

Original Article

Attitude and intention of Iraqi healthcare providers to get vaccinated against COVID-19: a cross-sectional study

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Abstract

Background: International efforts to confront the COVID-19 pandemic are joining forces by accelerating the pace of vaccination. This study aims to explore the attitude and the intent to get vaccinated against COVID-19 among healthcare providers (HCPs) in Iraq.

Methods: A cross-sectional survey was conducted in January 2021 using web-based facilities to access the respondents. The data were collected through a semi-structured and self-administered questionnaire, including sociodemographic and close-ended questions related to attitude and intention toward COVID-19 vaccination. Bivariate and multivariate logistic regression were recruited to predict variables. The statistical significance is considered at less than 0.05.

Results: Data of 209 HCPs with a mean age of 45.12 (\pm 6.37) years have undergone final analysis. Most of the HCPs were males (112, 53.6%) and nurses (110, 52.6%), who had close contact (64.6%) with COVID-19 patients, and forty percent have been infected with COVID-19. Overall, 115 HCPs (58.0%) reported intention to get vaccinated compared to 94 (42.0%) who declined vaccination. Variables associated with intention to get vaccinated among HCPs were high attitude toward COVID-19 vaccination (odds ratio (OR) = 1.740, 95% confidence interval (CI): 0.799, 3.786), aged less than 45 years (OR = 3.713; 95% CI: 1.647, 8.367), married (OR = 2.155; 95% CI: 0.984, 4.720), highly educated (OR = 2.657; 95% CI: 1.202, 5.871), doctors (OR = 3.153; 95% CI: 1.428, 6.963), contracted with COVID-19 (OR = 4.119; 95% CI: 1.623, 10.455), directly engaged in management of COVID-19 patients (OR = 3.962; 95% CI: 1.569, 10.005), and had lost a close relative due to COVID-19 (OR = 5.698; 95% CI: 1.506, 12.564).

Conclusion: The urgent need to improve the COVID-19 vaccine uptake rates among Iraqis requires a positive attitude and a high vaccination rate among HCPs.

Keywords: Vaccine, Intention, COVID-19, Attitude, Healthcare Providers, Iraq

Background

Severe acute respiratory syndrome 2 (SARS-CoV-2) and the accompanied successive waves of the global pandemic have revealed the fragility of most health systems in developed and developing countries alike [1,2]. Older adults with chronic diseases and healthcare professionals were ranked among the highest risk groups for SARS-CoV-2 exposure and clinical disease onset [3]. Moreover, high absenteeism rates were recorded among health care providers (HCPs) for many reasons, such as exposure to COVID-19 infection and isolation as a

Precaution to prevent the spread of infection [4,5]. Since the declaration of coronavirus as a global pandemic on 11th March 2020, hundreds of thousands of patients have had an influx of health care facilities in large parts of the world simultaneously, causing enormous pressure on healthcare facilities and HCPs, respectively [6,7,8]. There is no doubt that healthcare providers constitute the highest priority group for coronavirus vaccination [8,9]. Moreover, the vaccination process within the health care services must be qualified and already immunized cadres before launching the vaccination campaign [10]. Furthermore, the challenging work environment and the potential to put HCPs, and their families at risk of infection make the principle of reciprocity a logical explanation for exceptional priority [10]. HCPs acknowledged the expected benefits of receiving the vaccine for themselves and health care systems. Of course, the

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attitudes of healthcare providers will be reflected in the acceptance rates of COVID-19 vaccines within the general population, as they are reliable sources of information about the covid-19 infection and the vaccines, respectively [11,12]. The first confirmed case of Corona in Iraq was announced in March 2020 [13]. The Iraqis showed sufficient awareness of the pandemic, but the commitment to the instructions of the health administration was less than required [14,15]. The multiple waves of the pandemic affected the already crumbling Iraqi health system [16]. Most Iraqis prefer to visit private clinics rather than public health institutions because of the chronic shortage of health facilities, including human resource health.

Moreover, many Iraqis consider the infection with COVID-19 as a social stigma, which has further contributed to worsening the health situation [17]. Unfortunately, the non-compliance of many Iraqi people with preventive measures made public health institutions a source of infection. Most healthcare providers have contracted COVID-19 and become carriers of the infection in their environments [17]. The increased workload and the absence of the necessary legal legislation to protect HCPs forced many of them to leave work due to the repeated occurrence of workplace violence by patients and their relatives [18]. The rumors about the coronavirus's source and the lack of benefit from receiving the vaccine reduced the rate of receiving the vaccine among the general Iraqi society.

