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ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS MONKEYPOX VIRUS AMONG HEALTH CARE PROFESSIONALS OF DISTRICT LAKKI MARWAT

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ABSTRACT

Background:

Fighting health threats, especially the rise of this new widely spreading infectious disease. But the knowledge, attitude and practices of Health care workers were not assessed. Our study aimed to assess the knowledge, attitude and practices of HCWs towards monkeypox virus.

METHODS:

Descriptive cross sectional study was conducted for a time period of about 6 months. The data were collected using structured questionnaire. The sample size were calculated using Cochran's formula. . A non-probability convenient sampling method was used for sample collection. The data were analyzed using SPSS V28. Simple descriptive statistics were used by drawing customized tables and graphs from entered data.

Results:

Among 384 HCWs who participated in the research study 51.8% shows good knowledge 85.3% shows positive attitudes and 77.96% adopts good practices respectively. Education is the factor that effects those factors. Those HCWs with a bachelor's degree or above have more good knowledge shows positive attitudes and adopts good practices against MPXV than those who have low education like Diploma holders.

Conclusion:

The study showed noticeable difference in knowledge, attitude and practices among HCWs with the level of education affecting them. And encourages the health care authorities to arrange education campaigns for those with low education like diploma holders so hat they could manage health emergencies like monkeypox.

Keywords: *Monkeypox, knowledge, attitude, practices, health care professionals, district, Lakki marwat.*

INTRODUCTION

Monkeypox is a zoonotic viral disease caused by the monkeypox virus (MPXV), a member of the Orthopoxvirus genus belonging to the Poxviridae family. The Orthopoxvirus genus also includes other important viruses such as smallpox, cowpox, camelpox, and mousepox viruses (1). Monkeypox was first identified in 1958 in laboratory monkeys kept for research purposes, while the first human case was reported in 1970 in the Democratic Republic of Congo in a nine-year-old child (2). Since then, the disease has emerged as an important public health concern in several African and non-African countries. The recent outbreaks in many parts of the world, particularly during and after the COVID-19 pandemic, have highlighted the global significance of monkeypox and the urgent need for awareness, surveillance, and preventive strategies among healthcare workers and the general population (3).

Monkeypox virus is a large double-stranded DNA virus with a brick-shaped or ovoid structure measuring approximately 200–250 nm. The virus contains a lipoprotein outer membrane, surface tubules, two lateral bodies, and a dumbbell-shaped nucleoprotein core containing viral DNA (4). Unlike many DNA viruses, the replication of monkeypox virus occurs entirely within the cytoplasm of infected host cells using a virally encoded DNA-dependent RNA polymerase (5). Viral transmission occurs through direct contact with infected animals, respiratory droplets, contaminated materials, body fluids, skin lesions, and human-to-human contact, including close physical and sexual contact (6). Rodents are considered the major reservoir of the virus, although monkeys and other wild animals may also carry the infection.

Clinically, monkeypox resembles smallpox but is generally less severe. The disease commonly presents with fever, headache, muscle aches, fatigue, back pain, and lymphadenopathy, which is considered a distinguishing feature from smallpox (7). Following the prodromal stage, patients develop characteristic skin rashes that progress from macules and papules to vesicles, pustules, crusts, and scabs. The incubation period usually ranges from 1 to 2 weeks (8). Severe complications may occur in children, immunocompromised individuals, and patients with underlying diseases. Currently, there is no specific approved treatment for monkeypox; however, supportive management and certain antiviral agents such as tecovirimat, cidofovir, and brincidofovir have shown effectiveness in reducing disease severity (9). Preventive measures mainly focus on avoiding close contact with infected individuals and animals, maintaining hand hygiene, using personal protective equipment, isolating infected cases, and vaccination with smallpox vaccines, which provide cross-protection against monkeypox infection (10).

Healthcare workers are at increased risk of exposure because of their direct contact with infected patients and contaminated materials. Therefore, adequate knowledge, positive attitudes, and appropriate preventive practices among healthcare workers are essential for early diagnosis, infection control, and prevention of outbreaks. Assessing the awareness and practices of healthcare workers regarding monkeypox is necessary to identify knowledge gaps and improve preparedness against this emerging infectious disease.

