Research Article

Awareness of ChatGPT Among Medical Students and Trainee/Residents

Hina Lateef,[1] Rabia Arshad,[2] Eman Ayesha[3], Sumera Hanif,[4] Aroosha Zainab,[5] Omera Naseer,[6]

[1,5] Sheikh Zayed Hospital Rahim Yar Khan; [2] KEMU/ Mayo Hospital, Lahore; [3,4] Lahore Medical & Dental College/ Ghurki Trust Teaching Hospital, Lahore; [6] National Institute of Health, Islamabad, Pakistan

Abstract

Background: Artificial intelligence (AI) has recently become extremely popular and has transformed several fields including research, education, and health care. ChatGPT is a recently launched chatbot.[2] The ChatGPT architecture processes natural language using neural networks and creates responses that are human-like from input texts.

Objectives: This study aims to assess the awareness of ChatGPT among medical students and postgraduate trainees.

Methods: This is descriptive corssectional study. Our study targeted 370 medical students and postgraduate trainees from reputable institutions across Punjab using a convenient sampling technique. The data collection tool was a structured online questionnaire that assessed the participant's familiarity with ChatGPT, perceived usefulness, and intentions to use it in the future.

Results: Most of the respondents (78%) were from the age group 20-30yr. Among the respondents 54.7% (204) were females. Study reveals that males are more active users (27.2% using once weekly) as compared to females (19.2% using once weekly). 41.5% (39) of male MBBS students reported having full knowledge of ChatGPT compared to 30% (18) of female MBBS students. 28.6% (16) of male postgraduate trainees said they have full knowledge of ChatGPT compared to 10.3% (7) of female postgraduate trainees. 31.6% (6) of male BDS students have full knowledge of ChatGPT as compared to 9.1% (7) of female BDS students.

Conclusion: Medical students and trainees have moderate awareness of ChatGPT but positively perceive its utility in clinical decision-making, research, and education.

Corresponding Author | Dr. Rabia Arshad, KEMU/Mayo Hospital, Lahore **Email:** dr.rabiaarshad@gmail.com

Keywords | ChatGPT, Awareness, Medical students, Residents

Introduction

Artificial intelligence (AI) has recently become extremely popular and has transformed several fields including research, education, and health care.[1] ChatGPT is a recently launched chatbot.[2] The ChatGPT architecture processes natural language using neural networks and creates responses that are human-like from input texts. Despite all its potential benefits, ChatGPT presents some novel obstacles and approaches to education.[3] These include irrelevant references, copyright law violations, medical legal difficulties, inability to distinguish between credible and unreliable sources, and accuracy issues4. The platform of open AI that is presently expanding the quickest is ChatGPT, which has over 100 million members and receives 1 billion visits each month.

According to Bisdas et al. (2021), AI has been gaining substantial recognition recently in healthcare departments. Its application in these areas has sparked enthusiasm among students. They showed an optimistic approach towards acquiring knowledge and the integration of artificial intelligence into their training. However, there are certain limitations regarding the availability of AI in developing countries due to economic challenges.[5] Another study reveals the importance of AI in E-learning, highlighting its potential in overcoming the knowledge gap. It can be used in case-based E-learning. Its inclusion in health departments aims to enhance students' and trainees' knowledge and skills ultimately helping to revolutionize medical education6. According to a study conducted in Nepal, the majority of Nepalese students show an optimistic response toward incorporating AI into the medical curriculum. It might help in alleviating capacity constraints. The main dilemma lies in the healthcare institutes to effectively teach and implement AI7. A study conducted by Aboalshamat K et al. highlights the WHO's emphasis on the importance of healthcare professionals staying updated

