Effect of Co-existing Program Related to COVED-19 Prevention on the Performance of Street Sweepers Workers in Ismailia City

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Abstract

Background: COVID-19 is an emerging respiratory infection that was first discovered in December 2019, in Wuhan city, Hubei Province, China. On 11th March 2020 the World Health Organization (WHO) declared the coronavirus COVID-19 outbreak as pandemic. COVID-19 is characterized by rapid transmission and can occur by close contact with an infected person. **Aim:** This study aimed to evaluate the effect of co-existing program related to COVED-19 prevention on the performance among street sweepers' workers in Ismailia City. **Method:** One- group quasi-experimental design with pre-post evaluation, which was conducted in Ismailia city on street sweeper workers in first, second and third district. The studied participants compromised 84 street sweeper workers, was simple random selected from 3 districts in Ismailia city. **Tools:** Two tools were used to collect the data. **1)** an Interview Questionnaire about participants' knowledge, reported practices and attitudes toward COVID-19, **2)** An observation checklist, it was used to assess the practice of participants' related prevention of COVID-19. **Results:** a statistically significant difference between the street sweeper workers' total knowledge, attitudes and practices scores regarding co-existing with COVID-19 prevention pre and post program was detected at $P \leq 0.05$. **Conclusion:** a statistically significant improvement in the street sweeper workers' knowledge, reported practices, attitudes and practices regarding coexist with COVED-19 prevention after the application of the program was remarkable. **Recommendations:** Designing and applying more and continuous co-existing program related to COVID-19 prevention among street sweeper workers in all setting.

Keywords: Co-existing Program, COVID-19, Performance, Prevention program, Street sweeper workers.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has caused a sudden significant increase in hospitalizations for pneumonia with multi-organ disease. COVID-19 is caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). SARS-CoV-2 infection may be asymptomatic or it may cause a wide spectrum of symptoms, such as mild symptoms of upper respiratory tract infection and life-threatening sepsis. COVID-19 first emerged in December 2019, when a cluster of patients with pneumonia of unknown cause was recognized in Wuhan, China. As of July 1, 2020, SARS-CoV-2 has affected more than 200 countries, resulting in more than 10 million identified cases with 508 000 confirmed deaths **(Wiersinga et al., 2020).**

There are two main routes by which people can spread COVID-19: (1) infection can be spread to people who are nearby (within 2 meters) such that droplets could be inhaled into the lungs, and (2) it is also possible that someone may become infected by touching a surface, object or the hand of an infected person that has been contaminated with respiratory secretions and then touching their own mouth, nose, or eyes (such as touching door knob or shaking hands then touching own face) **(WHO, 2020).**

Global efforts have been exerted to prevent the spreading of the disease through political decisions together with personal behaviors, which depend on awareness of the public **(Abdelhafz et al., 2020).** The clinical symptoms of COVID-19 include fever, which is the most common symptom, cough, fatigue, malaise, and shortness of breath. Global concerns about the virus have risen due to its high transmission capability, which may be coupled with morbidity and mortality **(Singhal, 2020).**

Street sweepers carry on an essential role in continuous process of city cleaning. Street

sweepers are exposed to a variety of health risk factors on working environment such as dust volatile organic matter, bio-aerosols and mechanical stress, which cause certain occupational diseases **(Van Kampen et al., 2020).** In developing countries; including Egypt, those workers clean streets and collect wastes manually, with little, or no protective measures against direct dust exposures, wastes contact and injuries at their workplaces **(Eassa et al., 2016).**

In a press conference attended by the number of ministers, **Madbouli** said the world started to move toward plans to "co-exist" with the coronavirus, so the Egyptian state and people must work on restoring normal life, while taking into consideration some preventive measures **(Madbouli, 2020).** Public awareness of dealing with highly infectious respiratory diseases plays a vital role in limiting the spread of the infection, especially in middle and low-income countries, where health systems have, at best, the moderate capacity to respond to outbreaks. In Egypt, by the beginning of April of 2020, there were over 800 confirmed cases, with more than 50 fatalities, and a rapid tendency towards increase **(Egyptian PM, 2020).**

