Original article

Managing source of information and its relationship with fear of new strains of COVID-19 virus among a sample of Egyptians

Marwa M. Zein [1], Samar E Anwar[1], Youssef Elsendiony[2], Alaa Qandeel[2], Marwa Salem [2]*

[1]- *Public Health and Community Medicine Department, Faculty of Medicine, Cairo University.*

[2]- *Intern at Faculty of Medicine Cairo University*

A R T I C L E I N F O

A B S T R A C T

Background: The COVID-19 pandemic has fueled a surge of misinformation, including about new variants like BA.2.86, raising concerns about its spread and the effectiveness of containment efforts. This "infodemic" has exacerbated the impact of the pandemic, leading to economic strain and psychological effects such as "coronophobia," with both traditional and social media playing significant roles in its propagation. **Aim:** to explore the level of fear of the new strains of COVID-19 among a sample of the Egyptian population and to identify the relationship between the level of fear and the technique of managing the information source. **Methods:** The current exploratory cross-sectional study was conducted among a sample from the general population using a pre-tested electronic questionnaire, which included the following sections: i) Sociodemographic characteristics, ii) fear of COVID-19 questions, and iii) Currency, Relevance, Authority, Accuracy, and Purpose (CRAAP) test to evaluate the source of information **Results:** About one third of the 390 participants were afraid of the new strains of COVID-19; thinking about that issue or watching news about it made them uncomfortable. The majority felt anxious or palpitated when they thought about getting one of the new strains of COVID-19. The mean score of fear of new strains of COVID-19 was 15.9 ± 5.2. More than one third of them (32.1%) agreed that they always check the accuracy of the information by finding out if the information is supported by evidence or not. The fear of new strains of COVID-19 was significantly higher among females, married participants, and those suffering from chronic diseases. **Conclusion:** A significant proportion of the participants are not particularly afraid of new strains of viruses. About one third of them agreed that they always check the accuracy of the information by finding out if the information is supported by evidence or not.

Introduction

Since COVID-19 was entitled a pandemic, the whole world has been flooded with a wave of misinformation, especially with the emergence of the new variants of SARS-CoV-2. A novel variety known as BA.2.86 has been discovered in recent weeks in a small number of samples from sick individuals and waste (sewer) water in numerous nations, including Egypt [1]. This variation is noteworthy because it differs genetically from earlier iterations of SARS-CoV-2 and has been found in several locales recently [2]. The variant, which was discovered through genetic sequencing, has been found to have many mutations, causing

experts to be concerned about its potential spread [1].

The WHO director-general agreed that the world is dealing with an infodemic [3,4]. An infodemic is a flood of information, usually misleading information, in digital and physical environments during a disease outbreak [4,5]. This false information increased the already devastating effects of COVID-19, such as the economic burden and the psychological sequels, which were later given the name "coronophobia, " or "mass fear of COVID-19" [5,6].

Traditional outlets (TV and newspapers) as well as social media (Facebook and Twitter) can contribute to the skyrocketing of misinformation, bearing in mind that non-reliable and reliable information exhibit the same pattern of spread, so people are equally affected by them, which may jeopardize the efforts of the government in controlling the pandemic [6,7].

The themes of the COVID infodemic varied throughout the course of the pandemic due to its global scale. First, rumors spread about the source of the virus, then it was about the treatment and the efficacy of vaccines [7,8]. The researchers conducted the current study to explore the level of fear of the new strains of SARS COV-2 among a sample of the Egyptian population, identify the main source of information, and identify the relationship between the level of fear of the new strains of SARS COV-2 and the technique of managing the information source.

Methods

Study design

Exploratory cross-sectional study

Sample size and sampling technique

The researchers used a consecutive convenience sampling technique called "self-selection web-based questionnaires" and shared the questionnaire link with groups on Facebook, the most frequently utilized social media in Egypt. Requests were sent to the administrators of these groups to obtain permission to distribute this survey. The researchers posted the survey link along with an encouraging statement about its purpose and the contact information of one of the researchers. The inclusion criteria for participants: being an Egyptian adult and willing to participate.

