

Effect of Educational Intervention on Knowledge and Attitudes Regarding Human Monkey Pox among Primary School Teachers in Rural Areas at Minia District

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Abstract

Background: Recent reports of multiple Human Monkey Pox (HMPX) cases from several non-endemic nations in Europe, North America, and Oceania raise the possibility of an unexpected and concerning public health problem. **Aim of the research:** To examine the effect of educational intervention on knowledge and attitudes regarding Human Monkey Pox among primary school teachers in rural areas at Minia district. **Research design:** A quasi-experimental approach was utilized. **Setting:** The research was conducted at 5 governmental primary schools in rural areas at Minia district-Minia Governorate in Upper Egypt. **Sample:** A systematic random sampling of 180 primary school teachers. **Tools of data collection:** A self-administered questionnaire included the following parts: Part I: socio-demographic characteristic. Part II: participants' knowledge. Part III: participants' attitude. **Result:** About 18.3% of the studied teachers have good knowledge about human monkey pox pre teaching program compared with 71.1% of them have a very good knowledge post-teaching program. There are statistical significant differences in the subjects' level of knowledge and attitude regarding Human Monkey Pox after implementation of the educational intervention while the p value is 0.0001, 0.0001 respectively. **Conclusion:** Implementation of educational intervention was effective in raising the studied subjects' awareness regarding Human Monkey Pox. **Recommendation:** Continuous implementation of educational interventions regarding Human Monkey Pox among school population to enhance public awareness, raise the precautionary behaviors as well as mitigate the potential crisis.

Keywords: Attitudes, Educational Intervention, Knowledge, Primary School, Rural Areas & Teachers

Introduction

We are currently dealing with an illness that could endanger the entire planet's population after the COVID-19 pandemic shook the world in early 2020 and has not yet been eradicated. The Human Monkey Pox (HMPX) infection was classified as a Public Health Emergency of International Concern (PHEIC) on July twenty -three, 2022, by the (WHO) World Health Organization (Salim et al., 2022).

The monkey pox virus is primarily endemic in West as well as Central African nations, while there have been isolated patients recorded out of these areas. The majority of these uncommon instances are linked to the importation of illness from nations where it is endemic (WHO, 2022; Bunge et al., 2022). But novel, a number of HMPX outbreaks have been documented out of the endemic nations, as well as these outbreaks have eventually spread throughout the world with no aware epidemiological ties to West or Central Africa (European Center of Disease Control and Prevention (US CDC), 2022).

Among the four identified species of poxvirus infections after the eradication of smallpox, monkey pox is an illness brought on by the zoonotic monkey pox virus. Despite affecting a number of taxonomic species, the original host is still unclear. The

monkeypox virus can incubate a person for five to 21 days (Petersen et al., 2019). The disease is primarily spread by coming into close with the skin or fluids body of an infected animal, as a monkey, rat, or squirrel. Exposures to skin lesions, respiratory particles, as well as fluids body are the main ways that human-to-human transmission happens (Alshahrani et al., 2022).

In addition, vertical monkeypox virus transmission from mother to their baby is possible. Next probable method of transfer is through sexual contact. Virus DNA from the monkeypox was found in the semen fluid of all three monkeypox patients, according to recent Italian research. The majority of patients, as in the present epidemic, were found among bisexuals, males who have sex with other males, individuals who have several sexual partners, as well as those that had unsecured intercourse. The virus of monkeypox can transfer from animals to humans via the borne of blood pathway, which is another method of transmission (Dhawan et al., 2022).

One of the most typical signs of HMPX is a rash that can linger for two to four weeks. Fever, headache, aches in the muscles, back pain, low energy, and swollen glands (lymph nodes) may accompany this or precede it. The rash, which can affect the face, hands,

feet, groin, genital, and/or anal areas, resembles blisters or sores. These lesions can also appear on the eyes, in the mouth, throat, anus, rectum, or vagina. There could be a single sore or several thousand. Proctitis, an inflammation of the rectum that can cause excruciating pain, and vaginal inflammation that can make it difficult to urinate are conditions that some people experience (Kaler et al., 2022)

Serious bacterial infections from skin lesions, monkeypox that affects the brain (encephalitis), heart (myocarditis), lungs (pneumonia), and eyes (ocular complications) are among the possible complications. Hospitalization, supportive care, and antiviral medications may be necessary for individuals with severe monkeypox in order to lessen the severity of their lesions and accelerate their recovery (Kannan et al., 2022)