Coexistence with the COVID-19 during this period will depend on people's culture and how they deal with the disease, as well as taking and applying the necessary preventive measures **(Munodawafa et al., 2020).**Community health nurse is a specialty nursing practice that provides for and delivers health and safety programs and services to workers, worker populations, and community groups. The practices include health promotion, maintenance and restoration of health, prevention of illness and injury, and protection from work-related and environmental hazards **(Gebremedhin et al., 2016).**

Significance of the study:

Egyptians must learn to coexist with the coronavirus pandemic as the country pushes forward with efforts to reopen the economy. The official stressed the necessity of a 'gradual return to normal life, but with certain preventive measures,' especially as not all countries can continue imposing lockdowns until a vaccine is developed, due to the economic repercussions. A return of activities or facilities will not be the same before the pandemic **(Arab News, 2020).** Advances in prevention and effective management of COVID-19 will require basic clinical investigation, public health and clinical interventions **(Wiersinga et al., 2020).**

Within the framework of the new precautionary measures taken by the Egyptian Government to avoid the spread of the Coronavirus inside government entities and establishments and its keenness to ensure the safety, security and stability of workers and personnel throughout the country, it is mandatory for all officials to take the necessary pre-emptive actions and precautions to guarantee the continuity of work **(NTRA News, 2020).**

The incubation period of COVID-19 is assessed to be between 2 and 14 days. This means that if a person remains well 14 days after contact with someone with confirmed coronavirus, they have not been infected **(Lauer et al., 2020).** Therefore, this study had been designed to guide, train and implement infection control procedures for protecting the safety of street sweepers' workers.

Aim of the study:

This study aimed to evaluate the effect of co-existing program related to COVED -19 prevention on the performance among street sweepers' workers in Ismailia City

Subjects and Method

Specific objectives:

1. Assessing knowledge, practice, and attitude of street sweepers' workers about COVED -19.
2. Designing Co-existing Program Related to COVED -19 among street sweepers' workers.
3. Implementing of Co-existing Program Related to COVED -19 among street sweepers' workers.
4. Evaluating the effect of Co-existing Program Related to COVED -19 among street sweepers' workers.

The Research hypotheses:

H1. Street sweeper workers have satisfactory knowledge about COVED-19 prevention after implementation of the program than before.

H2. Street sweeper workers have satisfactory practice about COVED-19 prevention after implementation of the program than before.

H3. Street sweeper workers have satisfactory about COVED-19 prevention after implementation of the program than before.

Study design: One-group quasi-experimental design with pre-post evaluation was used. In a **one-group pretest-posttest design**, the dependent variable is measured once before the treatment is implemented and once after it is implemented **Setting**: The present study was implemented in Ismailia city to street sweeper workers in first, second and third district (these districts are responsible for the distribution of sweeper workers in Ismailia city). The first district has 80 sweepers' workers and is distributed to the areas (The area behind the main ambulance center and behind the Shaheed Mohammed Sammak Preparatory School and Saad Zaghloul Street and the mainland area). The second District has 160 sweepers and, it's distributed to the areas (Araisheyat Egypt, El Salam, El Obour). The third district has 90 sweepers and is distributed to the areas of (the land of the elgmaiat and the areas belonging to it and the station of shorouk).

Sample: The sample size was determined using the Epi Info 7 software**.** The study subjects compromised 84 street sweeper workers, was simple random sample selected from 3 districts in Ismailia city.

$$n = \left[\frac{Z_{\alpha/2} + Z_{\beta}}{P_1 - P_2}\right]^2 (p_1 q_1 + p_2 q_2)$$

(Dawson,2004)

Where

- n= sample size
- Z α/2 = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)
- Zβ = 0.84 (The critical value that separates the lower 20% of the Z distribution from the upper 80%)
- p1 = proportion post intervention (.29)
- p2 = proportion pre-intervention (.48)
- q = 1-P
- **n= 84**

(Nour et al., 2017)

Tools for data collection:

1) Interview Questionnaire for street sweeper worker's:

This tool was developed via the researchers in an Arabic language afterward revising the significant interrelated literatures, **(Abdel Wahed et al., 2020; Abdelhafiz et al., 2020 & Kasemy et al., 2020).** It comprised of four parts, as the following:

Part I: Street sweeper worker's socio-demographic characteristics:

It comprised socio-demographic characteristics about street sweeper worker's age, gender, marital status, education level, work status, region of residence, number of family members and income level

Part II: Knowledge of the street sweeper worker's regarding COVID-19:

It contained questions that assess knowledge of street sweeper worker's regarding COVID-19 such as modes of transmission, clinical symptoms, treatment, risk groups, isolation, prevention and control.