MATERIAL AND METHODS

2.1 ETHICAL CONSIDERATION

The ethical approval for this research was first given by the ethical committee of Khyber Medical University Institute of Health Sciences Lakki Marwat and also before giving the questionnaire to the participants they were informed through informed consent which contain the sampled individual voluntary response, anonymity and confidentiality of the participants.

2.2 INCLUSIVE AND EXCLUSIVE CRITERIA

The study included all health care professionals (laboratory technician and technologists, anesthesia technician and technologists and emergency technician and technologists) of district Lakki Marwat. The study also included the participants of KMU IHS Lakki Marwat who were in 5th semester or higher and the students of Ahmad Institute of Allied Health Sciences Lakki Marwat. The purpose of involving students is

because of their clinical rotation in the hospitals so whenever they came across this virus they can adopt preventive measures and protect themselves and educate the community about the harmful effects of this virus so that they could also gain awareness about this virus and stops spreading it. Those who are not related to the healthcare system are excluded.

2.3 SAMPLING PROCEDURE AND SAMPLE SIZE

The sampling procedure used was non probability convenient sampling method. As our population is unknown so the sample size is calculated using the Cochran's formula $n=Z^2.p.(1-p)/E2$ (sample size formula for population proportion).

n=sample size

Z=Z score or corresponding to the desired standard deviation 95%. p= Population proportion picking a choice or response.

E=margin of error of 0.05.

n= (1.96)2.0.5. (1-0.5)/ (0.05)2=384.

2.4 DATA COLLECTION TOOLS AND PROCEDURE

The tool used for data collection was a structured questionnaire. The prepared questionnaire was a modified form of previously published literature on smallpox and monkeypox disease. The questionnaire was distributed to most of the hospitals and the private laboratories and most of the public and private medical setting of the district. Before the questionnaires were distributed among the health care professionals they were informed about the questionnaire and research studies through informed consent. Their response was completely voluntary and without coerecsion. The questionnaire consists of 22 closed ended questions and is divided into three sections 1) information related to knowledge about MPXV 2) information related to attitude of HCW towards monkeypox 3) information related to practices adopted by HCW to prevent MPXV infection. The first section of the questionnaire consisted of 10 questions related to knowledge about the monkeypox with the possible response ranged from (yes and no) with an addition of don't know. The second section consisted of attitude related questions with the possible response ranged from (agree and disagree) to an addition of neutral. The third section of the questionnaire was about practices related information and with the possible response expected from (always and mostly) to an additional response of sometimes. The study method used was descriptive cross sectional study. This whole date collection process had taken time of about 2 months.

2.5. DATA ANALYSIS

The data were analyzed by SPSS version V28 using simple descriptive statistics. First the input data variables were analyzed by making customized table. Then the data from these tables were used to make graphs. These steps were followed for every section of the questionnaire (knowledge, attitude and practices section.

RESULTS

Following the collection of completed questionnaires from participants, the data were analyzed using SPSS version 28. This study was conducted to assess the knowledge, attitude, and practices (KAP) of healthcare workers (HCWs) regarding Monkeypox. Out of the total sample size of 384 participants, 15.62% were students from Khyber Medical University Institute of Health Sciences Lakki Marwat and Ahmad Institute of Allied Health Sciences Lakki Marwat irrespective of their technologies, while the remaining 83.38% were healthcare professionals working in public and private healthcare sectors. Among the healthcare professionals, 27.8% were anesthesia and emergency technicians/technologists, whereas 55.58% were laboratory technicians and technologists.

The participants were categorized into two educational groups: diploma holders and bachelor degree holders. Students from KMU IHS Lakki Marwat were included in the bachelor category, whereas students from Ahmad Institute of Allied Health Sciences were included among diploma holders. Overall, 149 (38.8%) participants were diploma holders and 235 (61.2%) were bachelors.

