



COVID-19 Pandemic's Impact on Medication Dispensing and the use of Health Services in Makkah, Saudi Arabia

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Aims: March 2020, WHO revealed that COVID-19 was a pandemic. Coughing, sneezing, close contact with infected individuals speeds up the disease spread. Saudi Arabia's government and the Ministry of Health sought to spread social awareness of the importance of quarantine and restriction, but unprecedented challenges and obstacles emerged. Therefore, in this study, the effect of COVID-19 on the dispensing of medication and the use of health care services evaluated.

Study design: This survey, cross-sectional, was performed in Makkah city individuals.

Place and Duration of Study: This survey was run out in Makkah city, Saudi Arabia for seven days, starting from June 15, 2020, to June 22, 2020.

Methodology: Survey of 112 applicants (33 men, 79 women; age range 16-56+ years) had been performed to explore COVID-19 impact on medication dispensing and the use of health care services regarding sociodemographic data in Makkah city residents, Saudi Arabia.

Results: This study demonstrated that most of the survey respondents coped well with COVID-19 changes. A significant correlation was found between coping with COVID-19 changes and the age of participants ($F_{(df)} = 7.846_{(4,107)}$, P -value 0.006) and ($F_{(df)} = 4.025_{(4,107)}$, P -value 0.047),

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respectively. Of all the participants, 68.75% had been able to dispense a prescription medication during COVID-19 restrictions. Among them, 30.36, 21.43, and 16.96% dispensed a prescription once, twice, and more than three times, respectively. The data showed that 67.86% of the participants successfully purchased medication from a community pharmacy during COVID-19 restrictions. There was no change in medication availability or price, at about 61.61% and 76.79%, respectively. A significant correlation between medication availability-price ($F_{(df)} = 4.025_{(3,105)}$, P -value 0.047) was found. During COVID-19 restrictions, 51.79% of the respondents were able to access health care services such as hospitals that provide health checking, or substance use for disease treatment. Interestingly, 25% of the participants had the same accessibility to health care services.

Conclusion: This research revealed that through the COVID-19 pandemic, the dispensing, availability, and price changes of medication and the use of health care services were running in a good manner. This would show that although there were restrictions due to COVID-19, access to medication or health care services was running smoothly.

Keywords: COVID-19; Saudi Arabia; Makkah; healthcare; medication dispensing.

1. INTRODUCTION

Severe Acute Respiratory Coronavirus-2 (SARS-CoV-2) is the main causing of COVID-19 disease. Coronaviruses (CoV) first appearance was in the 1960s with minor symptoms such as influenza. Vertebrates including snakes, birds, camels, bats, and other animals can be infected via CoV [1,2]. However, the deadly epidemics and pandemics began when new variables of the strains arose [3,4]. According to the WHO report in 2003, Severe Acute Respiratory Syndrome (SARS) firstly was an epidemic of virulent strains in China, which then affected worldwide. In Saudi Arabia, another coronavirus strain discovered in 2012, which called the Middle East Respiratory Syndrome (MERS) and then spread to neighbours, with around 2494 cases worldwide. The mortality rates of SARS-CoV, MERS-CoV, and SARS-CoV-2 were 34.4%, 11%, and 4.4%, respectively [5].

COVID-19 patients could have from a mild to severe symptoms such as fever, coughing, chills, difficulty breathing, sore throat, headache, and loss of smell or taste could appear after exposure to the virus between 2 to 14 days in a patient [6, 7]. Elderly individuals, infected pregnant women, and patients who have chronic health conditions such as pneumonia and multi-organ failure could face more severe symptoms [8,9]. In the respiratory system, SARS-CoV-2 could infect the alveolar cells of the lungs via its action on Angiotensin-Converting Enzyme 2 (ACE2) expression [10]. In the respiratory system, SARS-CoV-2 also has the ability to be shed to the gastrointestinal system [11,12].

