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Use of face masks for COVID-19 prevention: a qualitative study on barriers and motivators in Zimbabwe

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Abstract

Introduction To mitigate the impact of the COVID-19 pandemic, face mask use has been a key component of public health measures. Research in most settings has focused on understanding the effectiveness of this intervention in reducing COVID-19 transmission. This study aimed to identify the barriers and motivators of face mask use in the Zimbabwean population.

Methods Thirty key informant interviews (KIIs) and 10 focus group discussions (FGDs) were conducted with homogenous study groups of health workers, village health workers, church leaders, traditional healers, teachers, women leaders, transporters, youth leaders and the general population selected in 10 districts across the country from September–October 2022. Each study group consisted of key informants and FGD participants. Interviews and FGDs were captured using digital recording devices, transcribed verbatim, and translated into English. The data were analysed manually via thematic analysis.

Findings Six themes were generated in this study. The four themes identified as barriers were individual factors (low risk perception in rural areas and as the number of cases declined due to vaccination, lack of conviction and lack of knowledge on the importance of face masking resulting in practices such as sharing and improper wearing of masks), access challenges (due to scarcity and affordability resulting in reusing dirty masks or washing surgical masks), concern about side effects (breathing difficulties and other respiratory complications), and sociocultural and religious beliefs (resulting in removal of masks by traditional healers during consultations, removal of masks in church). Two themes that were identified as motivators included perceived benefits (confidence in the effectiveness of facemasks for the prevention of COVID-19 transmission) and environmental factors (fear of law enforcement agents and village health workers).

Conclusions The study findings underscore the need of awareness campaigns, improvement of accessibility and affordability of masks, sensitivity to religious and cultural beliefs to increase the usage and effectiveness of face mask during pandemics of respiratory diseases.

Keywords COVID-19 · Face masks · Motivators · Barriers · Qualitative

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Abbreviations

COVID-19	Coronavirus disease 2019
DHIS2	District Health Information Software 2
FGD	Focus group discussion
KII	Key informant interview
PHSM	Public health and social measures

1 Introduction

When the World Health Organization announced COVID-19 as a pandemic of international concern on the 11th of March 2020, non-pharmaceutical public health interventions were the first line of defense against SARS-CoV-2 infection [1]. Among these interventions was the use of face masks. Research on COVID-19 has shown that the use of face masks by the general public potentially limits community transmission of infectious diseases [2–7]. The use of face masks has been documented to curb viral transmission by asymptomatic individuals, thus limiting the extent of the epidemic [5]. However, the compulsory wearing of face mask laws enacted by many governments during the pandemic overlooked some unintended consequences of these public health guidelines for marginalized communities [8, 9]. Among other public health measures, Zimbabwe adopted mandatory face masking after the country's first COVID-19 case was detected in March 2020.

Mask wearing has been reported in many countries, though with variability. In Poland, cloth masks were more popular than single-use masks while a sizable proportion of those who reused their face masks indicated that they decontaminate their masks [10]. Mask reuse was also been reported in Kampala, Uganda [11]. In Western Uganda, some participants indicated that they would remove their face masks if they needed to talk to someone while others shared their masks [12].

In addition to delivering timely accurate and necessary information, risk communication should include people's beliefs, practices, concerns, and perceptions about the pandemic to develop sustainable evidence-based preventive strategies [10, 11]. Among other factors, socioeconomic status, culture, public policies, and regulations have been identified in some settings as affecting population adherence to public health guidelines [9, 11, 13–17]. Risk perception also affects compliance with preventive measures. Those who perceive themselves to be at high risk are more likely to comply with preventive measures [18, 19]. In Western Uganda, participants believed that wearing face masks in public would protect them from COVID-19 infection [12]. During the SARS outbreak, face mask wearing was more likely to occur in individuals with a strong belief in its effectiveness [20]. During the avian influenza pandemic in Taiwan, people who lacked knowledge about the cause of fatality were less likely to adhere to preventive measures, including mask wearing [21]. Positive associations have also been noted between a higher degree of knowledge and COVID-19 preventive measures, including wearing of face masks [22, 23].

Different communication platforms have been used to raise awareness to COVID-19. Social platforms such as twitter proved to have high reach and impact especially in the young population [24]. This is despite the fact that its effectiveness as a broadcasting platform for promotion of healthy behaviours has not been established [25]. Other studies documented that reliance on social media for COVID-19 information reduced adherence to face masks [16, 26, 27]. Despite the limitations in geographical coverage associated with use of traditional media sources such as televisions, radio or other government channels, these have proven to be trusted and mostly used sources for trustworthy information [24, 28, 29], and are also trusted by the older population [24].

A study conducted by Murukutla et al. [30] during the first 6 months of the pandemic reported high levels of adherence to preventive measures in African countries, including Zimbabwe. As the pandemic evolved, anecdotal evidence suggested low level of compliance with COVID-19 preventive measures including face mask wearing. We hypothesized that there could be factors affecting the adherence of the Zimbabwean population to face mask use during the pandemic. Thus, to allow assessment of these measures in future health crises, Coroiu et al. [31] emphasized the importance of identifying barriers and facilitators for adherence to preventive measures. Thus, the study aimed to identify the barriers and motivators of face mask use in the Zimbabwean population.

2 Methodology

2.1 Study design, setting and population

A descriptive qualitative study design based on the ethnography of social groups using an Emic and Ethical approach was conducted across 8 provinces in Zimbabwe in September and October 2022. This study, which was part of a larger

study focusing on social-behavioural determinants of population compliance with public health and social measures (PHSM) and COVID-19 vaccine uptake in 6 selected African countries, was conducted in Zimbabwe. The study sites/ districts in Zimbabwe were selected based on vaccine uptake statistics in the District Health Information Software 2 (DHIS2) database. The study sites and study population has been described previously [32, 33]. Ten districts (Binga, Rushinga, Makonde, Gokwe South, Chiredzi, Mbare, Seke, Insiza, Zengeza, and Epworth) were selected across 8 provinces (Fig. 1).

