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The relationship between social media dependency and psychological distress due to misunderstanding and fear of COVID-19 in medical students

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Abstract

Improper use of social media during the COVID-19 outbreak, leading to fear and misunderstanding, can contribute to psychological disorders in vulnerable populations. This descriptive and analytical cross-sectional study was conducted in 2023 on 511 medical students of Babol University of Medical Sciences. Data were collected using demographic, psychological distress, fear and misunderstanding questionnaires related to COVID-19 and social media dependency. A total of 511 medical students, with an average age of Mean and S.D; 23.57 ± 3.03 participated in the study. The average psychological distress score was 23.82 ± 7.73 (out of 54), the average score of social media dependency was 17.53 ± 3.09 (out of 30), for the fear of COVID-19 was12.63 ± 2.56 (out of 35), and for the misperception of COVID-19 was 0.53 ± 0.09 (out of 18). Path analysis results) showed that direct path from improper use of social media to psychological distress is significant (P < 0.001, B = 0.19) but this relationship is not significant through fear and misperception related to COVID-19. Improper use of social media, identified as the strongest predictor, can directly increase psychological distress in medical students, without mediation through fear and misperception related to COVID-19. These findings should be taken into consideration when designing and evaluating interventions aimed at promoting mental health and fostering appropriate use of social media among students during disease outbreaks.

Keywords Psychological distress, Social media, Dependency, Fear, COVID-19, Medical students

Introduction

From December 2019 until now, countries worldwide have been grappling with the COVID-19 virus [1]. The global outbreak of this disease was so rapid that it was recognized as the most significant public health threat in 2020 [2]. According to the World Health Organization, over 690 million COVID-19 cases and more than 6.8 million deaths were reported globally by September 2023. More than 7.5 million cases of COVID-19 were reported just in Iran [3]. Initially, many governments devoted special attention and effort to control COVID-19 infections, implementing national policies to minimize the virus's

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spread [4–6]. These measures included controlling borders and travel, mandating citizens to stay at home [7] and prohibiting outdoor activities [8]. While these measures effectively controlled the spread of COVID-19 [9, 10], they also resulted in the emergence of psychological symptoms among the population [11, 12]. University students were susceptible to psychological symptoms during the COVID-19 outbreak [13, 14]. The prolonged stay-at-home mandates compelled people to transition from social activities to home-based activities, engaging in sedentary behaviors such as increased Internet and social media usage instead of normal social behaviors [15].

The use of smartphones has witnessed a significant increase among various age groups during the coronavirus epidemic [16, 17]. Individuals within these groups were exposed to a barrage of misinformation, potentially stemming from increased access to communication technologies and messaging platforms [18]. Moreover, those subjected to home quarantine have exhibited noteworthy psychological challenges [19].

Fear, as the primary adaptive mechanism for organism defense, represents a preparatory response vital for survival. Prolonged and persistent fear can serve as a fundamental element in the development of various mental disorders [20]. Psychological distress has been reported among populations undergoing quarantine [2, 21, 22]. The fear of COVID-19 also stands out as a significant psychological issue [23] capable of exerting adverse effects on individuals' health [4, 24]. Indeed, fear, depression, anxiety and distress are psychological issues associated with the COVID-19 disease [25]. Information sourced from the Internet or social media is not always accurate. Studies on people's knowledge and perceptions of COVID-19 reveal instances where individuals believe in misinformation and false news disseminated through social media [26]. Instances such as death and poisoning resulting from the excessive consumption of alcohol as a purported treatment for COVID-19 exemplify the prevalence of such misconceptions on social media. This particular misconception originated in Iran, where false information circulated suggesting that consuming alcohol could disinfect the body and prevent or cure COVID-19. Such dangerous myths highlight the critical need for accurate public health communication, especially during pandemics [27].

