

# Preparedness of isolation hospitals to Covid-19 risk management and its impact on nurses' work engagement during the outbreak

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## Abstract

**Background:** Covid-19 risk management in health care settings is a process that affects every area in the organization system and needs to be integrated into everything the organization does to control or reduce the bad outcomes of the outbreak, so isolation hospitals should be prepared for the possible arrival of (Covid-19) patients, and its nursing staff members are well trained, equipped, and capable of practices with such patients. **Aim:** Evaluate preparedness of isolation hospitals to Covid-19 risk management and its impact on nurses' work engagement during the outbreak. **Research design:** A descriptive cross-sectional study. **Setting:** Isolation hospitals in Egypt. **Subjects:** A convenient sample consisted of 443 nurses working in isolation hospitals. **Tools of data collection:** Two tools were used; Covid-19 risk management and nurses work engagement questionnaires. **Results:** This study revealed that about half (53.7%) of overall of Covid-19 risk management levels were unsatisfactory (<75%), while less than half of them (44.9%) were have moderate level of work engagement during Covid-19 outbreak. **Conclusion:** There was statistically significant positive relationship between Covid-19 risk management and nurses work engagement ( $P=0.000$ ). **Recommendations:** Continuous education programs for nurses complied with redesigned healthcare systems based on Covid-19 risk evidence practice to achieve a sustainable healthcare system with experienced and a skillful nurse in infection controlling.

**Keywords:** Isolation hospitals, Covid-19 risk management, nurses' work engagement

## Introduction

Covid-19 risk management is a method that helps managers make the best use of available resources, the goal of Covid-19 risk management in isolation hospitals is to protect from the human and financial losses which may arise as a result of the outbreak which it is exposed (**Wikipedia, 2021b**).

Risk is described as exposure to the chance of hazard or bad consequences, injury and loss, the future impact of a hazard that is not controlled or eliminated, or the expression of the likelihood and impact of an event with the potential to influence the achievement of an organization's objectives (**Crane, et al., 2013**).

Risk management strategies can be integrated into the day-to-day functions of the isolation hospital. Future issues will address more

advanced principles, including the enterprise risk management model, which merges clinical management with an enterprise-wide process to identify, mitigate and finance risks involving human capital, strategic growth, regulations, and technology (**Lancaster and Stanhope, 2013**).

Covid-19 proactive risk assessment is an approach to identify and eliminate or minimize hazards. So Covid-19 risk management demands proactive rather than reactive strategies, therefore isolation hospitals need to develop a risk management system to provide guidelines for managing the Covid-19 risks, protecting the patients, health care providers, and hospital assets (**Rosc, 2019**).

Covid-19 risk management process is a framework for the actions that need to be taken, five basic steps are taken to manage this risk, it begins with identifying risks, goes on analyze risks, then the risk solution prioritized, a solution is implemented, and finally, monitored the risk(Thomas, 2020).

Isolation refers to the precautions that are taken in the hospital to prevent the spread of an infectious agent from an infected or colonized patient to susceptible persons(Jane., etal., 2007). Isolation practices are designed to minimize the transmission of infection in the hospital, using current understanding of the way infections can transmit. Isolation should be done in a user-friendly, well-accepted, inexpensive way that interferes as little as possible with patient care, minimizes patient discomfort, and avoids unnecessary(Medical-dictionary, 2021).

The isolation policy for severely immune-suppressed Covid-19 patients and those who have received critical care patients admitted to hospital is longer than those in the community, as there are uncertainties about the duration of infectiousness for patients with more severe illness (GOV.UK,2021).

World Health Organization affirmed a public health emergency of international concern on 30 Jan 2020 and later declared a pandemic on 11 March 2020. As of 2021, more than 185 million cases have been confirmed, with more than 4 million confirmed deaths attributed to Covid-19, making it one of the deadliest pandemics in history (Wikipedia, 2021a).

Covid-19 pandemic has impacted nurses physically and psychologically (WHO, 2020b)."Nurses are more vulnerable to Covid-19 infection than the general population due to frequent contact with infected individuals,they have been required to work under stressful conditions without proper protective equipment and make difficult decisions involving ethical implications (WHO2020a, 2021).

Nurses' work engagement is becoming a strategically important factor as a result of a global shortage of nurses who are the largest group of healthcare providers, In the era of Covid-19, critical care nurses are at extremely high risk of burnout, and moral distress and injury; they shoulder the overall challenge of

being the most trusted first responder (William.,etal 2021).