For scoring system, the knowledge of the studied street sweeper worker's was consisted of 25 items, answered on a true/false basis and an additional "I don't know" option. A correct answer assigned 1 point and an incorrect/unknown answer assigned 0 point. The total knowledge score ranged from 0 to 25 points. Then score calculated and categorized into low (poor knowledge) for those who had score < 50%, moderate (Fair knowledge) for score ranged from 50% to 74.9% and high (good knowledge) for those who had score of ≥ 75%.

Part III: Practices of the street sweeper worker's regarding co-exist with COVID-19:

It contained questions that assess practices and appropriate practices to co-exist with new situation as they report. This part included 13 items, such as wear mask, hand washing, use alcohol based hand rub, touch the face without hand wash, disinfect for surfaces, physical distance, use other peoples tools, ventilate the house etc..,).

For scoring system, the reported practices of the studied street sweeper worker's was consisted of 13 items, answered yes or no, the correct answer was assigned 1 point and an incorrect answer was assigned 0 point. The total scored of practice was (13) point. Then score calculated and

categorized into ≥ 50% considered satisfied and < 50 % unsatisfied.

Part IV: Attitudes of the street sweeper worker's regarding COVID-19:

Attitudes toward COVID-19, using a five-point Likert scale based on **(Abdelhafz et al., 2020)**. It consisted of 17 Points; the studied street sweeper workers were choices from "strongly disagree," "disagree," "undecided," "agree," or "strongly agree".

For scoring system, using a five-point Likert scale in the section on attitude, (zero) for strongly disagree, (1) for disagree, (2) for undecided, (3) for agree, and (4) for strongly agree a score of one given to answers that reflected good attitude, and a score of zero was given for answers that reflected bad attitude. Then score calculated and categorized into ≥ 60% considered positive attitude and < 60 % Negative attitude.

2) Observational Checklist:

An observation checklist was adapted from **Wilkinson et al. (2019**). It's filled in by the researchers, it was used to assess the practices of street sweeper worker's related prevention of COVID-19 such as (wearing and remove mask and gloves, hand washings and Alcohol-Based Hand-rub).

For scoring system, the observational checklist used to assess the practice of participants' related to wearing and remove mask, and hand washings, checked as done = 1 / not done = Zero and calculated the total score. Then score calculated and categorized into ≥ 50% considered satisfied and < 50 % unsatisfied.

Tools validity and reliability:

Validity was determined by a panel comprising three experts who decided that the translated study tools were valid. A panel comprised two assistant professors from the Family and Community Health Nursing Department and one from the Medical and Surgical Nursing Department, Suez Canal University. They were requested to express their opinions regarding lucidity, relevance, comprehensiveness, and construction of the translated tools. The phase of proving validity of the study tools continued for one month.

Reliability was established by assessing Cronbach's alpha coefficient. The tools were proved to be reliable, as the tool (1) Part II, assess knowledge of street sweeper worker's regarding COVID-19 confirmed an excellent internal consistency as Cronbach's α was 0.93. The reliability of the tool (1) Part III namely; assess practices and appropriate practices to co-exist with new situation as they report was reliable as α = 0.89, and the tool (1) Part IV namely; Attitudes toward COVID-19, using a five-point Likert scale showed an extremely high and acceptable internal consistency with α = 0.98. Also, the values of Cronbach's alpha coefficient for tool (2) an observation checklist to assess the practices of street sweeper worker's related prevention of COVID-19 was quite acceptable with α = 0.89. The phase of ascertaining reliability of the study tools was conducted within a month.