Open Epi was used to calculate the required sample size. Using the following formula. (n = [DEFF*Np (1-p)]/[(d2/Z21-/2*(N-1) +p*(1-p)])

n = required sample size, $Z_{\alpha/2} = 2.57$(99% CI), P = prevalence of the outcome (Fear of COVID-19 among general population assumed to be (74.9 %) according to a study conducted by [9] , N= Population size (for finite population correction factor or fpc), d = margin of error; 0.05, *DEFF*=Design effect (for cluster surveys, here assumed to be 1). With precision of 5%, a 95% confidence interval, and an 80% power. Adding 35% to compensate for potential nonresponse, the minimal sample size was estimated to be 390 participants.

Data collection tool

A pre-tested 2-pages (screen) e-questionnaire was used to obtain data from the participants. It included four sections:

i) Sociodemographic background of the participant; age gender., education, working status, residence

ii) Fear of COVID-19 questionnaire [10]: 7 questions with 5 levels of answers (strongly disagree, disagree, neutral, agree, strongly agree) the questions were modified to be fearing of new strains of COVID-19. The questionnaire is valid in Arabic language.

iii) Currency, Relevance, Authority, Accuracy, and Purpose (CRAAP) [11] test to evaluate the source of information : questions were derived from the original CRAAP test technique, 11 questions with 5 levels of answers (always, usually, often, sometimes, never). The questions were translated by two language experts into Arabic and back translated to English by another two independent language experts.

A pilot test was conducted with 10% of the calculated sample size (not included in the study results) to assess the clarity of the questions. Two questions were deleted due to responses which are non-specific. The questionnaire's content was validated by four faculty members who are public Health experts, and the necessary changes were made. The reliability of the questionnaire was confirmed by Cronbach's alpha coefficient of 0.855.

Statistical analysis

The researchers analyzed the data using the Statistical Package of Social Science Software program version 26. Categorical variables were expressed in proportions and percentages; Chi square and Fisher's exact tests were applied as appropriate. Continuous variables were expressed using mean, median, and standard deviation; the independent t test was used for comparison. The score of fear of COVID-19 was calculated by calculating the score for everyone after giving each answer a score (strongly disagree 1, disagree 2, neutral 3, agree 4, strongly agree 5). The score ranged from (1-35). The participants were grouped into 2 groups (16, >16) according to the median score of the fear of COVID scale. The higher the score on the scale, the more fear of COVID was found.

Ethical considerations

Ethical approval was obtained from the Research Ethics Committee at Cairo University (N-107). Only those who agreed were included, and those who refused were excluded from the study by submitting an empty form after answering "Not willing to participate." All procedures for data collection were treated with confidentiality according to the Helsinki Declarations of Biomedical Ethics. Participants will be informed that this is an anonymous survey, and that participation is voluntary.

Results

The demographic data of the study participants are demonstrated in **table (1)**. The questionnaire was completed by Four hundred sixty-one individuals ; their mean age was 25.9±7.1 years (range 18–71 years), about three quarters (73.5%) were females, around 71% were not married, around 90% live in urban areas, more than 80% were university graduates, and half of the participants were working; from them, 64.2% (149 participants from the 232 working participants) were working in the medical field. The majority were not suffering from chronic diseases. COVID-19 infection was reported by about half (47.9%) of the participants; more than 80% of the participants were vaccinated against COVID-19. Only three participants didn't hear about COVID-19 mutations.

Regarding the responses towards fear of new strains of COVID-19, 458 responses were agreed that they heard about COVID-19 mutants, as shown in **table (2)**, about one third of the participants were afraid of new strains of COVID-19; thinking about that issue or watching news about it made them uncomfortable. More than half of the enrolled participants were afraid their lives could end because of one of the new strains of COVID-19. The majority felt anxious or palpitated when they thought about getting one of the new strains of COVID-19. Mean score of fear of new strains of COVID-19 was 15.9 ± 5.2, with median 15 points, ranged from (0 to 29). More than half (57.2) of the participants score was 16 or less (not so afraid from new strains).

As displayed in **figure (1)** social media was the main source of knowledge as reported by about three quarters of the participants followed by television, radio and newspaper.

Regarding responses of the participants towards applying CRAAP test to evaluate the source of knowledge, more than one third of them (32.1%) agreed that they always check the accuracy of the information by finding out is the information supported by evidence or not **(Table 3)**.

Table 4 shows that the fear of new strains of COVID-19 was significantly higher among females, married participants, and those suffering from chronic diseases (p value<0.05).

