AI/Automation

SECTION EDITORS

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Medical writing and AI: Stronger together

AI is transforming medical writing by complementing human abilities in powerful ways: detecting subtle signals in massive datasets, parsing complex tables quickly, and managing the scale of today's large, adaptive trials like platform and umbrella studies. These tools bring speed, precision, and consistency – helping ensure that signals aren't missed and data isn't lost in complexity. Applications such as ChatGPT for drafting standard sections, NLP tools for systematic literature reviews, and Clinical Language Processing platforms for extracting insights from medical records are already delivering measurable efficiency gains in document development.

Still, AI can't replace the human mind. Medical writers and communicators contribute critical thinking, narrative strategy, and audience-specific nuance that machines cannot replicate. Whether developing clinical documents, scientific publications, or lay summaries, human expertise remains essential for clear, meaningful, and responsible communication. Just as importantly, humans provide the ethical judgment and scientific rigour required to ensure that medical information maintains its integrity and accuracy, regardless of the technologies used to produce it.

The future isn't about choosing between human or machine – it's about collaboration. When medical writers and AI tools work hand in hand, the results are faster, more accurate, and more impactful. This partnership requires thoughtful implementation: writers who work fluently with AI can effectively guide, verify, and refine outputs, particularly when communicating complex medical concepts where precision and context are critical. This collaborative approach is shaping the future of medical writing as a whole, enhancing its quality and reach across all forms of communication.

The medical communications landscape is rapidly evolving, with the most innovative organisations finding balanced approaches that leverage both technological efficiency and human expertise. By embracing this synergy, the field can overcome traditional constraints of time and resources while maintaining its integrity, strategic thinking, and scientific clarity that makes medical writing such a vital contributor to healthcare advancement.

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ChatGPT use among medical writers: A knowledge, attitude, and practices survey

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Abstract

There are numerous publications on ChatGPT but the trends of its usage in the medical writing field are unknown. We conducted an online survey to understand the knowledge, attitude, and practices of professionals in medical writing regarding ChatGPT usage. A total of 106 respondents from 21 countries participated in the survey. Most respondents were females (65.1%), aged 25-44 years (71.6%), Indians (61.3%), doctoral degree holders (45.3%), from the medical communications sector (55.7%), and with 1-5 years of experience (47.2%). Regarding knowledge about ChatGPT, most respondents (44.3%) had intermediate knowledge. The respondents with a high understanding showed certain significant correlations with the attitude and practice patterns such as agreeing on the ability of ChatGPT and other AI tools in saving time while writing ($p<0.001$) but also acknowledging its potential risks ($p=0.001$) and the need for guidelines for using ChatGPT ($p<0.001$). Thus, the working knowledge of ChatGPT influences the adoption of ChatGPT among medical writers and determines the perspectives on practices for the use of AI tools in medical writing.

Introduction

Medical writers have used artificial intelligence (AI)-based applications like grammar-check tools, reference managers, and data analysis software for over a decade.[1,2] But the use of AI in other areas such as literature search, data organisation and presentation, and writing had been relatively unexplored until the last couple of years. The introduction of advanced large language models (LLMs) in healthcare and medical research has paved the way for the unexplored potential of AI in medical writing.[3]

The current generation of LLMs is based on a natural language processing (NLP) model and trained on a large dataset of conversational text to create responses to user input in a conversational context.[4] Several NLP-based LLM tools such as Gemini from Google™ and CoPilot from Microsoft® are now integrated into the programs actively used in day-to-day work.[5,6] But ChatGPT, developed by OpenAI, was the first of its kind and one of the most sophisticated AI tools on the GPT (generative pre-training transformer) architecture. It stands apart from its predecessors as the first LLM that was open to the general public and thus made AI accessible to a larger community.[4,7] It was the most familiar AI tool for medical writers with several studies being actively published to study its uses at the time of

the conception of this study. Hence, we chose ChatGPT to capture the trend of AI use in medical writing.[8-10]

ChatGPT makes a strong case for medical writers to save time and increase their writing efficiency.[11] In medical writing, it can be used as an intermediary for ideation, as a search engine, for text generation and summarisation, language translation, writing abstracts, and much more.[3,11] However, ethical and legal concerns must be carefully considered, such as the potential for inaccuracies, bias, misinformation, hallucinations, and plagiarism in the generated content.[3] As a result, there is still considerable debate on using ChatGPT for writing parts or a complete scientific manuscript.[12,13]