Drugs that act as an inhibitor for viral DNA synthesis and supportive symptomatic treatments are typically used in the treatment of the disease, rather than MPXV-specific medications. With mild symptoms, almost all patients recover without needing medical intervention. The CDC guide's recommendations for managing MPX outbreaks state that supportive treatments (pain relief, avoiding dehydration, etc.) are adequate for patient care and comfort. Generally, it is thought that immunization against MPX using smallpox vaccines, antivirals, or vaccinia immune globulin (VIG) is effective (Rizk,et al.,2022)

There is not a specific HMPX vaccination that has been approved as of yet. However, smallpox vaccination offered cross-protection against the monkey pox virus. There are three generations of smallpox vaccinations available (Meo et al., 2022). Up until 2008, the first-generation vaccination was utilized to prevent smallpox. This vaccine was very impact at controlling smallpox, as well as it was crucial in the global eradication of smallpox. When the WHO declared smallpox extinct in 1980, this vaccine was discontinued. For groups that could be at a high risk for orthopoxvirus, the 2nd generation vaccination, the live attenuated vaccinia virus vaccination produced in tissue cultures, has been employed. The (MVA-BN) Modified vaccinia Ankara-Bavarian Nordic, the 3rd generation vaccine, has received approval for use in humans in Canada and Europe (WHO, 2022).

By providing health education on infection control and prevention as well as preventing stigma and discrimination, nurses have been instrumental in responding to the monkey pox outbreak. Nursing care for patients with monkey pox requires that the patient be kept apart and that their damaged skin and mucous membranes be protected. Dehydration and appetite loss are possible for the patient. In addition to checking vital signs, trying to rehydrate and provide

nutritional support, the nurse should closely monitor and watch for any complications (Koenig et al., 2022)

Significance of the research:

According to the WHO, HMPX is a worldwide emergency. Between 1 January 2022 and 19 August 2022, the monkey pox virus spread quickly from non-endemic to endemic areas, affecting ninety-four countries as well as infecting 41,358 individuals. 387 patients were documented from 7 endemic African nations, as well as 40,971 patients were reported from eighty-seven non-endemic nations in Europe, North America, Australia, as well as Asia (Awan et al., 2022).

The spread and influx of infectious diseases are growing with the advent of globalization, advancements in transportation and communication, and freedom of movement between nations and continents. As a result, infectious diseases are emerging and spreading more frequently, which has an impact on school health (Um & Cho, 2022).

Awareness is essential to educate the public, especially teachers, about the HMPX disease in the current state of global emergency in order to prepare pupils for the fight against such infectious diseases. Teachers in schools have the power to affect students' futures, knowledge, attitudes, and behavior. (Naing et al., 2022). Teachers also play a crucial role in creating an environment that encourages open communication and collaboration between parents as well as the students (CDC, 2019). It can improve action abilities on healthy living with technical advancement when school instructors participate in health promotion initiatives (Lee et al., 2020).

The WHO previously indicated that one difficulty in preventing the reemergence of the HMPX virus could be people's ignorance of the illness (WHO, 2022). Changing attitudes and behaviors can be accomplished by tackling knowledge as the first step. A growing influence of attitudes on conduct is frequently linked to expanding knowledge. In other letters, attitudes that are depend on vast volumes of information are more lasting, consequential, as well as effective indicators of behavior than attitudes that are depend on lack or wrong knowledge (Sallam et al., 2022)

Therefore, the current research aimed to examine the effect of educational intervention on knowledge and attitude towards HMPX virus among the studied teachers in rural areas at Minia district which could have implications on the likelihood of adherence to preventive measures of HMPX among school personnel including teachers and students, consequently their preparedness for future HMPX outbreaks of infectious could be enhanced.

Aim of the research:

The present research aimed to examine the effect of an educational Intervention on knowledge and attitudes regarding HMPX among primary school teachers in rural areas at Minia District in Egypt through the following

Objectives:

- 1) Assessing the knowledge, attitude of primary rural school teachers regarding HMPX.
- 2) Assessing the effect of an educational intervention on knowledge, attitude of the school teachers in rural areas regarding HMPX.
- 3) Finding the association between knowledge, attitude of the school teachers regarding HMPX

Research Hypothesis:

After implementation of the educational intervention, improvement in teacher's knowledge, attitude regarding HMPX can be achieved.

