	6.4	3	2.1

Table 5: Distribution of nurses' emotional regulation regarding COVID 19 (n=140)

Emotional regulation	Always		often		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%	N	%
1- When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	34	24.2	32	22.9	74	52.9	-	-	-	-
2- I keep my emotion to myself.	39	**27.8**	42	30	55	39.3	4	2.9	-	-
3- When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	34	24.2	32	22.9	74	52.9	-	-	-	-
4- When I am feeling positive emotion, I'm careful not to express them.	24	17.1	23	16.5	56	40	28	20	9	6.4
5- When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	46	**32.9**	52	37.1	39	27.9	3	2.1	-	-
6- I control my emotions by not expressing them.	34	24.3	36	25.7	58	41.4	8	5.7	4	2.9
7- When I want to feel more positive emotion, I change the way I'm thinking about the situation.	31	22.1	48	34.3	52	37.1	9	6.4	-	-
8- I control my emotions by changing the way I think about the situation I'm in.	27	**19.3**	47	33.6	59	42.1	7	5	-	-
9- When I am feeling negative emotions, I make sure not to express them.	34	24.3	22	15.7	75	53.6	9	6.4	-	-
10- When I want to feel less negative emotion, I change the way I'm thinking about the situation.	27	19.3	26	18.6	76	54.3	11	7.9	-	-

Table 6: Levels of variables among the sample (n=140)

Variable	N	%
Knowledge		
• Satisfactory	128	**91.43**
• Unsatisfactory	12	8.57
Preventive behavior		
• Good	119	**85**
• Poor	21	15
Risk perception		
• Positive	88	**62.87**
• Negative	52	37.13
Emotional regulation		
• Good	99	**70.71**
• Poor	41	29.29

Table 7: Relation between nurses' level of education, years of experience, marital status and knowledge, preventive behavior, risk perception and emotional regulation (n=140)

	Variables	Source of variance	Sum of Squares	df	Mean Square	F	p-value
Years of experience	Knowledge	Between Groups	12.542	2	6.271	1.882	.156
		Within Groups	456.429	137	3.332		
		Total	468.971	139			
	Preventive behavior	Between Groups	315.899	2	157.949	2.476	.088
		Within Groups	8740.701	137	63.801		
		Total	9056.600	139			
	Risk perception	Between Groups	7.616	2	3.808	.271	.763
		Within Groups	1927.320	137	14.068		
		Total	1934.936	139			
	Emotional Regulation	Between Groups	127.587	2	63.794	1.693	.188
		Within Groups	5161.234	137	37.673		
		Total	5288.821	139			
Level of education	Knowledge	Between Groups	32.803	3	10.934	3.409**	.010
		Within Groups	436.168	136	3.207		
		Total	468.971	139			
	Preventive behavior	Between Groups	320.154	3	106.718	1.661	.178
		Within Groups	8736.446	136	64.239		
		Total	9056.600	139			
	Risk perception	Between Groups	60.712	3	20.237	1.468	.226
		Within Groups	1874.224	136	13.781		
		Total	1934.936	139			
	Emotional Regulation	Between Groups	851.426	3	283.809	8.698**	.000
		Within Groups	4437.395	136	32.628		
		Total	5288.821	139			
Marital status	Knowledge	Between Groups	56.185	2	28.092	9.324**	.000
		Within Groups	412.787	137	3.013		
		Total	468.971	139			
	Preventive behavior	Between Groups	106.231	2	53.116	.813	.446
		Within Groups	8950.369	137	65.331		
		Total	9056.600	139			
	Risk perception	Between Groups	249.823	2	124.911	10.155**	.000
		Within Groups	1685.113	137	12.300		
		Total	1934.936	139			
	Emotional Regulation	Between Groups	65.249	2	32.625	.856	.427
		Within Groups	5223.572	137	38.128		
		Total	5288.821	139			

F test analysis of variance (ANOVA)** * F-test is significant at the 0.01 level**

Table 7: Correlation between study variables and demographic variables among the nurses

Variables	knowledge	Preventive behavior	Risk perception	Emotional Regulation
Years of experience	0.167*	0.217**	0.119	0.095
Work	0.152	0.127	0.073	0.124
Residence	0.204*	0.116	0.103	0.220**
Training courses	0.199*	0.247**	0.198*	0.214**
Level of education	0.239**	0.198*	0.223**	0.215**

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

Table 8: Correlation between the study variables among the nurses

Variables	knowledge	Preventive behavior	Risk perception	Emotional Regulation
Knowledge	1	.227*	.339**	.211*
Preventive behavior	.227*	1	.173*	.217*
Risk perception	.339**	.173*	1	.219*
Emotional Regulation	.211*	.217*	.219*	1

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

Conclusion:

The majority of the nurses have satisfactory levels of information, good level of preventive behavior and positive risk perception of dealing with COVID-19 patients, and they also have good levels of emotional organization, emotional flexibility and emotional control, which are reflected positively in dealing and caring COVID-19 patients in isolation hospitals. Furthermore, there was a statistically significant positive correlation between isolation nurses' knowledge and their preventive behavior, and emotional regulation (p-value at the 0.05 level). While, regarding the correlation between nurses' knowledge and risk perception there was a statistically significant positive correlation (P-value at the 0.01 level).

Recommendation

The researcher recommended that; Infection control courses should be implemented for all the nurses working in isolation hospitals before dealing with COVID 19 patients. Providing emotional and psychological support for nurses should be done to increase the emotional regulation.

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Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

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