The three study districts in the Harare metropolitan province were Mbare, Zengeza and Epworth, where transporters, religious leaders and women's leaders were recruited into the study, respectively. These districts are high density, over-populated areas housing residents of mixed culture and ethnic backgrounds. The Mbare district is located close to the central business district of Harare, while Epworth is a peri-urban district. The Zengeza district is located in Chitungwiza, a dormitory town of the Harare metropolitan city. Key activities in the Mbare district include vending and trading, and it is also a central bus park station for transport connecting to different areas within and across the borders of Zimbabwe. The water supply and sanitation facilities in Epworth are highly compromised. Hand washing facilities are scarce in these districts, while the water supply is intermittent, resulting in people converging at water collection points such as bore-holes. The Makonde district was chosen as the study site in Mashonaland West. The study participants in this area were village health workers. Key informant interviews (KIIs) and focus group discussions (FGDs) were conducted at the growth point, which was previously a farming compound. Most of the households in the area had a functional tippy tap, which residents referred to as *chigubhu gear*. In the Mashonaland East, Seke district, where a sample representing the general population was included in the study, is a peri-urban area situated close to Harare. The Rushinga district where youth leaders were recruited, is located in Mashonaland Central and borders Mozambique. The district has mixed cultures. Most of the shops at the growth point where the interviews and FGD were conducted had facilities for hand washing. The study district in Masvingo Province, Chiredzi, is inhabited by a mixed population with different cultures and ethnic backgrounds. In this study area, traditional healers were recruited for KIIs and FGDs where interviewed. The town where the data were collected is central to the trade between Harare, Chiredzi, Masvingo town and South Africa. It is densely

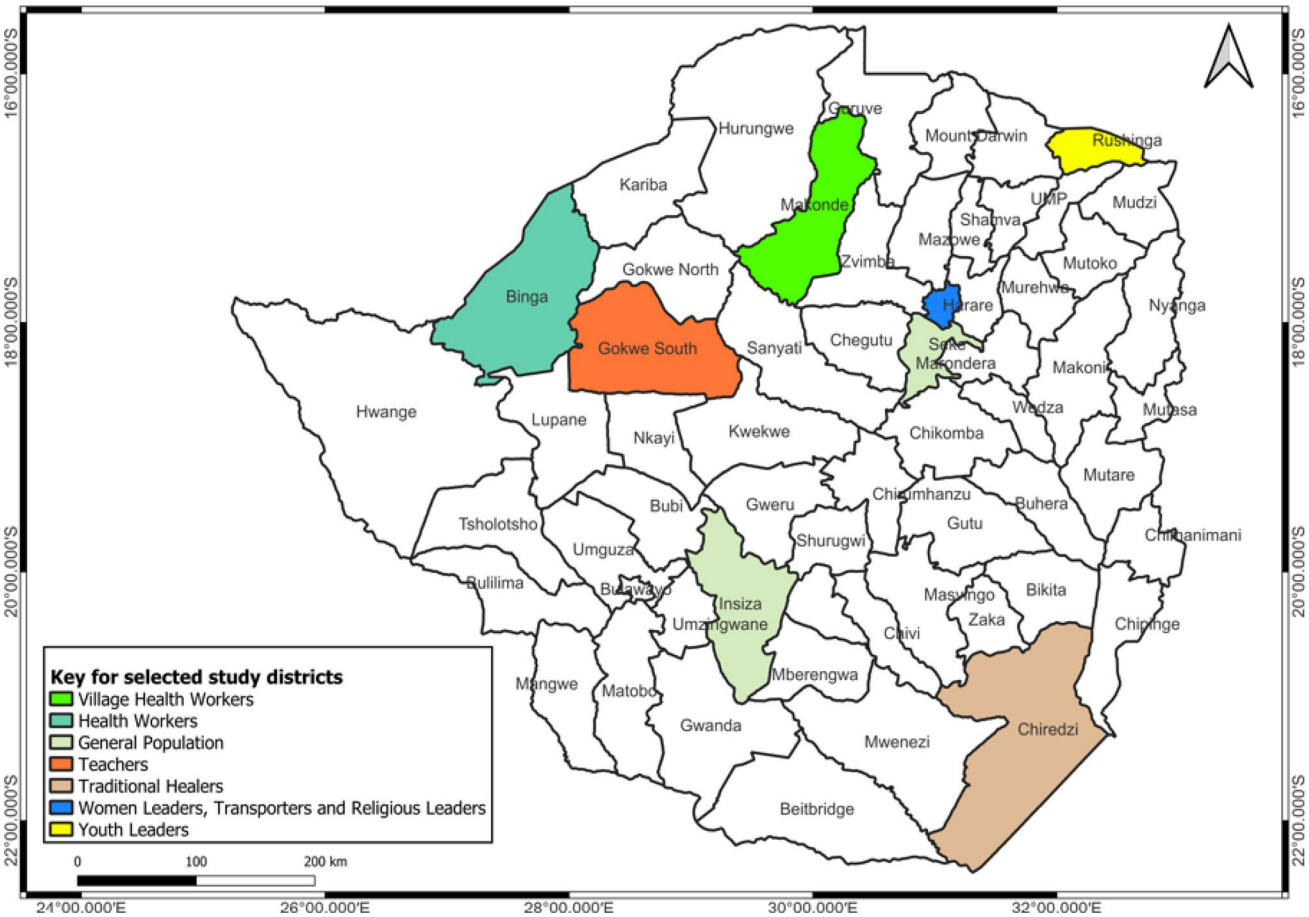

Fig. 1 Location of the study sites and classification of participants in the COVID-19 qualitative study. Map adapted from Midzi et al. [32]

populated with a frequent interrupted water supply. The Gokwe South district growth point was selected as the study site for Midlands Province, where teachers were recruited into the study. From observations, people, including school children, were not wearing face masks or observing physical distancing, and they had no visible hand washing facilities at their workplace. The study site in Matabeleland North, Binga district, is a resort place attracting many tourists and fish traders. Most of the shops and buildings had hand washing facilities or sanitizers at their entrances. In the Matabeleland South, the study sites were located at the Insiza district growth point and a rural area clinic. However, the visited rural clinic had no convenient hand washing facility at the time of entry. Generally, the water supply was not sufficient at the rural clinic, and the Blair toilets were dirty.

2.2 Sampling and sample size

The sampling procedure and sample size has been described previously [32, 33]. Purposive sampling was used to select different social and economic groups comprising health workers, village health workers, teachers, traditional healers, transporters, religious leaders, women leaders, youth leaders, and the general population. Each of the 10 FGDs included 10 participants. At each of the 10 sites, 3 key informants were identified for KIIs. Homogenous FGDs and KII participants were chosen per site. Individuals with first-hand and in-depth knowledge about the community, who are non-judgmental and sensitive to differences within the community participated as key informants. Individuals who are able to express themselves in a group setting and of similar study sample as the key informants were selected as FGD participants per study sites.