In December 2019, COVID-19 was discovered in Wuhan City in China. Following that, large

outbreaks were reported in nearby countries and eventually spread worldwide. On March 12, 2020, this outbreak was announced via the World Health Organization (WHO) to be a worldwide pandemic, and more cases reported [6]. March 2, 2020, it was first COVID-19 infected case reported in Saudi Arabia, then more cases reported, with around 360,335 case through December 17, 2020. Quick action had been taken by the Ministry of Health (MOH) to alert the community about the virus and who it can spread. Additionally, precautionary procedures and restrictions have been applied by governments to control virus transmissions, such as social contacts minimizing /outdoor activities, prohibiting mosques' prayers, online schools/universities, and lockdowns. This reaction among governments could affect different sectors. The health sector is one of them [13,14].

COVID-19 has a direct impact on individual health, including on the lungs, the kidneys, and other organs that require different therapies and hospital visits [15-18]. In acute and chronic disorders, medications are the most common healthcare intervention. The COVID-19 pandemic has led to a situation in which disabled elderly people with chronic and complicated conditions are being asked to isolate themselves at home [19]. The consequences of social distancing, staying home, and a general lockdown could undoubtedly impact medication dispensing/availability, follow-ups, check-ups, prescription refills, and access to health care services [16-18,20]. In many countries, such as the United Kingdom, the United States of America, Spain, and Italy, healthcare systems and pharmaceutical care are facing many challenges during the COVID-19 pandemic [17].

For example, hospitals in Italy had added around 80% more ICU beds, by April 2020 to accommodate more COVID-19 patients [21]. Additionally, the WHO suggested standards and regulations for many countries to continue running health services during the pandemic [22]. Accessing health care and dispensing or refilling prescription medication for chronic health management are important for every patient [23]. However, the worldwide shutdown has led to fewer exports and imports of medication. Subsequently, the pandemic's impact on pharmaceutical imports of important medicines, medicine availability, and accessibility to meet the needs of all chronic diseases patients is critical [24]. Therefore, this study analyses the COVID-19 disease's effect on medication dispensing and the use of health services in Makkah, Saudi Arabia.

2. METHODS

2.1 Study Plan

This survey, cross-sectional, was performed in Makkah city individuals. This survey was run out for seven days, starting from June 15, 2020, to June 22, 2020. The age of applicants was between 16 and 77 years.

The collected data is sufficiently reliable. To check that, 20 new volunteers were randomly asked the same questions and their answers were compared to the results of the analyzed data. Volunteers' answers were approximately 85% similar to the significant factors, which were obtained from this study, as mentioned in table 5. Data collection and validation processes were

conducted in the same city. For higher reliability, it is recommended to collect more data from other geographical locations to assess the reliability in a wider range. The validity of the collected data was checked by including the following:

- 1- Survey participations approved the consent form.
- 2- Participant age must be 16+.
- 3- Incomplete survey participations were removed.
- 4- Participations with typo errors were excluded. For example, if the participant put letters instead of numbers.

The questionnaires were delivered in the Arabic language with about five minutes of completion. The survey was designed utilizing Microsoft Forms online as in Figure 1. The questionnaire consisted of three main sections evaluating COVID-19 impact on medication dispensing and health-care services. The first part is filling out the questionnaire via each participant, to ensure that the questionnaire was relevant to the participants. The second part covered demographic data such as age, sex, and participants' information source for COVID-19. The third section asked about the participants' social interactions, health conditions (such as heart disease, diabetes, high blood pressure, kidney disease, asthma, immuno-compromised), COVID-19 test, and related symptoms, if any. Section four asked the participants about COVID-19 impact on prescribed medication dispensing and accessing health care services to evaluate any difference or changes during the pandemic, compared to before the pandemic.

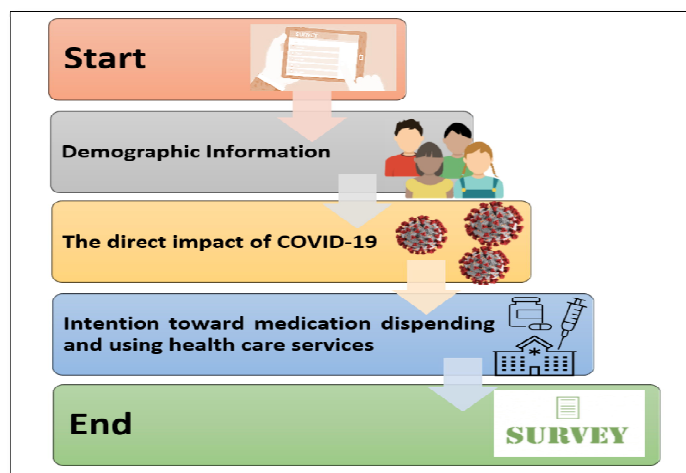


Fig. 1. The survey was designed using Microsoft online forms

2.2 Study Size and Variables

The number of participants in this study was 112. The sociodemographic characteristics were gender, age, family size, social contact, and COVID-19 test as independent/explanatory variables. Meanwhile, the impact of COVID-19 on medication dispensing, medication availability, medication price, and accessing healthcare services were considered as the response/dependent variables.

