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ORIGINAL RESEARCH

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Inadvertent Effects of COVID-19 Preventive Measures on Communicable Disease Incidence among Patients at Kabarak Health Centre, Nakuru County, Kenya

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Abstract

Infectious diseases remain a major global health challenge, causing significant morbidity and mortality. The Covid-19 pandemic has highlighted the importance of implementing measures to control the spread of infectious diseases. While Covid-19 preventive measures were put in place to mitigate the impact of the pandemic, unintended outcomes were noted, including a reduction in the incidence of other communicable diseases. This study aimed to investigate whether the implementation of Covid-19 preventive measures led to a decrease in the incidence of other communicable diseases at the Kabarak Health Center in Nakuru county. The study utilized a retrospective chart review design, and patient records from the years 2019 and 2020 were reviewed. Cases of typhoid, shigellosis, amoebiasis, cholera, gastroenteritis, upper respiratory tract infections, tuberculosis, and pneumonia were analyzed. The study found that the total number of reported cases in 2019 was higher than in 2020 for each month. Gastroenteritis had the highest number of reported cases for each year, followed by amoebiasis, among gastrointestinal infections. Upper respiratory tract infections had the highest number of reported cases, followed by pneumonia among respiratory infections for each month. The highest number of cases for each year was recorded in the months of June and July. Overall, the implementation of Covid-19 preventive measures had a positive effect on the prevalence of other infectious diseases. In conclusion, the study findings suggest that the implementation of Covid-19 preventive measures had unintended positive outcomes in reducing the incidence of other communicable diseases. Therefore, it is recommended that health systems continue to prioritize measures to control the spread of infectious diseases, including implementing infection prevention and control measures, promoting hand hygiene, and vaccination programs. Additionally, it is important to monitor the incidence of other communicable diseases to ensure that the measures put in place to control Covid-19 do not lead to the neglect of other public health concerns.

KEYWORDS:
Covid-19, infectious diseases, protocols, pandemic.

Introduction

Infectious diseases remain a significant cause of mortality and morbidity globally, according to the World Health Organization (Gupta and Guin, 2010; Otieno and Walekhwa, 2021). The majority of these diseases are communicable, caused by infectious agents that can be transmitted from person to person. These diseases include tuberculosis, salmonellosis, Lyme disease, respiratory tract infections, gastroenteritis, typhoid, and cholera, among others (Hawker et al., 2008). The Centers for Disease Prevention and Control (CDC) report that annually, there are nearly 327 meningococcal cases, 9,025 TB cases, 33,666 cases of Lyme disease, and 60,999 cases of salmonella recorded worldwide (Uche et al., 2017). Developing countries are mostly affected, and vulnerable populations such as the elderly and children under five years old are most affected. Tuberculosis is the leading cause of communicable disease mortality worldwide, particularly among people living with HIV (Chakaya et al., 2021). In Kenya, for instance, 10 million new cases of TB were reported in 2018, with 1.5 million patients dying from TB, while nearly half a million were diagnosed with drug-resistant TB (Harries et al., 2018). The country also grapples with other conditions such as cholera, typhoid, and upper respiratory tract infections, with cholera and typhoid outbreaks frequently recorded.

In addition to these communicable diseases, the COVID-19 pandemic declared a global health emergency in January 2020 has become the most recent and vicious threat to human health (Mahmood et al., 2020). The virus, SARS-CoV-2, is highly virulent due to its high mutation capacity, and although it is primarily a lower respiratory infection, it can spread to other organs and cause systemic disease (Nile et al., 2020). The virus is spread through contact with an infected person, and viral particles can remain suspended in the air for nearly 36 hours, making the virus highly infectious (Lotfi et al., 2020). The WHO and the Kenyan Ministry of Health have implemented specific and non-specific measures, such as hand washing, sanitizing, avoiding contact with the mouth and face in contaminated environments, covering coughs and sneezes with the elbow, avoiding overcrowding, ensuring social distance, avoiding close contact with infected individuals, proper masking, and mandatory isolation of infected and suspected individuals (Güner et al., 2020). These measures have primarily aimed at preventing the spread of the virus since viral diseases do not have a curative modality. Nonetheless, the measures also apply to other communicable diseases, particularly those affecting the respiratory and gastrointestinal tract. We hypothesize that these preventive measures may have reduced the spread of other communicable diseases during the pandemic period.