Nurses' work engagement is defined as focus attention, absorption, and available energy directed toward nurses' work-related tasks, which captures both inward and outward focus and is likely to lead to better task performance(Rothbard&Paul, 2012).

Work engagement is a measure of how nurses connect in their work and feel committed to the organization and its goals, nurses who are highly engaged in an activity feel excited and enthusiastic about their role, time passes quickly at work, and devote extra effort to the activity performed (Bargagliotti, 2012). Moreover, work engagement is a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption(Bakker & Xanthopoulou, 2009).Vigor is characterized by a high level of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. Dedication refers to being strongly involved in one's work and experiencing a sense of significance enthusiasm, inspiration, pride, and challenge. Absorption is characterized by being fully concerned and happily engrossed in one work, whereby time passes quickly and one has difficulties with detaching oneself from work(Schaufeli&Bakker, 2010).

Organizational engagement is the level of nurse's commitment and loyalty to their organization (Armstrong,2012). It is a stronger cognitive lead to alignment, focuses on the congruence between nurse's beliefs about where the organization should be heading, what the goals and aspirations of the organization should be, and the actual direction of the organization. Organizational engagement is a stronger affective lead to identification refers to the emotional bond the nurse experience with the organization (Albrecht, 2010)

### **Significance of the Study:**

On May 2020 the International Council of Nurses has collected statistics from 30 countries and has stated that around 90,000 HCWs have been diseased with COVID-19, and hundreds of them have died through the pandemic. Almost

6% of all confirmed cases of COVID-19 were among HCWs (Jewett, et al., 2020). Because nursing staff carries the main burden of working in isolation hospitals, where the increased time of working hours beside the great effort required caring for isolated patients, in addition patients under isolation receive a different level of nursing care. Nursing staff often fear contracting an infection from isolated patients. So, this study aimed to evaluate the preparedness of isolation hospitals to COVID-19 risk management and its impact on nurses' work engagement during the outbreak.

### **Aim of the Study:**

Evaluate preparedness of isolation hospitals to COVID-19 risk management and its impact on nurses' work engagement through the following:

- A. Assessing COVID-19 risk management in isolation hospitals
- B. Assessing nurses' work engagement in isolation hospitals
- C. Assessing the relationship between COVID-19 risk management, and nurses work engagement in isolation hospitals

### **Research questions:**

1. What is the level for COVID-19 risk management in isolation hospitals?
2. What is the level of nurses work engagement in isolation hospitals?
3. What is the relation between COVID-19 risk management and nurses' work engagement in isolation hospitals?

### **Subjects and Methods:**

**Research design:** A descriptive cross-sectional study was done among nurses, who are working in isolation hospitals.

**Setting:** A web-based study was conducted at isolation hospitals in Egypt, based on nurses' filling and submission of questionnaire through questionnaire's

URL link [https://docs.google.com/forms/d/e/1FAIpQLSf0qkqAts6\\_C4etR8iFIA8Ak1w2J0483\\_jcQ60B7VXDPgpCzw/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSf0qkqAts6_C4etR8iFIA8Ak1w2J0483_jcQ60B7VXDPgpCzw/viewform?usp=sf_link).

**Sample:** Convenience sample method of 443 nurses working in isolation hospitals in Egypt and accept to be included in the study

### **Tool of Data Collection:**

Two tools were used to collect data after translation into the Arabic language as follow:

**The tool I: Covid-19 risk management questionnaire:** was developed by the researchers based on the guidelines and reviewing related kind of literature (Helfrich, et al., 2009, AIR, 2010 or 2013, Anne Skinner, 2013, Lei Wang, 2018, WHO, 2019, Saudi Central Board For Accreditation of Healthcare institutions 2020, and The General Authority for Health Accreditation and Control, 2020) it consists of two parts

**Part I** related to personal characteristics data of nurses including; age, gender, marital status, nursing educational level, job title, years of experience, and attending training about COVID-19 risk management. **Part II** concerned with the assessment of COVID-19 risk management it consisted of 73 items grouped into 6 subscales as follow: (1) Risk management committee 9 items, (2) Psychological risk management 13 items, (3) Physical risk management 13 items, (4) Managing environmental and work environment risks 12 items, (5) Risks associated with emergencies 11 items, and (6) Patient risk management 15 items.

**Scoring system:** The scoring system for this tool in which the three possible responses for each statement were: Yes =2, No =1, don't know=0. It was considered as unsatisfactory risk management <75% and satisfactory risk management ≥ 75%.