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on the fundamentals and algorithms of AI. It is crucial to recognize that AI is not a one-size-fits-all solution and a lack of expertise about its proper use can result in incorrect diagnosis and potential harm. Therefore, medical students and trainees must acquire ample knowledge and expertise in utilizing AI to guarantee its appropriate application in healthcare settings.[8] One study conducted in Karachi concludes that participants demonstrate limited comprehension of AI overall but expressed a strong desire to integrate AI into both undergraduate and postgraduate teaching syllabi.[9] ChatGPT outshines other AI models in terms of its fluency in multiple languages, ability to create coherent and meaningful text, advanced understanding of a text, enhanced communication abilities, and potential to assist medical practitioners in analyzing patient data, medical records, and symptoms. It can devise treatment plans and aid in patient diagnosis. Moreover, it can play an important role in mental health counseling, and patient triage and can promote patient engagement while ensuring adherence to treatment plans through timely reminders.[10] Cotton D says et al. that ChatGPT helps you in finding answers to your inquiries but it cannot be considered responsible and answerable.[11] Although ChatGPT can play a pivotal role in improvising health care expertise to patients, health education, and scientific writing, there exist several concerns that need to be considered. These include ethical considerations, transparency, potential hallucinations, risk of providing overly detailed content, referencing issues, irrelevant information, and a potential decline in clinical skills. Urgent action is required to make standard operating procedures and recommendations to ensure the secure utilization of ChatGPT, with a focus on prioritizing its safe and responsible usage.[12]

This study aimed to determine the awareness of medical students and trainees about ChatGPT. This study assisted us in determining whether they have a thorough understanding of artificial intelligence (AI) technology, its implications for medical practice, and its possible advantages and disadvantages. This evidence can direct medical education programs including AI education and encourage responsible and secure utilization of ChatGPT in the healthcare setting.

Methods

A descriptive cross-sectional study was carried out at BMY Health, after approval from the ethics review committee (ERC) protocol number BMY-ERC1-10-2023 on 19 June 2023. The sample size was calculated to be 370 using the Open epi sample size calculator for proportion, keeping the estimated population size as 10000, the prevalence of outcome of interest as unknown, and the confidence limit as 5%. 370 medical students and trainees were chosen for the study after taking formal informed consent for participation in the study. Those who refused to participate and/or had visual or auditory impairment were excluded. Data was collected in 3 months via online Google forms after developing and testing a structured Questionnaire in English having 33 questions regarding demographics and questions related to knowledge of ChatGPT, its implications, and use in health. The collected data after cleaning was analyzed using SPSS software version 25. Descriptive analysis was done and frequencies and percentages of the variables were calculated.

Results

In one month, a calculated sample size of 370 was achieved. The majority of respondents were aged 20 to 30 and accounted for 78.0% (291). 54.7% (204) were female respondents. In terms of qualifications, 41.3% (154) possessed an MBBS degree, 25.7% (96) had a BDS, and 33.0% (123) were postgraduate residents. As for their current training stage, 88.2% (330) were undergoing undergraduate/post-graduate training, 9.1% (34) served as house officers and 2.7% (10) were pursuing second fellowship training. (Figure 1)

Figure. 1: *Demographic Variables*

When asked about knowledge of ChatGPT, 65.6% (61) of male respondents had full knowledge, 42.8% (74) had only a slight idea and 32.6% (29) had only heard the name of it. In contrast, 34.4% (32) of females had full knowledge, 57.2% (99) had a slight idea and 6.4% (60) had heard the name of it. 63.6% (14) of male respondents used ChatGPT daily, 54.1% (46) once weekly, and 58.1% (18) three times a week, while 36.4 % (9) of female respondents used daily and 45.9% (39) used once weekly and 41.9% (13) three times a week. (Figure 2)

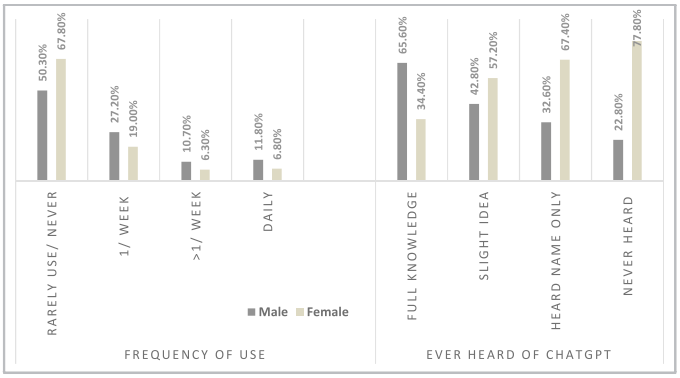

Figure 2: *Gender distribution of self-reported awareness*

level and frequency of use of Chat GPT with a statistically significant difference in genders (p=.04 for awareness, p=.00 for frequency of use).