Table 3.1: Frequency of Education among HCWs

Education Level	Frequency	Percent	Valid Percent	Cumulative Percent
Diploma Holders	149	38.8	38.8	38.8
Bachelors	235	61.2	61.2	100.0
Total	384	100.0	100.0	

Knowledge of HCWs Regarding Monkeypox

The overall knowledge of healthcare workers regarding monkeypox was satisfactory, with bachelor degree holders demonstrating better knowledge than diploma holders. Out of 3456 recorded responses related to the knowledge section, 1837 responses were categorized as good knowledge while 1619 responses were categorized as poor knowledge, indicating that HCWs generally possessed adequate knowledge regarding monkeypox infection.

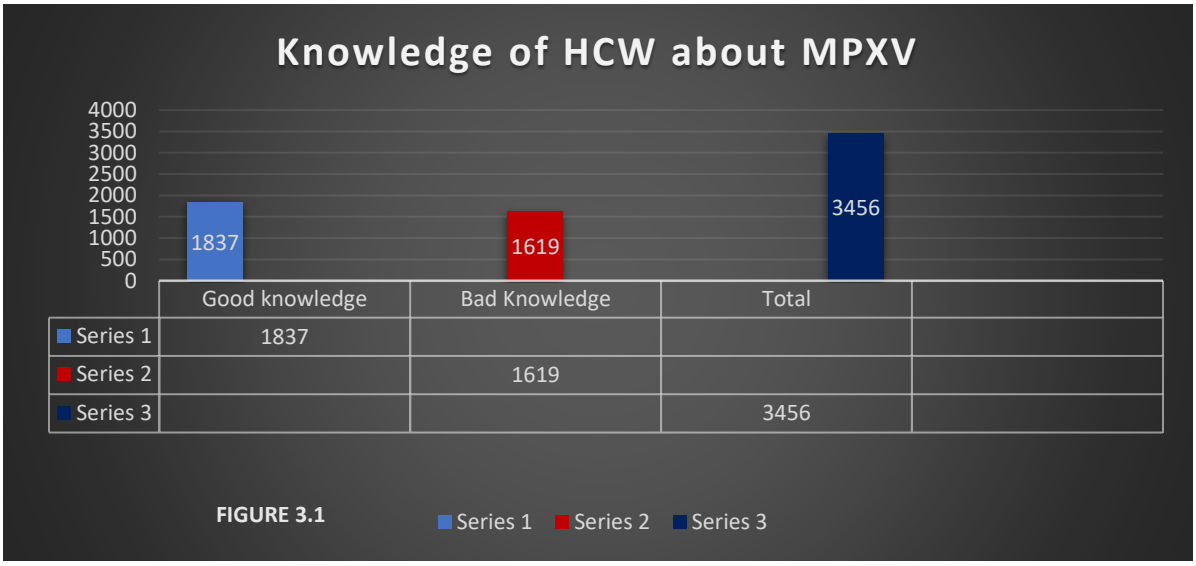


Fig. 3.1

Overall Knowledge of HCWs regarding Monkeypox Virus (MPXV)
Good knowledge responses = 1837
Poor knowledge responses = 1619

The findings further demonstrated that bachelor degree holders possessed significantly greater knowledge compared to diploma holders. This difference may be attributed to the more comprehensive and competitive curriculum of bachelor programs compared with diploma courses. Therefore, the study hypothesis stating that participants with higher education possess better knowledge regarding monkeypox was supported.

Table 3.2: Knowledge Difference among Bachelors and Diploma Holders Regarding MPXV

Questions	Responses	Diploma Holders	Bachelors
Have you heard about monkeypox and related terms?	Yes	89	187
	No	51	35
	Don't know	9	13
Do you know monkeypox is caused by a virus?	Yes	89	176
	No	35	42
	Don't know	25	17
Do you know monkeypox can be transmitted through infected body fluids?	Yes	83	154
	No	38	52
	Don't know	28	29
Can monkeypox be transmitted through contaminated food and water?	Yes	58	127
	No	50	66
	Don't know	41	42
Do you know the symptoms of monkeypox infection?	Yes	88	146
	No	42	60
	Don't know	19	29
Do you know the incubation period of monkeypox is 1–2 weeks?	Yes	77	131
	No	35	65
	Don't know	37	38
Is there any vaccine available for monkeypox virus?	Yes	83	134
	No	34	58
	Don't know	32	43
Can antibiotics be useful for monkeypox treatment?	Yes	66	129
	No	54	66
	Don't know	29	40
Do you know monkeypox can spread through sexual contact?	Yes	86	134
	No	31	59
	Don't know	32	42

Note: "Yes" was considered good knowledge for all questions except questions 7 and 8, where "No" represented good knowledge.