2.3 Study guides and data collection

Study guides with topic guides informed by the literature on vaccine uptake were developed by the World Health Organization and conceptualized in the Zimbabwean setting by a local research team comprising a PhD expert in grounding theory studies and ethnography, PhD holders in community health, individuals with master's degrees in public health and research assistants with at least a degree in social sciences. Three guides, including a semi-structured interview guide for KII, focus group discussion guide and observation checklist were uniformly used for data collection across all study groups as described previously [33]. In brief, the FGD and interview guides had similar questions which sought to understand the participants' and community's general knowledge and experiences on COVID-19 and its preventive measures, challenges hindering compliance to COVID-19 preventive measures in the community, influencers promoting compliance and recommendations to improve compliance with COVID-19 preventive measures in the community. The observation checklist was used to collect data on key features such as location of study site (i.e. church, homestead, market place, and public place), correct wearing of face masks of people on the site, presence of hand washing facilities/sanitizers, whether people were washing their hands, and whether people were practicing physical distance at the study sites. All the FGDs and the KIIs were conducted physically. Community sensitization and mobilization were conducted by the Environmental Health Officers drawn from the study districts. Each FGD took an average of 45 min, while each KII took approximately 30 min. Interviews and discussions were conducted in English or in one of the two local languages, Shona or Ndebele, depending on the preference of the participants. Each session was led by a skilled moderator while the assistant moderator observed and took notes. With consent from the participants, interviews were recorded.

2.4 Data analysis

All the audio recordings were transcribed verbatim, and those in local languages were subsequently translated into English. Using the thematic analysis approach, an analytic template, aligned with the FGD and KII guidelines, was developed as a starting point for analysis. An experienced qualitative researcher performed the initial coding of the transcripts. Other research team members inputted the codes by cross-checking the transcripts. The codes were then clustered and sorted to identify subthemes according to the meaning and trend of ideas. Subthemes were used to construct the main themes based on their relevance to the research question and the extracted transcripts. The most important and repetitive quotes on face masks were chosen to represent the selected themes. The research team repeatedly read the transcripts, discussed the analysis process, reviewed, and defined the themes to strengthen the rigour of the qualitative analysis [34]. No software was used in the analysis. Manual analysis was conducted since some of the local languages (Shona and Ndebele) expressions by participants which were critical as part of study findings could not be interpreted by an English software, thus, would be lost.

3 Findings

3.1 Study participant demographics

From the estimated sample size of 130 participants comprising 30 KIIs and 100 FGDs participants, 128 (98.4%) participated in the study. Two participants were lost to follow-up in 2 focus group discussions: one for traditional healers in Chiredzi and the other for women leaders in Epworth. The average age of the study participants was 46 years (SD = 11), and the age range was 20–72 years (Table 1). Among the participants, 70 (54.7%) were males, and 79 (61.8%) had attained a secondary level of education.

Six themes were generated in this study. Two motivating factors were identified: perceived benefit (confidence in the effectiveness of facemasks for the prevention of COVID-19 transmission) and environmental factors (fear of law enforcement agents and village health workers). The four themes identified among the barriers were individual factors (low risk perception, lack of knowledge on the importance of face masking, lack of conviction), access challenges (availability and affordability of face masks), concern about side effects (breathing difficulties and other respiratory complications), and sociocultural and religious beliefs.

3.2 Motivators to adhere to face masking

3.2.1 Confidence in facemask effectiveness

Some individuals adhered to face masking because they believed it was effective at preventing the spread of COVID-19. They had testimonies from personal experience and observations from others who did not get COVID-19 infection because of adherence.

> *"–––Putting on your mask when travelling, I can attest that these measures truly worked well for me. Those who also adhered to these measures helped them a lot, as some did not even contract COVID-19" (KI 3, Makonde District, village health worker).*

3.2.2 Fear of law

Some people wore face masks in public because they were afraid of law enforcement officers or health workers. It was a punishable offence to be found without a face mask. So wearing of face masks was rather fear of the law not for

Table 1 Age and sex distributions of the FGD and KII participants

Variable	Total Number of participants	Age in years				Gender	
		Mean age	Std. Dev.	Min	Max	Male n (%)	Female n (%)
Both FGD & KII	128	45.7	11.3	20	72	70 (54.7)	58 (45.3)
Key informant interviews	30	47.8	10.4	27	72	20 (66.7)	10 (33.3)
Focus group discussions	98	45.0	11.6	20	69	50 (51.0)	48 (49.0)
Study group (District)							
Village Health workers (Makonde)	13	49.5	6.4	37	62	4 (30.8)	9 (69.2)
Health Workers (Binga)	13	40.0	7.5	28	55	8 (61.5)	5 (38.5)
Population (Insiza)	13	52.4	13.2	21	72	7 (53.9)	6 (46.2)
Population (Seke)	13	47.2	15.4	25	69	8 (61.5)	5 (38.5)
Religious leaders (Zengeza)	13	48.0	11.5	20	68	10 (76.9)	3 (23.1)
Teachers (Gokwe South)	13	48.8	6.0	39	60	5 (38.5)	8 (61.5)
Traditional Healers (Chiredzi)	12	51.6	9.8	35	65	5 (41.7)	7 (58.3)
Transporters (Mbare)	13	40.3	9.7	27	61	13 (100)	0
Women Leaders (Epworth)	12	44.8	10.7	27	62	0	12 (100)
Youth Leaders (Rushinga)	13	34.5	8.5	21	46	10 (76.9)	3 (23.1)

FGD focus group discussion, *KII* key informant interview, *Std Dev* STANDARD deviation

prevention of COVID-19. In some communities, they enacted laws enforcing the practice of preventive measures to protect residents from COVID-19 infection.

"On the issues of wearing face masks, people were now more afraid of the police than the pandemic. The issue of wearing face masks became criminalized, so people were now avoiding the police. People would then remove masks in the absence of police. Therefore, because of fear, people were afraid of the police and associated COVID-19 PHSM noncompliant fines. You will then realise that people then respond in different ways" (KI 1, Zengeza District, religious leader).
"At our village courts, we put a law that you don't enter without a mask" (KI 2, Insiza District, village head).

3.3 Barriers to adherence to face mask wearing

3.3.1 Low risk perception

As the pandemic evolved and with the use of vaccines, the number of COVID-19 cases started to decline. This resulted in people being complacent since they were now considering themselves to be at low risk; thus, they were no longer seeing the importance of masking up.

"Compliance is now a problem as the disease seems to be seized because you see people in offices are no longer wearing masks and in buses—you find yourself not putting on masks so people are not in compliance because of fewer cases. It's not as bad as before" (KI 1 Binga District, health worker).

In the early days of the pandemic, COVID-19 cases and deaths were mainly concentrated in cities and towns. Except for those rural communities that had death due to COVID-19, or those from families that lost their breadwinners due the disease, most of the rural population had the perception that they were at low risk of infection.

"—So generally only those who come from the rural part would be a little bit sceptical about the disease. The disease was defined as occurring in an urban area. —, you find a lot of people in the urban area who succumbed to COVID-19 were coming to be buried in the rural areas. —the prevalence of COVID-19 in rural areas was lower unless one had died of COVID-19 from the rural areas and from the family with whom one was the bread winner, that is, when they could feel the effects of COVID-19" (KI 1, Gokwe South District, schools inspector).