Therefore, this study aimed to investigate whether the implementation of COVID-19 preventive measures led to a reduction in the incidences of other communicable diseases at the Kabarak Health Center in Nakuru County. The study compared the incidence of communicable disease cases before and during the pandemic period. The Kabarak Health Center serves students from Kabarak University and community members within the Kabarak community and its environs.

Materials and Methods

This study employed a retrospective chart review design Vassar and Matthew (2013), which involved the examination of patient records for a specific time period to investigate the incidence of communicable diseases. The study population consisted of patients who visited Kabarak Health Center (KHC) and were diagnosed with a communicable disease during the years 2019 and 2020. Purposive sampling according to Campbell et al. (2020) was utilized to select eligible patient records that met the specified inclusion criteria, while patients who did not meet these criteria were excluded.

The sample size for this study was determined using Cochran's formula, which takes into account the desired level of confidence, margin of error, and population size. With a 50% proportion (P) and 5% margin of error (E), the sample size was calculated to be 384, which was considered sufficient for the study. The study's ethical considerations were taken into account, with ethical approval obtained from the Kabarak Ethics Committee (KABU01/KUREC/001/07/08/22) and permission to collect data granted by the National Commission for Science, Technology, and Innovation (NACOSTI/P/22/19923). Additionally, access to patient records was authorized by the superintendent at KHC.

Data were collected from patient records stored at KHC, with information on communicable diseases diagnosed during the study period recorded. The data collection process was carefully conducted to ensure the accuracy and completeness of the collected data. Statistical analysis was performed using the statistical package for social scientists (SPSS) version 25, with descriptive and inferential statistics used to compare the incidence rates of communicable diseases between 2019 and 2020. The results were presented using tables, figures, and charts to provide a clear and concise representation of the data.

Throughout the study, strict adherence to ethical considerations was maintained, with patient confidentiality and privacy being upheld at all times. The study's findings are expected to provide valuable insights into the incidence of communicable diseases in the study population during the specified period, which can be used to inform healthcare policies and practices in the future.

Results

The purpose of this study was to investigate whether the implementation of Covid-19 preventive measures led to a reduction in the incidence of other communicable diseases at the Kabarak Health Center in Nakuru county between the years 2019 and 2020. In this section, we present the results of the retrospective chart review, including the total number of reported cases of communicable diseases and a comparison of the incidence between the years 2019 and 2020. We also provide a breakdown of the different types of communicable diseases analyzed and their respective incidences. The results of this study have significant implications for public health policy and the management of infectious diseases, particularly during pandemics such as Covid-19.

Table 1 shows how incidences of gastrointestinal (GI) and respiratory infections were distributed across the months between 2019 and 2020 at KHC. Notably, gastroenteritis and upper respiratory tract infections had the highest incidence cases each month for the two-year study period. There were no reported incidences of shigellosis, cholera and tuberculosis at KHC during the study period. In both years, incidences of typhoid were very minimal with highest recorded at 5 in the month of November 2020. Comparatively, cases of Amoebiasis were relatively low to moderate and steady for each month when 2019 and 2020 total cases were compared. Similarly, pneumonia incidences depicted similar steady character to Amoebiasis.

Table 1:

Tally of cases reported between 2019 and 2020 at KHC

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2019 (PRE-COVID PERIOD)														
Gastro-intestinal system	Typhoid	2	1	3	0	1	1	1	0	4	2	3	1	2
	Shigellosis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amoebiasis	14	101	41	10	34	4	13	23	9	36	16	7	29
	Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastroenteritis	158	120	125	131	121	168	48	172	118	109	124	83	123
Respiratory system	URTIs	120	138	153	53	41	460	866	34	121	116	156	32	173
	Tuberculosis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pneumonia	9	16	10	2	4	14	16	8	11	9	7	1	9
2020 (COVID PERIOD)														
Gastro-intestinal system	Typhoid	1	0	0	0	2	0	0	1	0	3	5	0	1
	Shigellosis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amoebiasis	16	52	28	6	33	34	15	3	22	33	10	8	22
	Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastroenteritis	120	165	44	126	96	74	131	37	113	89	110	71	98
Respiratory system	URTIs	73	112	141	13	23	301	479	19	53	68	116	33	120
	Tuberculosis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pneumonia	3	9	14	0	5	6	12	5	9	2	3	0	6

Figure 1 shows the graphical distribution of total incidences of GI and respiratory infections for each month during COVID and pre-COVID period. Notably, highest total incidences for either 2019 or 2020 were recorded in the months of June and July. Additionally, for each month, incidences of cases for the year 2020 were less compared to incidences recorded in 2019.