Regarding the relation between applying CRAAP test to evaluate the information source and the level of fear of new strains of COVID-19, it was revealed that level of fear is statistically significantly low among participants who check information relevance, and who always check for the contact information of the publisher (p value<0.05) **(Table 5 a& b)**.

Table 1. Sociodemographic characters of the enrolled participants (N=461).

Sociodemographic characteristics	N	%
Gender		
Male	122	26.5
Female	339	73.5
Marital status		
Married	135	29.3
Not Married	326	70.7
Residence		
Urban	414	89.8
Rural	47	10.2
Education		
Secondary School	29	6.3
University graduate	387	83.9
Postgraduate	45	9.8
Working		
Yes	232	50.3
Suffering from Chronic diseases		
Yes	33	7.2
No	428	92.8
Infected with COVID-19		
Yes	221	47.9
Maybe	133	28.9
No	107	23.2
Vaccinated against COVID-19		
Yes	383	83.1
Hearing about COVID mutations		
Yes	458	99.3

Table 2. Distribution of fear of new strains of COVID-19 virus assessment items among the enrolled participants (N=458).

Questions	Strongly disagree n (%)	Disagree n(%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)
I am most afraid of new strains of COVID-19	27 (5.9)	112 (24.5)	179 (39.1)	125 (27.3)	15 (3.3)
It makes me uncomfortable to think about new strains of COVID-19	51 (11.1)	144 (31.4)	120 (26.2)	130 (28.4)	13 (2.8)
My hands become clammy when I think about new strains of COVID-19	227 (49.6)	170 (37.1)	42 (9.2)	17 (3.7)	2 (0.4)
I am afraid of losing my life because of one of the new strains of COVID-19	112 (24.5)	131 (28.6)	122 (26.6)	84 (18.3)	9 (2.0)
When I watch news and stories about new strains of COVID-19 on social media, I become nervous or anxious.	60 (13.1)	124 (27.1)	138 (30.1)	124 (27.1)	12 (2.6)
I cannot sleep because I'm worrying about getting one of the new stains of COVID-19	247 (53.9)	152 (33.2)	44 (9.6)	15 (3.3)	0 (0.0)
My heart races or palpitates when I think about getting one of the new strains of COVID-19	215 (46.9)	156 (34.1)	58 (12.7)	26 (5.7)	3 (0.7)
Overall Score (mean ± SD)	15.9 ± 5.2				

Table 3. Distribution of responses regarding applying CRAAP test to evaluate the source of knowledge among the enrolled participants (N = 458).

	Applying CRAAP test	Never	Sometimes	Often	Usually	Always
Currency	When was the information published or posted?	39 (8.6)	116 (25.5)	115 (25.3)	86 (18.9)	99 (21.8)
	Has the information been revised or updated?	55 (12.1)	125 (27.5)	103 (22.6)	87 (19.1)	85 (18.7)
Relevance	Does the information relate to your topic or answer your question?	26 (5.7)	84 (18.5)	110 (24.2)	106 (23.3)	129 (28.4)
Authority	Who is the author/publisher/source/sponsor	53 (11.6)	132 (29.0)	74 (16.3)	79 (17.4)	117 (25.7)
	What are the author's qualifications to write on the topic?	79 (17.4)	130 (28.6)	85 (18.7)	67 (14.7)	94 (20.7)
	Is there contact information, such as a publisher e-mail address?	170 (37.4)	141 (31.0)	45 (9.9)	66 (14.5)	33 (7.3)
Accuracy	Is the information supported by evidence?	24 (5.3)	86 (18.9)	113 (24.8)	86 (18.9)	146 (32.1)
	Are there spelling, grammar, or other typographical errors?	106 (23.3)	138 (30.3)	71 (15.6)	81 (17.8)	59 (13.0)
Purpose	What is the purpose of the information? to inform? teach? sell? entertain? persuade?	44 (9.7)	127 (27.9)	94 (20.7)	97 (21.3)	93 (20.4)
	Does the point of view appear objective and impartial?	37 (8.1)	108 (23.7)	98 (21.5)	106 (23.3)	106 (23.3)
	Are there political, ideological, cultural, religious, institutional, or personal biases?	44 (9.7)	119 (26.2)	93 (20.4)	103 (22.6)	96 (21.1)

Table 4. Relationship between level of fear of new strains of COVID-19 and sociodemographic characteristics of the enrolled participants (n=458).