3.3.2 Lack of knowledge on the importance of face masking

Some people had no awareness of the stipulated COVID-19 preventive measures at a particular point in time, leading to non-adherence. A lack of awareness was noted in the guidelines regarding mask wearing. This lack of knowledge resulted in non-intentional adherence; through practices such as mask sharing and wearing dirty masks, thus putting people at risk of COVID-19 infection.

"Awareness regarding COVID-19 preventive measures to the people, I saw it as if it was very limited, because people seem to not have an understanding of what was happening. We used to have a situation where if we got to an office that required masking to enter with one person having it while their colleague did not have, one would enter and exit and then swop the mask for the colleague to enter. There was that risk where people were exchanging masks" (FGD participant 6, Gokwe South District, school teacher).
"Some will put them [masks] for a long time until they were dirty and no longer effective at combating COVID-19,–– some would not wash and iron the washable masks once they removed them. Some would also borrow a mask from a colleague when they wanted to enter a shop; thus, there was much mask exchange among people, so these are some of the challenges related to improper wearing of masks. The exchange in masks also exposed people to the spread of COVID-19, though that did not matter to people as they would wear masks so as not get arrested and to get access to shops and facilities that required wearing of masks on entry" (KI 3, Makonde District, village health worker).
"On face masks, we had challenges here at school; kids used to bring their own masks but remember the kids in Early childhood Development classes like each other and play while hugging their friends, and some even ask each other to exchange them" (FGD participant 3, Gokwe South District, school teacher).

Participants echoed that in the community, there were people who wore their masks improperly, either not completely covering the nose and mouth or on the chin only. Some would just put their masks in the pockets and put them on when they met police officers or village health workers. The maximum time allowable for single mask wearing was

not followed. Some of these inappropriate practices were mainly related to a lack of information on why the masks were supposed to be worn.

"––– there was the issue of how these face masks were being worn. Most people were wearing masks, but their nose and mouth were not covered or just covered the mouth but not the nostrils. ––– People did not understand that the face mask was worn to first protect yourself from contracting the virus and protecting others around you from exposure to the COVID-19 virus. With regard to this issue of face masks, there was challenge of information dissemination. It was late in its arrival to the people. Thus, people were not well informed about this campaign or policy or why it was put in place. These were the challenges that I saw affecting our community and church members" (KI 2, Zengeza District, religious leader). "Therefore, most of the people will put their masks in the pocket and only put on when they see village health workers or police" (KI 1 Makonde District, village health worker).

Misconceptions and myths circulating in the community led people to believe that they would be infected with COVID-19 when they wore masks. People were made to believe that the masks were contaminated with the virus, thus, would be a source of infection.

"In our locality, when people are encouraged to put on masks as a preventive measure against COVID-19 spread, most of the people resisted stating that these masks are treated with the COVID-19 virus. Therefore, according to the local people, they view masks as a means of infecting people with the COVID-19 virus the moment they are won, and these myths and misconceptions became a challenge in encouraging people to put on masks" (FGD respondent 7, Makonde District, village health worker).

Due to a lack of education, at first, it was a challenge for people to keep their face masks on for the whole day. Continued encouragement allowed people to realize the importance of always masking up. Religious leaders noted that the deaths of relatives or neighbours resulted in people understanding the need to comply with COVID-19 preventive measures.

"As pastors, we tried to encourage church members to wear their masks, but it seemed to fall on deaf ears as they had failed to truly understand why they had to wear masks. Shifting our focus to the church leaders themselves, initially, church leaders did not have a solid understanding of COVID-19. They slowly began to realize their true nature when fatalities began to rise sharply, causing the pandemic to become a true reality. This awakening led to their cooperation and shift from their initial beliefs and perceptions about COVID-19" (FGD participant 1, Zengeza District, religious leader).

3.3.3 Lack of conviction

There were also groups of people such as drunkards and public transport staffers who were not compliant with wearing face masks. These non-compliant people would sometimes try to justify their actions giving reasons which they presumed would surpass the reasons of mask wearing.

"In every community, there are such kind of people who have difficulties complying, especially those under the influence of alcohol, because during their drinking sprees, they can't be forced to wear masks because he/she would claim the mouth as his drinking tool. Additionally, commuters' drivers and conductors did not want to wear masks" (KI 1, Mbare District, transporter).

3.3.4 Access challenges leading to inappropriate practices

Some communities complained that during the early stages of the pandemic, masks were not readily available and were expensive; thus, they were not affordable to many. This approach allowed people to resort to homemade masks, which had not been tested for effectiveness. As the pandemic progressed, communities relied more on homemade cloth masks since they could not afford surgical masks.

"Availability of masks was a great challenge as they were scarce and expensive to buy, and this led the local people to improvise with recommended cloth masks. With time, the scarcity of masks gradually improved as people were able to make their own masks, which they could reuse after washing and ironing them. During the peak of the COVID-19 pandemic, we expected to obtain surgical masks from the hospital, as we could not access them as a community. The advent of the COVID-19 pandemic led to the scarcity of items such as surgical face masks, and they costed 1 USD for two, which was a lot of money to get in our locality" (FGD respondent 1, Makonde District, village health worker).

Due to inaccessibility, some people took disposed facemasks, clean them, and resold them at a cheaper price to those who had no facemasks but were intending to enter closed buildings such as shops and some businesses where masking was mandatory. Some would reuse disposable face masks, washed or unwashed. Even surgical masks were subjected to washing.

"Face masks were scarce. If you did not get them at local clinics, then it means that you had to buy them. This went on until the president announced that we could use cloth-based face masks. The cost attached to the use of face masks made people wash disposable face masks to avoid being arrested by the police. This puts many people at greater risk of contracting COVID-19 rather than protecting them. –-As you know, Zimbabweans are very enterprising; they would take used face masks, clean the face mask and then sale these masks again to people, especially at marketplaces where police were present. People who did not have face masks and wanted to buy their goods had no option but to buy useless face masks" (KI 1, Zengeza District, religious leader).

The participants echoed that those who lived in rural areas were the ones who were most affected by the lack of access of face masks due to lack of funds compared to the urban dwellers. This resulted in limited travel in this population group.

"This issue may be due to the availability of masks. There is no area where masks were being distributed; people had to purchase masks, and that on its own was a challenge to a number of people; rural people, in particular, do not have funds to purchase masks. However, for those in the urban setting, it was not a challenge at all; the cost was affordable. Therefore, for the rural folk, it was a little bit of a challenge, but for the urban dwellers, it wasn't a challenge at all" (KI 1, Gokwe South District, schools inspector).