Our study found that awareness of ChatGPT technology varied concerning different learning resources. The majority of doctors, including 62.5% (167) who learned from colleagues, friends, and family, 66.7% (12) with teachers, and 65.5% (55) informed through social media, were knowledgeable about the concept that ChatGPT is a language model developed by Open AI.

Among doctors who learned through teachers, awareness percentages were slightly lower, with 38.9% (7) recognizing ChatGPT's role in studying and reviewing medical concepts, 22.2% (4) considering it as an accurate and reliable information source, and 50.0% (9) recognizing its value in making presentations. Social media channels also showed significant

Table 1: *Awareness about ChatGPT in different categories of learning sources of doctors (n=369*)*

Awareness variables	Source of learning						Total N (%)
	Colleagues/ friends/ family (N= 267)		Teacher (N=18)		Social media (N=84)		
	n	% of N	n	% of N	n	% of N	
Knowledge about ChatGPT technology							
Knowledgeable for the concept of ChatGPT being a language model developed by Open AI	167	62.5%	12	66.7%	55	65.5%	236(63.1%)
Knowledgeable for the primary purpose of ChatGPT	97	36.7%	4	22.2%	29	34.5%	132(53.3%)
Knowledgeable of how much latest data is provided by Chat GPT	55	20.6%	4	22.2%	16	19.0%	75(20.1%)
Aware regarding uses for medical students							
For studying and reviewing medical concepts	122	45.7%	7	38.9%	45	53.6%	176(47.1%)
For accurate and reliable sources of information	54	20.2%	4	22.2%	14	16.7%	72 (19.3%)
For Quick medical information and clarification	143	53.6%	9	50.0%	46	54.8%	199(53.2%)
For making critical medical decisions and diagnosis	25	9.4%	2	11.1%	6	7.1%	33(8.8%)
For making presentations	102	38.2%	8	44.4%	39	46.4%	153(40.9%)
For research and thesis writing	86	32.2%	4	22.2%	25	29.8%	116(31%)
For email writing	49	18.4%	3	16.7%	17	20.2%	69(18.4%)
Aware regarding uses for physicians							
For Superior medical knowledge and diagnostic accuracy	72	27.0%	5	27.8%	21	25.0%	99(26.5%)
For up-to-date medical research and literature	128	48.0%	5	27.8%	40	47.6%	173(46.3%)
For seeking second opinions and additional information	108	40.4%	7	38.9%	29	34.5%	145(38.8%)
Aware regarding uses for teachers							
For Teaching assistance	150	56.2%	9	50.0%	49	58.3%	210(56.1%)
For making PowerPoint presentations	120	44.9%	7	38.9%	42	50.0%	171(45.7%)
For making MCQs	100	37.5%	5	27.8%	36	42.9%	142(38%)
For making Research proposals	82	30.7%	7	38.9%	32	38.1%	124(33.2%)
Aware regarding uses for patients							
In diagnosing medical conditions	74	27.7%	4	22.2%	23	27.4%	102(27.3%)
Can provide treatment recommendations	113	42.3%	6	33.3%	33	39.3%	152(40.6%)
Interact with patients directly	37	13.9%	2	11.1%	9	10.7%	48(12.8%)
Can recommend medical specialists and facilities on patient needs	104	39.0%	7	38.9%	33	39.3%	146(39%)
Can provide a reminder to ensure the patient's compliance with treatment	90	33.7%	6	33.3%	18	21.4%	115(30.7%)

* 1 case was excluded for the missing value in the source of learning

awareness percentages, with 53.6% (45) aware of ChatGPT's role in studying and reviewing medical concepts, 16.7% (14) recognizing its value as an accurate and reliable information source, and 54.8% (46) finding it beneficial for creating presentations.

Among those who gained knowledge through colleagues, friends, and family, 27.0% (72) were aware of ChatGPT's potential to provide superior medical knowledge and diagnostic accuracy. Additionally, 48.0% (128) recognized its value for staying up-to-date with medical research and literature, while 40.4% (108) saw it as a tool for seeking second opinions and additional information. In the context of doctors who learned through social media channels, awareness percentages varied, with 25.0% (21) aware of ChatGPT's potential for providing superior medical knowledge and diagnostic accuracy, 47.6% (40) recognizing its value for accessing up-to-date medical research and literature, and 34.5% (29) recognizing it as a resource for seeking second opinions and additional information.