Subjects and Methods:**Research design**

A quasi-experimental design with pre/posttest was used to measure the effectiveness of the educational intervention.

Research setting:

The research was performed at 5 governmental primary schools in rural areas at Minia district at Minia Governorate in Upper Egypt. Minia primary educational district located in rural areas is divided into 10 districts. Out of these 10 districts, 3 districts were selected randomly to be included in the research. Each district contains a number of schools ranged from 5-10 schools.

The first selected primary educational district is El borgaya district which includes 10 primary schools, so 2 schools has been selected randomly from this district (Damarees primary school, and, Abo sweelam primary school). The second selected primary educational district is Demsheer district which includes 10 primary schools so 2 schools has been selected randomly from this district (Demsheer primary school, and Nazlet El flaheen primary school). The third selected primary educational district is Beni Mohamed sultan district which includes 5 schools so 1 school has been selected randomly from this district (Ammar ebn Yasser school).

Sample size and technique

The sample size was determined by utilization of the software EPI/info version 7, with 90% Confidence Interval (CI), 5% margin of errors, and population size of 472 teachers at the selected schools, so the calculated sample size was 173 teachers which increased to a total number of 180 teachers to avoid refusal rate. A systematic random sampling method

was utilized to fulfill the sample size using the teacher daily attendance record.

The count of teachers that was chosen from each school was calculated by dividing the count of teachers in each school by the total number of teachers at all the selected schools (472) then multiplied by the estimated sample size (180).

No	School Name	No of teachers	Sample Taken
1	Damarees primary school	105	40
2	Abo sweelam primary school	97	36
3	Demsheer primary school	85	33
4	Nazlet El flaheen primary school	75	29
5	Ammar ebn Yasser school	110	42

Tools of data collections:

Data collection was carried out by using a self-administered questionnaire designed by the researchers depend on literature review and composed of the following parts:

Part I: Assess the sociodemographic characteristic of the participants as: age, sex, teachers' professional qualification, marital status, monthly income, history of chronic disease and history of vaccination.

Part II: This part developed by the researchers depend on the recent literatures Harapan *et al.*, (2020); Nath *et al.*, (2022) and Ibrahim as well as Zaghmir, (2023), to assess the participants' knowledge about HMPX. It includes 34 questions and divided as definition (3 questions), source of knowledge (1 question), prevalence and susceptibility (2 questions) incubation period (1 question), transmission (3 questions), signs and symptoms (7 questions), prognosis (1 question), prevention (11 questions) and treatment (5 questions). All the questions were in the form of yes, no, or I don't not know.

Part III: This part developed by the researchers depend on the recent literatures Bates & Grijalva, (2022) as well as Riccò *et al.*, (2022), assess knowledge about isolation and infection control practices of HMPX cases at home (18 questions in the form of true, false, I don't not know).

Scoring system

The knowledge's scores of the questionnaire were determined depend on one point for the true answer and zero for the wrong answer as well as don't know. Therefore the teachers were have a very good knowledge if the score more than 75%, good if the score ranged from 60-75% as well as poor if the score less than 60%.

Part IV: This part developed by the researchers depend on the recent literatures Alshahrani *et al.*, (2022); Salim *et al.*, (2022); & Ibrahim as well as Zaghmir, (2023), to assess the participants' attitude regarding HMPX (11 statements). Also these statements were answered on a five-point Likert scale (the responses were either never, rarely, sometimes,

often or always). These statements included their opinions about how often they think about monkeypox outbreak, how often they feel paranoid about contacting monkeypox viral infection, how often they avoid social contact, etc

Scoring system

The attitude's statements were scored on a five-point likert- scale as: never (one), rarely (two), sometimes (three), often (four), as well as always (five). The score for this part was determined by summing up of all of its statements, with summed scores more than sixty percent indicates a positive attitude toward HMPX while a summed score less than or equal sixty percent indicates a negative attitude toward HMPX.

Content Validity of the Research Tools

Five community health nursing specialists evaluated the research instruments' content validity. The tools' content coverage, item sequencing, clarity, application, relevance, word count, format, and overall presentation were all scrutinized. Modifications were done in accordance with the advice and suggestions of specialists.

Reliability

Using Cronbach's alpha, the reliability of the research questionnaire was determined. Based on data analysis, the knowledge component's coefficient alpha was 0.945, while the attitude component's was 0.926.