3.3.5 Concerns about side effects

Some members of the community were reported to have experienced side effects due to wearing facemasks. The side effects ranged from discomfort and difficulty breathing to the degree of suffocation. Discomfort and breathing challenges were more common in people with medical conditions such as asthma, hypertension, heart disease and obesity. In addition to these people, elderly people and pregnant women also complained of suffocation. Thus, these population groups were at risk of contracting COVID-19.

"Chronic conditions such as hypertension and asthma were a challenge as far as masking up was concerned as they caused difficulty breathing and suffocation." (FGD participant 9, Seke District, community member).

It took time for some individuals to get used to wearing masks always when they are outdoors. Some complained of respiratory complications such as flu, and/or shortness of breath if they covered their nose, while others would experience dizziness and headaches if they spent much time putting on masks. The intermittent wearing of face masks exposed them and others to COVID-19.

"It's not easy to adapt to something. From past experience, somebody would tell you if they are using a mosquito net, they suffocate and then imagine if they are supposed to be using a mask for the first time. It is not easy even to spend approximately 30 minutes covering your mouth and nose; breathing becomes difficult, and you end up breathing the body air. Even if you breathe out its still coming back. ––– but if you have seen somebody suffering from COVID-19, you end up saying its either I do this or I die. ––I had a challenge putting on my mask for more than 30 minutes. I became dizzy, you know I had this headache, so I tried to put it on, remove it and put it on, but it was risky. Thank God I survived" (KI 2, Gokwe South District, schools inspector).
"Masks were responsible for flu, suffocation and other respiratory complications" (FGD participant 6, Zengeza District, religious leader).

Another side effect of masks mentioned by the community was overheating, resulting in sweating, rash and lip sores. Among the different types of masks available, homemade masks were said to be the ones responsible for most of the side effects. Due to heat, the material/fabric used to make the homemade masks also caused discomfort or breathing difficulties. Some people complained of physical discomfort due to the size of the masks versus the size of their faces.

"Some masks were homemade using the wrong type of fabric. This can lead to discomfort and breathing difficulties. Zimbabwe is a country with a hot climate, so such types of masks can cause considerable discomfort and complications" (FGD participant 4, Zengeza District, religious leader).

"Most people complained about facemasks. Some people said facemasks generated a lot of heat, and others reacted badly with sores around the lips. Some people faced difficulty breathing if one wears a face mask for a long period of time" KI 1, Chiredzi District, traditional healer).
"For some of us with big faces, masks will be uncomfortable pulling the ears, and they will be painful" (FGD participant 3, Mbare District, transporter).

3.3.6 Sociocultural factors and religious beliefs

The wearing of face masks at public gatherings or places such as churches, funerals or water points was stigmatized in some communities. People also had the misconception that masks were worn only by those who went to work or who were COVID-19 positive. This exposed people to COVID-19 as some would socialize without putting on face masks.

"Those adhering to using masks, especially in public gatherings such as funerals, would face some negative comments and isolation to the extent that they would be discouraged from continuing with the mask" (FGD participant 5, Epworth District, women leader).
"You find that only those who go to work wore the masks. Even at shops, people socialize with each other without wearing masks. At times people could laugh at you, saying you are wearing a mask at home. Most people would not wear their mask at home; they would only wear them when they were going to work" (KI 2, Seke district, Accountant).

Religious and traditional gatherings also had challenges with masks wearing. Traditional healers expressed that the spirits that they possessed were not aware of the new norm of wearing face masks. This exposed traditional healers and their clients to COVID-19, as they sometimes performed their healing activities without masks. In church gatherings, some congregants would feel that their voices were not clear if they were putting on a mask.

"We traditional healers are just homwe (used instruments). Therefore, as we execute our healing tasks, Spirit does not know the need to put on face masks. Therefore, the Spirit medium does not know about the existence of COVID-19. It took much time trying to reason with the Spirit about this issue of COVID-19" (FGD participant 8, Chiredzi District, traditional healer).
"Some individuals would remove their masks for prayers or when singing in church for them to feel audible. In fact, in some situations, some members of the audience would remove their face masks in church so that their voices could be heard when singing or praying" (KI 3, Zengeza District, religious leader).

4 Discussion

The study has identified low risk perception, lack of knowledge, lack of conviction, access related challenges, concern about side effects, sociocultural and religious beliefs as barriers to face masking among the Zimbabweans during the COVID-19 pandemic. On the other hand, motivating factors were perceived benefits of masking and fear of law enforcement. These findings underscore the need of targeted interventions aimed at improving people's knowledge and increasing accessibility of masks in the event of new surges of COVID-19 or other pandemics of respiratory origin to enhance face masking adherence. The interventions should be coupled with clear, culturally sensitive public health messaging aiming to dispel myths and misinformation for promotion of positive behaviour change in the community. Public health interventions should also leverage on the existing motivators to strengthening community engagement while enforcement should be supportive for increased awareness and compliance.

Although the study was conducted in late 2022, when the number of cases and new infections had decreased, understanding what makes citizens more or less likely to adhere to PHSM will be of continued significance. In the event that another wave is experienced or other epidemics emerge, lessons learned from this pandemic may help guide public health responses.

Our study noted that due to socioeconomic status, the public could not access face masks. This economic vulnerability led to mask reuse, washing, sharing, and wearing for a longer time than recommended. While findings in the US showed that social and economic factors had no association with face masks use [35], our findings are consistent with reports of poor adherence to COVID-19 measures in vulnerable populations due to socioeconomic status [17, 30]. In other studies face mask use was noted to be higher in people with higher socioeconomic status [36, 37]. The difference in the influence of socioeconomic status on adherence to face masks could be due to factors such as cultural

norms and practices, and effectiveness of policy enforcement which may vary by setting. Based on the findings in our study, socioeconomic ability should be considered in a public health response as recommended previously [16, 30]. The adoption of a one-size-fits-all public health measure does not guarantee compliance or, consequently, the effectiveness of the preventive measure. Thus, structures should be established to pool resources to provide face masks to vulnerable people during public health emergencies thereby decreasing health inequalities among the population and consequently improving adherence to mask use.

Study findings also showed that groups of people, such as public transport drivers, conductors and drunkards, did not adhere to wearing face masks intentionally, exposing themselves and others to COVID-19. Such intentional nonadherence has been associated with psychological and antisocial tendencies [38, 39]. As public health programme managers engage communities to understand the factors affecting compliance with an intervention, they should also aim to understand the distinction and roots of nonadherence to tailor relevant policy responses.