Sociodemographic characteristics		Fear of new strains of COVID-19		*p* value
		≤16	**>16**	
Age group	18-30	220 (58.2)	158 (41.8)	0.559
	31-40	31 (54.4)	26 (45.6)	
	>40	11 (47.8)	12 (52.2)	
Gender	Male	85 (69.7)	37 (30.3)	**0.001***
	Female	177 (52.7)	159 (47.3)	
Marital status	Married	62 (45.9)	73 (54.1)	**0.002***
	Not Married	200 (61.9)	123 (38.1)	
Residence	Urban	232 (56.4)	179 (43.6)	0.333
	Rural	30 (63.8)	17 (36.2)	
Education	Secondary School	12 (41.4)	17 (58.6)	0.143
	University graduate	227 (59.0)	158 (41.0)	
	Postgraduate	23 (52.3)	21 (47.7)	
Occupation	Yes	126 (54.8)	104 (45.2)	0.293
	No	136 (59.6)	92 (40.4)	
Chronic diseases	Yes	13 (39.4)	20 (60.6)	**0.032***
	No	249 (58.6)	176 (41.4)	
COVID infection	Yes	117 (53.4)	102 (46.6)	0.183
	Maybe	77 (57.9)	56 (42.1)	
	No	68 (64.2)	38 (35.8)	
COVID Vaccine	Yes	224 (58.9)	156 (41.1)	0.096
	No	38 (48.7)	40 (51.3)	

*Statistically significant

Table 5a. Relationship between fear of new strains of COVID-19 and applying the CRAAP test for evaluation of information sources.
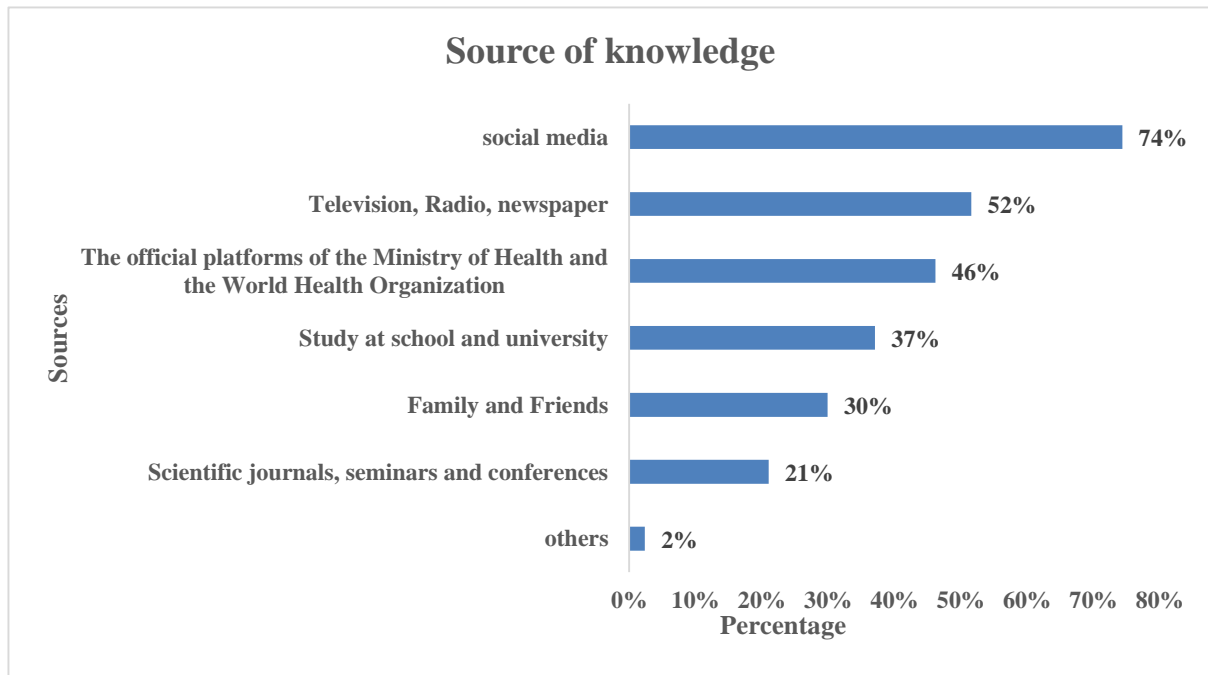
Applying CRAAP test			Fear of new strains of COVID-19		*p* value
			≤16	**>16**	
Currency	When was the information published or posted?	Never	28 (71.8)	11 (28.2)	0.252
		Sometimes	68 (58.6)	48 (41.4)	
		Often	67 (58.3)	48 (41.7)	
		Usually	44 (51.2)	42 (48.8)	
		Always	53 (53.5)	46 (46.5)	
	Has the information been revised or updated?	Never	38 (69.1)	17 (30.9)	0.062
		Sometimes	66 (52.8)	59 (47.2)	
		Often	63 (61.2)	40 (38.8)	
		Usually	41 (47.1)	46 (52.9)	
		Always	52 (61.2)	33 (38.8)	
Relevance	Does the information relate to your topic or answer your question?	Never	23 (88.5)	3 (11.5)	**0.002***
		Sometimes	53 (63.1)	31 (36.9)	
		Often	66 (60.0)	44 (40.0)	
		Usually	52 (49.1)	54 (50.9)	
		Always	66 (51.2)	63 (48.8)	
Authority	Who is the author/publisher/ source/sponsor?	Never	32 (60.4)	21 (39.6)	0.605
		Sometimes	71 (53.8)	61 (46.2)	
		Often	45 (60.8)	29 (39.2)	
		Usually	41 (51.9)	38 (48.1)	
		Always	71 (60.7)	46 (39.3)	
	What are the author's qualifications to write on the topic?	Never	44 (55.7)	35 (44.3)	0.452
		Sometimes	72 (55.4)	58 (44.6)	
		Often	53 (62.4)	32 (37.6)	
		Usually	33 (49.3)	34 (50.7)	
		Always	58 (61.7)	36 (38.3)	
	Is there contact information, such as a publisher e-mail address?	Never	107(62.9)	63 (37.1)	**0.018***
		Sometimes	79 (56.0)	62 (44.0)	
		Often	29 (64.4)	16 (35.6)	
		Usually	26 (39.4)	40 (60.6)	
		Always	19 (57.6)	14 (42.4)	