Pilot study: a pilot study was implemented on 10% of the studied street sweeper worker's (No.8) who were selected randomly. It was done in order to ascertain the significance, clarity and practicability of the used study tools, and to estimate the time required to fill in the study tools. The pilot study was conducted in the first of August 2020 for two weeks**.**

Procedure: An official permission was obtained after the dean of the Faculty of Nursing sent an official letter to the directors of the first, second and third district in Ismailia city. Then the program was implemented. The preparation period, data collection, implementation and evaluation of a program continued for six months since the first of September 2020 to the end of February 2021. The program moved out through four phases, assessment, planning, implementation and evaluation as follows:

Assessment Phase: The researchers initiated to collect the data after an official approval was obtained to conduct the study and finalization of the data collection tools. Data were collected from street sweeper workers who were working in the previously mentioned settings after the taking their consent to conduct the study and explain the aim of the study. The assessment phase (pre-test) was done on 8 groups and took four weeks to be fulfilled, two group / week, one visit for each groups, each visit took around 30-45 minutes were allocated for data collection, around 8-10 street sweeper workers were assessed per visit.

Planning Phase: Co-existing program related to COVED-19 prevention and a simple booklet were developed based on the baseline information gathered during assessment phase (pre-test) and review of recent literature **(Wiersinga, etal 2020).** The planning phase took around four weeks. The content of the program was including

modes of transmission, clinical symptoms, risk groups, isolation, prevention and control measures.

Implementation Phase: Co-existing program related to COVED-19 prevention was conducted through six sessions (2 theoretical & 4 practical), each session was taking approximately 45 minutes for each group. Every week take two groups, each group have two sessions / week and all groups take about four weeks to complete the theoretical sessions. For the practical sessions, every week take two group, each group have two sessions / week and all groups take about two month to complete the theoretical sessions.

To start with the first session, the objectives of the program were clarified. Besides, the street sweeper workers were informed concerning the sessions' time, the stages of the study, content, and extent. Each session started with a summary regarding what was provided during the preceding session and objectives of a new one. The street sweeper workers were permitted to request any explanation or clarification of any point involved in the sessions. The program was presented in a clear and concise form focusing on the program objectives, using different teaching methods such as modified lecture and small group discussion, and appropriate media as printed booklet and videos.

Evaluation Phase: The effectiveness of the program on performance among street sweeper's workers was evaluated immediately subsequent to the implementation of the program (post-test) by means of the pre-mentioned tools. The evaluation phase (post-test) was done on 8 groups and took four weeks to be fulfilled, two group / week, one visit for each groups, each visit took around 30-45 minutes.

Ethical considerations: The study protocol was approved by the Scientific Research Ethics Committee of the Faculty of Nursing; Suez Canal University. An informed consent was obtained from the street sweeper workers after complete description of the purpose and nature of the study. Confidentiality of the collected data and anonymity were strictly maintained through a code number affixed to each the street sweeper workers questionnaire.

Voluntary participation of the street sweeper workers was confirmed as they were well-informed that they had the freedom to withdraw from study at any phase. Finally, the process of data collection and program implementation were not disturbing the harmony of the work of the above-mentioned settings.

Statistical analysis: Data entry and statistical analysis were done by means of statistical package for social science (SPSS) version (25.0). Data were presented using descriptive statistics including means and standard deviations for quantitative variables, plus frequencies and percentages for qualitative variables. Qualitative categorical variables were compared utilizing Chi-square test. Continuous data were normally distributed. Pearson coefficient to correlate between two normally distributed quantitative variables. Statistical significance was considered at P-value < 0.05, and highly significant at < 0.001.

Results:

Tables 1, revealed the street sweeper workers personal characteristics, the mean age were 47.46±6.87. More than half of them (53.6%) were men. Approximately half (45.2%) of them live in urban areas and more than two thirds (67.9%) were married.

Tables 2, showed that, most of the street sweeper workers (95.2%) hadn't enough monthly income, and more than one third36,9 % of them had chronic illness.

Figure 1, illustrated the street sweeper workers education, about one thirds (31%) of them qualified by secondary degree.

Tables 3, denoted total mean scores of street sweeper workers knowledge regarding coexist with COVID-19, there was statistically significant different ($p \leq 0.05$) improvement in the mean scores of total knowledge among the street sweeper workers regarding coexist with COVID-19 post implementation of the program compared to pre implementation of the program.

Figure 2, illustrates that, about three quarter (73.8%) of the street sweeper workers had a good level of knowledge regarding COVID-19 post implementation of the program.

Tables 4, displayed reported practices of the street sweeper workers regarding coexist with COVID-19. An obvious statistically significant difference (<0.05) improvement in the total reported practices after program implementation.

