**Letter to the Editor**

**Correlation of Monkeypox (MPOX) and Obesity: Obese patients need to take more precaution**

**Keywords:** Monkeypox (MPOX); Obesity; Monkeypox virus; Confirmed case; Obese Patients

**Dear Editor,**

The multi-country outbreak of Monkeypox (MPOX) was proclaimed a public health emergency of international concern (PHEIC) on July 23, 2022, by WHO Director-General [1]. In the middle of May 2023, 87429 cases were confirmed worldwide with 140 deaths from more than 110 countries, and the number is continuously increasing. Though little is known about the relationship between disease severity and its determinants, the illness of Monkeypox has been made worse by several co-morbidities (AIDS, diabetes, and Lymphoproliferative Disorders). Obesity is one of the leading causes of death and is associated with various illnesses. According to the most recent data on obesity, there are around 1.3 million fatalities caused by obesity worldwide each year which has increased 3x globally in recent years [2]. In the European Region, males (63%) and females (54%) are affected by this epidemic. Human Monkeypox, also known as MPOX, is an uncommon zoonotic disease caused by a Monkeypox virus (MPXV) from the family Poxviridae with an enveloped 190 kb double-stranded DNA genome [3]. The former Congo Basin (Central Africa) is now classified as Clade One (I), and West Africa as Clade Two (II), where Clade II is made up of the subclades IIa and IIb (Mostly spreading-B.1 lineage-1945 sequences) (<https://nextstrain.org/monkeypox/mpxv)(https://mpox.genspectrum.org/explore>). Clinical symptoms of confirmed MPXV patients include fever, chills, exhaustion, headaches, and muscle pains [4]. After one to three days of MPOX infection, the onset of fever and lymphadenopathy rash was observed, which typically affects the hands, feet, chest, face, and mouth, as well as the penis, testicles, labia, and vagina, as well as the anus, appears. The incubation period of this self-limited disease is 3-17 days. Close physical contact, skin-to-skin contact with an infected person with rash, contact with their saliva, upper respiratory secretions (snot, mucus), and anus, rectum, or vagina are all ways MPXV can be transmitted. Oral, anal, or vaginal sex, as well as touching the genitals (penis, testicles, labia, and vagina) are also risk factors. Interacting with contaminated clothing, bedding, towels, fetish gear, or sex toys has a relatively low transmission risk. The main objective of this correspondence is to investigate the possibility of a link between the prevalence of obesity and the number of MPX cases and fatalities globally.

This study gathered the essential MPOX-related data from the "Our World in Data (OWID)" website (<https://ourworldindata.org/explorers/monkeypox>) from May 1, 2022, to April 30, 2023. This data included the total number of new cases and fatalities from 103 different nations. In our analysis, we also gathered and used information on the prevalence of obesity (https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight). The relationship between cases/deaths and obesity was assessed using a linear regression analysis with cases/deaths as the dependent variable and the obesity rate as the independent variable.

Among the top 10 countries with the most MPOX cases, the USA reported the most (30154 cases), while Canada the lowest (1484 instances). By obesity rate, the USA also exhibited the highest cases (36.20%) among top cases countries, with Peru showing the lowest (19.47%) (Supplementary Table-ST1). It is also revealed that the average total number of MPOX cases in the top 10 and the world increased by 0.05% and 0.06%, respectively if the obesity rate rises by 1% (Supplementary Table-ST2). In the top 10 countries and globally, the model explained 35.4% and 7.74% of the total variation, respectively. Pearson’s correlation coefficient and scatter plot showed a perfect positive linear relationship (r=0.596 and r=0.278) between total cases and the obesity rate of the top 10 countries and world MPX cases (Supplementary Table-ST2 and Figure 1). The majority of MPOX deaths (42), as well as obesity (36.20%), also occur in the USA. Among the top 10 countries with the highest death rates, Argentina (2) has the fewest MPOX deaths in the percentages of obese people (28.30%) (Supplementary table-ST 1).

The average number of deaths in MPOX increases by 0.41 times for every 1% increase in the obesity rate in the top 10 deaths countries. The model explained 34.26% of the total variation (Table 2). Pearson’s correlation coefficient and scatter plot showed a positive linear relationship (r=0.585) between total deaths and the obesity rate of the top 10 MPOX deaths countries (Supplementary Table-ST2 and Figure 1).



Figure 1: Scatter plot with regression line between total cases and deaths of MPX with obesity rate.

Our findings indicate a substantial association between obesity and MPXV cases, with the top countries with the prevalence of obese individuals affecting relatively more people, despite the lack of research-based evidence about MPOX and obesity. According to WHO statistics, the Americas and Europe had the highest percentage of obese adults, and these two continents also suffered the worst effects of MPOX rather than others. One needs to monitor their health, and blood lipid levels, get guidance from a nutritionist, partake in enough physical activity, and manage their diet to handle the significant problem of obesity. Two doses of the JYNNEOS MPXV vaccine are used to prevent this infection, despite the longevity of vaccination action yet unclear [5]. Some nations have policies or are creating them to provide vaccines to people who may be at risk, including laboratory staff, quick reaction teams, and healthcare professionals. The primary preventative method for Monkeypox involves increasing public knowledge of risk factors and teaching individuals about the steps they may take to lessen virus exposure. According to this data, obese patients may need to take more care and adhere to recommended practices in order to safeguard themselves against MPXV infection.

**Conflicts of Interest** – All the authors have no conflict of interest

**Funding** – Nil

**Ethical Approval** – Not Required

**Informed Consent** - Not Applicable

**Data Availability** - Not Applicable

**References**

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