Ethical considerations

Prior to conducting the research, the ethical and research committee of the faculty of nursing at Minia University gave its clearance. Teachers' verbal consent was attained after they were informed of the nature and goals of the study in order to elicit their cooperation. For the sake of anonymity and privacy, each assessment page was coded. Participants have the option to leave the before beginning the study.

Pilot research: It was used on ten percent (15) of the calculated sample, and its primary objectives were to evaluate the questionnaire's validity and the acceptability of the participants to the study's issue. As there were no significant changes made to the research's tools, the results of the pilot study were incorporated into the study's final findings.

Development of the Educational intervention

Administrative phase: prior to starting the research an authorities permission was taken from manager of the primary educational district at Minia governorate to contact the selected schools to begin the research; then letters were addressed to the directors of the chosen schools. Each director was informed about date and time of data collection of the research. Teachers have been met in small groups after explaining the aim and technique of the research to attain their agreement to share in the research. The educational program was included 4 phases:

Assessment phase, planning phase, intervention (implementation) phase and evaluation phase (immediately after the ending the intervention phase). The research lasted for three months while started by the (1st of October 2022 as well as finished by the end of December 2022), 2 days/ week from 9a.m: 2 PM.

1- Assessment phase (pretest): It was intended for attaining essential data from the participants and for assessing their knowledge, and attitude concerning HMPX. This assisted in the delivery of the educational intervention, and also was a pretest for further decision pre the application of the educational intervention. First the researchers introduced themselves to the participants, discussed to them the purposes of the research briefly and an oral consent for was obtained from them. The tools of the research were completed by the participants. The time needed to finish the questionnaire was about ten minutes. This phase lasted for 3 weeks.

2- Planning phase: Based on the assessment data, the content of the educational intervention were determined to affect the participants' knowledge and attitude regarding HMPX so identified educational requirements were converted into learning objectives. The phase of planning also involved the educational intervention time, count of sessions, methods of teaching as well as media that used in addition to teaching setting as well as intervention facilities.

Teaching place and time: The sessions were implemented by the researchers for the teachers of each school at the school library after finishing their daily research schedule.

Teaching methods: Teaching techniques like lectures, small group discussions, and question and answers were used during the sessions. To keep the sessions engaging, data show slides, movies, and informative pamphlets were employed. The teachers were handed a colorful, illustrated booklet at the conclusion of the sessions that was created in Arabic and supplemented by illustrations.

Implementation phase: The intervention included 3 sessions while the session's time ranged from 45-60 minutes. The number of teacher in each session ranged from 10-15 teachers. At the start of every session the purpose of the session were discussed. Each session finished by a summary of its important points at its end. This phase began from the end of October 2022 to the end of December 2022.

3- Evaluation phase: Evaluation of the effect of the educational intervention was done through post-test immediately after implementing and completing the course of intervention using the same data collection forms as in the pre-test.

Statistical analysis

Statistical software SPSS 24.0 was used for data entry and statistical analysis. Data are presented using descriptive statistics like averages and standard deviations for quantitative variables and frequencies and percentages for qualitative variables. The Fisher test and the Chi square test were utilized to know the level of significance between qualitative data in the pre, posttests while, the paired t-test was utilized to detect differences in mean score between pre and posttest for quantitative data. Spearman correlation test was used to detect correlation between quantitative variables. When the significant probability was less than 5% ($p < 0.05$), all results were deemed statistically significant.

Results

Table (1): Personal and demographic characteristics of the studied teachers' at Minia district (n = 180).

Items	No.	%
Age/ years		
25 – 35	31	17.2
36- 45	108	60.0
>45	41	22.8
Mean \pm SD	41 \pm 6.5	
Gender		
Male	54	30.0
Female	126	70.0
Study certificate		
Bachelor's degree	139	77.2
Post-graduate degree	35	19.5
Teaching diploma	6	3.3
Marital status		
Single	11	6.1
Married	150	83.3
Divorced	11	6.2
Widow	8	4.4
Monthly income		
Less than 3000 L.E	30	16.7
3000- 4000 L.E	131	72.8
4000 – 5000 L.E	19	10.5
History of chronic diseases		
Yes	40	22.2
No	140	77.8
History of chicken pox		
Yes	17	9.4
No	163	90.6
Two or more COVID-19 vaccine shots		
Yes	158	87.8
No	22	12.2
Childhood vaccination complete		
Yes	174	96.7
No	6	3.3

Table (2): Previous receiving health teaching about HMPX of studied teachers at Minia district (n= 180).