Tables 5, demonstrated attitudes of the street sweeper worker's regarding coexist with COVID-19. A statistical significant improvement was detected in the street sweeper workers attitudes

scores after program implementation as (p= ≤ 0.05).

Tables 6, the findings, obtained by the observational checklist used to assess the practice of the street sweeper workers related to wearing and remove mask, wearing and remove gloves and hand washings, indicated that, there were statistically significant different (p≤0.05) improvement in the mean scores of total practice of the street sweeper worker's regarding coexist with COVID-19 post implementation of the program.

Figure 3, clarify that, most (92.9%) of the street sweeper workers had satisfactory practice regarding coexist with COVID-19 post implementation of the program.

Tables 7, demonstrated the relationship between the street sweeper workers total satisfactory knowledge scores and their total satisfactory practice post implementation of the program. As presented in the table, there were statistically significant relations between the street sweeper workers total satisfactory knowledge scores and their total satisfactory practice post implementation of the program.

Table 8, illustrates that, correlation between total knowledge, total practice and total attitude of the street sweeper workers post implementation of the program. As described in the table, there was statistically significant positive correlation between total mean score of knowledge and total mean score practice among the street sweeper workers post implementation of the program as (r=0.834) at P <0.001.

Besides, a positive correlation was detected between the street sweeper workers total mean score of knowledge and total mean score of their attitude post implementation of the program as (r=0.129) at P <0.247.

Table (1): Frequency& percentage distribution of the street sweeper workers according to their personal characteristics (n=84)

Variables	Total Sample(n=84)	
	No.	%
Age (Years)		
30: < 40	9	10.7
40: < 50	41	48.8
50: < 60	34	40.5
Mean ± SD Range	47.46±6.87 30-59	
Gender		
Male	45	53.6
Female	39	46.4
Residence		
Rural	33	39.3
Urban	38	45.2
Poor districts in urban areas	13	15.5
Marital status		
Single	2	2.4
Married	57	67.9
Divorced	2	2.4
Widowed	23	27.4

Table (2): Frequency& percentage distribution of the street sweeper workers according to their monthly income & chronic illness (n=84)

Items	Total Sample (n=84)	
	NO.	%
Income (monthly)		
Not Enough	80	95.2
Enough for usual daily expenses	4	4.8
Have any chronic illness		
Yes	31	36.9
No	53	63.1

Figure (1): Distribution of the street sweeper workers regarding their level of education (n=84)

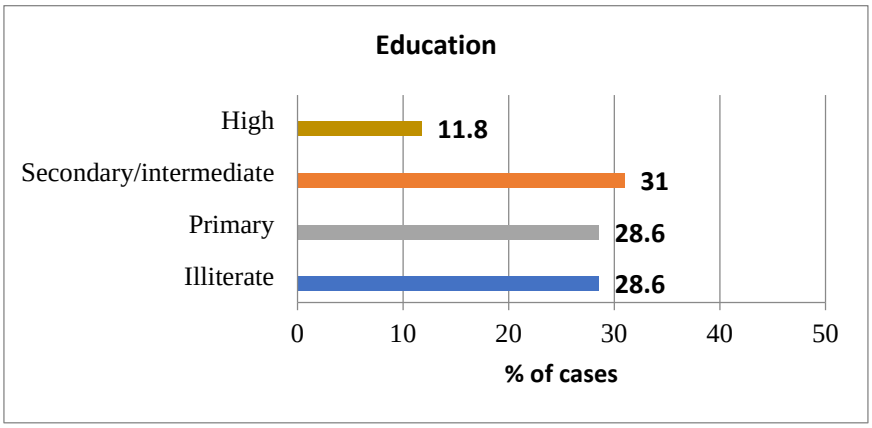

Table (3): Mean scores of the street sweeper workers knowledge regarding coexist with COVID-19 (n=84).