**Tool II:** Nurses work engagement questionnaire was adopted from (Zhang & Gan, 2005, and Schaufeli & Baker, 2006) to assess nurses work engagement, it consisted of 32 items divided into 3 subscales which are (1) Vigor 11 item (2) Dedication 10 items (3) Absorption 11 item

**Scoring system:** The responses were scored on a five-point Likert scale in which the five possible responses for each statement were rating from Never=1 Rarely=2 Sometimes=3, Mostly=4 Always=5, then never and rarely considered low, sometimes considered moderate and mostly and always considered high.

**Validity and reliability:**

The content validity was tested by a jury of (5) experts in the field from faculties of nursing at Universities of Ain Shams, Zagazig, Mansoura, Helwan, and Port Said to ensure that the tools were relevant, understood, and applicable, the necessary modifications were carried accordingly. Cronbach's alpha a coefficient of internal consistency was used to assess the internal reliability of risk management in isolation hospitals and nurses' work engagement, they were: 0.758 and 0.867, respectively.

#### **Pilot study:**

A pilot study was carried out on 10% of the study sample (44 nurses) to test the questionnaire feasibility, understandability and to estimate the time consumed for filling the forms. Nurses included in the pilot study were excluded from the main study sample.

#### **Fieldwork:**

Due to lockdown all over Egypt in this critical period to achieve social distance, the researchers used the online data collection method. A Google form was created and nurses in isolation hospitals were invited to complete and submit it. Data collection through social media makes it difficult to determine the location of the sample to the specific place where there are no boundaries no breaks. The questionnaire URL link was shared with groups on Facebook, WhatsApp, and Telegram. Data of the current study was collected for 60 days from 15 May to 15 July 2020. The aim of the study was explained at the beginning of the questionnaire to nurses working in isolation hospitals. Filling the tools took about 20-30 minutes then submission was done. The nurses who filled through the URL link were 443 nurses.

#### **Administration and Ethical consideration:**

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

#### **Statistical Design:**

The collected data were organized, tabulated, and statistically analyzed using SPSS software (Statistical Package for the Social Sciences,

version 26, SPSS Inc. Chicago, IL, USA). The categorical variables were represented as frequency and percentage. Continuous variables were represented as mean and standard deviation. An independent t-test was used to test the difference between two means of continuous variables. ANOVA test was used to test the difference between more than two means of continuous variables. Pearson correlation coefficient test was conducted to test the association between two continuous variables. Hierarchical regression analysis was performed to explore the independent variable of work engagement (dependent variable). Statistically significant was considered as ( $p\text{-value} \leq 0.01 \& 0.05$ ).

#### **Results:**

**Table (1):** Shows distribution of study sample regarding their personal characteristics, it appears from the table that (46.7%) of them at the age group 26-35 years. More than half of the studied sample (59.9%) was female, and 52.1% were married. As for nursing educational level, 49.7% of them were bachelor's degrees in nursing. Concerning their job titles (69.5%) were staff nurses. And years of experience (79.0%) ranged from 1-10 years. And the most of studied sample (75.4%) aren't attending training about Covid-19 risk management.

**Table(2):** Shows mean scores of Covid-19 risk management as reported by the studied sample, it appears that the lowest mean scores of Covid-19 risk management subscale ( $12.67 \pm 3.68$ ) related to (risk management committee) followed by ( $15.06 \pm 4.78$ ) to (risks associated with emergencies) subscale, while the highest mean scores ( $23.28 \pm 6.04$ ) related to (patient risk management) subscale.

In addition, psychological risk management takes the highest rank (6) with 68.0 % from all subscales measuring Covid-19 risk management.

**Table 3:** States levels of Covid-19 risk management among the studied sample, it appears from the table that (psychological risks management) is the highest unsatisfactory level (66.6%). about half (53.7%) of overall Covid-19 risk management levels were unsatisfactory (<75%)

**Table 4:** Represents mean scores of nurses work engagement as reported by the studied sample, it appears that the highest rank was for dedication which also has the lowest mean scores ( $36.35 \pm 9.23$ ) followed by vigor ( $38.02 \pm 10.15$ ), while the highest means scores related to absorption ( $38.79 \pm 9.30$ ) from all subscales measuring nurses work engagement during Covid-19 outbreak. **Figure (1):** It appears that 10.2% of the studied sample had low work engagement level, while less than half of them (44.9%) had moderate work engagement levels during covid-19 outbreak.