2.3 Data Analysis

Data were collected using Microsoft Forms (Microsoft Office 365). Then, the collected data were analysed using Microsoft Excel. The percentages and frequency were calculated for the survey question, while evaluation of variance (ANOVA) was used to assess for significant differences between medication availability and medication price.

3. RESULTS

The survey was distributed in Makkah, Saudi Arabia using social media, and the convenience sampling methodology was used to collect the data [25]. This was to help us reach our sample size of 112 participants. The collected data were analysed in three main sections. The first section intended to obtain the first insight through demographic data. Table 1 shows the distribution of demographic variables among the questionnaire sample. A total of 112 applicants contributed. The demographic data distribution of the applicants presented a high percentage of females, with about 70.54%, whereas the rest of the sample was male, with 29.46%. The 16-25 and 26-35 age categories accounted for approximately half of respondents, i.e., 44.64 and 41.07% ($n = 112$), whereas the ≥ 36 -year category accounted for 14.29%. As per the collected data, the percentages of individuals in a family living together in the same home between 1-3, 4-6, and > 6 members were 11.61, 48.21, and 40.18%, respectively. We also asked the participants about whether they were coping with the changes that had taken place due to the COVID-19 pandemic. The result was that around 96.43% of the informants were coping with the changes related to the COVID-19 pandemic, while only 3% were not. A significant correlation between coping with COVID-19 changes and the age of participants ($F_{(df)} = 7.846$ ($4,107$), P -value 0.006) and ($F_{(df)} = 4.025$ ($4,107$), P -value 0.047), respectively, that was found (see Table 5).

Additionally, this study found no correlation between coping with COVID-19 changes and the number of individuals in the family living in the same home ($F_{(df)} = 0.142$ ($2,109$), P -value 0.706) (see Table 5).

The second part of the survey questions appears in Tables 2 and 3. Lists of the respondents' answers regarding health conditions and having been tested for COVID-19 were analysed. The data showed that, overall, the percentage of participants who admitted to not having health problems was about 83.04%; among them, 20.54% were male and 62.5% were female (see Table 3). Only 16.96% of participants said that they had health problems, with 8.92% and 8.03% male and female, respectively. Additionally, we asked about health conditions and COVID-19 testing with regard to participants' family members. Table 2 shows that 60.71% of participant family members had health problems, while 39.29% did not have health problems. Among the participant family members, 87.5% had not been tested for COVID-19, while 12.5% had been tested.

The third part of the survey questions appears in Table 4, regarding knowing more details about the COVID-19 pandemic's impact on medication dispensing, its availability, its price, and the use of health services. Many questions were asked of the participants. Before the COVID-19 pandemic, about 34.82% of the participants had been dispensed a prescription medication for themselves and 50.89% had been dispensed a medication for someone else. Only 14.29% of the participants had not been dispensed any medications. Meanwhile, during the COVID-19 pandemic, about 68.75% of participants had been dispensed a medication, with only 31.25% of them not having been dispensed any medication. Among those who were able to receive a dispensed medication during the COVID-19 pandemic and restriction, there were able to receive a dispensed medication once time (30.36 %), while others were able to do so twice (21.43) or more than three times (16.96).