The spread of the coronavirus has led to several consequences, including the generation of social panic and rapid changes in people's lifestyles through social media [28]. Research has identified a significant relationship between the use of virtual social networks and heightened levels of anxiety and insomnia [29]. Furthermore, studies indicate that the adverse changes in community during the COVID-19 outbreak are directly related to an escalation in psychological distress, necessitating prompt preventive and therapeutic interventions [30]. Moreover, the addictive use of smartphones has shown a significant association with the manifestation of symptoms of psychological distress [31]. This disease has imposed an overwhelming mental burden on individuals at various levels [15, 32–34]. Given the elevated prevalence of COVID-19 and its repercussions, along with the imperative to explore the relationship between social media dependency, fear, and misperception within the context of COVID-19, and psychological distress—particularly in vulnerable and pivotal demographic groups such as medical students functioning as community health advocates—the groundwork for this research was provided by Lin et al.'s model. Their model played an effective role in explaining the relationships between these variables. Study revealed that during the COVID-19 outbreak, individuals underwent heightened psychological distress and insomnia due to the improper use and dependency on social media. In response, healthcare providers are advised to devise campaigns aimed at mitigating fear and anxiety related to COVID-19 [30]. Examining the aforementioned relationship, along with the factors influencing psychological distress and social media dependency, holds the potential to inform educational intervention planning. This study was undertaken to assess the correlation between social media dependency and psychological distress through misperception and fear of COVID-19 among medical students of University of Medical Sciences.

Hypothesis: There is a significant relationship between social media dependency and psychological distress among medical students, mediated by the misunderstanding and fear of COVID-19.

Methods

Participants

The participants were selected through an available sampling method. Analytics Calculators, an online software tool, was utilized for path analysis.

In path analysis studies using structural equation modeling (SEM), the sample size is considered to be at least 5–15 people per item [35], But the more realistic minimum required sample size is estimated based on the number of hidden variables and the number of measured variables and to identify the standard effect size of the expected coefficients and based on the confidence level and power of the test. Analytic Calculator software was used in this sample size design. The sample size required to detect the expected effect size is 0.18 [30] With 4 hidden variables and 24 measured variables in the SEM model, 95% confidence level and 90% test power are estimated to be about 479 cases [36] that Including 5%

drop, at least 503 samples are required for this study. The chosen parameters for path analysis encompassed an anticipated effect size of 0.18 [30], Ultimately, the study included 511 general medicine students spanning various academic levels, including basic sciences, clinical preparation, internship, and clerkship, enrolled in both public university and self-governing campuses between the years 2015 and 2021. Exclusion criteria included unwillingness to participate and history of mental disorder.

Procedure

Research design This research is a cross-sectional study, conducted in 2023, employing a descriptive-analytical approach on 511 medical students affiliated with University of Medical Sciences.

Informed Consent The Ethics Committee of Babol University of Medical Sciences approved the study protocol at 03.06.2022. Informed consent was obtained from the participants. Consent to participate was written. This research followed the ethical guidelines of the Declaration of Helsinki. Subsequently, the authors compiled a set of assessment instruments, which are fully described in the Instruments section, then the researchers administered these assessment instruments to the study participants. In order to ensure the confidentiality of the participants' answers and to clarify the objectives of the study, comprehensive explanations were provided to the participants along with the distribution of informed consent forms.

Data Analysis Data description utilized mean (standard deviation), mean difference (standard), median (interquartile range), percentage, and frequency. Pattern path analysis was conducted using AMOS22 software explore the factors influencing psychological distress. Univar ate and multivariate regression analyses were employed to examine the relationship between demographic variables and psychological distress, as well as social media dependency. Pearson's correlation coefficient was utilized to assess the correlation among model variables. Statistical analysis was performed using SPSS22 software at a significance level of $P < 0.05$.

Measures

The data collection tool in this research includes demographic questionnaire and scales of psychological distress, social media dependency, fear and anxiety related to COVID-19. The Brief Symptom Inventory (BSI), created by Derogatis in 1975, stands as a crucial standardized screening tool, facilitating the quantitative evaluation of psychological distress and psychiatric disorders [37, 38]. Comprising 18 items, the BSI offers response options on a four-point Likert scale (0–3). The questionnaire's scoring spans from 0 to 54, with higher scores indicating a more severe level of disorder. Notably, the Persian version of the BSI has demonstrated satisfactory psychometric properties in prior studies [39].