Study findings show that risk perception also plays a key role in behavioural adherence. As echoed by the participants, at the time of the study, most people were no longer wearing face masks in closed settings or public places since they were considering themselves at low risk of infection. During the early stages of the epidemic, a study conducted in African countries, including Zimbabwe, reported high levels of adherence to public health and preventive measures [30]. Earlier studies noted that risk perception fluctuates with time in response to disease situations and factors unrelated to disease situations, such as media reports of epidemics [40, 41]. Notably, public health guidelines on COVID-19 were continuously updated in response to the evolving pandemic in the country. The relaxation of COVID-19 restrictions by the government may also have contributed to the belief that COVID-19 was no longer a public health problem in the country, leading to poor adherence to preventive measures. The scenario is similar to reports in Ghana, where some communities stopped wearing masks, among other preventive measures, when the government announced the relaxation of COVID-19 protocols. They believed that they were no longer at risk of infection [42].

It is also noted in this study that some people were ignorant of the changes in the public health guidelines, including the reasons for mandatory masking in public places, shops, or offices. This resulted in no mask or improper wearing of masks or mask sharing for entry into shops, offices or other closed settings. Similar scenarios involving a lack of knowledge have also been shown to hinder compliance with masking during the avian influenza [21], and COVID-19 [11] pandemics in other settings.

In our study, participants expressed concern about the side effects of masks. This concern was previously expressed in other studies [43–45]. Such side effects are likely to dissuade individuals from continued mask wearing. As recommended by Gyapong et al. [43], to increase compliance with face mask use during respiratory disease outbreaks, the designs of face masks should be improved focusing on tolerability, comfort and safety.

The use of cloth masks and the reuse of surgical masks as a cost-cutting measure were noted in this study. However, some people would use these products without washing, and others would wash them for reuse. These findings corroborate those from Poland and Uganda, where the public used more cloth masks than single-use masks, with variability in decontamination [10, 11]. Despite the practice of mask reuse being a result of socioeconomic conditions, people also lacked adequate knowledge of which masks could be reused and to what extent, as was recommended in the early stage of the pandemic. This notion of poor knowledge about the significance of masking was further affirmed by the reported practice of removing masks as people sing or pray or improperly wearing face masks in this study. A related situation was recorded in Western Uganda, where people removed their face masks if they needed to talk to someone [12].

Participants reported that people were motivated to wear masks because they perceived that masks would protect them against COVID-19 infection. It was also reported that some people realized the importance of masking after witnessing fatalities in their communities. This finding is in support of previous reports noting that individuals usually wear masks due to the perceived susceptibility and severity of being afflicted with a life-threatening disease [18], and the perceived benefits and effectiveness of the masks [20, 46].

It was indicated that misconceptions about masks being infected with a virus circulated in the community and became a barrier to masking for others. Misconceptions in the era of COVID-19 were not surprising because of the availability and ease of use of different information sources [24, 25] and the surge in infordemics associated with the pandemic [24, 25, 42]. Misconceptions result in negative perceptions towards COVID-19 preventive measures [47]. Thus, in future surges or pandemics, efforts should be made to demystify such disinformation, as it will result in exacerbated transmission of the virus.

Corroborating previous findings, [48], participants indicated that individuals who wore masks in the community or public gatherings such as funerals and churches were being alienated or discriminated against in the community.

Preference of socio-cultural and religious norms over COVID-19 preventive measures were also noted in Ghana [42], and Iran [49, 50]. Thus, communities should be educated on the increased risk of disease transmission posed by sociocultural and religious beliefs.

As cited by some participants, people wore masks for wrong reasons, especially in fear of law enforcement agencies, or to be allowed access to certain facilities. Law enforcement for adherence to preventive measures during the COVID-19 pandemic was not peculiar to Zimbabwe only. Other states also employed the same strategy [51–54]. Globally, the implementation of a mandatory policy increased compliance with masking [37, 55] while a voluntary policy lead to poor compliance [19, 55], compounded by stigmatization [55]. Despite the benefits of law enforcement to comply with public health guidelines, it should be integrated with intensified health education for the general population such that individuals will consider their health a priority rather than fear of law enforcement agencies.

4.1 Study strengths and limitations

Our study was limited in that data was collected at a single point in time, thus, does not truly reflect the dynamic nature of social behavioural factors affecting wearing of face masks during the COVID-19 pandemic in Zimbabwe. Nevertheless, our study offers important insights into the social behavioural determinants of compliance with face masking in Zimbabwe. While social desirability bias cannot be completely overruled, our study had improved trustworthiness and validity through triangulation of different data sources (KIIs, FGDs, diversity in age, religion, social status, cultural values and economic status), and from different study sites, thus, providing comprehensive understanding of motivators and barriers of face masking in Zimbabwe.

5 Conclusion

Our study identified motivators for and barriers to adherence to face masking in Zimbabwe. This finding shows that while in some instances, nonadherence is intentional, in most cases, it is nonintentional. It is thus, important for public health managers to provide targeted responses to these barriers to improve compliance in the event of new COVID-19 waves or other future pandemics. Structures should be established to protect vulnerable populations in the case of future pandemics of a similar nature. Risk communication and community engagement should be continuous to appraise the public with up-to-date information about the disease and the importance of adhering to PHSM during a pandemic.

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Author contributions MJMM, NM, LSC, PM and GM conceptualized the study and wrote the proposal. MJMM, NM, PM, and GM trained the data collectors. MJMM, NM, PM, and GM collected the data. MJMM, NM, PM, GM, and TM analysed the data, and MJMM and NM drafted the manuscript. All the authors reviewed and approved the manuscript.

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Data availability The audio recordings generated in this study are not available to the public for the sake of protecting participant confidentiality. Anonymized transcripts are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate The Medical Research Council of Zimbabwe approved the study (Approval Number A/2948). Written informed consent was obtained from all participants before the study was implemented. Participation in the study was voluntary, and participant confidentiality was maintained throughout the study by using pseudonyms to maintain the anonymity of all the participants. Furthermore, all the data were password-protected in the electronic participant database.

Consent for publication Participants agreed to share their anonymous data through publication during the consent form signing.

Competing interests The authors declare no competing interests.