Figure 1:

Comparison of Communicable Cases Reported at KHC Between 2019 And 2020

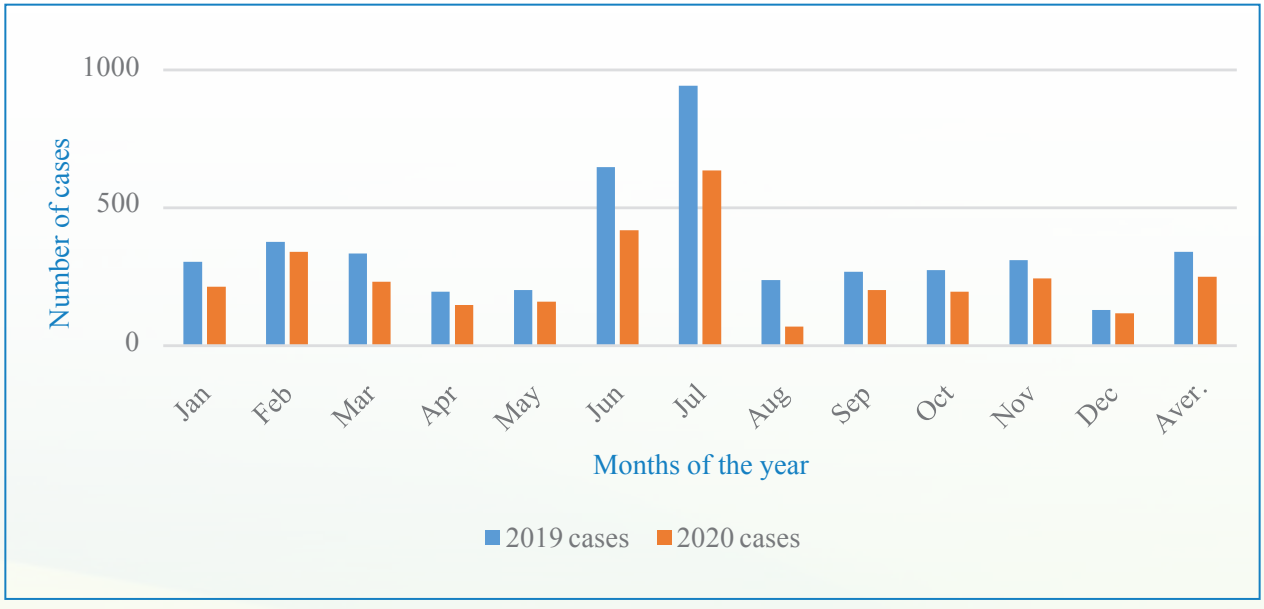


Figure 2 shows the distribution of GI infections between 2019 and 2020 at KHC. For each month, the differential gap in the number of cases is relatively significant between 2019 and 2020. Notably, incidences recorded in 2019 surpassed those recorded in 2019 in the month of July.