**Table(5):** Observes mean scores of Covid-19 risk management and nurses work engagement in relation to their personal characteristics; it is clear from the table that there is a highly a statistically significant relationship ( $p \leq 0.01$ ) between mean scores of the overall Covid-19 risk management with age, gender, and years of experience and there is statistically significant relationship ( $p \leq 0.05$ ) with their nursing educational level and job title.

Concerning nurse's work engagement, it is clear from the table that there is a highly statistically significant relationship ( $p \leq 0.01$ ) between nurses' work engagement and their job title, and a statistically significant relationship with their gender ( $p \leq 0.05$ ).

**Table(6):** Shows the relationship between Covid-19 risk management, and nurses' work engagement, it is clear from the table that there is a highly a statistically significant relationship ( $p \leq 0.01$ ) between overall Covid-19 risk management subscales and overall nurses work engagement subscales.

**Table (7):** It is clear from the table that, job title and the overall Covid-19 risk management are predictors of nurses' work engagement ( $p \leq 0.00$ )

**Figure (2):** The figure shows that there was statistically significant positive relationship between Covid-19 risk management and nurses' work engagement ( $P=0.000$ )

**Table (1): Personal characteristics of the studied sample (N=443)**

Variables	N	%
<b>Age years</b>		
▪ <25 years	177	40.0
▪ 26-35	207	46.7
▪ 36-45	48	10.8
▪ >45	11	2.5
<b>Gender</b>		
▪ Male	178	40.1
▪ Female	265	59.9
<b>Marital status</b>		
▪ Single	212	47.9
▪ Married	231	52.1
<b>Nursing educational level</b>		
▪ Diploma degree	69	15.6
▪ Technical degree	126	28.4
▪ Bachelor degree	220	49.7
▪ Post graduate degree (master / doctorate)	28	6.3
<b>job title</b>		
▪ Staff nurse	308	69.5
▪ Head nurse	53	12.0
▪ Nursing supervisor	62	14.0
▪ Nursing director	20	4.5
<b>Years of experience</b>		
▪ 1-10	350	79.0
▪ 11-20	71	16.0
▪ 21-30	22	5.0
<b>Attending training about Covid-19 risk management</b>		
▪ No	334	75.4
▪ Yes	109	24.6

Table (2): Mean scores of Covid-19 risk management among the studied sample(N=443)

Covid-19 risk management subscales	No of items	Min - Max	Mean± SD	Mean percentage	Rank
1. Risk management committee	9	0.0-18.0	12.67±3.68	70.4 %	4
2. Psychological risk management	13	0.0-26.0	17.69±4.45	68.0 %	6
3. Physical risk management	13	0.0-26.0	19.73±4.69	75.9 %	2
4. Work environment risk management	12	0.0-24.0	18.15±4.80	75.6 %	3
5. Risks associated with emergencies	11	0.0-22.0	15.06±4.78	68.5 %	5
6. Patient risk management	15	0.0-30.0	23.28±6.04	77.6 %	1
Overall Covid-19 risk management subscales	73	0.0-146	106.57±22.99	73.0%	

Table (3) Levels of Covid-19 risk management among the studied sample (N=443)

Covid-19 risk management subscales	Unsatisfactory (<75%)		Satisfactory (≥75)	
	N	%	N	%
1. Risk management committee	233	52.3	210	47.4
2. Psychological risks management	295	66.6	148	33.4
3. Physical risk management	191	43.1	252	56.9
4. Work environment risk management	175	39.5	268	60.5
5. Risks associated with emergencies	266	60.0	177	40.0
6. Patient risk management	170	38.4	273	61.6
Overall of COVID-19 risk management	238	53.7	205	46.3

Table (4): Mean scores of nurses work engagement of the studied sample (N=443)

Nurses work engagement subscales	No of items	Min - Max	Mean± SD	Mean percentage	Rank
1. Vigor	11	11.0-55.0	38.02±10.15	69.1 %	3
2. Dedication	10	10.0-50.0	36.35±9.23	72.7 %	1
3. Absorption	11	11.0-55.0	38.79±9.30	70.5 %	2
Overall Nurses work engagement during COVID-19	32	32.0-160.0	113.15±26.83	70.7 %	