Received teaching about HMPX	Pre	
	No.	%
Yes	85	47.2
No	95	82.8
Sources of information		
Social media	56	65.1
Awareness campaigns	10	11.5
Family / friends	2	2.3
T.V and radio	31	35.6
Health care provider	1	1.1
Books	1	1.2
Research article	0	0.0

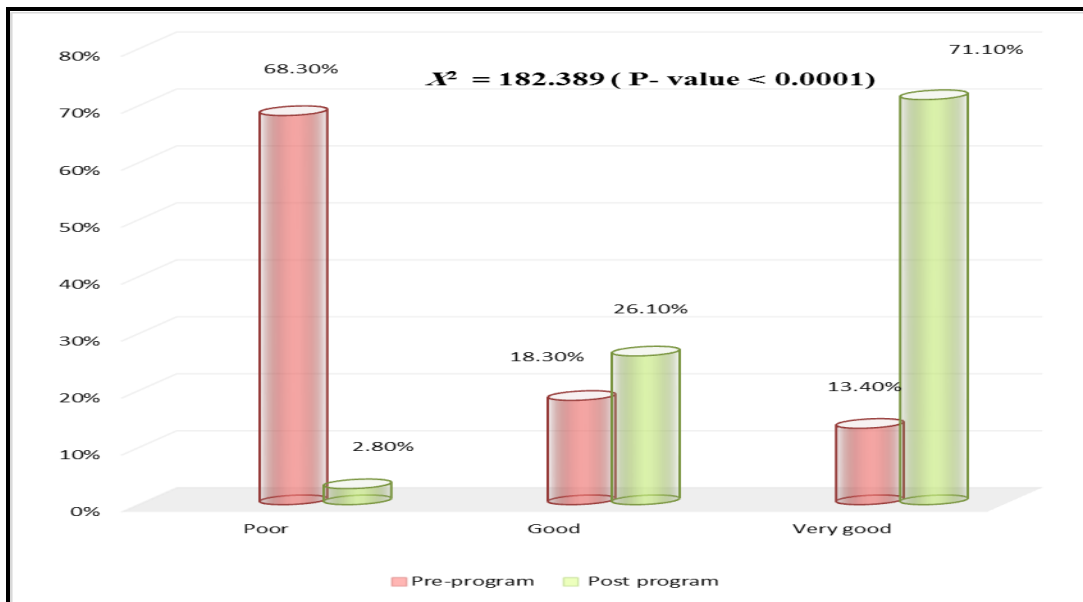


Figure (1): Total score of studied teachers' Level of knowledge regarding human monkey pox pre and post teaching program (n = 180).

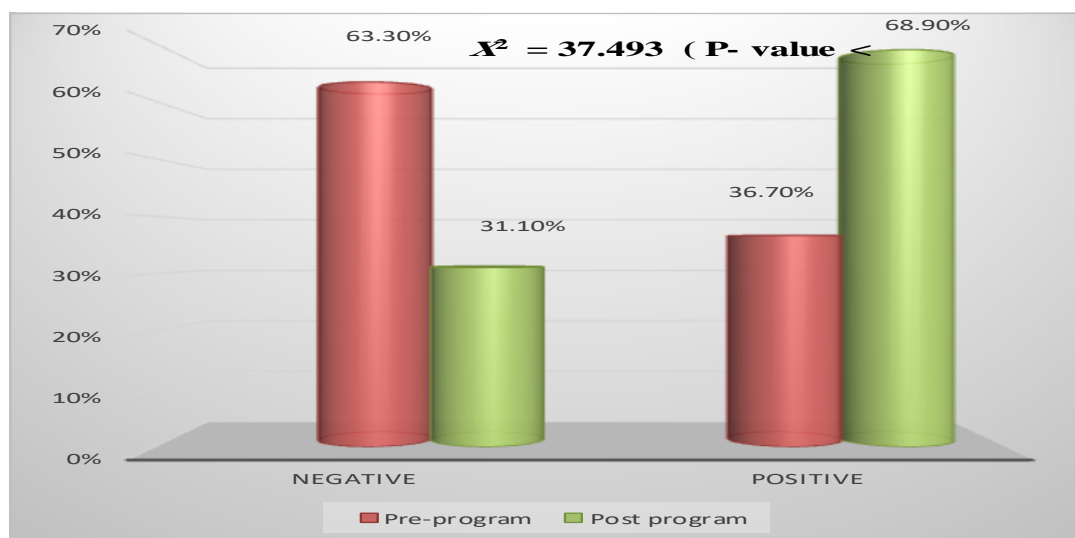


Figure (2): Total attitude levels about human monkey pox of the studied teacher pre and post educational intervention (n = 180).