The field of regulatory writing is also evolving with advances in AI. The number of regulatory submissions involving AI or machine learning increased almost 10-fold between 2020 and 2021.[14] LLMs like ChatGPT and several new software such as DistillerSR and fern.ai™ can help streamline processes for writers such as technical documentation, clinical evaluation, and surveys for post-marketing surveillance among others. AI is also transforming the way clinical trials are conducted. Generation of a clinical study report (CSR) with a substantial number of narratives can make the process significantly long, tedious, and complex for the medical writers.[15] Specialised AI tools such as TriloDocs™ are now being developed and harnessed to automate clinical data management and CSRs through generative AI and machine learning.[16] However, such tools need rigorous assessment and validation in line with the nature of the regulatory field and compliance with international guidelines.[17-19]

Overall, the medical writing community seems divided on the practical use of ChatGPT. While some medical writers recognise its potential to enhance their work by offering a strong foundational framework, others are hesitant to embrace it due to concerns about inaccurate information and potential errors it may produce.[20]

This knowledge, attitude, and practice (KAP) survey aims to understand the opinions and usage patterns of ChatGPT and other AI tools among medical writers. We conducted an online survey and examined how demographics and knowledge may influence attitude and practice patterns. The study also discusses the potential implications for the future of AI tools in medical writing based on the results of the survey.

> ChatGPT has the potential to be a versatile tool for medical writers. However, the current perception of such tools and their usage within the medical writing community remain unclear.

Methods

Study design

This is an observational, questionnaire-based study. Participation in the survey was voluntary. An online survey collected responses from professionals in medical writing worldwide. The selection criteria were not restricted to any one specific kind of medical writing. Google Forms (Google LLC, Mountain View, CA, USA), used as the survey tool, automatically verified that the survey was fully completed prior to submission and could not be submitted twice. Participant responses were anonymous and confidentiality was maintained throughout the study.

Questionnaire development

The first draft of the questionnaire was developed with the help of ChatGPT (*ChatGPT.* GPT-3.5 OpenAI; 2023).[21] The resulting questionnaire (see Appendix I) was then modified and re-developed based on the inputs and review of this study's authors who are practicing medical writers specialising in medical communications and manuscript writing.

The questionnaire consisted of 4 sections and 35 questions: 1. Demographic information (11 questions) followed by 2. Knowledge, 3. Attitude, and 4. Practice (8 questions each) on the use of ChatGPT in medical communications.

The questionnaire was piloted among 14 expert medical writers to assess the clarity of the survey. Based on the feedback of the participants in the pilot survey, the questionnaire was finalised.

Study participants and survey dissemination

The source population for the survey consisted of medical writers worldwide. The survey was distributed on the social networking platform LinkedIn™ and by personal communication through an online link directing to the questionnaire on Google Forms. The survey was launched on June 14, 2023, and remained open till September 24, 2023 (Figure 1).

Statistical analysis

The completed questionnaires were automatically coded on Microsoft® Excel 2016 through Google Forms and manually verified. Data analysis was performed using SPSS version 28. Descriptive statistics such as frequencies and percentages for each survey item were calculated. Pearson's Chi-square analysis (Monte-Carlo simulation) was used to investigate associations between the categorical variables: demographics and knowledge, knowledge and attitude, and knowledge and practice of ChatGPT among the respondents.[22,23] Only the significant correlations are presented.