In addition, the data revealed that 67.86% of respondents successfully purchased medication from a community pharmacy during COVID-19. Furthermore, the study sought to evaluate the changes that could arise, due to the COVID-19 pandemic, in terms of medication availability and its price when medication is purchased from a community pharmacy. Therefore, these two questions were asked: "During COVID-19, what

changes do you think COVID-19 has had on medication availability or its price when purchased from your local pharmacy?" The respondents showed a variety of beliefs. The majority of respondents (61.61%) believed that there were no changes in medication availability, and only some of them (25.89%) said that a medication reduced in its availability. Only 4.5% and 8.04% of respondents stated that some medication was hard to find and not available during the pandemic, respectively. Regarding whether there was a change in a medication

price during COVID-19 restrictions, the results indicated that about 76.79% of the respondents were able to purchase a medication from a community pharmacy during COVID-19 with no price change, while some of the participants (21.43%) found that the price of the purchased medication had increased. Only 1.79% of respondents stated that there was a decrease in medication price. Additionally, this study found a correlation between the availability and price of medication during COVID-19 ($F_{(df)} = 4.025_{(3,105)}$, P -value 0.047) (see Table 5).

Table 1. Respondent demographics (N=112)

Demographics and variables	Frequency, n (%)
Gender	
Male	33 (29.46)
Female	79 (70.54)
Age (years)	
16-25	50 (44.64)
26-35	46 (41.07)
36-45	6 (5.36)
46-55	3 (2.68)
56+	7 (6.25)
Number of individuals in the family	
1-3	13 (11.61)
4-6	54 (48.21)
> 6	45 (40.18)
Coping with changes related to the COVID-19 pandemic	
Really well	53 (47.321)
Medium well	55 (49.11)
Not well at all	4 (3.57)

Table 2. General questions about health conditions and COVID-19 testing (N=112)

Characteristics	Answer	Total	(%)
Do you have any underlying health conditions? For instance, heart disease, asthma, immuno-compromised, high blood pressure, kidney disease, diabetes.	Yes	19	16.96
	No	93	83.04
Have you been tested for COVID-19?	Yes	8	7.14
	No	104	92.86
Do any of your family members have any underlying health conditions? For instance, heart disease, asthma, immuno-compromised, high blood pressure, kidney disease, diabetes.	Yes	68	60.71
	No	44	39.29
Have any of your family members been tested for COVID-19?	Yes	14	12.5
	No	98	87.5

Table 3. Details of participants' health conditions and COVID-19 test (N=112)

Characteristics	Answer	Male, n(%)	Female, n(%)	Total, n(%)
Do you have any underlying health conditions? For instance, heart disease, asthma, immuno-compromised, high blood pressure, kidney disease, diabetes.	Yes	10 (8.92)	9 (8.03)	19 (16.96)
	No	23 (20.54)	70 (62.5)	93 (83.04)
Have you been tested for COVID-19?	Yes	2 (1.79)	6 (5.36)	8 (7.14)
	No	31 (27.68)	73 (65.18)	104 (92.86)

Table 4. General knowledge about medications and accessing health services before and during COVID-19 (N=112)

Characteristics	Answer	Total	(%)
Before COVID-19, did you dispense medications for yourself or someone else?	For me	39	34.82
	Someone else	57	50.89
	No	16	14.29
During the COVID-19 restrictions, did you dispense a prescription medication?	Yes	77	68.75
	No	35	31.25
During the COVID-19 restrictions, how many times did you dispense a prescription medication?	0	35	31.25
	1	34	30.36
	2	24	21.43
	>3	19	16.96
When was the last time you successfully purchased medication from your community pharmacy?	During COVID-19	76	67.86
	Before COVID-19	36	32.14
During the COVID-19 restrictions, in general, what changes have you seen in medication availability when dispensing medication from your local pharmacy (community pharmacy)?	No change in availability	69	61.61
	Reduced availability	29	25.89
	Very hard to find	5	4.46
	Not available	9	8.04
During the COVID-19 restrictions, in general, what changes (if any) do you think have been made in medication prices when dispensing medication from your local pharmacy (community pharmacy)?	Prices not changed.	86	76.79
	Prices increased.	24	21.43
	Prices decreased	2	1.79
Before COVID-19, did you normally access health care services that provide health checking, needle and syringe access, or substance use for disease treatment?	Yes	45	40.18
	No	67	59.82
During COVID-19 restrictions, have you accessed health care services that provide health checking, needle and syringe access, or substance use for disease treatment?	Yes	58	51.79
	No	54	48.21
During COVID-19 restrictions, how do you regard the difficulty involved in accessing health care services?	Not used	54	48.21
	Same availability	28	25
	Easier to access.	10	8.93
	Difficult to access in person (telehealth services instead)	7	6.25
	Difficult to access (e.g., longer waits, less staff available)	9	8.04
	Extremely difficult	4	3.57