In light of the widespread reluctance to receive the coronavirus vaccine in Iraq, the alarming rise in the spread of the emerging coronavirus infection COVID-19, and the urgent need to increase vaccine acceptance rates to achieve herd immunity, knowing the rate of intention to accept the coronavirus vaccine among HCPs has become inevitable.

Methods

Study population and sample

We conducted a cross-sectional web-based study from 1st to 28th February 2021 among healthcare providers to explore the intention to get vaccinated against COVID-19. The present study was part of a large national initiative [15]. The data was collected from three provinces, including Anbar in the west, Diyala in the east, and Salahuddin in the north of Iraq.

Inclusion and exclusion criteria

All Iraqi healthcare providers of both genders, employed and unemployed, private and public sectors, academic and non-academic institutions, and willing to participate are included in the study. At the same time, we excluded incomplete data, students in the medical field, some health units such as recorders, cleaners, and porters, and those not willing to participate.

Sample size

The sample size calculator arrived at 195 participants, using a margin of error of $\pm 7\%$, a confidence level of 95%, and a 50% response distribution [20]. Non-response correction = 10%. Thus, the total sample size was (195+20) 215. Supervision during the data collection phase was ensured in all stages. After excluding six incomplete documents, the sample was 209 for final analysis.

Study instrument

In this study, the authors developed a semi-structured questionnaire recruiting different items from previously published related articles [21-35]. The social media available in Iraq, such as WhatsApp, Viber, and Facebook, were used to facilitate access to the participants. The questionnaire was prepared in English and then translated into Arabic to be used through the Google form link after garnering the content validity [36], and Cronbach alpha reliability was 74.2. On the first page of the survey, we included the full details about the purpose of the study and how to answer the questions, along with "assurance of the freedom to participate or withdraw and that all information and opinions submitted would be anonymous and confidential". Moreover, a consent form must be signed before respondents can participate in the study. The questionnaire's three main sections are the sociodemographic factors, closed-ended questions used to evaluate the attitude (12 questions), and the intention to be vaccinated (5 questions) in the second and third sections, respectively.

Dependent variable

The dependent variable was the "intention to get vaccinated". We have recruited five questions to determine the intention of healthcare providers to get vaccinated: "I predict I will receive the vaccine against COVID-19", "I plan to receive the vaccine against COVID-19", "I prefer to receive the vaccine against COVID-19 after a while" and "I think it is time to get a vaccine against COVID-19". The responses were given in the form of "strongly disagree", "disagree", "do not know", "agree", and "strongly agree". For the purpose of analysis, the median was used to cut off the intention of vaccination into a high intention (median and above) and low intention (below the median).

Attitude toward COVID-19 vaccination

The attitude was measured using twelve questions adopted from an earlier published article. The responses were given as "strongly disagree", "disagree", "don't know", "agree", "strongly agree".

Independent variables

For the purpose of analysis, some of the sociodemographic variables were exposed to categorization. The age variable was reported in five groups: "25-34", "35-44", "45-54", "55 years and above; however, the age was categorized into two groups coded "zero" for respondents aged less than 45 years and coded "one" for those aged 45 years and above. The gender was coded as "zero" for males, and "one" for females. Marital status was captured as binary, and a value of one was used for married participants coded "one" and those who are single, widows, divorced considered unmarried and coded "zero". The place where people resident was either rural and coded "zero" or urban and coded "one". At the time of data collection (1st January 2021), the exchange rate of Iraqi Dinar (IQD)1 = United States Dollar (USD) 0.0008. Therefore the monthly income (including all incentives and bounces) of our respondents was coded "zero" for those who earned less than USD 400 (IQD 600,000) and coded "one" for those who earned more than USD 400. The occupation was recorded and coded into "one" for doctors (physician, dentist, pharmacist) and the code of "zero" for nurses from all departments.

