



Worldwide Childhood Mortality from Covid-19 (SARS-CoV-2)

Joseph Onwude^{1*}; Dolamu Sokunbi²

¹FRCOG Gynaecologist, Statistician and Epidemiologist, The Croft, Warley Road, Great Warley, Brentwood CM13 3HT, United Kingdom.

²FASN Consultant Nephrologist Physician, Nacogdoches Medical Centre, Nacogdoches, TX 75965, USA.

*Corresponding Author(s): Joseph Onwude

The Croft, Warley Road, Great Warley, Brentwood
CM13 3HT, UK.

Email: jlonwude@btconnect.com

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Abstract

Since 2019, including children from Wuhan, China, there have been few childhood deaths from Covid-19 infections. We documented six deaths worldwide. We show a support for a hypothesis that could explain this phenomenon which includes findings of minimal deaths in countries which have had recent measles outbreaks associated with mass immunizations with Measles, Mumps and Rubella (MMR). It is possible that children are protected from Covid-19 deaths because of recent MMR vaccination.

Introduction

There is now no doubt that children are affected by Covid-19 infections. However, it is now generally agreed that it does not seem to harm children. No plausible explanation exists for this anomaly in environments where these infections have caused wide-ranging population mortalities, especially in much older people, like in their grandparents.

In a 30 day period, of 1391 Chinese children under 16 years who were known to have been with adults with this infection and who were assessed and tested in Wuhan, 171 (12.3%) were confirmed to have SARS-CoV-2 infection. A range of clinical features are described including fever, cough and pharyngeal erythema and pneumonia either in combination or completely asymptomatic. However a 10-month child with intussusception developed multi-organ failure and died 4 weeks after admission [1].

Most Coronavirus related deaths have been in children. These include Measles, Mumps, Polio and Rubella. There is a curiosity that Covid-19, another Corona virus seems to spare children from death but massively disproportionately affect individuals in the later years.

There are hundreds of Corona viruses, most of which circulate among animals as pigs, camels, bats and cats. Sometimes those viruses jump to humans-called a spillover event-and can cause disease. Four of the seven known Corona viruses that sicken people cause only mild to moderate disease. Three can cause more serious, even fatal, disease.

SARS Coronavirus (SARS-CoV-1) emerged in November 2002 and caused severe acute respiratory syndrome (SARS). That virus disappeared by 2004. Middle East Respiratory Syndrome (MERS) is caused by the MERS coronavirus (MERS-CoV).

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Transmitted from an animal reservoir in camels, MERS was identified in September 2012 and continues to cause sporadic and localized outbreaks. The third novel coronavirus to emerge in this century, SARS-CoV-2 causes coronavirus disease 2019 (SARS CoV-2 or COVID-19), which emerged from China in December 2019 and was declared a global pandemic by the World Health Organization on March 11, 2020.

It is accepted that Corona viruses are a large family of viruses that usually cause mild to moderate upper-respiratory tract illnesses, like the common cold. However, the three Coronaviruses that have emerged from animal reservoirs over the past two decades to cause serious and widespread illness and death are SARS-CoVid-1, MERS-CoV and SARS-CoV-2.

This article aims to establish the reported number of actual deaths in children aged 16 years and below from 1 December 2019.

Methodology

The internet was searched for childhood deaths associated with Covid-19. Each reported death was explored for details that made them attributable to Covid-19.

Results

The search results are summarized in the Table 1. This shows that worldwide, there have been 6 documented deaths in children aged 16 years and below since 1 December 2019. The distribution of associated countries are also displayed. In Table 2, we show the Covid-19 related deaths against the occurrence of measles outbreaks which were either combined with partial mass MMR vaccination or total mass MMR vaccination.

Table 1: Worldwide Childhood Mortalities from Covid-19.

Age years	Country	Associated Medical Issues	Confirmed Covid-19	Cause of death	Comments
10-months	China	Intussusception	Yes	Multiple organ failure	None
12	Belgium	None	Yes	None declared	Healthy
13	UK	None	Yes	None declared	-
14	Portugal	Psoriasis	Yes	None declared	Healthy athlete
16	France	None	Yes	Lung failure	Healthy
16	US	None	1 st IgM test: Negative 2 nd IgM test: Positive	Multisystem Inflammatory Syndrome	Healthy. Sudden onset Type 1 Diabetes
18	UK	Significant	Yes	None declared	Infection associated but unlikely cause
19	UK	None	Yes	None declared	Worked in mums Italian restaurant
21	Spain	Leukaemia	Yes	Pneumonia	Healthy

Table 2: Relationship between Covid-19 Deaths and Measles Outbreaks Managed with Mass MMR Vaccination