Knowledge Difference between Bachelors and Diploma Holders

Bachelor participants demonstrated higher good knowledge scores compared with diploma holders.

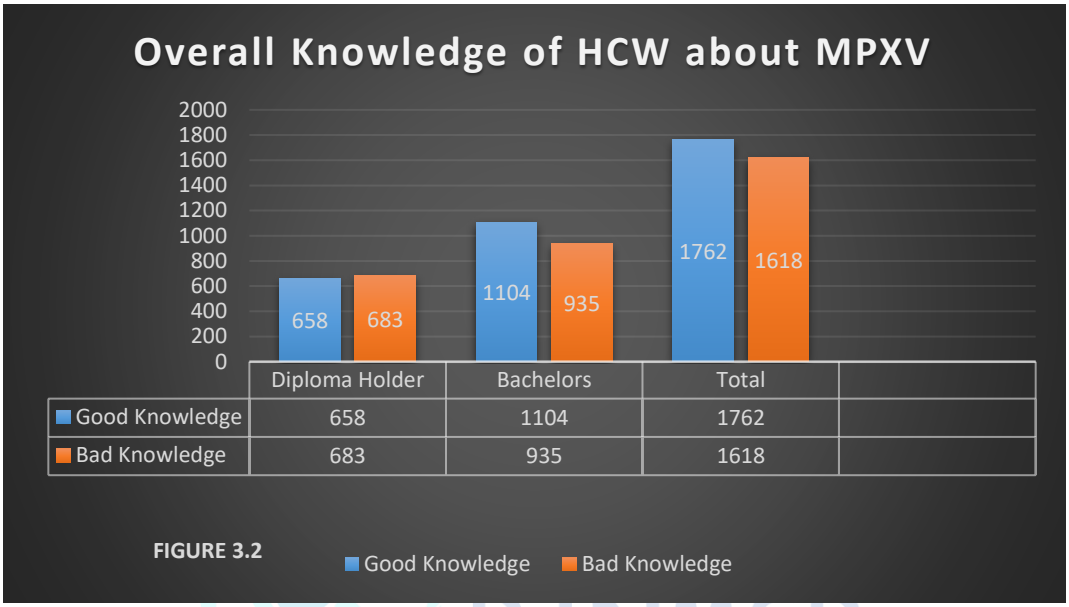


Fig. 3.2

Attitude of HCWs toward Monkeypox

The attitudes of healthcare workers towards monkeypox were generally positive. During data collection, many laboratory technicians required translation of the questionnaire because of limited understanding of English medical terminology. However, after explanation of the knowledge section, participants demonstrated improved understanding and positive attitudes toward the disease.

Positive attitude responses were higher among bachelor degree holders compared to diploma holders.

- Diploma holders positive attitude responses = 826
- Diploma holders negative attitude responses = 145
- Bachelors positive attitude responses = 1299
- Bachelors negative attitude responses = 221

Table 3.3: Difference in Attitude between Diploma Holders and Bachelors toward MPXV

Statements	Responses	Diploma Holders	Bachelors
Monkeypox is a serious public health concern	Agree	135	207
	Disagree	7	24
	Neutral	7	4
Vaccination can prevent monkeypox	Agree	117	176
	Disagree	14	41
	Neutral	18	18
Monkeypox should be classified as a global emergency	Agree	109	175

Statements	Responses	Diploma Holders	Bachelors
	Disagree	25	39
	Neutral	15	21
Monkeypox patients should be isolated	Agree	118	186
	Disagree	22	39
	Neutral	9	10
Society has enough awareness regarding monkeypox	Agree	119	184
	Disagree	20	41
	Neutral	10	10
Reducing travel to endemic areas can reduce spread	Agree	126	189
	Disagree	17	37
	Neutral	6	9
HCWs should receive specialized training regarding monkeypox	Agree	102	182
	Disagree	40	39
	Neutral	7	14