Table (3): Mean scores of total knowledge and attitude about HMPX of the studied teachers pre and post educational intervention (n= 180).

Items	Pre	Post	t-test	P – value
	Mean ± SD	Mean ± SD		
Total knowledge about HMPX	27.3 ± 13.2	46.2 ± 7.2	16.853	0.0001**
Total attitude	29.2 ± 8.8	36.6 ± 9.9	7.431	0.0001**

One-way t-test **highly statistically significance differences

Table (4): Relation between demographic data of the studied teachers and total knowledge levels about HMPX pre and post the educational intervention (n= 180).

Items	No.	Total knowledge levels pre						Total knowledge levels post					
		Poor (n = 123)		Good (n = 33)		Very good (n = 24)		Poor (n = 5)		Good (n = 47)		Very good (n = 128)	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Gender													
Male	54	42	77.8	11	20.3	1	1.9	1	1.9	13	24.1	40	74.0
Female	126	81	64.3	22	17.5	23	18.2	4	3.2	34	27.0	88	69.8
$X^2 / Fisher (P - Value)$		8.809 (0.012)*						Fisher (0.796)					
Study certificate													
Bachelor’s degree	139	97	69.8	25	18.0	17	12.2	5	3.6	35	25.2	99	71.2
Post-graduate degree	35	20	57.1	8	22.9	7	20.0	0	0.0	8	22.9	27	77.1
Teaching diploma	6	6	100.0	0	0.0	0	0.0	0	0.0	4	66.7	2	33.3
$X^2 / Fisher (P - Value)$		6.716 (0.348)						Fisher (0.238)					

Fisher / chi test was used to determine statistical differences *statistically significance at 0.05

Table (5): Relation between demographic data of the studied teachers and total attitude levels regarding HMPX pre and post the educational intervention (n= 180).

Items	No.	Total attitude level pre				Total attitude level post			
		Negative (n = 114)		Positive (n = 66)		Negative (n = 56)		Positive (n = 124)	
		No.	%	No.	%	No.	%	No.	%
Gender									
Male	54	35	64.8	19	35.2	21	38.9	33	61.1
Female	126	79	62.7	47	37.3	35	27.8	91	72.2
$X^2 (P - Value)$		0.073 (0.787)				2.177 (0.140)			
Study certificate									
Bachelor’s degree	139	90	64.7	49	35.3	45	30.9	96	69.1
Post-graduate degree	35	21	60.0	14	40.0	10	28.6	25	71.4
Teaching diploma	6	3	50.0	3	50.0	1	16.7	5	83.3
$X^2 (P - Value)$		1.488 (0.685)				0.804 (0.849)			
Marital status									
Single	11	8	72.7	3	27.3	4	36.4	7	63.6
Married	150	92	61.3	58	38.7	47	31.3	103	68.7
Divorced	11	7	63.6	4	36.4	3	27.3	8	72.7
Widow	8	7	87.5	1	12.5	2	25.0	6	75.0
$Fisher (P - Value)$		Fisher (0.442)				Fisher (0.948)			
History of chronic diseases									
Yes	40	28	70.0	12	30.0	12	30.0	28	70.0
No	140	86	61.4	54	38.6	44	31.4	96	68.6
$X^2 (P - Value)$		0.984 (0.321)				0.030 (0.863)			
History of chicken pox									
Yes	17	10	58.8	7	41.2	1	5.9	16	94.1
No	163	104	63.8	59	36.2	55	33.7	108	66.3
$X^2 (P - Value)$		0.164 (0.685)				5.575 (0.018)*			

Items		Total attitude level pre				Total attitude level post			
		Negative (n = 114)		Positive (n = 66)		Negative (n = 56)		Positive (n = 124)	
		No.	%	No.	%	No.	%	No.	%
Two or more COVID-19 vaccine shots									
Yes	158	99	62.7	59	37.3	48	30.4	110	69.6
No	22	15	68.2	7	31.8	8	36.4	14	63.6
$X^2 (P - Value)$		0.254 (0.614)				0.323 (0.570)			
Childhood vaccination complete									
Yes	174	109	62.6	65	37.4	56	32.2	118	67.8
No	6	5	83.3	1	16.7	0	0.0	6	100.0
$X^2 (P - Value)$		1.069 (0.301)				2.803 (0.094)			
Received teaching about HMPX									
Yes	85	51	60.0	34	40.0	54	30.3	124	69.7
No	95	63	66.3	32	33.7	2	100.0	0	0.0
$X^2 / Fisher (P - Value)$		0.771 (0.439)				4.478 (0.034)*			