Table 5b. Relationship between fear of new strains of COVID-19 and applying the CRAAP test for evaluation of information sources.

Applying CRAAP test			Fear *of new strains* of *COVID-19*		*p* value
			<=16	>16	
Accuracy	Is the information supported by evidence?	Never	12 (50.0)	12 (50.0)	0.965
		Sometimes	50 (58.1)	36 (41.9)	
		Often	65 (57.5)	48 (42.5)	
		Usually	50 (58.1)	36 (41.9)	
		Always	83 (56.8)	63 (43.2)	
	Are there spelling, grammar, or other typographical errors?	Never	64 (60.4)	42 (39.6)	0.365
		Sometimes	77 (55.8)	61 (44.2)	
		Often	43 (60.6)	28 (39.4)	
		Usually	39 (48.1)	42 (51.9)	
		Always	37 (62.7)	22 (37.3)	
Purpose	What is the purpose of the information? to inform? teach? sell? entertain? persuade?	Never	29 (65.9)	15 (34.1)	0.752
		Sometimes	70 (55.1)	57 (44.9)	
		Often	55 (58.5)	39 (41.5)	
		Usually	53 (54.6)	44 (45.4)	
		Always	53 (57.0)	40 (43.0)	
	Does the point of view appear objective and impartial?	Never	24 (64.9)	13 (35.1)	0.304
		Sometimes	56 (51.9)	52 (48.1)	
		Often	59 (60.2)	39 (39.8)	
		Usually	55 (51.9)	51 (48.1)	
		Always	66 (62.3)	40 (37.7)	
	Are there political, ideological, cultural, religious, institutional, or personal biases?	Never	27 (61.4)	17 (38.6)	0.457
		Sometimes	61 (51.3)	58 (48.7)	
		Often	53 (57.0)	40 (43.0)	
		Usually	58 (56.3)	45 (43.7)	
		Always	61 (63.5)	35 (36.5)	

*Statistically significant

Figure 1 . source of information among the enrolled participants (N= 458)

Source of knowledge

- social media — 74%
- Television, Radio, newspaper — 52%
- The official platforms of the Ministry of Health and the World Health Organization — 46%
- Study at school and university — 37%
- Family and Friends — 30%
- Scientific journals, seminars and conferences — 21%
- others — 2%