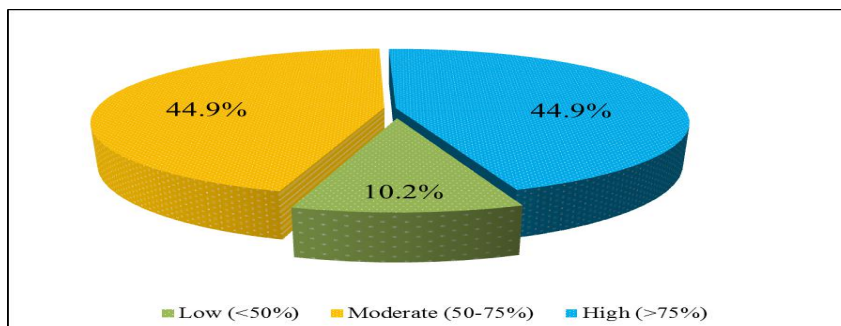


Figure (1): Levels of nurses work engagement of the studied sample (N=443)

Table (5) Mean scores of Covid-19 risk management and nurses work engagement in relation to their personal characteristics (N=443)

Variables	Overall Covid-19 risk management	Overall nurses work engagement
<b>Age years</b>	Mean± SD	Mean± SD
▪ < 25 years	104.86±23.26	114.76±23.93
▪ 26-35	109.99±22.72	113.35±28.43
▪ 36-45	100.81±20.08	109.60±27.25
▪ >45	94.55±26.12	99.09±35.75
<b>F value /P value</b>	3.94/0.009**	1.51/0.21
<b>Gender</b>		
▪ Male	104.13±22.09	111.07±28.62
▪ Female	110.13±23.85	116.20±23.73
<b>T value /P value</b>	2.72/0.007**	1.98/0.04*
<b>Marital status</b>		
▪ Single	107.22±23.86	115.08±25.33
▪ Married	105.97±22.19	111.39±28.08
<b>T value /P value</b>	0.57/0.56	1.44/0.15
<b>Nursing educational level</b>		
Diploma degree	100.88±21.71	113.96±33.97
Technical degree	105.04±21.91	115.33±27.57
Bachelor degree	108.37±23.74	111.25±24.34
Post graduate degree (master / doctorate)	113.25±22.41	116.29±22.14
<b>F value /P value</b>	2.86/0.04*	0.79/0.49
<b>job title</b>		
▪ Staff nurse	104.84±22.83	116.56±23.64
▪ Head nurse	109.79±18.17	98.60±34.10
▪ Nursing supervisor	108.35±26.21	105.50±30.25
▪ Nursing director	119.10±22.36	122.95±18.84
<b>F value /P value</b>	3.07/0.03*	9.99/0.000**
<b>Years of experience</b>		
▪ 1-10	107.65±23.13	113.83±25.85
▪ 11-20	105.76±20.26	113.23±25.93
▪ 21-30	92.00±24.89	102.14±40.84
<b>F value /P value</b>	4.93/0.008**	1.97/0.14
<b>Attending training about Covid-19 risk management</b>		
▪ No	105.93±22.67	114.08±27.39
▪ Yes	108.50±23.91	110.32±24.94
<b>T value /P value</b>	1.01/0.31	1.27/0.21

\* Statistically significant ( $p \leq 0.05$ )\*\* Highly statistically significant ( $p \leq 0.01$ )

Table (6): Relationships between Covid-19 risk management, and nurses work engagement among the studied sample (N=443)

Covid-19 risk management	Nurses work engagement subscales							
	Vigor		Dedication		Absorption		Overall nurses work engagement	
	r	p	R	p	r	p	r	p
1. Risk management committee	0.11	0.02*	0.15	0.002**	0.15	0.001**	0.14	0.002**
2. Psychological risk management	0.17	0.000**	0.19	0.000**	0.19	0.000**	0.20	0.000**
3. Physical risk management	0.22	0.000**	0.29	0.000**	0.32	0.000**	0.30	0.000**
4. Work environment risk management	0.26	0.000**	0.36	0.000**	0.32	0.000**	0.33	0.000**
5. Risks associated with emergencies	0.12	0.009**	0.19	0.000**	0.20	0.000**	0.18	0.000**
6. Patient risk management	0.32	0.000**	0.40	0.000**	0.38	0.000**	0.39	0.000**
Overall Covid-19 risk management	0.26	0.000**	0.34	0.000**	0.33	0.000**	0.33	0.000**

\* Statistically significant ( $p \leq 0.05$ ) \*\* Highly statistically significant ( $p \leq 0.01$ )

Table (7): Factors affecting nurses work engagement among the studied sample (N=443)