Overall Attitude of HCWs toward MPXV
Positive attitude responses = 2125 (85.3%)
Negative attitude responses = 366 (14.7%)

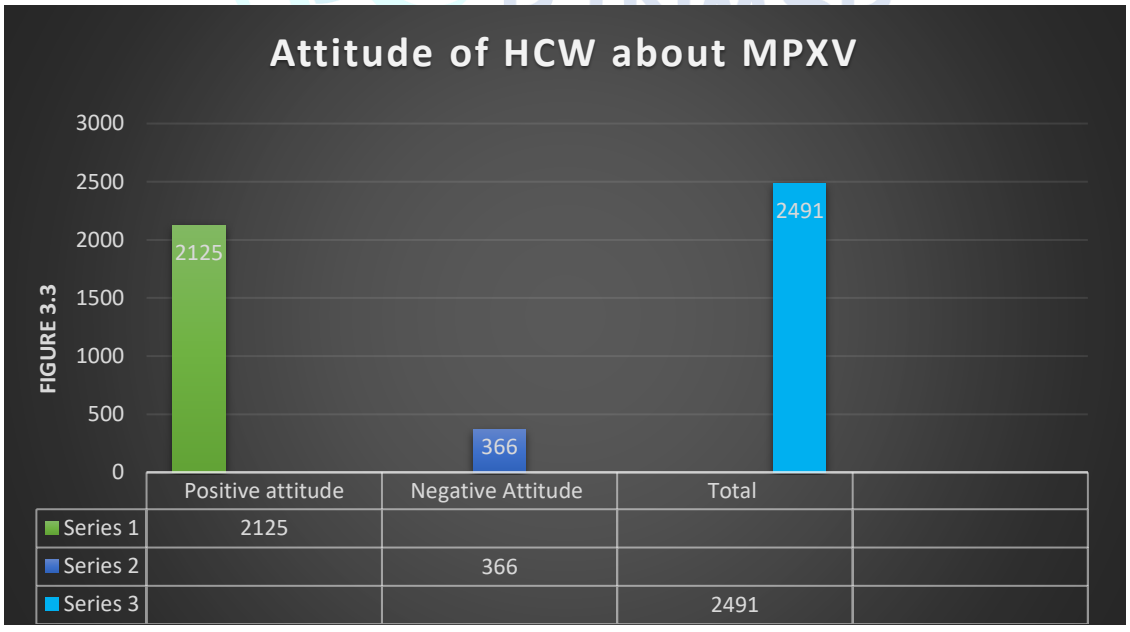


Fig. 3.3

Attitude Difference between Bachelors and Diploma Holders

Bachelor degree holders demonstrated more positive attitudes toward monkeypox compared to diploma holders.