Doctors are aware of ChatGPT's potential for teaching assistance, PowerPoint presentations, multiple-choice questions (MCQs), and research proposals. Among those informed through colleagues, friends, and family, 56.2% (150) are aware of its usefulness. Among those who gained knowledge through teachers, 50.0% (9) acknowledge ChatGPT's potential for teaching assistance, 38.9% (7) see its usefulness in PowerPoint presentations, and 27.8% (5) perceive it as a tool for research proposals. Social media channels also show some distinctions in awareness percentages. Among those informed through teachers, 22.2% (4) are aware of ChatGPT's potential in diagnosing medical conditions, 33.3% (6) recognize its treatment recommendations, and 33.3% (6) acknowledge its value in providing reminders to ensure patient compliance with treatment plans. However, for doctors who acquired knowledge through social media channels, awareness percentages vary. (Table 1)

Respondents who frequently use ChatGPT showed notable concerns and perceptions, with 47.1% (16) of daily users expressing worry about it providing incorrect or misleading information. Furthermore, 52.9% (18) of daily users were concerned that it might interfere with critical thinking and independent learning. Interestingly, a substantial percentage of doctors (29.4% (10) who use it daily believed it could replace physicians in the future.

Regarding usability, a majority of doctors found ChatGPT to be user-friendly (67.7% (21) of >1/week users) and requiring minimal technical knowledge (74.2% (23) of >1/week users). Additionally, 55.9% (19) of daily users appreciated its faster responses. However, only 29.4% (10) of daily users believed it had a larger knowledge base, and a small percentage (16.1% (5) thought it was highly successful in understanding natural language interactions between patients and healthcare providers.

In terms of caution in use, doctors who used ChatGPT more frequently were more likely to find it a partner rather than a

Table 2: *Concerns/ perceptions related to ChatGPT among doctors who commonly use Chat GPT (n=150)*

Variable	Frequency of Using ChatGPT ~		
	1/ week (N= 85)	> 1/ week (N= 31)	Daily (N=34)
Limitations			
Providing incorrect or misleading information to use	35 41.7%	11 35.5%	16 47.1%
Lacking the ability to understand and adapt to individual needs	30 35.3%	16 51.6%	10 29.4%
Interfering with critical thinking and independent learning	48 56.5%	15 48.4%	18 52.9%
It can replace Teachers in the future	18 21.2%	8 25.8%	8 23.5%
It can replace Physicians in the future	17 20.2%	8 25.8%	10 29.4%
Usability in comparison with other AI tools			
It requires minimal technical knowledge or programming skills	51 60.7%	23 74.2%	20 58.8%
It is user-friendly	44 52.4%	21 67.7%	16 47.1%
It offers faster responses	45 53.6%	16 51.6%	19 55.9%
It has a larger knowledge base	28 33.3%	13 41.9%	10 29.4%
ChatGPT is compatible with electronic health record (EHR) systems	16 19.0%	6 19.4%	13 38.2%
Chat GPT is highly successful in understanding natural language interactions between patients and healthcare providers.	7 8.3%	5 16.1%	8 23.5%
Caution in use			
The scope of ChatGPT's responsibilities should be limited	22 26.2%	12 38.7%	10 29.4%
One should continuously evaluate ChatGPT's performance*	44 52.4%	10 32.3%	11 32.4%
I find ChatGPT a partner rather than a competitor	60 71.4%	22 71.0%	28 82.4%

~Data written as count, percent (% of N)
* Variables that were found significantly different about the frequency of use.

competitor (82.4% (28) of daily users), indicating a positive perception of its role. Moreover, 52.4% (44) of doctors who used it >1/week believed that one should continuously evaluate its performance, suggesting an awareness of the need for ongoing assessment. (Table 2)

There were significant differences in knowledge, perceptions, and acceptance of ChatGPT among MBBS students, BDS students, and residents, with MBBS students generally exhibiting higher awareness and a more favorable view of its integration into medical education and practice. MBBS students displayed higher awareness (46.2% (109) of ChatGPT's origin compared to BDS students (22.5% (53) and residents (31.4% (74), with a notable p-value of .034. Moreover, 65.3% (49) of MBBS students recognized the latest data available until 2021, in contrast to only 14.7% (11) of BDS students and 20% (15) of residents, with a highly significant p-value of .00. MBBS students (45.7% (91) and BDS students (28.1% (56) expressed more interest in using ChatGPT for quick medical information than residents (26.1% (52), with a significant p-value of .009. Additionally, MBBS students exhibited a greater belief in the ethical justification of ChatGPT's use (48.6% (70) compared to BDS students (18.1% (26) and residents (33.3% (48), supported by a significant p-value of .008.