Social media dependency Dependency to social media was assessed using the Bergen Social Media Addiction Scale (BSMAS), initially developed and psychometrically evaluated by Andreassen et al. in 2016 [40], The Persian version of this tool has undergone psychometric evaluation in Iran by Lin et al. in 2017 [41]. This questionnaire is a six-item self-report scale with response options on a five-point Likert scale (1–5), yielding a score range of 6 to 30. A score higher than 19 indicates a higher level of risk of social media addiction. The psychometric properties of the Persian BSMAS version (including construct validity, concurrent validity, stability and internal consistency) have been satisfactory in previous researches [30, 41].

Fear of COVID-19 This variable was assessed using the Fear of COVID-19 Scale (FCV-19S), initially designed and psychometrically evaluated by Pakpour et al. in Iran in 2020 [23]. The tool has undergone validity and reliability testing in various countries [42–44]. Comprising 7 items with response options on a five-point Likert scale (1–5), the questionnaire has a score range of 7 to 35. A higher score indicates a greater fear of COVID-19. The Persian version of the Fear of COVID-19 Scale has demonstrated satisfactory psychometric properties in previous research, encompassing construct validity, concurrent validity, stability, and internal consistency [23].

Misperception about COVID-19 This variable was evaluated using a valid and reliable 18-item questionnaire developed by the researcher, inspired by the work of Lin et al. [30]. The questionnaire, demonstrating high internal consistency with a Cronbach's alpha of 0.9, assesses an individual's understanding of information related to COVID-19. Response options are categorized as correct (1) or incorrect (0). Scores range from 0 to 18, with higher scores indicating a greater misperception of information regarding COVID-19.

Results

A total of 511 medical students from University of Medical Sciences participated in the study, with an average age of 23.57 ± 3.03 years, Among them, 211 (41.29%) were male, and 349 (68.30%) were single. 332 individuals (64.97%), resided in the dormitory. Additionally, 392 (76.71%) were native. In terms of academic progression, 173 students (33.86%) were at the clinical preparatory stage. 366 subjects (71.62%), had a history of COVID-19, and 505 participants (98.83%), reported using social media (Table 1).

The average psychological distress score was 23.82 ± 7.73 (out of 54), social media dependency score was 17.53 ± 3.09 (out of 30), fear of COVID-19, was

Table 1 Demographic characteristics of the participants (number = 511)

Variable	Sub-groups of Variables	Percentage (frequency)
Gender	Male	211 (41.29)
	Female	300 (58.71)
Marital status	Single	349 (68.30)
	Married	162 (31.70)
Father's education	High school	355 (69.47)
	University	156 (30.53)
Mother's education	High school	370 (72.41)
	University	141 (27.59)
Address	Dormitory	332 (64.97)
	Non-dormitory	179 (35.03)
A native of Mazandaran	No	119 (23.29)
	Yes	392 (76.71)
Grade	Basic sciences	119 (23.29)
	Clinical preparation	173 (33.86)
	Internship	127 (24.85)
	Clerkship	92 (18.00)
History of COVID-19	No	145 (28.38)
	Yes	366 (71.62)
History of COVID-19 vaccine injection	No	0 (0.00)
	Yes	511 (100)
Use of social media	No	6 (1.17)
	Yes	505 (98.83)

12.63 ± 2.56 (out of 35) and misperception of COVID-19 was 0.53 ± 0.09 (out of 18) (Table 2).

The path analysis results regarding factors influencing psychological distress revealed that the variable of social media dependency had the most substantial impact on psychological distress, serving as the most robust explanatory factor (P < 0.001, B = 0.19). Notably, a direct and significant relationship was observed between social media dependency and psychological distress. However, this relationship did not reach significance for fear of COVID-19 and misperception of COVID-19. Similarly, the relationships between fear and misperception of COVID-19 with psychological distress were not found to be significant. The model under investigation demonstrated a good fit (RMSEA = 0.000, CFI = 1.000, Chi-square = 0.344, P = 0.577) among medical students at University of Medical Sciences. (Fig. 1).

The findings showed that, in the univariate regression analysis, father's education and place of residence exhibited a statistically significant relationship with the use of social media. However, in the multivariate regression analysis, no significant relationship was observed (Table 3).

The results indicate that marriage, mother's education, place of residence, grade of education, and use of social media exhibit a statistically significant relationship with symptoms of psychological distress in both univariate and multivariate regression analyses. However, father's education demonstrates a statistically significant relationship only in the univariate analysis (Table 4).

