ChatGPT: Transcending Language Limitations in Scientific Research Using Artificial Intelligence

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ABSTRACT

Health and scientific researchers in non-English speaking countries such as Pakistan, are not proficient in English, which limits their ability to communicate their ideas and findings to the international scientific community. ChatGPT is a large language model that can help non-native English speakers to write high-quality scientific papers much faster by assisting them in conveying their ideas in a clear and understandable manner, as well as avoiding common language errors. In fact, ChatGPT has already been used in publication of research papers, literature reviews, and editorials. However, it is imperative to recognise that ChatGPT is still in its early stages, thus, it is important to recognise its limitations. It is suggested that ChatGPT should be employed to complement writing and reviewing tasks but should not be relied on to generate original content or perform essential analysis, as it cannot replace human expertise, contextual knowledge, experience, and intelligence. Researchers should exercise caution and thoroughly scrutinise the generated text for accuracy and plagiarism before incorporating it into their work.

Key Words: Artificial intelligence, ChatGPT, Health research, Scientific research.

In today's globalised world, the exchange of ideas and knowledge is more important than ever, particularly in the field of health and scientific research. However, one of the major challenges that researchers face is the language barrier.[1-3] Many researchers, especially those in non-English speaking countries such as Pakistan, may not be proficient in the language, which can limit their ability to communicate their ideas and findings to the international scientific community.[1-4] Studies have shown detrimental effects of English hegemony in maintaining a disparity in scientific knowledge.[1,2] Researchers have faced challenges in publishing scientific articles in English, which is the language used in over 90% of articles.[1] These challenges included additional financial costs, reading and writing difficulties, and anxiety.[1,2] A study published in 2022 reported 43.5% of doctoral students faced rejection or revision of their articles due to poor English grammar.[1] Moreover, translation and editing services are costly and research has shown that researchers from higher socioeconomic backgrounds tend to have higher proficiency in English.[1] Furthermore, research has shown a significant correlation between research productivity and training in the English language.[3]

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Professionals in Pakistan also believe that training in all four language skills, including reading, speaking, writing, and listening, is necessary to increase research productivity.[3] A study published in 2022 revealed that native and non-native English speakers from Pakistan use English differently to express themselves.[4] Native English speakers are more likely to express their opinions in a clear and persuasive way, probably because of their language and cultural background.[4]

ChatGPT is a large language model developed by OpenAI. One of the most significant benefits of using ChatGPT for scientific research is that it can help non-native English speakers to write high-quality scientific papers much faster. By understanding and responding to natural language, ChatGPT can assist researchers in finding the right words to convey their ideas and ensure that the paper is written in a clear and understandable manner. Additionally, ChatGPT can assist researchers in avoiding common language errors that may occur when writing in a foreign language, which can be especially important in scientific papers where accuracy is crucial. Another major benefit of using ChatGPT for scientific research is that it increases efficiency. By automating the writing process, ChatGPT can help researchers focus on more important tasks, such as data analysis and experimentation. Additionally, ChatGPT can help researchers avoid the tedious and time-consuming task of proofreading and editing, which can often take up a significant portion of the writing process. With ChatGPT, researchers can be sure that their papers are free of grammatical and linguistic errors and are written in a professional manner, which can help speed up the publication process. ChatGPT has already been

used in published research papers, literature reviews, and editorials.[5-7] This research paper itself exemplified how ChatGPT can be used to enhance the language and grammar of a research article, thereby ensuring a polished and error-free final product.

Based on the analysis of ChatGPT's applications, capabilities, and limitations, Alshater concluded that ChatGPT holds the potential to significantly enhance academic research across a broad range of fields.[8] According to a recent article published in Nature, ChatGPT is capable of generating text that sounds both realistic and intelligent in response to user prompts.[9] Susnjak conducted a study to evaluate the ability of ChatGPT, to execute complex cognitive tasks and found ChatGPT to be capable of generating text that is indistinguishable from that produced by humans.[10] Gao *et al.*, showed that ChatGPT generate clear and believable scientific abstracts,[11] implying that it can be challenging to differentiate between abstracts created by Artificial Intelligence (AI) and ones that are written by humans.[9]