Figure 2:
Comparison of Gastrointestinal Cases Reported Between 2019 And 2020

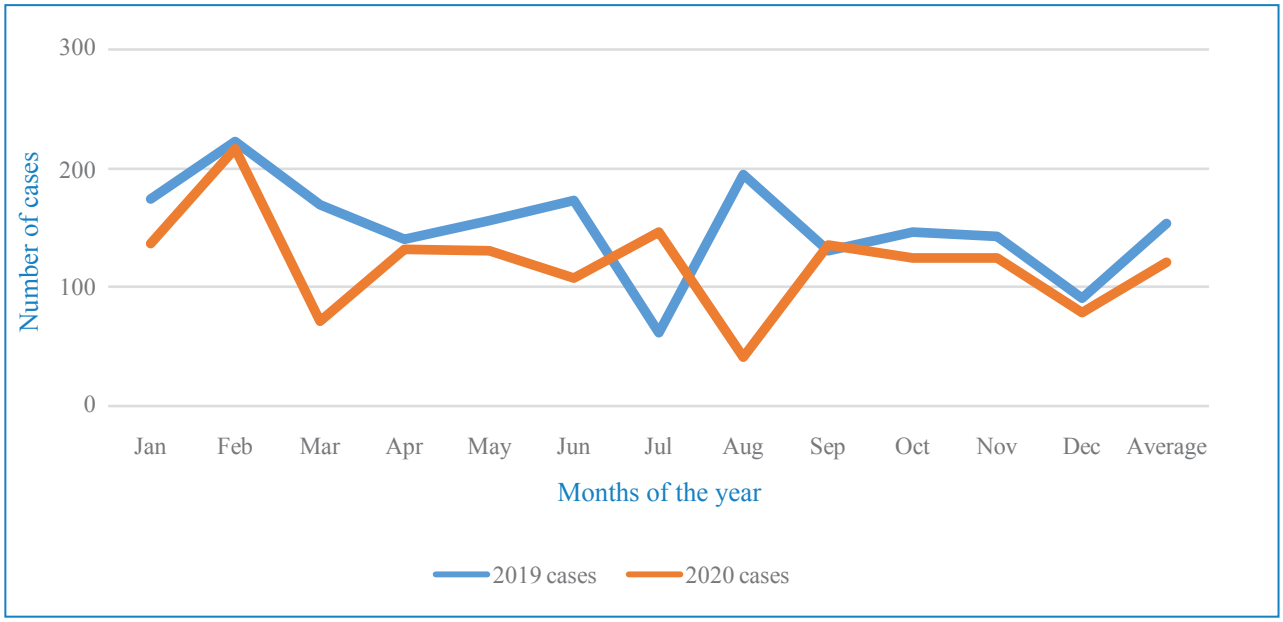


Figure 3 shows the distribution of respiratory cases at KHC between the years 2019 and 2020. Highest incidences recorded were in the months of June and July. The differences in cases for each month between the two years was relatively small across all months. Notably, after initialization of use of Covid-19 preventive protocols, incidences of respiratory infections reduced as noted in the months of April and May.

Figure 3:
Comparison of Respiratory Cases Reported Between 2019 And 2020

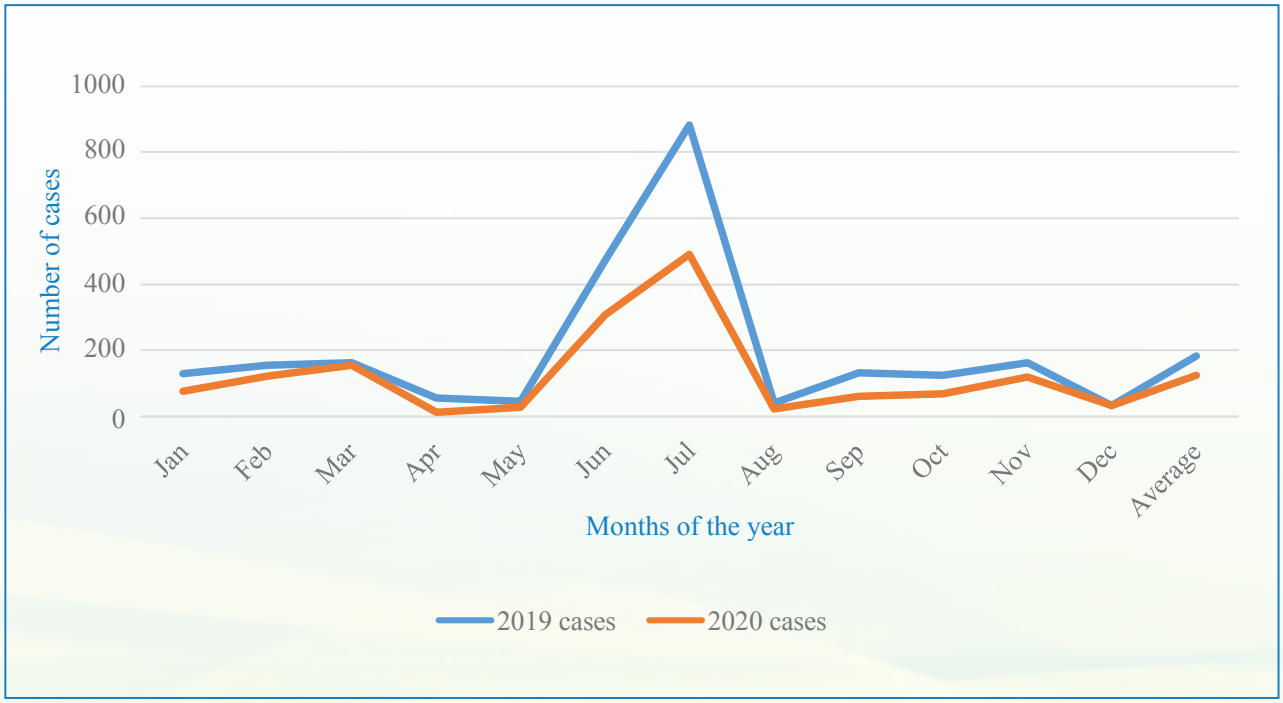


Figure 4 show the distribution of incidences of gastroenteritis between 2019 and 2020. The differential gap in number of cases is relatively wide in most months of the years and narrows during the last quarter of the year. Highest incidences were in the months of June and August for the year 2019 while in 2020, highest incidences were recorded in February.