A larger proportion of MBBS students (46.6% (81) believed that ChatGPT should be part of the curriculum, in contrast to BDS students (20.1% (35) and residents (33.3% (58), with a significant p-value of .040. MBBS students (50% (115) were more inclined to recommend ChatGPT to others, with only 19.6% (45) of BDS students and 30.4% (70) of residents expressing the same intention, supported by a significant p-value of .001. (Table 3)

Discussion

ChatGPT, a potential AI-developed language model, has recently emerged and excels across various fields including medicine and scientific writing necessitating further exploration.[12]

The study was conducted among 370 respondents from various age groups, with 78% of respondents falling between 20 and 30 years of age group. 54.7% of respondents are females. About qualifications, 41.3% held an MBBS degree, 25.7% were BDS graduates, and 33.0% were postgraduate students. Notably, 88.2% of respondents were either undergraduate or postgraduate training. Regarding self-reported awareness and frequency of use of ChatGPT, male respondents displayed higher awareness and usage of ChatGPT, with 65.6% having full knowledge and 63.6% using it daily in contrast to female respondents who showed a lower level of awareness. Overall, 63.1% of respondents recognized it as an Open AI language model. However, only 53.3% were aware of its primary purpose. Among medical students,

Table 3: *Responses with marked differences in qualification*

Sr#		MBBS Students N (%)	BDS students N (%)	Residents N (%)	P value
1	ChatGPT is a language model developed by Open AI	109(46.2%)	53(22.5%)	74(31.4%)	.034
2	Latest data available till 2021	49(65.3%)	11(14.7%)	15(20%)	.00
3	Study and review	71(40.3%)	54(30.7%)	51(20%)	.08
4	Quick medical information	91(45.7%)	56(28.1%)	52(26.1%)	.009
5	Making presentations	73(47.7%)	41926.8%)	39(25.5%)	.025
6	Second opinion	56(38.6%)	50(34.5%)	39(26.9%)	.006
7	Recommend specialist	70(47.9%)	35(24%)	41(28.1%)	.091
8	Teaching assistance	73(34.8%)	70(33.3%)	67(31.9%)	.002
9	PowerPoint presentations	82(48%)	54(31.6%)	35(20.5%)	.001
10	Research purpose	51(41.1%)	40(32.3%)	33(26.6%)	.063
11	Not emotionally intelligent	117(45.2%)	59(22.8%)	83(32%)	.045
12	ChatGPT use is ethically justified	70(48.6%)	26(18.1%)	48(33.3%)	.008
13	Satisfaction with the quality of responses	81(47.6%)	35(20.6%)	54(31.8%)	.014
14	ChatGPT is a partner rather than a competitor	98(47.1%)	43(20.7%)	67(32.2%)	.074
15	Should be part of the curriculum	81(46.6%)	35(20.1%)	58(33.3%)	.040
16	Will recommend it to others	115(50%)	45(19.6%)	70(30.4%)	.001
17	It will revolutionize the medical field through efficient diagnosis and treatment recommendations	77(47.2%)	36(22.1%)	50(30.7%)	.077

47.1% valued it for studying, while 46.3 % of physicians increasingly recognized its utility for accessing up-to-date research. 56.1 % of teachers acknowledged its use as a teaching assistant. 40.6% of respondents were aware of its capacity to provide treatment recommendations. Regarding limitations, daily users 47.1% worry about incorrect information. 52.9% feel it may interfere with critical thinking. Remarkably, 29.4% of daily users believe ChatGPT could replace physicians in the future. Furthermore, 34.8% of MBBS students found value in ChatGPT for teaching assistance, and 50% would recommend it to others. In contrast, BDS students had lower awareness levels and ethical concerns.

Our research shows that most medical students and residents are moderately aware of ChatGPT but lack in-depth knowledge. They view it as a helpful tool for physicians and support its integration into medical training. To ensure responsible and effective use in the medical field, ethical concerns need careful consideration. Exploring variations in awareness and usage can assist in the process of developing targeted strategies to maximize ChatGPT's benefits for all demographics. The majority see its potential in improving healthcare and education.