Years of experience are categorized into "less than ten years" and have been coded "zero" and coded "one" to the experience of "10 years and above". The self-rated health status was reported on a scale ranging from "very bad" to "very good," a scale ranging from "1" to "5". Moreover, the self-rated health status was categorized into poor health (very bad, bad, moderate) and good health (good and very good).

Statistical analysis

The data was analyzed using the IBM SPSS version 16. Categorical variables are presented in terms of frequencies and percentages. Bivariate analyses were performed using the independent t-test for continuous variables (normal distributed", and the chi-square test for the categorized variables. In the multiple logistic regression, odds ratio (OR) and confidence intervals (CIs) were estimated, and only the variables with a p-value of < 0.05 were recruited to explore the factors that predict

"HCP's intention to get vaccinated" against COVID-19. The statistically significant is considered at less than 0.05.

Results

Descriptive and general characteristics of related factors

Two hundred and nine completed questionnaires underwent the final analysis. The residents' mean age was 45.12 (\pm 6.37), ranging from 24 to 63 years old. More than half of healthcare providers were males (53.6%), nurses (52.6%), aged less than 45 years old (58.4%), married (55.5%), and low educated level (54.5%). Most of our respondents had the experience of 10 years and above (60.3%), with a monthly salary exceeding USD 400 (61.7%), and 75.1% of them ranked themselves as healthy. Out of the total sample, 40.7% reported they had contracted the covid-19 infection, 64.6% of them managed COVID-19 patients directly, and 19.6% of them had lost one or more of their relatives in Iraq due to COVID-19 infection (Table 1).

Table 1: Bivariate analysis of predictors in intention to get vaccinated (n=209)

Factors	Category	Total (n=209)	No	Yes	χ^2	p-value
Age	≥ 45	87(41.6)	20(23.0)	67(77.0)	12.293	0.000
	<45	122(58.4)	57(46.7)	65(53.3)		
Gender	Female	97(46.4)	32(33.0)	65(67.0)	1.155	0.316
	Male	112(53.6)	45(40.2)	67(59.8)		
Marital status	Married	116(55.5)	31(26.7)	85(73.3)	11.469	0.001
	Single	93(44.5)	46(49.5)	47(50.5)		
Educational level	High	95(45.5)	23(24.2)	72(75.8)	11.943	0.001
	Low	114(54.5)	54(47.4)	60(52.6)		
Residency place	Urban	134(64.1)	54(40.3)	80(59.7)	1.917	0.181
	Rural	75(35.9)	23(30.7)	52(69.3)		
Occupation	Doctor	99(47.4)	24(24.2)	75(75.8)	12.833	0.001
	Nurses	110(52.6)	53(48.2)	57(51.8)		
Experience	≥ 10 years	126(60.3)	45(35.7)	81(64.3)	0.173	0.770
	<10 years	83(39.7)	32(38.6)	51(61.4)		
Income level	USD \geq 400	129(61.7)	45(34.9)	84(65.1)	0.555	0.465
	USD<400	80(38.3)	32(40.0)	48(60.0)		
Self-ranked health	Good health	157(75.1)	59(37.6)	98(62.4)	0.148	0.743
	Poor health	52(24.9)	18(34.6)	34(65.4)		
Have you been infected with COVID-19?	Yes	85(40.7)	10(11.8)	75(88.2)	38.720	0.000
	No	124(59.3)	67(54.0)	57(46.0)		
Have you been in direct contact with COVID-19 patients?	Yes	135(64.6)	11(14.9)	63(85.1)	23.780	0.000
	No	74(35.4)	66(48.9)	69(51.1)		
Have you lost a relative due to COVID-19?	Yes	41(19.6)	5	36	13.316	0.000
	No	168(80.4)	72	96		

Intention to get vaccinated

The mean value of intention to vaccination was 20.82(SD 2.32), and the median was 21.0. More than one-half of the healthcare

providers (115, 58.0%) agreed that they actively intended to get vaccinated compared to (94, 42.0%) who disagreed.