Figure 4:
Comparison of Gastrointestinal Cases Reported Between 2019 And 2020

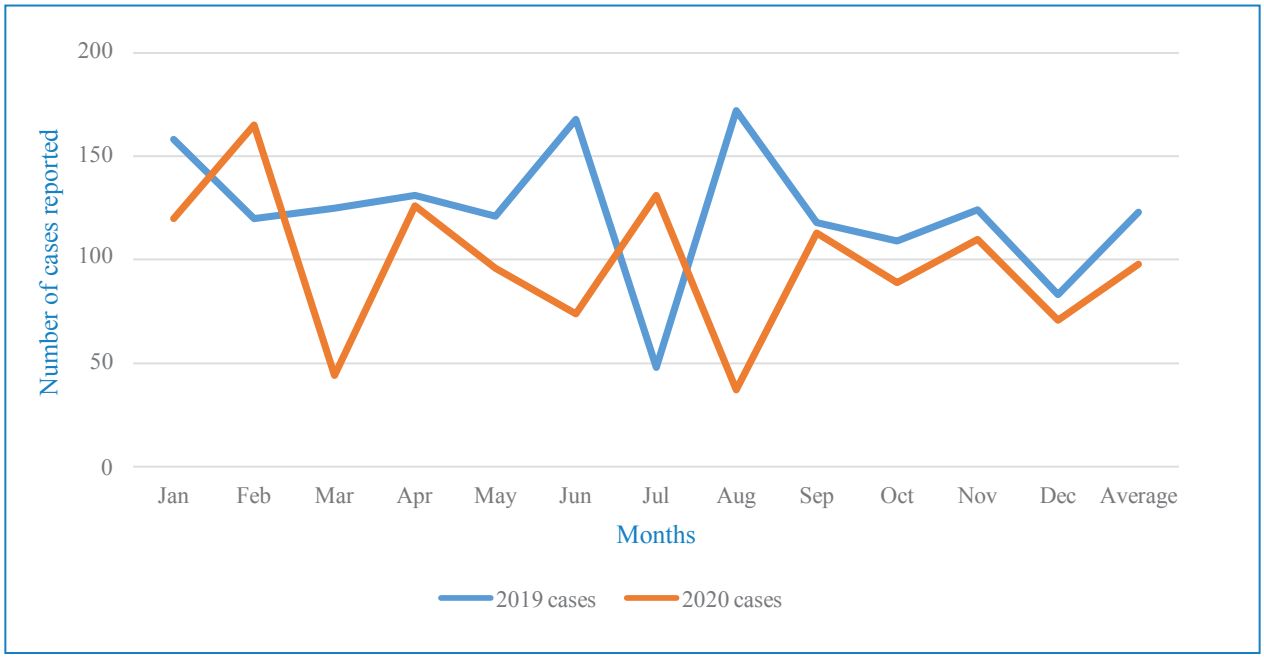


Figure 5 depicts distribution of Upper respiratory infections between 2019 and 2020 at KHC. Highest incidences were recorded in the months of June and July. Correspondingly, these are the coldest months in Kenya during which the public is most susceptible to respiratory infections.