While ChatGPT holds immense potential for scientific research, it is imperative to recognise that the technology is still in its nascent phase and hence, presents certain limitations. For instance, ChatGPT is not capable of carrying out independent research or experimentation. Additionally, it lacks the ability to comprehend the context of scientific papers, thereby resulting in generation of irrelevant or inaccurate information. Hence, researchers must exercise caution while utilising this technology and verify its output before incorporating it in their work. Furthermore, ChatGPT lacks specialised knowledge, creativity, and analytical skills, which are critical in producing high-quality research outcomes. ChatGPT is also unable to provide information based on data and events after 2021. The model may also misinterpret the context in which the text is being generated, reflecting biases present in its training data, thus leading to inaccuracies or inappropriate suggestions. When posed with questions, ChatGPT may sometimes provide incorrect answers and it is the user's responsibility to verify their accuracy. In this regard, it is imperative to thoroughly scrutinise the generated text for plagiarism and ensure proper citation. It is worth mentioning that ChatGPT is unable to provide references or citations for the information it provides. Moreover, ChatGPT may also generate false and incorrect citations for research publications, which may not even exist in real. It is suggested that ChatGPT should be employed to complement writing and reviewing tasks but should not be relied on to generate original content or perform essential analysis, as it cannot replace human expertise, contextual knowledge, experience, and intelligence.

Although there are potential advantages, experts are currently assessing the long-term consequences and impact of implementing these models in the field. There are concerns about the potential misuse of ChatGPT and the need for policies to regulate its access and usage.[12,13] A proposed policy regarding the use of AI-generated text in scientific manuscripts has been put forward by David Resnik and colleagues. The policy focused on the values of transparency, honesty, and full disclosure.[13]

New policies have been established by various journals and publishers, such as Elsevier and Nature, concerning co-authorship with AI programs or the inclusion of AI-generated text in scientific manuscripts.[14,15] These policies aimed to address the concerns surrounding the accuracy and accountability of such content.[14,15] AI programs, including ChatGPT, are predictive but not always reliable, thus necessitating close supervision to maintain the integrity of the content.[13] Cureus, a medical journal by Springer Nature, hosted a contest to evaluate the capabilities of AI in academic publishing by inviting participants to submit case reports using ChatGPT.[16] Moreover, Elsevier explicitly stated that it is not appropriate to include AI or AI-assisted technologies as authors or co-authors, or cite them as such.[14] This is because authorship entails duties and responsibilities that are specific to humans, as specified by Elsevier's AI policy for authors.[14] Generative AI tools should only be used to improve readability and language, and authors who utilise generative AI and AI-assisted technologies while writing their manuscript are required to disclose this information in their work at the end of the manuscript before the list of references.[14] Similarly, generative AI tools such as ChatGPT do not fulfil the authorship criteria according to the guidelines published by Nature.[15] Lastly, and most importantly, a position statement was published by Committee on Publication Ethics (COPE) on 13th February 2023, stating that AI tools do not fulfil the requirements for authorship, as they are unable to take responsibility for the work that is submitted to the journal.[17] Moreover, authors must be transparent when using AI tools in the creation of manuscripts and should be mentioned in the materials and methods section.[17] Authors are solely responsible for any ethical violations that may occur, even if the content is generated by AI.[17]

In conclusion, ChatGPT is a powerful tool that is transcending language limitations in scientific research. By helping non-native English speakers to write high-quality scientific papers, increasing efficiency, and enhancing the quality of scientific papers, ChatGPT is enabling researchers to communicate their ideas more effectively and participate more fully in the global scientific community. This is particularly important for researchers in non-English speaking countries, such as Pakistan, where the language barrier can be a major obstacle to communicate ideas and findings to the international scientific community. However, it is important to recognise its limitations, and should be only used as a starting point as it cannot replace human expertise and contextual knowledge. Researchers should exercise caution and thoroughly scrutinise the generated text for accuracy and plagiarism before incorporating it into their work.

DISCLOSURE:
During the preparation of this manuscript, the authors used ChatGPT and Grammarly in order to improve readability and language. After using the tool/service, the authors reviewed and edited the content as needed.

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The authors declared no competing interest.

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