References

1. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020. 2020. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mediabriefing-on-covid-19. Accessed 28 Dec 2023.
2. Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet. 2020;395(10242):1973–87.
3. Cheng VC, Wong SC, Chuang VW, Therefore SY, Chen JH, Sridhar S, To KK, Chan JF, Hung IF, Ho PL, Yuen KY. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. J Infect. 2020;81(1):107–14. https://doi.org/10.1016/j.jinf.2020.04.024.
4. Middleton JD, Lopes H. Face masks in the COVID-19 crisis: caveats, limits, and priorities. BMJ. 2020;369: m2030.
5. Eikenberry SE, Mancuso M, Iboi E, Phan T, Eikenberry K, Kuang Y, Kostelich E, Gumel AB. To mask or not to mask: modelling the potential for face mask use by the general public to curtail the COVID-19 pandemic. Infect Dis Model. 2020;5:293–308.
6. Javid B, Weekes MP, Matheson NJ. COVID-19: should the public wear face masks? BMJ. 2020;369: m1442.
7. Rader B, White LF, Burns MR, Chen J, Brilliant J, Cohen J, Shaman J, Brilliant L, Kraemer MUG, Hawkins JB, Scarpino SV, Astley CM, Brownstein JS. Mask-wearing and control of SARS-CoV-2 transmission in the USA: a cross-sectional study. Lancet Digit Health. 2021;3(3):e148–57.
8. Martin GP, Hanna E, McCartney M, Dingwall R. Science, society, and policy in the face of uncertainty: reflections on the debate around face coverings for the public during COVID-19. Crit Public Health. 2020;30(5):501–8.
9. Hanna E, Martin G, Campbell A, Connolly P, Fearon K, Markham S. Experiences of face mask use during the COVID-19 pandemic: a qualitative study. Sociol Health Illn. 2022;44(9):1481–99. https://doi.org/10.1111/1467-9566.13525.
10. Matusiak Ł, Szepietowska M, Krajewski PK, Białynicki-Birula R, Szepietowski JC. The use of face masks during the COVID-19 pandemic in Poland: a survey study of 2315 young adults. Dermatol Ther. 2020;33(6): e13909. https://doi.org/10.1111/dth.13909.
11. Mboowa G, Musoke D, Bulafu D, Aruhomukama D. Face-masking, an acceptable protective measure against covid-19 in Ugandan high-risk groups. Am J Trop Med Hyg. 2020;104(2):502–13. https://doi.org/10.4269/ajtmh.20-1174.PMID:33319741;PMCID:PMC7866310.
12. Sikakulya FK, Ssebuufu R, Mambo SB, Pius T, Kabanyoro A, Kamahoro E, Mulumba Y, Muhongya JK, Kyamanywa P. Use of face masks to limit the spread of the COVID-19 among western Ugandans: knowledge, attitude and practices. PLoS ONE. 2021;16(3): e0248706. https://doi.org/10.1371/journal.pone.0248706.
13. Doogan C, Buntine W, Linger H, Brunt S. Public perceptions and attitudes toward COVID-19 nonpharmaceutical interventions across six countries: a topic modelling analysis of twitter data. J Med Internet Res. 2020;22(9): e21419. https://doi.org/10.2196/21419.
14. Michie S, West R. Behavioural, environmental, social, and systems interventions against COVID-19. BMJ. 2020;370: m2982. https://doi.org/10.1136/bmj.m2982.
15. Seale H, Heywood AE, Leask J, Sheel M, Thomas S, Durrheim DN, Bolsewicz K, Kaur R. COVID-19 is rapidly changing: examining public perceptions and behaviors in response to this evolving pandemic. PLoS ONE. 2020;15(6): e0235112. https://doi.org/10.1371/journal.pone.0235112.
16. Seale H, Dyer CEF, Abdi I, Rahman KM, Sun Y, Qureshi MO, et al. Improving the impact of nonpharmaceutical interventions during COVID-19: examining the factors that influence engagement and the impact on individuals. BMC Infect Dis. 2020;20(1):607. https://doi.org/10.1186/s12879-020-05340-9.
17. World Health Organization. COVID-19 and the social determinants of health and health equity: evidence brief. World Health Organization. 2021. p. 1–32.
18. Sim SW, Moey KSP, Tan NC. The use of facemasks to prevent respiratory infection: a literature review in the context of the health belief model. Singap Med J. 2014;55(3):160–7.
19. MacIntyre CR, Nguyen PY, Chughtai AA, Trent M, Gerber B, Steinhofel K, Seale H. Mask use, risk-mitigation behaviours and pandemic fatigue during the COVID-19 pandemic in five cities in Australia, the UK and USA: a cross-sectional survey. Int J Infect Dis. 2021;106:199–207. https://doi.org/10.1016/j.ijid.2021.03.056.
20. Tang CS, Wong CY. Factors influencing the wearing of facemasks to prevent the severe acute respiratory syndrome among adult Chinese in Hong Kong. Prev Med. 2004;39(6):1187–93.
21. Kuo P-C, Huang J-H, Liu M-D. Avian influenza risk perception and preventive behavior among traditional market workers and shoppers in Taiwan: practical implications for prevention. PLoS ONE. 2011;6(9): e24157.
22. Velikonja NK, Erjavec K, Verdenik I, Hussein M, Velikonja VG. Association between preventive behaviour and anxiety at the start of the COVID-19 pandemic in Slovenia. Zdr Varst. 2020;31(1):17–24.
23. Feyisa ZT. Factors limiting youths' practice of preventive measures toward the outbreak of COVID-19 in Oromia special zone surrounding Finfinnee. Ethiopia PloS one. 2021;16(3): e0248495. https://doi.org/10.1371/journal.pone.0248495.
24. Fridman I, Lucas N, Henke D, Zigler CK. Association between public knowledge about COVID-19, trust in information sources, and adherence to social distancing: cross-sectional survey. JMIR Public Health Surveill. 2020;6(3): e22060.
25. Faus M, Alonso F, Javadinejad A, Useche SA. Are social networks effective in promoting healthy behaviors? A systematic review of evaluations of public health campaigns broadcast on Twitter. Front Public Health. 2022;22(10):1045645. https://doi.org/10.3389/fpubh.2022.1045645.
26. Stein RA, Ometa O, Pachtman Shetty S, Katz A, Popitiu MI, Brotherton R. Conspiracy theories in the era of COVID-19: a tale of two pandemics. Int J Clin Pract. 2021;75(2): e13778. https://doi.org/10.1111/ijcp.13778.
27. Romer D, Jamieson KH. Conspiracy theories as barriers to controlling the spread of COVID-19 in the U.S. Soc Sci Med. 2020;263:113356.