	Unstandardized Coefficients		Standardized Coefficients	t	P value
	B	Std. Error	Beta		
Gender	-2.49	2.44	-0.04	-1.02	0.31
job title	-4.46	1.34	-0.14	-3.32	<b>0.001**</b>
Total Covid-19 risk management	.40	.053	0.34	7.64	<b>0.000**</b>

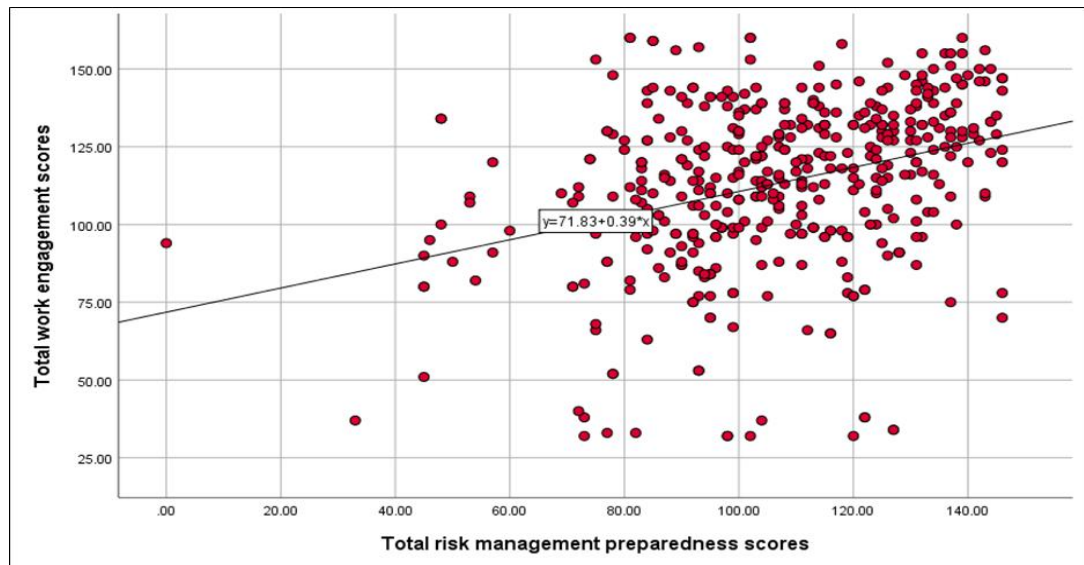


Figure (2): Relationships between Covid-19 risk management, and nurses work engagement among the studied sample (N=443)



## Discussion

Nurses playing a critical role in the Covid-19 outbreak response and are the backbones of a country's defenses to limit or contain the spread of disease. They are on the front lines providing the necessary care for patients with suspected and confirmed Covid-19, Under challenging circumstances, they face higher risks of potential Covid-19 infection in their efforts to protect the greater community, responding to Covid-19 requires critical preparedness including equipping health care workers especially nurses and facility management with the information, procedures, and tools required to safely and effectively work (WHO,2020c).

### Levels of Covid-19 risk management and nurses work engagement

According to the study results, it appears that about half of the studied sample was having an unsatisfactory level of overall Covid-19 risk management these findings answer the first research question. This may be due to that there is a lack of personal protective equipment, and insufficient quantities of medical supplies to confront the pandemic, and the number of cases exceeded the capacity of the isolation hospitals, also exposing to a hard work environment for a long period, all these circumstances make the nurses feel that they are unsafe and able to be infected in any time more easily than others as they are in high risk for infection which subsequently affects their family and relative health which ending by death, this in agreement with (Ewees., et al., 2020) study about Knowledge, Risk Perception, Preventive Behavior and Emotional Regulation regarding COVID-19 among Nurses Working in Isolation Hospitals who reported that more than half of nurses were afraid to be infected and had positive risk perception with Covid-19, also These results agreed with (Olapegba., et al., 2020) in which he revealed that most Nigerians nurses had perceived Covid-19 as a mortal threat and engaged in precautionary behavior. Also, (Haridi., et al., 2016) study about compliance with infection control standard precautions guidelines reported that the healthcare workers are in high compliance with infection control practices to protect themselves and others.