Figure 5:
Comparison of URTIs Cases Between 2019 And 2020

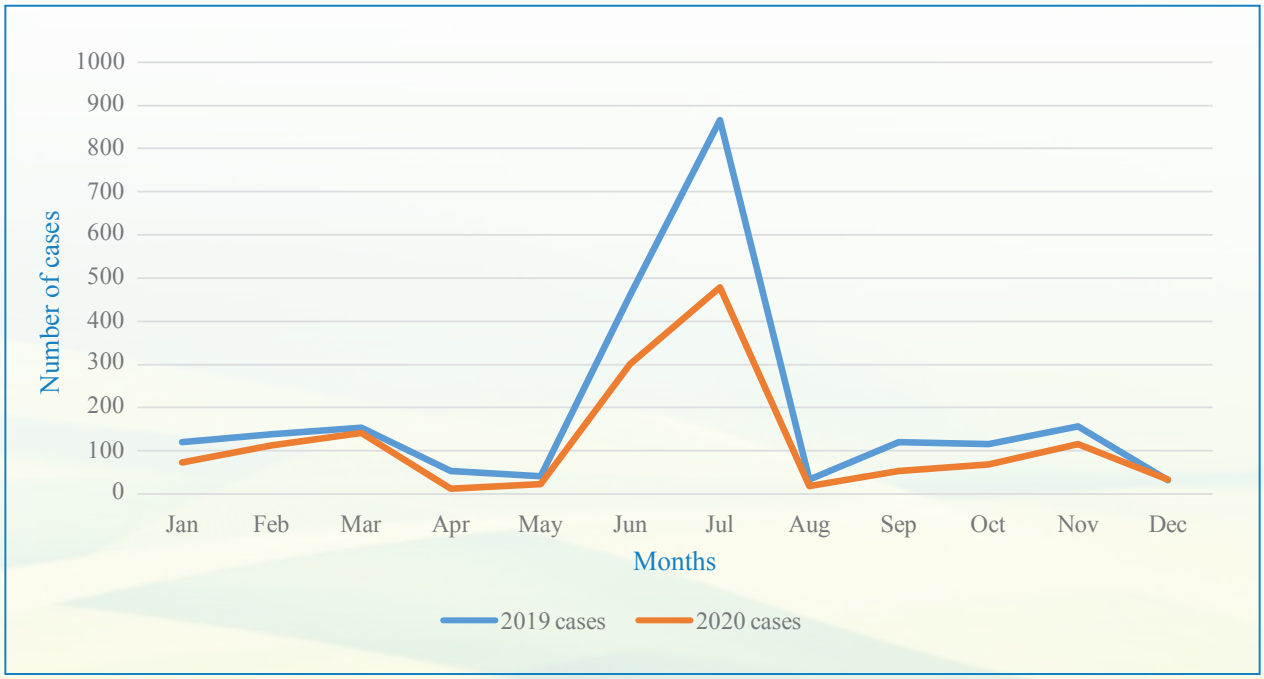


Figure 6 depicts distribution of Amoebiasis incidences between 2019 and 2020. Highest cases for both years were in the months of February. Notably the distribution of cases is erratic with no perceived pattern. However, in general, incidences tend to reduce as each year progresses from January to December.