Fisher / chi test was used to determine statistical differences *statistically significance at 0.05

Table (1): Presents that 60% of the studied teachers are aged from 36: 45years with mean age 41 ± 6.5 years, 70% of them are females, 77.2 % of them have bachelor’s degree, and 72.8% of them have income from 3000: 4000 L.E. Moreover 77.8% of them don't have history of chronic diseases, 90.6% of them don't have history of chicken pox, 87.8% of them have two or more COVID-19 vaccine shots and (96.7%) of them have taken their childhood vaccination completely.

Table (2): illustrates that 82.8% of the studied teachers didn't receive teaching about HMPX before the educational intervention. The same table shows that the primary source of information regarding HMPX among the studied teachers pre the educational intervention is 65.1%.

Figure (1): The current figure shows that 18.3% of the studied teachers have good knowledge about human monkey pox pre teaching program compared with 71.1% of them have a very good knowledge post-teaching program with statistics difference differences ($P = 0.0001$).

Figure (2): The current figure shows that 36.7% of the studied teachers have positive attitude about human monkey pox post teaching program compared with 68.9% of them have positive attitude post-teaching program with statistics difference differences ($P = 0.0001$).

Table (3): Shows that after implementation of the educational intervention, there is increase in the mean score of the total knowledge of the studied teachers regarding monkey pox while it was 27.3 ± 13.2 in the pre educational intervention compared with 46.2 ± 7.2 after the educational intervention with statistical significant differences (0.0001**). Also this table shows that there is increase in the mean score of the total attitude of the studied teachers regarding

monkey pox after implementation of the educational intervention while it increased to 36.6 ± 9.9 compared with 29.2 ± 8.8 before implementation of the educational intervention with statistical significant differences (0.0001**).

Table (4): Shows that there is a statistical significant relation between total knowledge level about HMPX pre educational program and gender of the studied teachers while the (p-value= 0.012) . Also there is a statistical significant relation between receiving teaching about HMPX and total knowledge level while the p-value is (0.001). Also this table illustrates that there is a statistical significant relation between total knowledge level about HMPX and history of chicken pox among the studied teachers after implementation of the educational intervention while the (P-value =0.05).

Table (5): Illustrates that there is statistical significant relations between total attitude level of the studied subjects regarding HMPX and their history of chicken pox as well as receiving teaching about HMPX after implementation of the educational intervention (P-value =0.01 &.03 respectively).

Discussion

The public must be aware about monkeypox, have attitudes that support control, and be prepared to adopt management strategies in order to effectively control HMPX. However, little is known about the knowledge levels and perspectives of primary school teachers regarding HMPX. Furthermore Teachers in schools have the power to shape the knowledge, attitude, and behavior of students in the future. They are viewed as an essential target audience for a variety of health education initiatives with the overarching goal of instilling lifelong healthy living behaviors in youngsters (Naing et al., 2022). So the

aim of this research was to assess the effect of educational intervention on knowledge and attitudes regarding human monkeypox among Primary school teachers at rural areas at Minia district in Egypt.

Regarding receiving teaching about HMPX, the present research finding revealed that the highest number of teachers didn't receive teaching about HMPX before the educational intervention. So, this finding disagrees with **Ahmed et al., (2022)** while it was revealed that 92% of the participant's handout attended a lecture or seminar about HMPX

The present research revealed that the highest number of the studied teachers their source of information about HMPX was the social media. This research finding was in the same line with **Ibrahim & Zaghamir, (2023)**; **Ahmed et al., (2022)** while they found that the percent of people (58%), (62.2) respectively rely on social media as their primary find of information about HMPX. This finding clarify the significant effect that social media has on the transfer of information as well as the required for reliable sources of information for most personnel to reach information that has been constantly updated.