Items	Pre-intervention	Post-intervention	test	P value	Effect size (d)
	Mean ±SD	Mean ±SD			
1. Definition (3 questions)	1.48±1.08	1.03±.47	4.09	**<.001***	.45
2. Mode of transmission (9 questions)	3.01±3.00	6.13±2.40	8.64	**<.001***	.94
3. Signs and symptoms (3 questions)	1.40±1.28	2.61±.82	8.56	**<.001***	.93
4. Complications (2 questions)	.81±.95	1.61±.71	7.20	**<.001***	.72
5. Prevention (5 Questions)	2.26±1.90	2.70±.72	2.08	**.04***	.23
6. Co-existing knowledge (3 Questions)	1.32±1.29	4.15±1.56	14.68	**<.001***	1.61
Total Score (25 Questions)	10.29±7.56	18.23±5.76	8.99	**<.001***	1.1

is paired sample t test *: Statistically significant at $p \leq 0.05$**;** d is Cohen's effect size

Figure (2): Illustrates of total knowledge levels of the street sweeper regarding coexist with COVID-19 pre and post program (n=84).

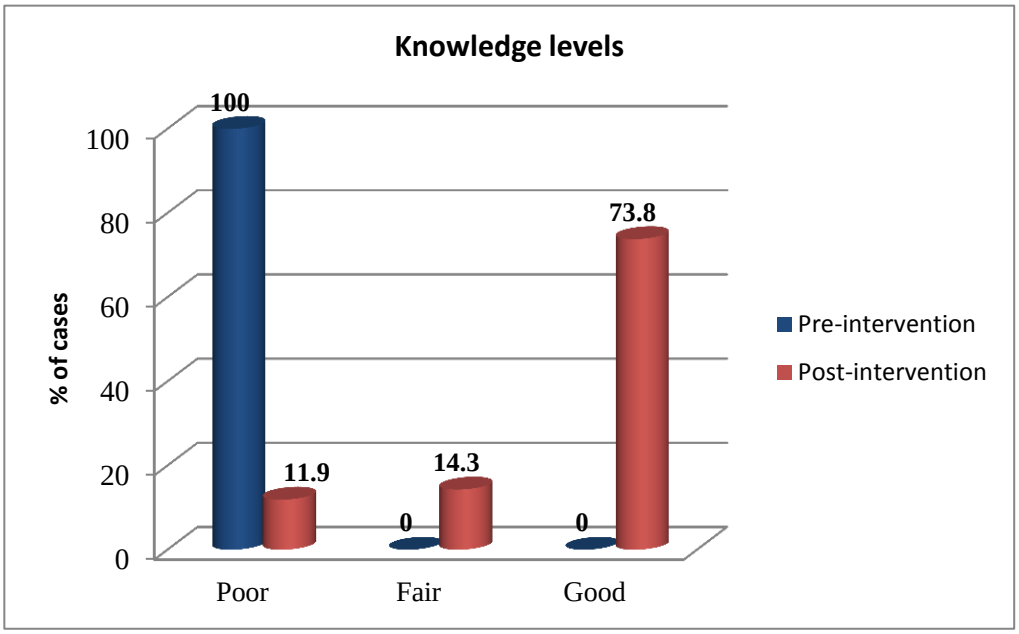

Table (4): Street sweeper workers reported practices regarding coexist with COVID-19 pre and post program (n=84)

Items	Pre-program	Post-program	Z	P value
	Median	Median		
1. Hygienic practices - wearing mask, hand washing and cleaning the surface	1	5	5.19	**<.001***
1. Coexisting practices - Physical distancing, using other people's tools, shaking hands with others, ventilating the house	1	6	6.35	**<.001***
Total reported practices	2	10	6.99	**<.001***

Wilcoxon Signed Ranks Test is used; P value is significant <.05

Table (5): Mean scores of the street sweeper workers attitude regarding coexist with COVID-19 pre and post program (n=84).