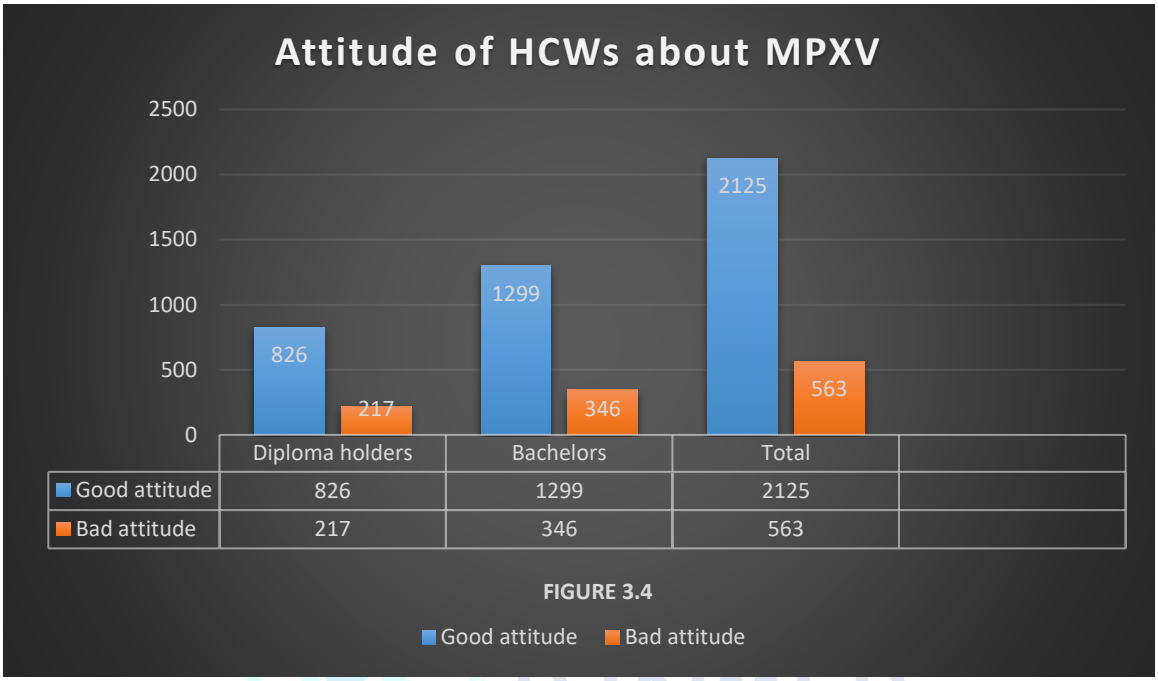


Fig. 3.4

Practices of HCWs toward Monkeypox

Participants demonstrated good preventive practices regarding monkeypox. Preventive measures included use of personal protective equipment (PPE), vaccination, hand hygiene, infection control practices, and participation in educational activities.

Table 3.4: Difference in Practices among Diploma Holders and Bachelors

Practices	Responses	Diploma Holders	Bachelors
HCWs should always use PPE when handling monkeypox cases	Always	126	200
	Mostly	13	26
	Sometimes	10	9
Routine hand hygiene should be practiced	Always	129	189
	Mostly	15	36
	Sometimes	5	10
HCWs should be vaccinated against monkeypox	Always	119	174
	Mostly	21	44
	Sometimes	9	17
Education regarding monkeypox should be included in training programs	Always	103	162
	Mostly	35	60

Practices	Responses	Diploma Holders	Bachelors
	Sometimes	11	13
Proper infection control measures should be enforced	Always	117	178
	Mostly	21	38
	Sometimes	11	19

Overall Preventive Practices of HCWs regarding MPXV
HCWs demonstrated good preventive practices regarding monkeypox.