In addition, it is observed that; risks associated with emergencies subscale have the highest rank in between subscales measuring Covid-19 risk management with 60% unsatisfactory level, from the researchers' point of view that in the presence of the pandemic and from the beginning of it, the emergency arise where hand-washing facilities and the triage area of Covid-19 are available, but the remaining obstacle in this emergency is providing the sufficient number of nurses and training them to be qualified to deal with Covid-19 patients, the old modern problem, which was manifested in the presence of Corona virus (Covid-19). So choosing the nurses to work in isolation hospitals is mandatory, there are penalties for those who refuse to work which may reach the final dismissal from work and deprivation of all rights, this obligation makes nurses feel worried about their whole life in general either working in mysterious circumstances with a mysterious pandemic or deprivation and loss of a job future, as they have families, child and personal life beside a national duty for everyone to do in such condition. These findings are in the same line with (Hussain et al., 2018), Saqlainet et al., (2020); and (Ewees et al., 2020), who founded that there was a statistically significant positive correlation between preventive behavior and the presence of training courses, also in congruence with (Miligi., et al., 2020) study "impact of Training Program on Nurses' Knowledge, Attitude and Practices towards Corona virus (COVID-19)" who revealed in that nurses had knowledge deficiency regarding the prevention and control of Covid-19 infection as a majority of nurses did not expose to workshop or orientation program regarding the infection control which affected negatively on the practice and patient outcomes. Moreover, this finding was in the same line with, (Serwaa et al., 2020), in his study about "Knowledge, risk perception and preparedness towards corona virus disease-2019 (Covid-19) outbreak among Ghanaian nurses. Also (Abdel Wahed., et al., 2020) study about "assessment of Knowledge, Attitudes, and Perception of Health Care Workers Regarding COVID-19" who confirmed that it is well known that knowledge of nurses is a very important prerequisite for prevention beliefs, positive attitudes, and promoting positive practices. It also affects their coping strategies to some extent (McEachan., et al., 2016). Inadequate knowledge

with other factors, as type and frequency of exposure, could increase the risk of infection (Jiang et al 2018).

### Levels of nurses work engagement

According to the study findings about half of the nurse's work engagement levels, while less than half of them had a moderate level of work engagement during the covid-19 period these findings answer the second research question. As regards mean scores of nurse's work engagement subscales the result revealed that the highest mean scores were for absorption followed by vigor. This could be attributed to those nurses with experience in dealing with the infectious disease as Covid-19 and selected to work in isolation hospitals have greater absorption or interest and strength with their basement and they are more likely to be enthusiastic and persevere even when things do not go well. This finding goes with (Wonder, 2011) in his study measuring factors that facilitate and inhibit engagement of registered nurses and (Kamal, et al., 2014) study about nurses work engagement, moral distress, and critical reflective practice among nursing working in intensive care units, who found that vigor, was the highest mean scores from all subscales measuring nurse's work engagement

### Relationship between study parameters; Covid-19 risk management, nurses work engagement and their personal characteristics

Concerning Covid-19 risk management, the present study revealed that there is a highly statistically significant relationship ( $p \leq 0.01$ ) between Covid-19 risk management and nurses age, gender, and years of experience, and there is a statistically significant relationship ( $p \leq 0.05$ ) with their nursing education level and job title, this result on the same line with (Milligi, et al., 2020) result who found that there was a significant association between nurses' years of experiences and age with nurses' knowledge, practice, and attitude regarding Covid-19 risk management. Additionally (Elshenawy, et al., 2020) reported that; there was a positive correlation between overall nurses' knowledge, attitudes, practice towards safety measures related Covid-19 pandemic and nurses age, job title, year of experience, and nurse educational level.

While there was no statistically significant relationship between nurses work engagement and their age, years of experience, and nursing educational level, as well there is a highly statistically significant relationship ( $p \leq 0.01$ ) between nurses work engagement and their job title, and a statistically significant relationship with their gender ( $p \leq 0.05$ ).

Concerning the relation between nurses work engagement and their age, the current study finding showed that, no statistically significant relationship was present between nurses work engagement and their age, this could be attributed to that working in isolation hospital is highly dependent on nurses skills and how to offer direct nursing care to the very critically ill patient and critical infectious disease as Covid-19 whether the nurses were young in age and this makes them have a strong immune system and good health that helps them to work hard for a long period inside the isolation hospital, or whether they are elderly, which makes them have experience, efficiency, competency and practicality in dealing with Corona patients in isolation hospitals. The finding was congruent with (Othman, et al., 2013) study about "Resilience and work engagement: A stitch to nursing care quality" who indicated that the staff nurses' age did not make any significant differences towards the variance in work engagement among public hospitals. On the opposite way, (Warshawsky, et al., 2012), and (Kamal, et al., 2014) who reported that nurses working in acute hospital settings showed a statistically significant relationship between work engagement level and their age.