Items	Pre-intervention		Post-intervention		t test	P value
	Mean	SD	Mean	SD		
I think this virus was initially designed as a biological weapon	2.35	.685	2.50	.570	1.846	**<.001***
Do you have confidence that we can win the battle against the emerging corona virus?	2.29	.785	3.01	.703	8.052	**<.001***
I think this disease is serious	2.38	.727	3.04	.630	7.118	**<.001***
Infection with the coronavirus is associated with stigma (e.g. people who are infected feel ashamed because people are afraid of them)	2.27	.797	1.58	.960	5.178	**<.001***
I am worried that I or my family could get this virus	2.31	.776	2.83	.487	6.523	**<.001***
When I meet my colleagues and friends, I always greet them with a handshake	2.31	.776	1.40	.762	8.280	**<.001***
When I meet my friends and colleagues, I always greet them with a hug	2.36	.688	1.24	.939	9.215	**<.001***
I wash my hands regularly for an adequate period of time	2.31	.760	2.99	.668	7.065	**<.001***
I usually wear a face mask to protect myself from infection	2.18	.747	2.82	.519	8.159	**<.001***
If I find out that I have come into contact with someone who has the virus, I will inform the health authorities	2.21	.793	3.00	.711	8.322	**<.001***
If I have any of the symptoms associated with the disease, I will report it to the health authorities	2.18	.779	2.99	.736	8.804	**<.001***
If I find out that I have come into contact with someone who has the virus, I agree to be isolated at home for a certain period of time until it is proven that I am free of the disease	2.26	.808	3.00	.711	7.812	**<.001***
If I find out that I came into contact with someone who has the virus, I agree to be isolated in the hospital for a certain period of time until it is proven that I am free of the disease	2.25	.674	2.94	.608	8.696	**<.001***
If a lab test is available to detect the virus, I'm willing to do it	2.31	.791	3.31	.791	9.578	**<.001***
I usually follow the updates about the virus spread in my country	2.25	.742	2.77	.717	5.602	**<.001***
If a lecture on the virus is being held near me, I will attend it	2.27	.750	3.12	.751	8.623	**<.001***
If pamphlets with information about the disease are distributed, I will read them and follow the instructions listed	2.25	.742	3.13	.741	8.999	**<.001***
Total attitude	2.27	.69	2.68	.46	5.64	**<.001***

^{MC} is Monte Carlo for Chi square test; # is paired sample t test *: Statistically significant at $p \leq 0.05$
SA = Strongly Agree, A = Agree, N = Not sure, DA = Disagree, SDA = Strongly Disagree

Table (6): Mean scores of the street sweeper workers practices regarding coexist with COVID-19 pre and post program (n=84).

Items	Pre-program	Post-program	test	P value	Effect size (d)
	Mean ± SD	Mean ± SD			
1. Wearing masks	2.44±1.75	6.43±2.96	10.93	**<.001***	1.6
1. Wearing gloves	5.17±2.94	7.38±3.48	4.72	**<.001***	.7
1. Hand washing	6.25±3.17	14.82±6.10	12.90	**<.001***	1.8
Total practice Score	13.85±6.73	28.63±12.02	10.85	**<.001***	1.1

is paired sample t test *: Statistically significant at p ≤ 0.05; d is Cohen's effect size

Figure (3): Illustrates of total practice levels of the street sweeper regarding coexist with COVID-19 pre and post program (n=84).

Table (7): The relationship between street sweeper workers total satisfactory knowledge scores and their total satisfactory practice post implementation of the program (n=84)

Items		Satisfactory total knowledge score						
		Post Knowledge score (n=84)						MC P value
		Poor (10)		Fair (12)		High (62)		
		N	%	N	%	N	%	
Satisfactory total Practice Score								
post-practice	Satisfactory	6	7.7	11	14.1	61	78.2	**.001***
	Unsatisfactory	4	66.7	1	16.7	1	16.7	

MC is Monte Carlo for Chi square test & Significant at p < 0.05

Table (8): Correlation between total knowledge, total practice and total attitude of the street sweeper workers post implementation of the program (n=84)

Items	Total practice		Total attitude	
	R	P value	R	P value
Total knowledge	.834	**<.001***	.129	.247

r is Pearson correlation & P value is significant (two tailed significance) ≤.05

Discussion:

COVID-19 disease was first identified during the outbreak of severe acute respiratory syndrome in Wuhan, China, in December 2019. On the 11th of March 2020, the World Health Organization (WHO) characterized the disease as the first pandemic caused by a coronavirus. The disease had spread in more than 200 countries with a mortality rate of about 5.7% **(Baud et al., 2020).**

Egypt is one of the biggest countries in the Arab region, Africa and the Middle East. With more than 100 million citizens, Egypt is among the most populous countries in Africa. This high number of citizens could be associated with a great risk of spread and mortality, especially among persons with chronic diseases. Global efforts have been exerted to prevent the spreading of the virus. These efforts include political efforts by the governments, together with personal attitude and behaviors, which depend on the awareness of the general public about the disease **(Central Agency for Public Mobilization and Statistics Website (2020).**