Figure 6:
Comparison of Amoebiasis Cases Between 2019 And 2020

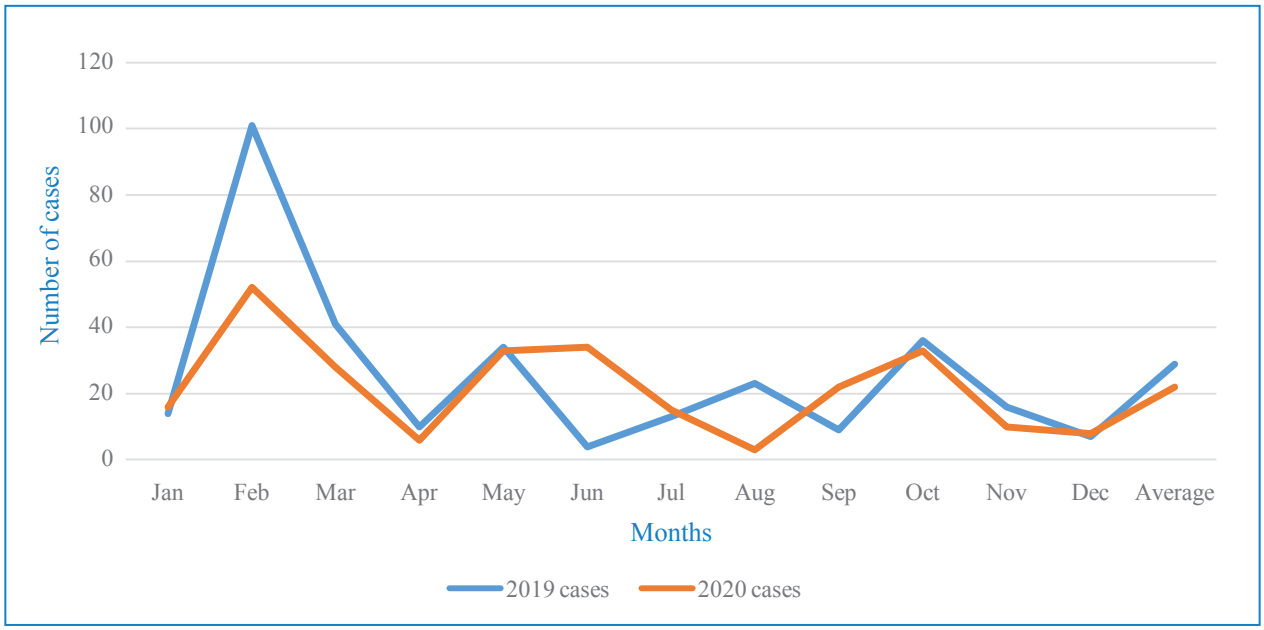
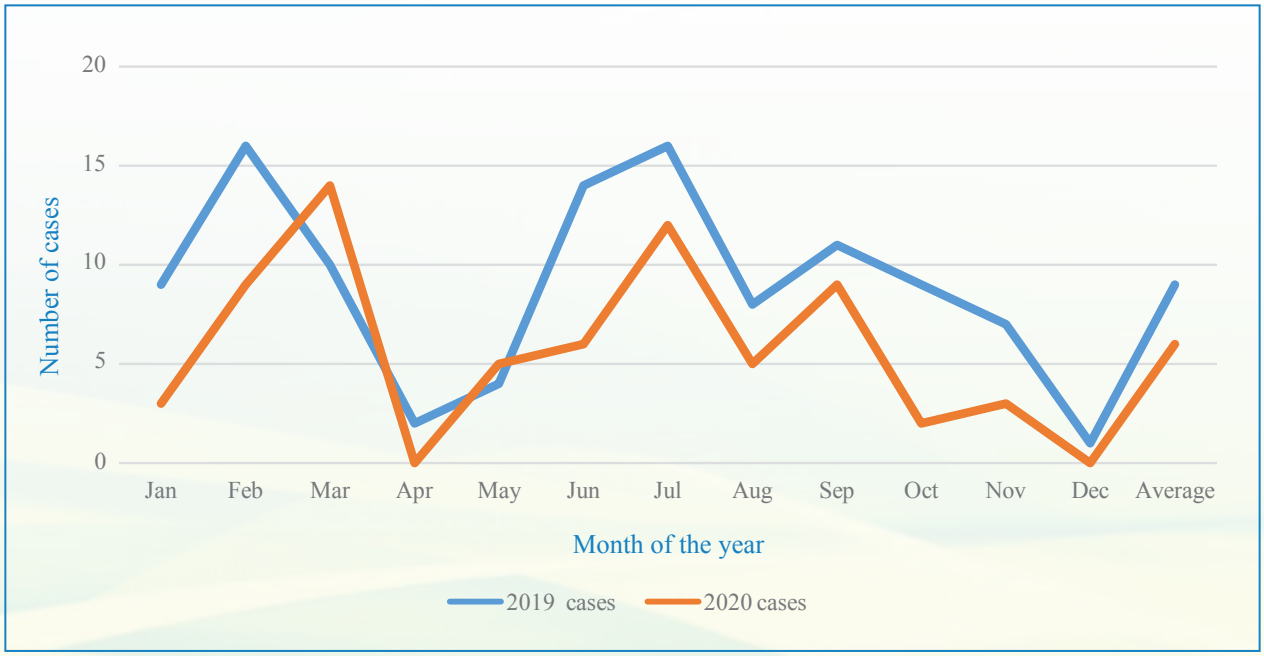


Figure 7 shows the distribution of pneumonia incidences between 2019 and 2020. Distribution pattern for cases before and during Covid-19 was relatively similar: as the number of cases increase or decrease for each month in 2019, an increase or decrease in 2020 was also observed. However, highest incidences were seen in July for 2019 while for the year 2020, it was in the month of March.

Figure 7:
Comparison of Pneumonia Cases Between 2019 And 2020



Discussion

This study aimed to investigate the effect of implementing COVID-19 preventive measures on the incidence of communicable diseases at the Kabarak Health Center in Nakuru county between 2019 and 2020. The findings indicated no reported cases of cholera, shigellosis, and tuberculosis during the study period, which could be due to the diseases not being endemic in the study area or inadequate surveillance. This is consistent with other studies that reported a low incidence of these diseases in African countries (Lawal, 2021; Oleribe et al., 2021). However, it is worth noting that the COVID-19 pandemic may have affected the surveillance and reporting of communicable diseases.