63.1 % of respondents gained knowledge about ChatGPT being a language model developed by Open AI through colleagues, friends, or family and 53.3 % were knowledgeable about the primary purpose of ChatGPT via similar sources. A separate study conducted by Bisdas revealed that 60.1% of the students primarily relied on web browsing and 59.4% on social media for AI information. 67.9% had a moderate understanding of AI as a broad term. Notably, higher agreement levels were linked to males, pre-clinical students, and those from developed countries.[5] Another study revealed that students became aware of Chat GPT through various means and their responses were primarily associated with social media platforms.[13] A study conducted in Syria revealed that about 70% had a basic understanding of AI, but only 23.7% understood its applications.[14] Comparatively, a separate study among dental institutes in Saudi Arabia revealed that only 22% of participants had a basic knowledge of AI technologies, and 37% were aware of AI applications.[15]

When considering the usefulness of ChatGPT, approximately 27.3% of respondents think that it holds promise in the identification of medical conditions. Around 40.6 % of respondents believe in its role in patient treatment and 39% of respondents see its benefits in suggesting health specialists. In contrast, another study found that 12.5% of respondents hold the view that AI could aid in scrutinizing patient data for diagnosis. Meanwhile, 24.5% of respondents anticipate its potential in crafting individualized treatment plans. Additionally, 28.2% of respondents regard it as a reliable app to refer patients to other healthcare professionals.[6]

In our research, 46.6% of MBBS students, 20.1% of BDS students, and 33.4% of residents showed support for integrating ChatGPT into the curriculum. Moreover, 40.3% of MBBS students, 30.7% of BDS students, and 20% of residents reported usage of ChatGPT for studying and reviewing medical concepts. Additionally, 46.3% of respondents identified value in using ChatGPT to access up-to-date medical research and literature. In a separate study, Banreje found that 58% perceived AI technologies to have a positive influence on education and training, 62% believed AI could potentially reduce clinical responsibilities and 68% believed that it could strengthen research and assessment skills[16]. The majority of participants (77.4%) also believed that AI plays a pivotal role in healthcare, as noted by Al Saad.[17]

In our study, we identified several limitations related to ChatGPT. Specifically, 47.1 % of daily respondents raised concerns about misleading information. 29.4% of daily users expressed dissatisfaction with its responses. Furthermore, 52.9% of daily users think that it interferes with critical thinking while 29.4% of daily users think that it can replace physicians. In a different survey, 18.1% of respondents agreed that AI could lead to a rise in the percentage of diagnostic errors.[18] Regarding ethical issues, 90 % of participants agreed that AI would lead to new ethical dilemmas, while 70 % agreed that AI would also result in new challenges.[7] Another study showed that a significant 76.4% of medical students and 67.7% of doctors either strongly disagreed or disagreed with the notion that AI would replace physicians in the future.[19] In a separate study, 61.86% of respondents expressed concerns about the possibility of reduced human interactions as AI usage continues to grow in the future.[5]

Furthermore, in January 2023, a study revealed an outright prohibition on ChatGPT within New York's public school system, it was found that approximately 22% of students from an Austrian university confirmed involvement in plagiarism.[11]

Our study yields valuable insights into the perspectives of medical students and postgraduate trainees' on ChatGPT. However, limitations include a lack of reference data, potential sampling bias from online questionnaires, non-responder impact, and identity confirmation challenges. Additionally, the use of convenient sampling and a small sample size may limit generalizability. Acknowledging these limitations is essential for guiding future research and implementation strategies within the rapidly evolving technological landscape.

The study highlights the positive impact of ChatGPT in healthcare but emphasizes the need for targeted educational interventions and integration into medical curricula. Addre-

ssing limitations, promoting critical thinking, and addressing privacy concerns could enhance its effectiveness.

Conclusion

The study reveals moderate awareness of ChatGPT among medical students and trainees, but its potential for widespread adoption in medical practice and education is evident. Participants perceive ChatGPT's usefulness in clinical decision-making, research, and education, enhancing peer support and collaboration, and encouraging critical thinking.

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Authors' Contribution

All the authors contributed equally in accordance with ICMJE guidelines.

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