In this study, a decrease in monthly income was found to be associated with poor knowledge and poor practice. This is supported by other studies in Malaysia **(Azlan et al., 2020)** and United States **(Wolf et al., 2020)** which reported that participants with low income showed poor knowledge of COVID-19. Moreover, the study in China, **(Zhong et al., 2020)** who reported that high income was associated with good knowledge and appropriate practice of COVID-19.This is due to the fact that economic status is the main determinant of behavior and actions for maintaining one's health. It is shown that low monthly income leads to a feeling of inability to change one's behavior or condition, and finally inability of executing recommended protective behaviors of COVID-19 **(Park et al., 2018).**

From the researcher's point of view, an increase in income leads to the possibility of satisfying needs for protecting COVID-19. For example, buying facemask and hand sanitizer is possible when there is adequate income. Moreover, Individuals with low income will fail to stay at home, rather prefer to continue their daily activities to satisfy their basic needs during the transmission period.

The educational level can be considered a determinant factor in the effectiveness of the educational program; the present study illustrated that one thirds of them qualified by secondary degree. Moreover, the difference is statistically significant. This can be justified by the fact that the more educated have a better ability to get process and comprehend basic health information and services needed to make appropriate health decision. This is in accordance with that of other studies **Abdelhafiz et al. (2020), Ferdousa et al. (2020), and Zegarra et al. (2020),** which revealed that those with the highest levels of education have an advantage in terms of greater understanding of COVID-19, its mode of transmission, and methods of prevention.

From the researcher's point of view, when someone gets more educated he/she will have a better understanding of control measures and preventive strategies related to COVID-19, and the ability to practice recommendations to protect COVID-19 will increase. Furthermore, education results in better information collection habit and lead to efficient use of health inputs for prevention of COVID-19.

The present study demonstrated some deficiency in the knowledge's of studied sample concerning COVID-19. This was particularly evident in their knowledge about atypical presentations of COVID-19 and its precautionary measures before the implementation of the

educational program. However, significant improvements in knowledge occurred after implementation of the program and less than three quarter of the studied sample had a good level of knowledge regarding COVID-19 post implementation of the program. This was noticed in the all areas assessed as well as in total knowledge. This finding is consistent with the results of the studies of, **Bezerra (2020),** who found that before the intervention, participant's knowledge about Middle East respiratory syndrome coronavirus improved substantially after the intervention.

The studied sample showed a positive attitude toward COVID-19, and post implementation score is significantly higher than the pre implementation one. This finding is consistent with the results of studies of **Bezerra et al. (2020),** who reported that the participant's attitudes increased significantly after the intervention.

The good knowledge and positive attitude translate into good practices during the COVID-19 outbreak **(Zhong et al., 2020).** Therefore most of the studied sample had satisfactory practice regarding COVID-19 post implementation of the program. This result may be explained by the fact that practices toward COVID-19 is simple, easy to learn, and easy to practice. These findings are in line with other studies conducted in Saudi Arabia by **Almutairi et al. (2015),** who found that the participants' self-reported infection management activities in relation to Middle East respiratory syndrome coronavirus infection were significantly improved after the intervention.

In addition, the results of the studies done in **Bangladesh by Haque et al. (2020)** who studied knowledge, attitude and practices (KAP) towards COVID-19 and assessment of risks of infection by SARS-CoV-2 among the Bangladeshi population and noticed that almost all participants washed their hands frequently, avoided crowded places, and avoided shaking hands.

Also there were statistically significant correlation between total knowledge and total practice of studied sample post intervention. people with poor knowledge were more likely to have poor practice. This finding is consistent with a study in China, **Zhong et al. (2020).**From the researcher point of view , this might be due to the reason that knowledge is the main modifier of positive attitudes toward COVID-19 preventive practices and these activities are practiced after having awareness and knowledge of activities to be performed. Knowledge of COVID-19 decreases the risk of infection by improving participant's practices.

Conclusion:

In deduction, based on the present study findings and research hypotheses, a statistically significant improvement in the street sweeper workers knowledge, reported practices, attitudes and practices regarding coexist with COVED - 19 after implementation of the program than before had been noticed.

Recommendation:

From the results of the existing study, the following recommendation is suggested:

Continuous awareness of street sweepers in their workplaces regarding preventive measures against the Corona virus**.**

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