The result of the present study indicated that no statistically significant relationship between nurses works engagements and total years of experience in nursing, this could be attributed to experienced nurses catch the new nurses and makes them involved within a team that will make them feel available to fully engage in their roles and the gain self-confidence and reduce errors through monitoring their performance and giving feedback to one another. This finding was consistent with (Simpson, 2009) who conducted a study in the United States on professional nurses and confirmed that there is no statistically significant relationship

found between years of experience in nursing and nurses work engagement.

As well the present study finding revealed that there is no statistically significant relationship was present between nurse's work engagement and their nursing educational level. This could be attributed to that all nurses who work in isolation hospitals with regardless of their nursing educational levels put themselves in a battle with a hidden enemy that took the lives of many people around the world, which made them in the challenge with time to defeat this enemy, forgetting their educational levels and scientific degrees, that's why they were called the (White Army). The finding was consistent with (Giallonardo, et al., 2010) & Kamal, et al, 2014) who stated that no statistically significant relationship between nurses' work engagement and their nursing educational level. Also, (Othman, et al., 2013) indicated that qualification did not make any significant differences towards the variance in work engagement among public hospital nurses.

### **Relationships between Covid-19 risk management and nurses work engagement**

Findings of the study indicated that there were statistically significant positive relationship between Covid-19 risk management and nurses work engagement, from the researchers point of view that, the more precautions takes to overcome Covid-19 risk and manage it carefully the more the nurses feels engaged, satisfied and feel they are safe from being infected, this may be due to the mortality nature of covid-19 as it is vague disease, no vaccine, no medication these makes them afraid from being infected, generally nurses feel that they have to do a lot of vigor, dedication, and absorption in work to patient, beside their heavy workload which extend for long periods of hours puts the nurses under great challenges, this finding in agreement with study done in China by (Wu, et al, 2018) who reported that despite the situation the nurses being exposed to the suffering patients together with the scarcity of resources and the large total number of worked hours denotes a strong emotional strain, nurses feel that they cannot show their emotional state, and they try to offer their best expression. Psychological risk management subscales have a statistically significant positive relationship with nurses work

engagement subscales as the nurses participate with infection control committee with participation in decision making through the pandemic in addition nurses qualifications and experiences are suitable to deal with Covid-19 patients, all these items make the nurses able to continue to work for long periods and always persevere even when things don't go well which result in psychologically satisfied and engaged in her work.

This finding is not consistent with a study carried out by (Hatch, et al., 2018) study about "Age, burnout and physical and psychological work ability among nurses" who reported that the risk of the psychological problems that have received the lowest scores, perhaps could be due to the pandemic's peak situation; nurses have not yet developed physical symptoms that are the product of the psychological wear to which they are subjected, and that later is when psychosomatic symptoms are likely to emerge.

In addition, job title and overall Covid-19 risk management are predictors of nurse's work engagement among the studied sample ( $p \leq 0.00$ ), these findings are in congruence with (Kamal, et al., 2014) and (Miligi, et al., 2020).

### **Conclusion**

Mean scores of Covid-19 risk management and nurses work engagement in relation to personal characteristics; there is a highly a statistically significant relationship ( $p \leq 0.01$ ) between mean scores of the overall Covid-19 risk management with age, gender, and years of experience and there is a statistically significant relationship ( $p \leq 0.05$ ) with their nursing educational level and job title.

Concerning nurses' work engagement; there is a highly statistically significant relationship ( $p \leq 0.01$ ) between nurses work engagement and their job title, and statistically significant relationship with their gender ( $p \leq 0.05$ ). There was a highly statically significant positive relationship between Covid-19 risk management and nurses' work engagement ( $P=0.000$ ).

### **Recommendations:**

-Continuous education programs for nurses complied with redesigned healthcare systems

based on Covid-19 risk evidence-practice to achieve a sustainable healthcare system with an experienced and skillful nurse in infection control.

- Improving nurses' work environment with a focus on workload, and ranking nurse self-care in association with critical care nursing standards to reduce the negative impact of workload on nurses' work engagement.

-The organizations should design a formal risks management program that can be understood and used by all members of nursing staff

- A long-term policy constructions, advanced human resources planning, and strategies are needed to support healthcare organizations specifically is crucial to respond properly to any expected emergency in the future.

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