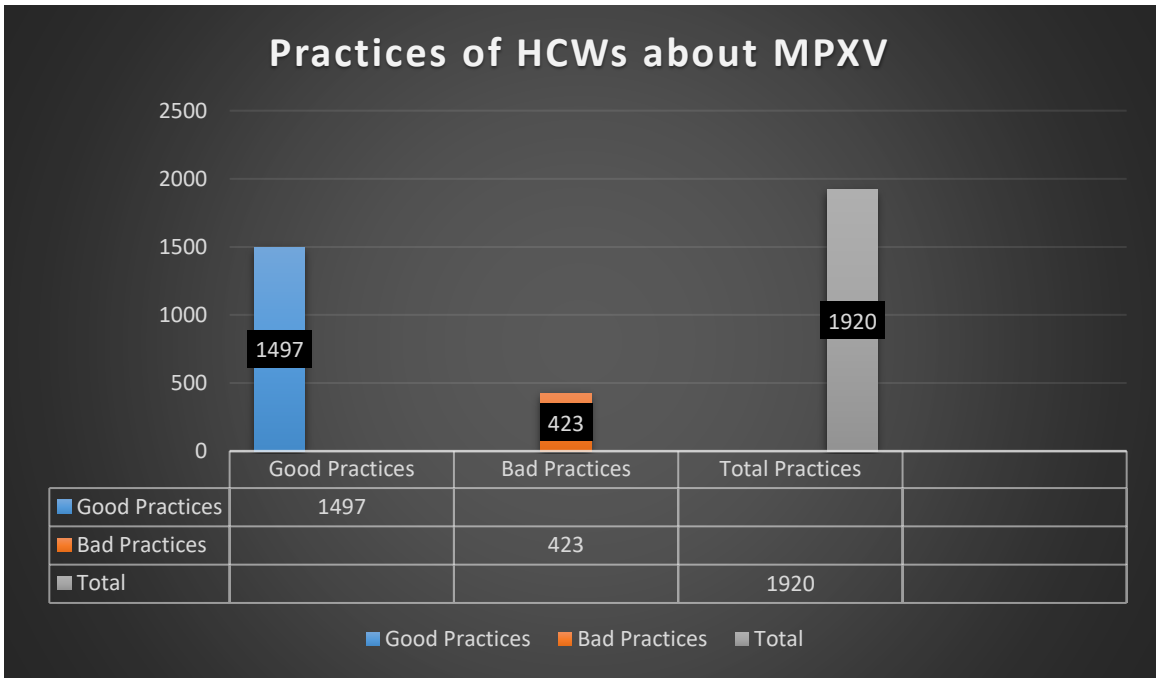


Fig. 3.5

Practice Gap among HCWs
Bachelor participants demonstrated better preventive practices compared to diploma holders.

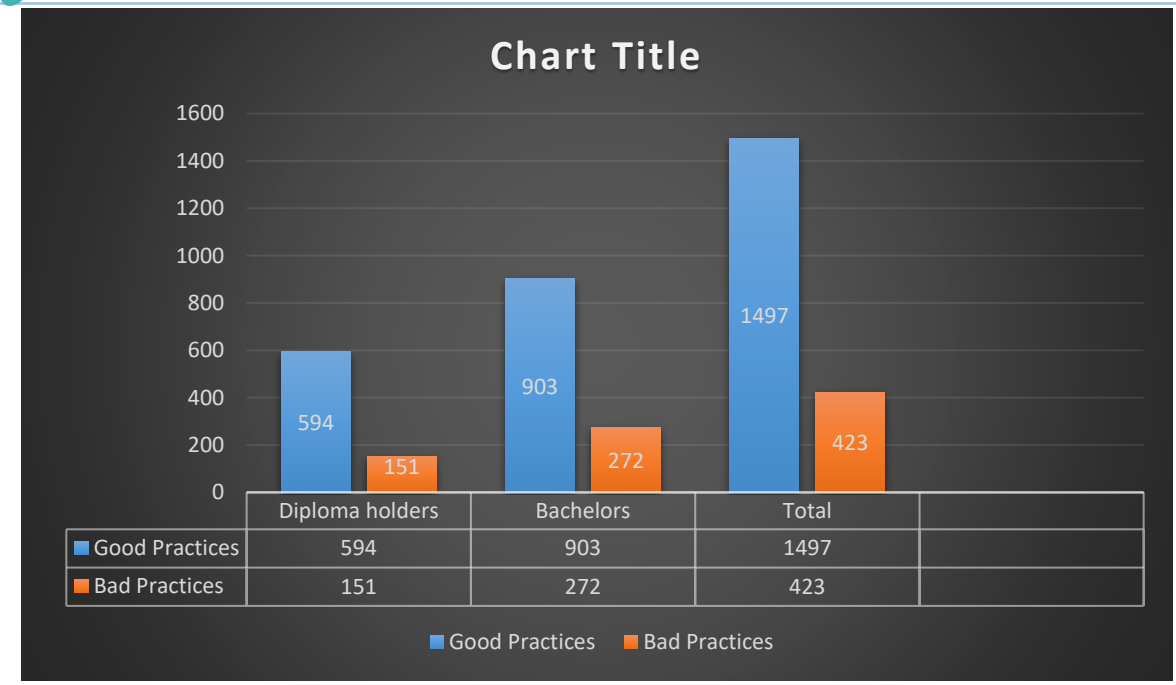


Fig. 3.6

Overall Knowledge, Attitude and Practice Gap among HCWs toward MPXV
The findings indicate that healthcare workers generally demonstrated good knowledge, positive attitudes, and good practices toward monkeypox infection, with bachelor degree holders consistently scoring higher than diploma holders.