Table 5. ANOVA analysis

Dependent Variable	Independent Variable	F _(df)	P-value
The price change of medicines	Medicine availability	4.025 (3,105)	0.047
Coping with the new situation of COVID-19	Number of individuals living in the same home	0.143 (2,109)	0.71
Coping with the new situation of COVID-19	Age	7.846 (4,107)	0.006

Note: Out of 112, three participants did not respond to this question

The act of visiting a health care service throughout the COVID-19 pandemic and restriction could have changed. The survey evaluated the visiting of health care services before and after the COVID-19 pandemic. The data indicated that over 48.21% of respondents did not visit a hospital for health services and around half of the respondents (51.79%) had visited it during the COVID-19 pandemic (see Table 4). The respondents were accessing health care services for health check-ups or to receive treatment via needle or syringe. During the COVID-19 restrictions, there was no bias among the respondents; around 51.79% were able to access health care services and the other half had not been there. Regarding evaluating the difficulty involved in accessing health care services during COVID-19, 25% of the respondents reported that health care services were available the same as they were before COVID-19. Meanwhile, 8.04% of the respondents encountered difficulty in accessing health care services due to longer wait times for appointments and less staff available. About 6.25% of the respondents overcame difficulty in accessing health care services by using telehealth services. Only 3.57% of the respondents had extreme difficulty accessing health care services during COVID-19.

4. DISCUSSION

The COVID-19 pandemic has had an unexpected impact on health systems, especially medication dispensing and the use of health care services that provide health checking, needle and syringe access, or substance use for disease treatment. Hence, the present study described the current effect of the COVID-19 pandemic on medication dispensing and the use of health care services. The sample consisted of data collected from 112 participants. Information about the respondents' responses was analysed and compared to the sociodemographic characteristics of the population. When COVID-19 broke out in Saudi Arabia, the MOH revealed that there was an increasing number of COVID-19 cases in different cities including Makkah [26].

Minimizing social contacts/outdoor activities, prohibiting mosques' prayers, offering online schools/universities, and implementing lockdowns were the actions that the government took to reduce the spread of the virus's transmission [13,14]. These actions may contribute to an undesirable impact on medication dispensing and the use of health care services, which could have negative sequences [27,28]. Therefore, in this study, the impact of these actions—resulting from the COVID-19 pandemic—on medication dispensing and the use of health care services was assessed in Saudi communities located in Makkah city during the pandemic.

In this study, we observed that only a very small percentage of the participants did not cope with COVID-19 pandemic changes, and over 90% of the respondents coped with the changes. This is an interesting result and revealed that a high rate of the participants coped with COVID-19-related pandemic changes, which could reflect a good effect on society and individuals' social and psychological behavior [29]. A similar result has been found by London's Imperial College and YouGov, who studied how people in 13 nations coped with isolation during the COVID-19 pandemic. The study found that about 92, 88, 87, 84, and 83% of respondents from the UK, Spain, Sweden, and Italy were fine with isolation to fight the spread of COVID-19 [30]. Staying home and avoiding crowds were the most favored option for Italians and Brits [30]. In addition, the quarantine and the complete and partial lockdown played an important role in influencing the psychological actions of individuals, such as tending to express their feelings more often on social media platforms [31]. Also, a significant correlation was found between coping with COVID-19 changes and the age of participants ($F_{(df)} = 7.846 (4,107)$, P -value 0.006), indicating that the age categories from 16-25 years old and 26-35 years old were the most-accounted-for age categories in the study, with over 80% of participants, while only around 14% of participants were ≥ 36 years old. The data from this study indicated that young adults may have a decreased rate of adverse

psychosocial outcomes and positive coping behaviors with COVID-19 changes, compared to older adults [32,33].

Additionally, our report analysed the health conditions of the respondents and their family members' answers. The percentage of participants and their family members who did not have any health problems were over 80% and 39%, respectively. According to these obtained results, a lower rate of survey respondents had been having health problems as compared to their family members. This result could be because the majority of the survey participants were between 16 and 25 years old and 26 to 35 years old. This claim should be studied in other, dedicated research.