Discussion

The results of the present study indicate that the inappropriate use of social media and dependence on it, being the strongest predictor, can directly and, without the mediation of fear and misperception of COVID-19, affect the increase of psychological distress in medical students. Variables such as father's education and place of residence were associated with social media dependency, as well as mother's education, place of residence, level of education and use of social media with psychological distress.

According to our results, the average score of psychological distress in participants was 23.82% ± 7.73. A study conducted in Iran focusing on medical students revealed that 57.97% of students had encountered psychological distress during the COVID-19 outbreak [45]. Notably, medical students engaged in direct contact with COVID-19 patients showed more severe symptoms of psychological distress, with anxiety and stress playing pivotal roles. The heightened risk of infection

Table 2 Description of variables studied among the participants (number = 511)

Variable	Cronbach's alpha	Mean (SD)	Median (interquartile range)	Max, Min
Psychological distress	0.79	7.73 ± 23.82	25 (21–28)	0–42
Symptoms of physical disorder	0.59	3.12 ± 7.87	8 (6–10)	0–15
Symptoms of depressive disorder	0.67	2.95 ± 8.00	8 (6–10)	0–16
Symptoms of anxiety disorder	0.69	3.21 ± 7.94	8 (6–10)	0–17
Misconception of Covid-19	0.63	0.09 ± 0.53	0 (0–1)	0–7
Social media dependency	0.68	3.09 ± 17.53	18 (16–20)	7–26
Fear of covid-19	0.71	2.56 ± 12.63	12 (11–14)	7–27

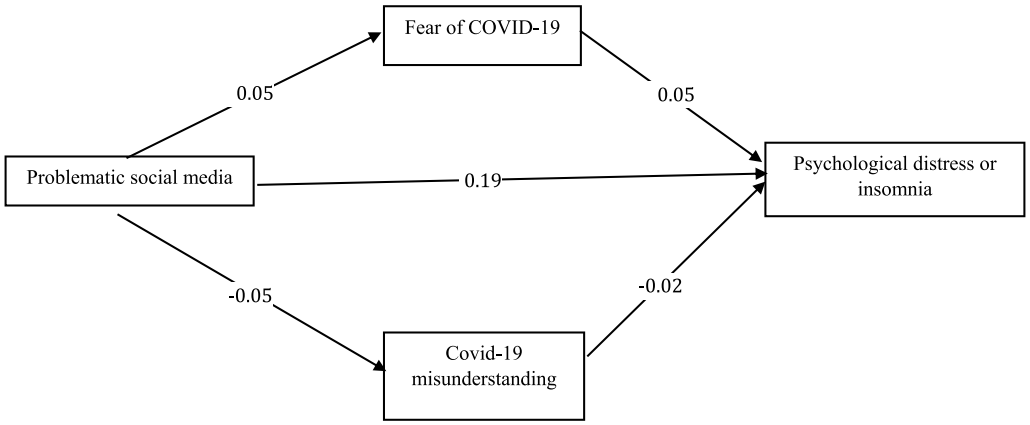

Fig. 1 Path analysis of the pattern of psychological distress in Babol medical students according to standard path coefficients

Table 3 The relationship between social media dependency and demographic characteristics in participants (number = 511)