Table 2: intention to get vaccinated among healthcare providers (n=209)

No.	Questions	*SD(%)	D(%)	NK(%)	A(%)	SA(%)
1.	I intend to receive the vaccine against COVID-19	4(1.9)	6(2.9)	9(4.3)	99(47.4)	91(43.5)
2.	I predict I will receive the vaccine against COVID-19	5(2.4)	3(1.4)	6(2.9)	87(41.6)	108(51.7)
3.	I plan to receive the vaccine against COVID-19	2(1.0)	11(5.3)	45(21.5)	114(54.5)	37(17.7)
4.	I prefer to receive the vaccine against COVID-19 after a while	2(1.0)	3(1.4)	32(15.3)	118(56.5)	54(25.8)
5.	I think it is time to get a vaccine against COVID-19	3(1.4)	6(2.9)	8(3.8)	103(49.3)	89(42.6)

*SD: Strongly disagree; D: disagree; NK: Do not know; A: Agree; SA: Strongly agree

Attitude toward COVID-19 vaccination

An independent-sample t-test was run to determine if there were differences in attitude toward COVID-19 vaccination between healthcare providers who actively intended to get vaccinated and their counterparts. The attitude was more among healthcare providers who were actively intending to get vaccinated ($m = 44.74$, $SD = 3.92$) than healthcare providers who were not actively intending to get vaccinated ($m = 41.00$, $SD = 3.15$), a statistically significant difference ($m = 3.74$, 95% CI (2.70, 4.77), $t(187.088) = 7.560$, $p < 0.001$). Most of the respondents (83.7%) agreed or strongly agreed with the possibility that the vaccines reduce the incidence of covid-19, and they believed (80.4%) that the vaccine would protect them. Nearly sixty percent (58.3%) of the participants do not have enough information about the vaccine, which made the majority

(84.2%) of them prefer other people to get the vaccine first. However, the opportunity to choose the type of vaccine raised the likelihood of accepting the vaccine among 78.5% of respondents. Three-quarters of respondents (75.1%) disclose that the media has an impact on accepting or rejecting the vaccine, destabilizing the confidence in vaccine-producing pharma companies among 67.9% of respondents. More than seventy percent (72.8%) of the respondents were worried because the vaccine was new and was produced in a short time. Therefore, 25.4% of them thought the vaccine's risks were greater than its benefits. Fifty-five percent (55.0%) preferred to develop natural immunity by getting COVID-19, either because they believe that COVID-19 is not dangerous in 44.4% of them or because they had a bad reaction to a vaccine in the past.

Table 3: Intention to get vaccinated among healthcare providers (n=209)

No.	Questions	*SD(%)	D(%)	NK(%)	A(%)	SA(%)
1.	Vaccines might substantially reduce the incidence of covid-19	9(4.3)	14(6.7)	11(5.3)	92(44.0)	83(39.7)
2.	I think the vaccine will protect me	13(6.2)	12(5.7)	16(7.7)	73(34.9)	95(45.5)
3.	Have a lack of information about the vaccine.	9(4.3)	17(8.1)	61(29.2)	87(41.6)	35(16.7)
4.	Prefer other people to get the vaccine first	4(1.9)	16(7.7)	13(6.2)	114(54.5)	62(29.7)
5.	Opportunity to choose the type of vaccine to help you accept the corona vaccine	7(3.3)	13(6.2)	25(12.0)	132(63.2)	32(15.3)
6.	The media has an influence on the acceptance or rejection of the corona vaccine	8(3.8)	12(5.7)	32(15.3)	107(51.2)	50(23.9)
7.	Do not trust vaccine-producing pharma companies.	20(9.6)	25(12.0)	22(10.5)	82(39.2)	60(28.7)
8.	Be concerned because this is a new vaccine produced in a short time.	14(4.3)	17(8.1)	26(12.4)	67(32.1)	85(40.7)
9.	The risks of the vaccine are greater than its benefits.	24(11.5)	54(25.8)	78(37.3)	24(11.5)	29(13.9)
10.	Prefer to develop natural immunity by getting COVID-19.	7(3.3)	31(14.8)	56(26.8)	86(41.1)	29(13.9)
11.	Believe COVID-19 is not dangerous for me.	5(2.4)	62(29.7)	45(21.5)	79(37.8)	18 (8.6)
12.	Had a bad reaction to a vaccine in the past.	26(12.4)	79(37.8)	41(19.6)	42(20.1)	21(10.0)

*SD: Strongly disagree; D: disagree; NK: Do not know; A: Agree; SA: Strongly agree