The findings of the study indicate a notable reduction in the overall incidence of communicable diseases during the COVID-19 pandemic in 2020 compared to 2019, with the highest frequency of cases occurring in June and July for both years. This observation may be attributed to a multitude of factors, including seasonal variation, demographic shifts in affected populations, and altered health-seeking behaviors. The seasonal impact on communicable disease transmission is well documented, with colder weather conditions associated with increased transmission of respiratory infections, especially among young children (Altizer et al., 2006). The reduced incidence of these infections during the COVID-19 pandemic may be linked to the implementation of non-pharmaceutical interventions (NPIs) aimed at limiting the spread of COVID-19, such as social distancing, mask-wearing, and school closures (Abuhammad et al., 2022). These measures may have inadvertently led to a reduction in the transmission of other respiratory infections. The altered health-seeking behaviors during the pandemic may have also influenced the reduced incidence of communicable diseases. People may have avoided seeking healthcare services for mild symptoms, fearing exposure to COVID-19 in healthcare facilities, resulting in lower disease reporting. Additionally, changes in healthcare delivery models, such as telemedicine and reduced in-person appointments, may have contributed to reduced disease reporting. (Domingo and Rovira, 2020). Nevertheless, the implementation of COVID-19 preventive measures, such as wearing masks and social distancing, may have contributed to the reduction in the transmission of other communicable diseases. This is consistent with other studies that have reported a decrease in the incidence of communicable diseases during the COVID-19 pandemic (Tanislav and Kostev, 2022; Ullrich et al., 2021).

Gastroenteritis had the highest frequency of cases among the gastrointestinal infections, with a slight increase in February and July 2020 compared to 2019. This could be due to changes in food hygiene practices or an increase in waterborne transmission, as reported in other studies. Furthermore, COVID-19 can affect the GI tract through the angiotensin-converting enzyme 2 (ACE2) receptors, which are present in the GI epithelium. Additionally, COVID-19 can cause systemic inflammation that can result in GI symptoms such as diarrhea, nausea, vomiting, and abdominal pain. COVID-19 may also alter the gut microbiota, leading to further GI complications. Finally, medication side effects, particularly those related to treatments for COVID-19, may contribute to GI symptoms (Choi et al., 2022; Love et al., 2022). The decrease in cases towards the end of 2020 may be attributed to the easing of preventive measures, leading to increased human interaction and consequently, increased transmission.

Upper respiratory tract infections (URTIs) exhibited the highest incidence rate among respiratory infections, with a relatively minor deviation in the total number of cases between 2019 and 2020, except for June and July, during which 2019 recorded a greater number of cases. This observation may be attributed to seasonal factors, as previously discussed, where colder weather conditions increase the transmission of respiratory infections, especially among young children. It is noteworthy that the implementation of COVID-19 preventive measures may not have been equally effective in reducing the transmission of URTIs, as some of the causative agents are commensals or are reactivated from latent infections, thus evading

traditional infection control measures (Unger and Bogaert, 2017). Additionally, URTIs are known to be highly contagious, and people may unknowingly spread the infection through close contact with others, even while asymptomatic (Gao et al., 2021). It is also essential to consider the potential influence of demographic shifts in the affected populations on the incidence of URTIs during the COVID-19 pandemic. For instance, the pandemic-related closure of schools and daycare centers may have reduced the transmission of URTIs among children. However, this factor could have been counteracted by increased exposure to URTI-causing pathogens among individuals who continued to work outside the home.

Conclusions

1. The COVID-19 pandemic had a notable impact on the incidence of communicable diseases in 2020, with a reduction in the total number of reported cases compared to 2019. The reduction may be attributed to a combination of seasonal factors, demographic shifts, and altered health-seeking behaviors during the pandemic.
2. The implementation of COVID-19 preventive measures may not have been equally effective in reducing the transmission of upper respiratory tract infections (URTIs), due to the high transmissibility of URTIs and the limitations of traditional infection control measures. URTIs also pose a unique challenge as some of the causative agents are commensals or are reactivated from latent infections.

Recommendations

1. Continued implementation of COVID-19 preventive measures, including social distancing, mask-wearing, and school closures, may have the unintended but positive effect of reducing the transmission of other infections. We recommend continued implementation of these measures especially among densely populated areas.
2. Given the challenges of controlling the transmission of URTIs, additional research should be conducted to identify and evaluate alternative infection control measures, such as ventilation improvements and air filtration systems, that could be used to reduce the spread of these infections.

Conflict of Interest

Authors declare no conflict of interest.

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