Variables	Univariate analysis (raw effects)			Multivariate analysis (adjusted effects)		
	B(SE)	95% confidence interval	P-Value	B(SE)	95% confidence interval	P-Value
Age	− 0.01 (0.04)	− 0.10 to 0.07	0.790	− 0.04 (0.05)	− 0.16 to 0.07	0.448
Gender	0.45 (0.27)	− 0.09 to 1.00	0.102	0.53 (0.28)	− 0.02 to 1.10	0.061
Job	0.20 (0.38)	− 0.54 to 0.95	0.585	0.08 (0.38)	− 0.66 to 0.84	0.816
Marital status	0.46 (0.29)	− 0.11 to 1.04	0.115	0.50 (0.31)	− 0.12 to 1.12	0.118
Mother's education	− 0.41 (0.30)	− 1.01 to 0.18	0.175	0.09 (0.37)	− 0.63 to 0.82	0.804
Father's education	− 0.71 (0.29)	− 1.29 to − 0.13	0.016	− 0.59 (0.36)	− 1.30 to 0.12	0.104
Place of residence	− 0.67 (0.28)	− 1.23 to − 0.11	0.019	− 0.48 (0.30)	− 1.07 to 0.10	0.107
Native	− 0.30 (0.32)	− 0.94 to 0.32	0.343	− 0.13 (0.33)	− 0.78 to 0.51	0.679
Grade of study	0.11 (0.27)	− 0.42 to 0.66	0.668	0.07 (0.35)	− 0.62 to 0.76	0.840
A history of COVID-19	0.01 (0.30)	− 0.58 to 0.61	0.959	− 0.03 (0.31)	− 0.64 to 0.57	0.915
Use of social media	− 0.30 (1.27)	− 2.81 to 2.19	0.809	− 0.25 (1.27)	− 2.75 to 2.24	0.842

Table 4 Relationship between psychological distress and demographic characteristics in participants (number = 511)

Variables	Univariate analysis (raw effects)			Multivariate analysis (adjusted effects)		
	B(SE)	95% confidence interval	P-Value	B(SE)	95% confidence interval	P-Value
Age	0.11 (0.11)	− 0.11 to 0.33	0.321	− 0.23 (0.13)	− 0.49 to 0.02	0.072
Gender	0.41 (0.69)	− 0.95 to 1.77	0.554	0.56 (0.64)	− 0.69 to 1.82	0.337
Job	0.33 (0.95)	− 1.53 to 2.20	0.726	0.26 (0.85)	− 1.41 to 1.95	0.756
Marital status	2.75 (0.72)	1.33 to 4.18	< 0.001	1.87 (0.71)	0.47 to 3.28	0.009
Mother's education	− 4.12 (0.74)	− 5.58 to − 2.65	< 0.001	− 2.53 (0.83)	− 4.17 to -0.90	0.002
Father's education	− 3.18 (0.73)	− 4.61 to − 1.74	< 0.001	− 1.11 (0.81)	− 2.70 to 0.48	0.171
Place of residence	− 4.27 (0.69)	− 5.63 to − 2.91	< 0.001	− 3.08 (0.67)	− 4.40 to − 1.76	< 0.001
Native	− 0.08 (0.81)	− 1.67 to 1.51	0.920	0.91 (0.73)	− 0.53 to 2.36	0.218
Grade of study	3.07 (0.67)	1.74 to 4.40	< 0.001	3.00 (0.79)	1.44 to 4.56	< 0.001
A history of COVID-19	− 0.73 (0.75)	− 2.22 to 0.75	0.335	− 0.05 (0.69)	− 1.41 to 1.31	0.943
Use of social media	18.70 (3.06)	12.67 to 24.73	< 0.001	18.51 (2.85)	12.91 to 24.12	< 0.001

during the outbreaks of serious infectious diseases places medical students under significant psychological pressure [46].

As indicated by the results of the current study, the average fear of COVID-19 among medical students was 12.63 ± 2.56. In a study by Quadros et al. the level of fear of COVID-19 among Indian students was reported as 45.2% [47]. Another study by Patelarou conducted in Italy on nursing students demonstrated that after vaccination, the fear of COVID-19 decreased [48]. The variance in findings could be attributed to the timing of the studies, as the earlier ones were conducted at the peak of the COVID-19 pandemic when fear levels were naturally higher. In contrast, the present study was conducted after three rounds of vaccination, and as COVID-19 transitioned from a pandemic to an endemic state, which may have contributed to reduced fear levels among the participants. In the present study, the average score of misperceptions of COVID-19 was 0.53 ± 0.09, indicating a low level among students. However, in a study by Pakpour et al. which focused on investigating the mediating effects of fear of COVID-19 and misperception of COVID-19 on the relationship between the problematic use of social media, psychological distress and insomnia, high level of misperception of COVID-19 was reported [30]. This disparity could be attributed to the heightened knowledge of medical students about COVID-19 and related issues. Regarding social media dependency, the current study found a score was 17.53 ± 3.09 (out of 30) among medical students, with 27% exhibiting inappropriate use of social media. In a systematic study and meta-analysis by Zang et al. on medical students in China, it was reported that 30% of students were addicted to the Internet [49].