Regarding the level of knowledge about HMPX, the present research revealed that the highest number of teachers had a poor level of knowledge regarding HMPX before implementation of the educational intervention, because the majority of teachers had inadequate levels of knowledge about disease. This agrees with **Ahmad et al., (2022)** who revealed that Participants had insufficient knowledge of HMPX. (**Alshahrani et al., 2022**). Furthermore, the studied teachers did not have a previous experience with HMPX and their knowledge is inadequate as knowledge of something can to some extent originate from previous experience (**Sallam et al., 2022**).

The results of the present research disagree with former research not only between ordinary persons, but among Jordanian dentistry, nursing, medical, as well as pharmacy students **Sallam et al., (2022)**, practicing generalists in Indonesia **Harapan et al., (2020)**, medical students in Saudi as well as physicians. **Alshahrani et al., (2022)**, as well as the Italian physicians (**Riccò et al., 2022**). In my opinion, this is may be due to individuals of the human personnel are assumed to have knowledge of the disease as they studied the health sciences as well as must have knowledge at minimum concerning topics related to the health. This reinforces the newness of the disease, not in concept of its appearance, but rather in concept of its reemergence. A shortage of information regarding the symptoms, transmission as well as management can undesirably impact the prevention of the disease.

The present research revealed that after execution of the educational intervention, there is raise in the mean

score of the total knowledge of the studied teachers regarding monkey pox while it was 27.3 ± 13.2 in the pre educational intervention compared with 46.2 ± 7.2 after the educational intervention with statistical significant differences (0.0001**). This could be attributed to the planned teaching program which was effective in improving knowledge of the studied teachers.

Regarding, attitude toward HMPX among the studied teachers, the present research revealed that about more than two third of the teachers have a negative attitude toward monkey pox before the educational intervention. A negative attitude toward the illness can have detrimental effects by preventing adherence to healthy habits that help in disease prevention and control, as well as by having a negative impact on health-seeking behavior in the event of infection. This research finding contradicted with **Meo et al., (2022)** despite the fact that his data show that the public has a positive impression of the growing monkeypox danger. From the perspective of the researchers, this contradiction might be attributed to the difference in the availability of different resources providing information about the disease among the studied groups.

The present research revealed that after execution of the educational intervention there was a significant difference in the subjects' level of attitude toward HMPX. This can explain the role of educational intervention in raising the studied teachers level of knowledge about HMPX which in turn affected their attitude positively. To educate the public to fight against such infectious diseases, it is essential to have a positive attitude regarding the HMPX disease.

Regarding the relation between demographic data as well as level of knowledge related to HMPX among the studied subjects, this research result showed that there was statistical significant relation between the teachers' knowledge levels and their gender as well as received teaching about HMPX before implementation of the educational intervention while the (P-value =0.012 &.001 respectively). Moreover, there was statistical significant relation between the studied teachers level of knowledge and their history of chicken pox after execution of the educational intervention as (P-value =0.05). This result was in the same line with **Jairoun, et al., (2022)** while getting information about HMPX, having a history of human chickenpox infection, and gender were important predictors of having good awareness of the. The findings of the present research are in the same line with **Alshahrani et al., (2022)** who reported that there was statistical significant relation between the knowledge of the participants about HMPX, their gender and receiving education about the disease.

Regarding the relation between demographic data of the teachers and their total attitude levels regarding HMPX, the research result revealed that there was statistical significant relation between the studied teachers total attitude levels as well as their history of chicken pox as well as received teaching about HMPX as (P-value =0.01 &.03 respectively), while no statistical significant relation between the studied subjects' total knowledge levels and (gender, study certificate, marital status, history of chronic diseases, two or more covid-19 vaccine shots as well as childhood vaccination complete) after educational intervention. These results disagree with **Nath et al., (2022)** who clarified that there wasn't significance relation between the attitude of the participant as well as their demographic traits.

Conclusion

After implementation of the educational intervention, there were statistical significance differences in the mean score of knowledge as well as the mean scores of attitude of the studied teachers regarding HMPX. Moreover, there is a positive correlation between level of knowledge and attitude of the studied teachers regarding HMPX, so it can be concluded that the implementation of educational intervention regarding HMPX was effective in raising the studied teacher's awareness regarding it.

Recommendations

- Given the severity of the present outbreak, further educational programs are required, with a particular focus on increasing public awareness about HMPX.
- Educational materials including brochures, handouts and booklet should be available in schools regarding HMPX
- Continuous implementation of educational interventions regarding Human Monkey Pox among school population to enhance public awareness, raise the precautionary behaviors as well as mitigate the potential crisis.

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