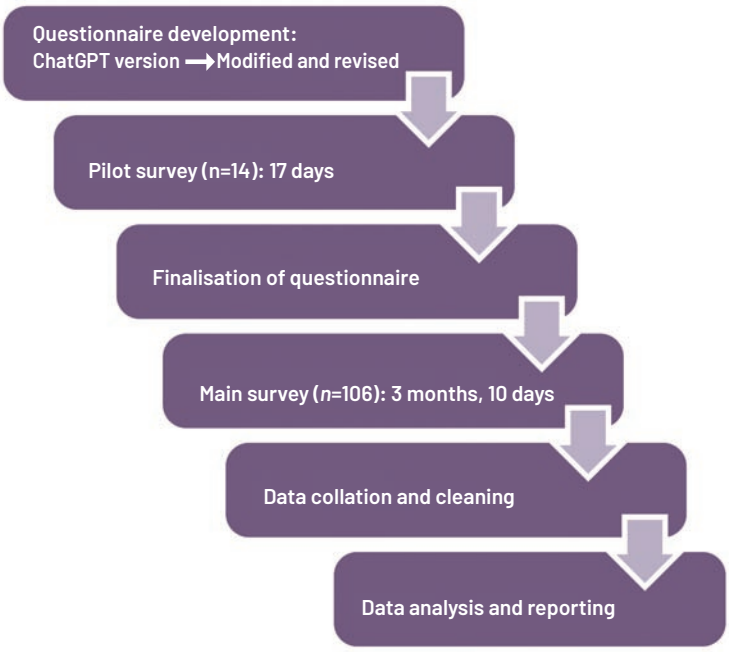

Figure 1. Study flow chart

Table 1. Descriptive statistics of survey respondents N = 106

Gender						
Female	Male	Not to say				
69 (65.1)	36 (34.0)	1 (0.9)				
Age						
<25	25-34	35-44	45-54	55-64	>65	
8 (7.5)	38 (35.8)	38 (35.8)	18 (17.0)	2 (1.9)	2 (1.9)	
Level of education						
Bachelors	Post graduate	Doctoral				
18 (17.0)	40 (37.7)	48 (45.3)				
Sector of work						
Pharma-ceutical industry	Medical communi-cations	Academic institution	Healthcare organisation	Other		
9 (8.5)	59 (55.7)	11 (10.4)	21 (19.8)	6 (5.7)		

Years of experience in medical writing					
<1 year	1-5 years	6-10 years	11-15 years	>15 years	
16 (15.1)	50 (47.2)	20 (18.9)	10 (9.4)	10 (9.4)	
Professional certification in medical writing or editing					
No	Yes				
87 (82.1)	19 (17.9)				
Membership of a professional organisation of medical writing					
No	Yes				
76 (71.7)	30 (28.3)				
Formal training in medical writing					
No	Yes				
70 (66.0)	36 (34.0)				
Experience in using AI-powered tools for medical communications					
No	Yes				
58 (54.7)	48 (45.3)				

Results

Demographic characteristics

A total of 106 respondents from 21 countries took the survey and were included in the final analyses (Table 1).

The majority of the respondents were female (65.1%), aged 25-44 years (71.6%), and had an advanced academic degree (doctoral degree, 45.3%). The majority had limited experience in medical writing, with 47.2% reporting 1-5 years of work experience. Even though the majority of the respondent population was from India (61.3%), respondents from countries worldwide including Europe, Australia, Canada, USA, and other Asian countries also participated in the survey (Figure 2).

Their specialisation in writing ranged from medical education writing (48%), regulatory writing (14%), health economics and outcomes research (~6%) to medico-marketing (35%), science journalism (17%), and blog writing (~2%). Most respondents lacked a professional certification in medical writing or editing (82.1%) and were not members of any professional organisation for medical communications (71.7%). Almost half of the respondents affirmed using AI-powered tools for medical communications (45.3%).

Figure 2. Distribution of the survey respondents. The colour scale represents the number of participants.

Knowledge about ChatGPT

This section's questions were intended to assess the respondents' general understanding of ChatGPT, without focusing on its usage. Overall, 82.1% of the respondents indicated that they have a general understanding of how ChatGPT functions. The knowledge related to the working of ChatGPT was assessed by seven single-choice questions for ease of scoring. Figure 3 shows the percentage of respondents who provided the correct answer response to each question.

The responses were given a score of one for each correct answer. Based on their total scores, the respondents were divided as having "low" (score 0-2), "average" (score 3-4), or "high" knowledge (score≥ 5). Most of the participants (44.3%) had average knowledge of ChatGPT (Figure 4).

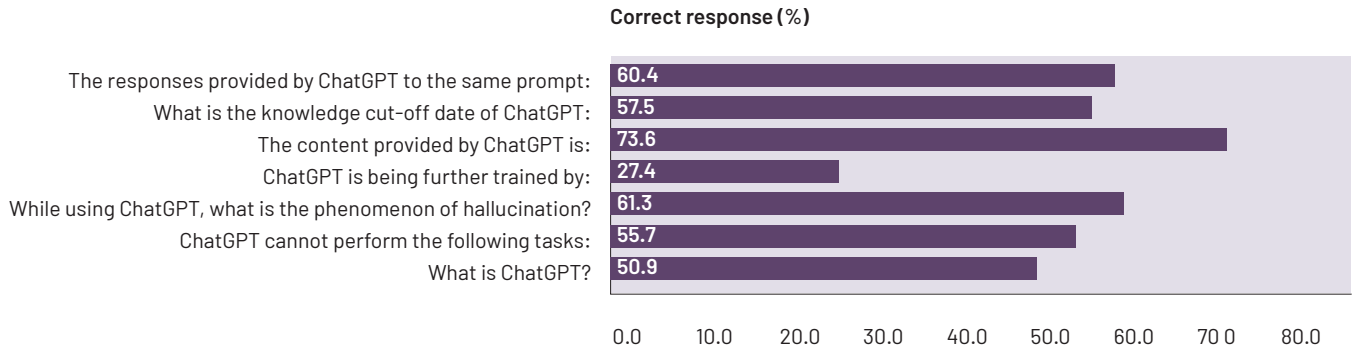

Figure 3. Percentage of respondents correctly answering the questions in the knowledge section of the survey