Factors associated with intention to get vaccinated in bivariate analysis

Cross tabulation showed that only doctors (chi-square test ($\chi^2 = 12.833$, $p = 0.001$) who were aged 40 years old and above ($\chi^2 = 12.293$, $p < 0.001$), being married ($\chi^2 = 11.469$, $p = 0.001$), high educated level ($\chi^2 = 11.943$, $p = 0.001$), being infected with COVID-19 ($\chi^2 = 38.720$, $p < 0.001$), had direct contact with COVID-19 patients ($\chi^2 = 23.780$, $p < 0.001$), and had lost one or more close-relative due to COVID-19 ($\chi^2 = 13.316$, $p < 0.027$), were significantly associated with the intention to get vaccinated against COVID-19 (Table 1).

Factors associated with intention to get vaccinated in multiple logistic regression

In the multivariable logistic regressions, attitude toward COVID-19 vaccination (odds ratio (OR)=1.740, 95% CI: 0.799 to 3.786) with the other seven variables was associated significantly with the intention to get vaccinated ($p < 0.05$). The healthcare providers who lost close-relative due to COVID-19 (OR = 5.698, 95% CI: 1.506 to 12.564), being infected with COVID-19 (OR = 4.119, 95% CI: 1.623 to 10.455) and were in direct contact with COVID-19 patients (OR = 3.962, 95% CI: 1.569 to 10.005) had the highest odds ratios. At the same time, the married healthcare providers (OR = 2.155, 95% CI: 0.984 to 4.720) with a positive attitude toward COVID-19 vaccination

(OR = 1.193, 95% CI: 1.076-to 1.334) had the lowest odds ratios. The Hosmer and Lemeshow test indicated a good fit ($p = 0.344$). The total model was significant ($p < 0.001$) and accounted for 55.8% of the variance (Nagelkerke R square = 0.558).

Discussion

In this study, we tried to study the intentions of HCPs, including doctors and nurses, in Iraq to receive the COVID-19 vaccine. Many factors are discussed to understand the motives that may contribute to the decision-making process regarding the acceptance or rejection of the vaccine among HCPs. Previous studies [3,7-10] have acknowledged the distinct role of health professionals in addressing the COVID-19 pandemic, which made them the most vulnerable professions to infection with the virus. No doubt they have the priority in receiving the vaccine because they are the front line of defense when responding to the pandemic. Moreover, community health promotion and protection depend mainly on healthy and highly educated HCPs prescribing treatment and administering vaccinations to patients. Our results showed that the intention to receive the COVID-19 vaccine exceeded half of those surveyed (115, 58.0%).

Table 4: Factors associated with intention to get vaccinated in multiple logistic regression (n=209)

Variables	B	S.E.	Wald	P-value	OR	95% CI
Attitude	0.176	0.397	9.610	0.002	1.193	1.076-1.334
< 45 years	1.312	0.415	10.012	0.002	3.713	1.647-8.367
45 years and above					Reference	
Married	0.768	0.400	3.685	0.039	2.155	0.984-4.720
Single					Reference	
High education	0.977	0.405	5.835	0.016	2.657	1.202-5.871
Low education						
Doctors	1.148	0.404	8.068	0.005	3.153	1.428-6.963
Nurses					Reference	
Infected with COVID-19?	1.416	0.475	8.875	0.003	4.119	1.623-10.455
No					Reference	
Direct contact with COVID-19 patients?	1.377	0.473	8.483	0.004	3.962	1.569-10.005
No					Reference	
Lost a close relative due to COVID-19?	1.740	0.679	6.568	0.010	5.698	1.506-12.564
No					Reference	