Discussion

The current study was conducted to explore the level of fear of the new strains of COVID-19 among a sample of the Egyptian population and to identify the relationship between the level of fear and the technique of managing the information source. It was revealed that a significant proportion of the participants are not particularly afraid of new strains of SARS CoV II. About one third of them agreed that they always check the accuracy of the information by finding out is the information supported by evidence or not. This could be due to a range of factors, such as a perceived decrease in the severity of the virus, and increased confidence in vaccines.It is notable in the current study that social media was the main source of knowledge for the participants which is consistent with previous studies by **Ma et al. [12]** and **Shaikhain et al.** [13] This finding has important implications for public health messaging. Social media platforms are known for their ability to spread misinformation and disinformation, which can lead to confusion and mistrust among the public. Therefore, it is important that health authorities and organizations take steps to ensure that accurate and reliable information about the pandemic is disseminated through social media channels.

Another interesting finding from this study is that only about one third of the participants reported always checking the accuracy of the information they receive about the pandemic. This highlights the need for greater emphasis on media literacy and critical thinking skills in public health communication. By encouraging people to fact-check information and seek out evidence-based sources of information, we can help to combat the infodemic. An earlier study conducted among a sample of high school students in the Philippines found that the CRAAP test effectively leads students to consider the aspects that should be evaluated when judging credibility of online news [14]. Overall, the results of this study suggest that there is a need for ongoing efforts to educate the public about COVID-19 mainly the new strains, and to promote accurate and reliable information about the virus and its variants. This can be achieved through a range of strategies, such as targeted public health messaging, media literacy programs, and collaborations between health authorities and social media companies. During these kinds of emergencies, less educated individuals, older

individuals, and rural and remote-region residents do not get the health emergency information accurate and timely [15]. This kind of communication inequality is quite common, causing marginalized social groups to be at a higher risk than estimated and to be less likely to follow appropriate behaviors [16,17].

The results of this study suggest that a relatively low proportion of participants reported using the CRAAP test to evaluate the accuracy and reliability of information about COVID-19. Specifically, only about one third of the participants (32.1%) reported always checking the accuracy of the information by finding out if the information is supported by evidence or not. This finding could be explained by the following many people may not be aware of the importance of evaluating the accuracy and reliability of information, or they may lack the skills and knowledge needed to do so effectively. Additionally, the proliferation of misinformation and disinformation on social media can make it difficult for people to identify accurate sources of information. This finding highlights the need for greater emphasis on media literacy and critical thinking skills in public health communication. By encouraging people to use tools like the CRAAP test to evaluate the accuracy and reliability of information, we can help to fight against the spread of false information. This is quite important in the context of this emerging infection, where accurate and reliable information can be a matter of life and death.

The current study revealed that fear from new strains of COVID-19 was significantly higher among females, married participants and who were suffering from chronic diseases. This finding was in accordance with a recent study conducted among Egyptian physicians experiencing higher levels of COVID-19 phobia were more likely to be females, **Abdelghani et al.** [18] This finding has important implications for public health messaging and suggests that targeted interventions may be needed to address the concerns of these groups.

Overall, the outcomes of this cross-sectional study suggest that using the CRAAP test to evaluate the accuracy and reliability of information about the pandemic may be associated with lower levels of fear from new strains of COVID-19. Specifically, participants who reported always checking for the relevance of information and the contact information of the publisher were

found to have significantly lower levels of fear from new strains of COVID-19. This finding highlights the importance of media literacy and critical thinking skills in mitigating the negative impact of misinformation and disinformation about the pandemic.

It is worth noting that this study has several limitations, including the use of self-reported data and collecting data via an online survey. Certain populations are less likely to have internet access and respond to online questionnaires, which may limit the generalizability of the findings to other populations. Further research is needed to replicate these findings in larger and more diverse populations and to explore the underlying mechanisms linking media literacy and fear of new strains of COVID-19.

Authors' contributions

M.S made substantial contributions to the study conceptualization and design, A.A and D.A contributed to data analysis and interpretation, and manuscript writing. other authors made substantial contributions to the data acquisition and manuscript writing A.S, F.A and D.A were involved in drafting the manuscript (methods and results section) and revising it carefully for important intellectual content and statistical analysis. All authors read and approved the final version of the manuscript.

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