28. Umeta B, Mulugeta T, Mamo G, Alemu S, Berhanu N, Milkessa G, Mengistu B, Melaku T. An analysis of COVID-19 information sources. J Pharm Policy Pract. 2022;15(1):49. https://doi.org/10.1186/s40545-022-00446-8.
29. Desalegn Z, Deyessa N, Teka B, Shiferaw W, Hailemariam D, Addissie A, Abagero A, Kaba M, Abebe W, Nega B, Ayele W. COVID-19 and the public response: knowledge, attitude and practice of the public in mitigating the pandemic in Addis Ababa, Ethiopia. PLoS ONE. 2021;16(1): e0244780.
30. Murukutla N, Gupta AK, Maharjan M, Fabrizio C, Myers EW, Johnson A, Nkwanzi V, Wilkason CA, Lacey N, Tshangela A, Djoudalbaye B, McClelland A. Psychosocial determinants of adherence to public health and social measures (PHSMs) in 18 African Union Member States during the early phase of the COVID-19 pandemic: results of a cross-sectional survey. BMJ Open. 2022;12(6): e054839. https://doi.org/10.1136/bmjopen-2021-054839.
31. Coroiu A, Moran C, Campbell T, Geller AC. Barriers and facilitators of adherence to social distancing recommendations during COVID-19 among a large international sample of adults. PLoS ONE. 2020;15(10): e0239795. https://doi.org/10.1371/journal.pone.0239795.
32. Midzi N, Mutsaka-Makuvaza MJ, Charimari LS, Mangwiro P, Manengureni T, Mugadza G. Factors affecting hand hygiene practice during the COVID-19 pandemic in the Zimbabwean population: a qualitative study. BMC Infect Dis. 2024;24(1):385. https://doi.org/10.1186/s12879-024-09277-1.
33. Midzi N, Mutsaka-Makuvaza MJ, Charimari LS, Mangwiro P, Manengureni T, Mugadza G. Understanding facilitators and barriers to COVID-19 vaccination in the Zimbabwean population: a qualitative analysis. BMC Public Health. 2024;24(1):1174. https://doi.org/10.1186/s12889-024-18650-3.
34. Korstjens I, Moser A. Series: practical guidance to qualitative research. Part 4: Trustworthiness and publishing. Eur J Gener Pract. 2018;24(1):120–4. https://doi.org/10.1080/13814788.2017.1375092.
35. Cunningham GB, Nite C. Demographics, politics, and health factors predict mask wearing during the COVID-19 pandemic: a cross-sectional study. BMC Public Health. 2021;21(1):1403. https://doi.org/10.1186/s12889-021-11424-1.
36. Bish A, Michie S. Demographic and attitudinal determinants of protective behaviors during a pandemic: a review. Br J Health Psychol. 2010;15(Pt 4):797–824. https://doi.org/10.1348/135910710X485826.
37. Badillo-Goicoechea E, Chang TH, Kim E, LaRocca S, Morris K, Deng X, Chiu S, Bradford A, Garcia A, Kern C, Cobb C, Kreuter F, Stuart EA. Global trends and predictors of face mask usage during the COVID-19 pandemic. BMC Public Health. 2021;21(1):2099. https://doi.org/10.1186/s12889-021-12175-9.
38. Hills S, Eraso Y. Factors associated with nonadherence to social distancing rules during the COVID-19 pandemic: a logistic regression analysis. BMC Public Health. 2021;2:352.
39. Brown CS, Ravallion M, Van de Walle D. et al. Can the world's poor protect themselves from the new coronavirus?. 2020.
40. Choi D-H, Yoo W, Noh G-Y, et al. The impact of social media on risk perceptions during the MERS outbreak in South Korea. Comput Human Behav. 2017;72:422–31.
41. Schneider CR, Dryhurst S, Kerr J, et al. COVID-19 risk perception: a longitudinal analysis of its predictors and associations with health protective behaviours in the United Kingdom. J Risk Res. 2021;24:294–313.
42. Aberese-Ako M, Immurana M, Dalaba MA, Anumu FEY, Ofosu A, Gyapong M. An ethnographic study of multiple factors influencing perceptions, attitudes, and observance of COVID-19 preventive measures among rural and urban slum dwellers in Ghana. J Environ Public Health. 2023;2023: 1598483. https://doi.org/10.1155/2023/1598483.
43. Gyapong F, Debrah E, Oforiwaa M, Isawumi A, Mosi L. Challenges and adverse effects of wearing face masks in the COVID-19 era. Challenges. 2022;13:67. https://doi.org/10.3390/challe13020067.
44. Thatiparthi A, Liu J, Martin A, Wu JJ. Adverse effects of COVID-19 and face masks: a systematic review. J Clin Aesthet Dermatol. 2021;14(9 Suppl 1):S39–45.
45. Kisielinski K, Giboni P, Prescher A, Klosterhalfen B, Graessel D, Funken S, Kempski O, Hirsch O. Is a mask that covers the mouth and nose free from undesirable side effects in everyday use and free of potential hazards? Int J Environ Res Public Health. 2021;18(8):4344. https://doi.org/10.3390/ijerph18084344.
46. Lau JTF, Griffiths S, Choi K-C, Lin C. Prevalence of preventive behaviors and associated factors during early phase of the H1N1 influenza epidemic. Am J Infect Control. 2010;38(5):374–80.
47. Malecki KMC, Keating JA, Safdar N. Crisis communication and public perception of COVID-19 risk in the era of social media. Clin Infect Dis. 2021;72(4):697–702. https://doi.org/10.1093/cid/ciaa758.
48. Chan DKC, Zhang C-Q, Weman-Josefsson K. Why people failed to adhere to COVID-19 preventive behaviors? Perspectives from an integrated behavior change model. Infect Control Hosp Epidemiol. 2020. https://doi.org/10.1017/ice.2020.2.
49. SoleimanvandiAzar N, Irandoost SF, Ahmadi S, et al. Explaining the reasons for not maintaining the health guidelines to prevent COVID-19 in high-risk jobs: a qualitative study in Iran. BMC Public Health. 2021;21(1):848. https://doi.org/10.1186/s12889-021-10889-4.
50. Ahmadi S, Jorjoran Shushtari Z, Shirazikhah M, et al. Social determinants of adherence to COVID-19 preventive guidelines in Iran: a qualitative study. Inquiry J Health Care Org Provis Financ. 2022;59:15. https://doi.org/10.1177/00469580221084185.004695802210841.
51. Grace S. Policing social distancing: gaining and maintaining compliance in the age of coronavirus. Polic J Policy Pract. 2020;14(4):1034–53.
52. Jiang F, Xie C. Roles of Chinese police amidst the COVID-19 pandemic. Polic J Policy Pract. 2020. https://doi.org/10.1093/police/paaa071.
53. Mazerolle L, Ransley J. Policing health regulations in democratic societies: a focus on COVID-19 challenges and opportunities in Australia. Int J Comp Appl Crim Just. 2021;45(3):315–27.
54. Perry G, Jonathan-Zamir T. Expectations, effectiveness, trust, and cooperation: public attitudes towards the Israel police during the COVID-19 pandemic. Polic J Policy Pract. 2020. https://doi.org/10.1093/police/paaa060.
55. Betsch C, Korn L, Sprengholz P, Felgendreff L, Eitze S, Schmid P, Böhm R. Social and behavioral consequences of mask policies during the COVID-19 pandemic. Proc Natl Acad Sci USA. 2020;117(36):21851–3. https://doi.org/10.1073/pnas.2011674117.