Such findings were greater than the studies conducted in America, Ethiopia, Greece, and Palestine [21,22,23,24], which confirmed that the rate of willingness to accept the vaccine was 36%, 53.1%, 51.1%, 37.8% and respectively. Several reasons might back behind such positive behavior of Iraqi HCPs, including the period of collecting information, the availability of several types of vaccines, the steady increase in morbidity and mortality rates due to successive waves of the pandemic, and the absence of effective treatment for coronavirus except for the vaccine. However, our results are still far from those recorded in Canada (80.9%), French (76.9%), Scotland (77.6%) and Italy (74.0%) [25,26,27,28]. As mentioned above, the variant in results may also be attributed to the difference in time and study design, the target population in terms of type and sample size, and the extent of the coronavirus spread and its impact on the health system, social and economic status, as happened in many European countries compared to the countries of the Middle East. According to this study, the attitude of health professionals had an impact on the intention to accept the COVID-19 vaccine. The results of the logistic regression analysis showed that the intention to get vaccinated increases at a rate of 1.1 whenever the attitude towards the COVID-19 vaccine positively improves. The results of our study correspond to several studies conducted in China [29], Italy [30], and the United Kingdom [31], also confirming that the negative attitude towards the vaccine significantly weakened the intention to uptake the vaccine against the COVID-19 infection. The possibility that sociodemographic factors are determinants of COVID-19 vaccine acceptance was studied at the bivariate and multivariate analysis levels. Married doctors aged 45 years old and above with high educated degrees were significantly associated with high intention to get vaccinated against COVID-19. In their systematic research, Li M et al. [32] indicated that elderly male doctors have a positive view towards COVID-19 vaccination compared to female nurses, who showed a greater hesitancy. Younger participants (<45) had 3.7 times the likelihood of accepting the vaccine than the old age group. Similar findings were reported in studies from Palestine [24] and the USA [33]. accepting the vaccine than the old age group.

Likewise, to earlier studies conducted in Greece [23], Palestine [24], the USA [33], Congo [34], and France [35], we found that doctors had 3.153 times the likelihood of having the intention to get vaccinated compared to nurses. Although the study of perceived risk was not a target of our study, however, we found that the HCPs who had been infected with COVID-19 and those who engaged in the management of patients with COVID-19, and those who had lost a close relative due to COVID-19 showed 4.119, 3.962 and 5.698-times likelihood intention to accept the vaccination compared to their counterparts, respectively. Similar studies in Ethiopia [22] and France [26] indicated that acceptance of the COVID-19 vaccine among health professionals was associated with fear of COVID-19 and perceived risk of infection.

Our study complaints some limitations. First, this study focused on analyzing the measured intention to get vaccinated against COVID-19 rather than the actual intention; therefore, the actual behavior of Iraqi HCPs may be different from intentional measures. Second, the response bias is possible because we had no information on non-responders and if they differed in some criteria from responders. Third, the study's design is a cross-sectional model, which cannot establish a causal relationship between the variables. Fourth, the small sample size and the study restriction on three governorates of Iraq limit the generalization of study results at the national level.

Conclusion

In conclusion, more than half of the participants in our study indicated that they intended to be vaccinated against COVID-19. The positive attitude of HCPs had a direct effect on enhancing the intention to vaccinate. Moreover, the multivariate logistic regression analysis showed attitudes toward COVID-19 vaccination, Age, marital status, educational level, occupation, being infected with COVID-19, being in contact with COVID-19 patients, and losing a close relative due to COVID-19 were the main predictors for accepting the vaccination. To raise vaccine uptake rates and improve awareness among HCPs implementing evidence-based educational interventions contributes to alleviating the fears of the hesitant part.

Abbreviation

COVID-19: Coronavirus; HCPs: Healthcare Providers; IQD: Iraqi Dinar; USD: United States Dollar

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Availability of data and materials

Data will be available by emailing dr.saadlezzi@gmail.com.

Authors' contributions

Saad Ahmed Ali Jadoo (SAAJ) was the designer of the study, coordinating all aspects of the research, the article's writing, the analysis and interpretation of the study and drafting and reviewing the article. Mustafa Ali Mustafa Al-Samarrai (MAMA) and Badaea Thamer Yahyaa (BTY) contributed to the study's concept, and arrangement. Adil Hassan Al-Hussainy (AHA), Ismail Ibrahim Latif (IIL) and Shukur Mahmood Yaseen (SMY) contributed to interpretation of results and data collection. All authors have read and approved the final version of the manuscript.

Ethics approval and consent to participate

We conducted the research following the Declaration of Helsinki. The protocol of the study was approved by the Ethics Committee of the College of Medicine, Diyala University (Ref: 1250 at 15-July-2020); the Ethics Committee of the Scientific Issues and Postgraduate Studies Unit (PSU), College of Medicine, University of Anbar (Ref: SR/368 at 19-July-2020). Moreover, web-based informed consent was obtained from each participant after explaining the study objectives and the guarantee of secrecy.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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