Also, more details about the impact of the pandemic on medication dispensing, its availability, its price, and the use of health services were studied before and during the COVID-19 restrictions. The data showed that, before the COVID-19 pandemic, around one-half percent of survey participants had dispensed a medication for someone else, perhaps by taking their patients (family members) to dispense their medication prescription on their behalf. This would give researchers a glance at the response behind this maneuver. During the COVID-19 pandemic, around three-quarters (68.75%) of participants had been dispensed a medication. Among them, 30.36, 21.43, and 16.96% had been dispensed a prescription once, twice, and more than three times, respectively. While only one-third of them had not been dispensed any medication. This obtained data indicated that the dispensing of medication may not be affected by the outbreak of COVID-19. A similar discovery was found in many countries to ensure medication dispensing for people's needs. Some countries had used different processes for issuing, handling, and filling prescriptions for chronic patients. For example, Greece made regular prescriptions available by phone. Ireland, Hungary, and Latvia used e-prescriptions. Croatia, Albania, Romania, Ireland, the Russian Federation, and Spain extended the validity of prescriptions [34].

With regard to the changes in medication availability and price during COVID-19, a high rate of respondents believed that there were no changes in medication availability, they were able to purchase a medication from a pharmacy at a fixed price. Only a few participants found that the price of the purchased medication/supplements (vitamins/ immune boosters and

personal protective equipment) had increased. In India, a similar finding had been identified by Haque et al. regarding medicine availability and price changes due to COVID-19. They found that no price increases were seen in medications such as antimalarials and antibiotics. However, there were price increases in personal protective equipment [35]. Another study had been done in Northern Nigeria. It revealed that the prices of some medications (hydroxychloroquine, antimalarials, and antibiotics), vitamins/ immune boosters, and personal protective equipment had increased [36].

In addition, regarding the effect of COVID-19 restrictions on the services provided by the visited hospital, around one-half percent of the individuals who visited hospitals during the lockdown found that there was no change in the requested services. Only 6% of respondents used telehealth services instead of in-person services when there was difficulty in accessing health care services. Several countries used alternative processes for accessing health care services, such as telemedicine to reduce in-person contact. For instance, Luxembourg, Croatia, Romania, North Macedonia, and Spain used phone-based consultations. Germany and Belgium modified the benefits basket to allow for more extensive reimbursement of teleconsultations. The United Kingdom applied a telephone triage system to assist in new cancer appointments and prevent needless hospital visits. Belgium added a new hotline of general practitioners for homeless people. At home, primary care visits were used in Croatia [34]. Another study, by Lazzarini et al. evaluated the effect of COVID-19 on clinic visits such as pediatric emergencies in Italy, compared to before COVID-19. They found that there was decrease in pediatric emergency hospital access during the pandemic, as compared to before it [18]. These presented data illustrated that the availability, price of medication, and use of health services may not be affected by the outbreak of COVID-19 in Makkah, Saudi Arabia.

5. CONCLUSION

In summary, on March 12, 2020, the COVID-19 disease was announced to be a pandemic. This disease could have an impact on medication dispensing and health care services due to precautionary procedures and lockdowns. Therefore, evaluating its effect was necessary. This study found that the majority of survey respondents coped well with COVID-19-related

changes such as social distancing, staying home, and partial/general lockdowns. There was a significant correlation between coping with the new condition of COVID-19 and the age group ($F_{(df)} = 7.846_{(4,107)}$, p -value 0.006). Additionally, the relationship between coping of respondents to the new situation of COVID-19 and the number of individuals living at the same home was nominal. This survey also found that COVID-19 could not negatively impact medication dispensing, availability, and price change. Additionally, there was a significant correlation between medication availability and its price ($F_{(df)} = 4.025_{(3,105)}$, P -value 0.047). Interestingly, almost half of the respondents believed that, in visiting hospitals during the lockdown, there was no change in the requested services. A few mentioned that there had been little effect on access to healthcare services during COVID-19. With the recent outbreak of this pandemic throughout the world, there is a need for stakeholders to study ways to increase health care service accessibility. In the case of potential outbreaks, this population-based survey may give the government with baseline data for prevention steps. More groups may be explored through future research.

CONSENT

It was approved by every participant.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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