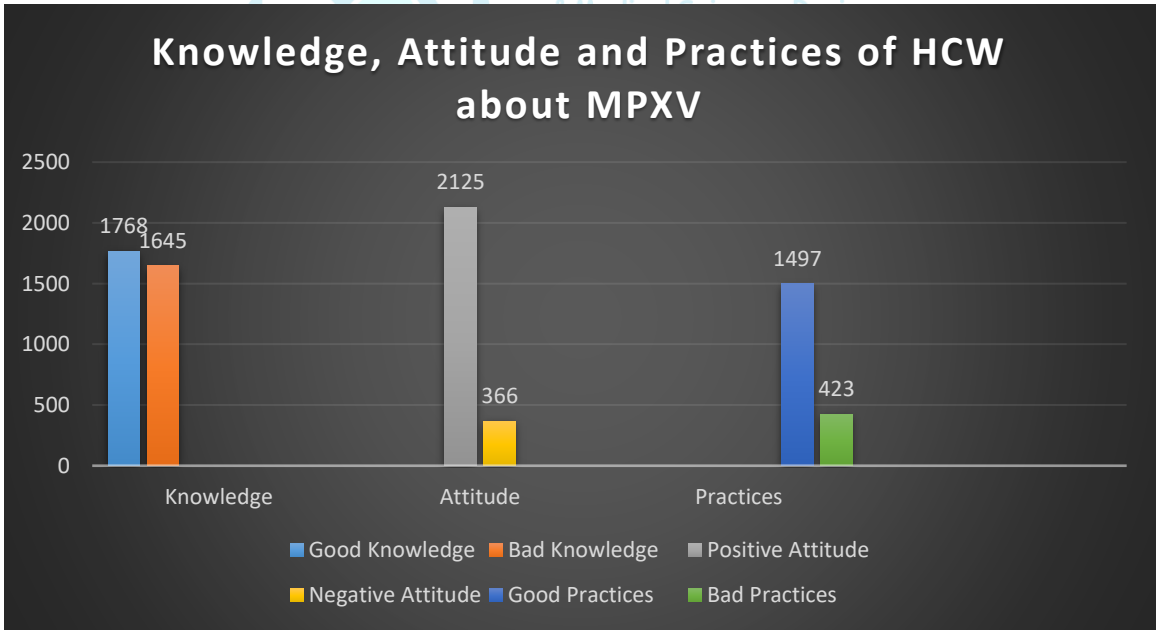


Fig. 3.7

REFERENCES

McCollum AM, Damon IK. Human monkeypox. Clin Infect Dis. 2014;58(2):260–267.

Ladnyj ID, Ziegler P, Kima E. A human infection caused by monkeypox virus in Basankusu Territory, Democratic Republic of the Congo. Bull World Health Organ. 1972;46(5):593–597.

World Health Organization. Multi-country monkeypox outbreak situation reports. Geneva: WHO; 2022.

Reynolds MG, Damon IK. Outbreaks of human monkeypox after cessation of smallpox vaccination. Trends Microbiol. 2012;20(2):80–87.

Moss B. Poxvirus DNA replication. Cold Spring Harb Perspect Biol. 2013;5(9):a010199.

Bunge EM, Hoet B, Chen L, et al. The changing epidemiology of human monkeypox—A potential threat? PLoS Negl Trop Dis. 2022;16(2):e0010141.

Huhn GD, Bauer AM, Yorita K, et al. Clinical characteristics of human monkeypox and risk factors for severe disease. Clin Infect Dis. 2005;41(12):1742–1751.

Jezek Z, Szczeniowski M, Paluku KM, Mutombo M. Human monkeypox: Clinical features of 282 patients. J Infect Dis. 1987;156(2):293–298.

Adler H, Gould S, Hine P, et al. Clinical features and management of human monkeypox: A retrospective observational study in the UK. Lancet Infect Dis. 2022;22(8):1153–1162.

Centers for Disease Control and Prevention. Monkeypox prevention and treatment guidelines. Atlanta: CDC; 2022.

World Health Organization. Monkeypox outbreak toolbox. Geneva: WHO; 2022.

Centers for Disease Control and Prevention. Monkeypox: Prevention and infection control. Atlanta: CDC; 2022.

Bunge EM, Hoet B, Chen L, et al. The changing epidemiology of human monkeypox—A potential threat? PLoS Negl Trop Dis. 2022;16(2):e0010141.

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