The findings of the current study indicate that social media dependency directly predicts psychological distress, and fear and anxiety about COVID-19 do not mediate this relationship. This aligns with Bányai et al.'s study on problematic smartphone use, which found that excessive smartphone use was associated with increased symptoms of psychological distress [50]. Similarly, Lei et al.'s investigation into the relationship between distress symptoms and smartphone addiction in medical students revealed a significant positive correlation between smartphone addiction and students' mental health issues [51]. Chen et al.'s study in Taiwan suggested that one of the early signs of problems related to smartphone addiction is a disorder of psychological distress [52]. Pakpour et al.'s study also supported the significant relationship between psychological distress and improper use of social media, both directly and indirectly through fear and misperception of COVID-19 [30]. The absence of this mediating relationship in the current study may be explained by the lower levels of fear and anxiety about COVID-19 among medical students.

To mitigate psychological distress and inappropriate social media use among medical students, educational institutions should implement social media literacy programs, provide accessible mental health counseling, and launch awareness campaigns about misinformation. Additionally, promoting healthy digital habits and offering stress management workshops can further support students' mental well-being.

The present study revealed that variables such as the father's education and place of residence were correlated with social media dependency Additionally, the mother's education, place of residence, level of education, and use of social media were associated with psychological distress. This is consistent with Bashirian et al.'s study, which explored the link between the level of education and parents' occupation with internet addiction, depression, and anxiety among students in Sanandaj city [53]. The explanation may lie in the encouragement provided by educated parents for their children to engage in healthy activities such as studying and exercising in their free time. Khazaei et al.'s research also highlighted the connection between demographic variables and psychiatric disorders in young individuals [54]. However, Ghahfarokhi et al.'s study yielded different results, indicating that demographic factors such as gender, type of university, place of residence, and field of study were not influential in students' dependence on mobile phones [55].

Limitations of the study and future directions

This research was faced with several limitations, firstly, the data of this research was collected with a limited volume and a more accurate judgment needs to consider students with a larger volume and in a longer time frame and in different disciplines. Also, cross-sectional studies are not able to discover the cause and effect relationship, therefore, it is recommended to conduct longitudinal studies to discover the connections, and this study was conducted in the form of self-reporting, which may cause bias in the answers, of course, by saying it confidentially. Keeping the information to the sample of the subjects, this limitation has been removed to some extent. For future research, it is suggested to explore the following areas: the role of specific social media platforms in psychological distress; the impact of social media use in different educational settings or professional fields; the effects of interventions aimed at reducing social media dependency; and the potential moderating effects of social support, coping strategies, and personality traits on psychological outcomes. These areas of investigation can provide deeper insights into the complex relationship between social media use and mental health.

Conclusions

The study identified inappropriate use of social media as the strongest predictor directly influencing the increase in psychological distress among medical students, independent of the mediation of fear and misperceptions of COVID-19. While acknowledging limitations such as self-report scales, convenience sampling, the cross-sectional design, and the indeterminacy of causal relationships, these findings offer valuable insights. They underscore the need for developing, implementing, and evaluating educational interventions aimed at promoting mental health and fostering responsible social media use among medical students during disease outbreaks. It is recommended that comprehensive educational programs be designed, including workshops, psychological counseling, and guidance on time management and social media usage. These initiatives can better leverage the study's findings to enhance the mental well-being of medical students in crisis situations.

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Author contributions
MA.J, P.V, HA.N and Z.Gh were the principal investigators and designed the study. Z.Gh searched literature. MA.J and P.V supported the interview development. A.M and R.H collected data and prepared data for qualitative analyses. MA.J and A.B supervised data collection. HA.N analyzed data. M.A drafted the manuscript and both MA.J and A.P supported drafting the manuscript. All authors have provided comments and critical revisions to the manuscript. All authors approved the final manuscript prior to submission.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The Ethics Committee of Babol University of Medical Sciences (REF:IR.MUBABOL.HRI.REC.1400.220) at 03.06.2022, approved the study protocol. Informed consent was obtained from the participants. Consent to participate was written. This research followed the ethical guidelines of the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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