	Country	No of deaths	Population	Mortality rate /million people	Comment
Countries that did not have Measles outbreaks and therefore no need for mass Measles, Mumps and Rubella vaccination					
1	Belgium	20,779	11.5 million	1807/million	No MMR vaccinations between 1980 and 1990
2	UK	100,000	66 million	1515/million	No Measles outbreaks
3	USA	419,000	372 million	1126/million	No Measles outbreaks
Regional Measles Outbreak Combined with Partial Mass Vaccination for Measles, Mumps and Rubella					
4	Nigeria	1,504	200 million	7.5/million	Measles outbreak in conflict affected area. Partial mass vaccination of 4.7 million people
5	Hong Kong	169	7.5 million	22/million	Measles outbreak 1997. Mass MMR immunization for infants-19 years and selected MMR vaccination for groups like adult healthcare workers, airport staff, foreign domestic helpers and any adults seeking them between 2019 and until 2020
Measles Outbreak Combined with Mass Vaccination for Measles, Mumps and Rubella					
6	Cambodia	0	16.2 million	0/million	Measles outbreak 2019
7	Laos	0	7.1 million	0/million	Measles outbreak 2019
8	Madagascar	0	27.5 million	0/million	Measles outbreak 2018
9	Singapore	29	58.5 million	0.5/million	Measles outbreak 2017
10	South Korea	321	52 million	6.2/million	Measles outbreak 2001-2002. MMR immunization of whole population

Conclusions

It is remarkable that a Corona virus that has only caused 6 documented childhood deaths worldwide has caused mortalities in much older adults, which have reached 1126/million population in the US and 1484/million population in the UK. It was incumbent to explore the reasons for this.

Firstly, we adopted the hypothesis first proposed by scientists from Lithuania and Kurdistan that the traditional childhood vaccines against Measles, Mumps and Rubella (MMR vaccine) may be able to protect children from the harm of Covid-19. This theory was based on their discovery of a sequence similarity of the 30 amino acid residues between glycoproteins of SARS-CoV-2, Measles and Rubella viruses. Kodzius et al [2] followed this hypothesis along the lines that the antibodies produced in children from the MMR vaccine could recognize some protein parts (epitopes) on the SARS-CoV-2 spike proteins". They theorised that these antibodies, particularly in the epithelial layer of respiratory airways, blocked binding and entry of the virus into the cells".

Kodzius et al [2] were inspired by the immunological principle based on the antibody cross-reaction recognizing antigens in two different microbes. They then looked for homology sequence in SARS-CoV-2 and the viruses that commonly are prevented by vaccination during childhood. It was discovered that 30 amino acid residues share similarities between the Spike (S) glycoprotein of the SARS-CoV-2 virus and the fusion glycoprotein of Measles virus as well as with the envelope glycoprotein of the Rubella virus. These initial findings have been supported by epidemiological studies [3], including proposals for a plausible explanation in cross-immunity protection [4].

Two other epidemiological observations support the concept that MMR vaccination can protect against Covid-19 deaths. The first observation is that countries which did not engage in MMR vaccinations between 1980 and 1990, like Belgium and Switzerland, have very high Covid-19 related death rates. Belgium, for example has the highest Covid-19 mortality rate (1807/million) worldwide. The corresponding Covid-19 related mortality rate for Switzerland is also very high (998/million).

In countries like Nigeria, which was widely infected many years ago with measles and which accepted the MMR vaccine widely since its establishment in 1971, the Covid-19 related mortality rates is low (7.2/million population) compared to Belgium and Switzerland.

The second observation is associated with recent measles outbreaks and whether the countries managed the outbreaks with part or full mass immunization with MMR. We report that countries with the lowest rates of Covid-19 deaths are those that have combined the management of recent measles with mass MMR immunization. Cambodia, Laos, Madagascar for example, which have had recent measles outbreaks between 2018 and 2019, and which managed the outbreaks with mass MMR immunization have reported no mortality from Covid-19 related deaths (0/million), (Table 2).

In countries like the UK and USA where there have not been measles outbreaks and therefore no mass vaccination immunization with MMR, the Covid-19 mortality rates in adults is 1515/million population in the United Kingdom and 1126/million population in the United States of America. In a conflict affected area of Nigeria, there was a measles outbreak which was managed by partial mass vaccination of 4.7 million people. The Covid-19 related death rate is recorded as 7.5/million population.

These reports suggest that there might be a relationship between mass vaccination with MMR in countries with or without measles outbreaks.

The evidence is strong that childhood deaths worldwide from Covid-19 is extremely rare, only 6 reported cases. The evidence points to a strong determination that MMR vaccination in children and world mass MMR vaccination has a protective effect on Covid-19 deaths.

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