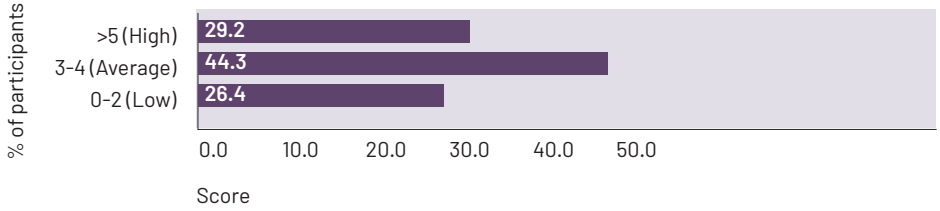

Figure 4. ChatGPT knowledge among survey participants based on an arbitrary scoring

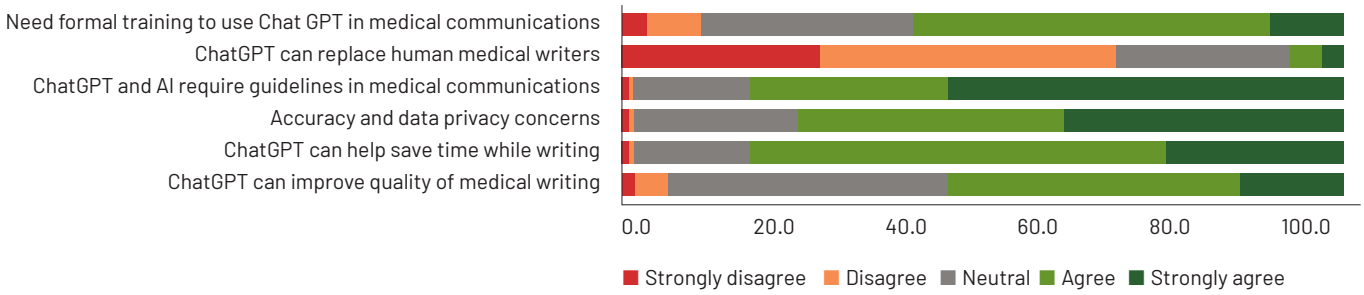

Figure 5. Attitude of respondents towards ChatGPT

Abbreviations: AI, artificial intelligence

Attitude towards ChatGPT

Figure 5 gives the respondents' responses to the questions on their attitude towards ChatGPT. Most of the respondents (40.6%) agreed that ChatGPT can improve the quality of medical writing and 57.5% believed it can save time. However, 38.7% strongly agreed with concerns about the accuracy and privacy of the data generated. A strong agreement (54.7%) was observed on the need for guidelines to regulate the use of ChatGPT and other AI technologies, as well as the necessity for formal training to use it effectively (49.1%). The majority of respondents (40.6%) disagreed with the idea that ChatGPT could replace human writers. Responses varied widely on the suitability of ChatGPT for creating specific types of communication aids, such as slide decks, patient brochures, manuscripts, or books. This variation indicates that medical writers use ChatGPT differently depending on the type of writing. However, most respondents identified plain language summaries and blogs as the most suitable for ChatGPT use (Figure 6A). Likewise, most respondents believe that ChatGPT can be particularly useful for drafting the Abstract or Introduction of a manuscript (Figure 6B).

Practice patterns of ChatGPT

Table 2 gives the respondents' responses to the questions on usage of ChatGPT. The frequency of usage of ChatGPT among the respondents varied but most of them used it sometimes (39.6%). The respondents largely used ChatGPT for writing summaries (24.4%) followed by routine tasks like composing emails or drafting letters (19.5%), organising scattered points into a coherent paragraph (18.3%), and understanding complex topics (15.9%) (Figure 7). They did not seem to find it particularly easy or difficult to use and 33.0% responded neutral to the question on ease of usage. Most respondents find the quality of content generated by ChatGPT fair (42.5%) or good (32.1%). Despite only using it sometimes, almost half of the respondents (48.1%) responded that they may recommend the use of ChatGPT to other medical writers. Almost one-fourth of the respondents thought that ChatGPT had improved their writing efficiency (28.3%). Among the challenges faced by the respondents, the requirement of multiple attempts (prompts) to get the desired response and inaccuracy of the content were the most encountered (Figure 8).

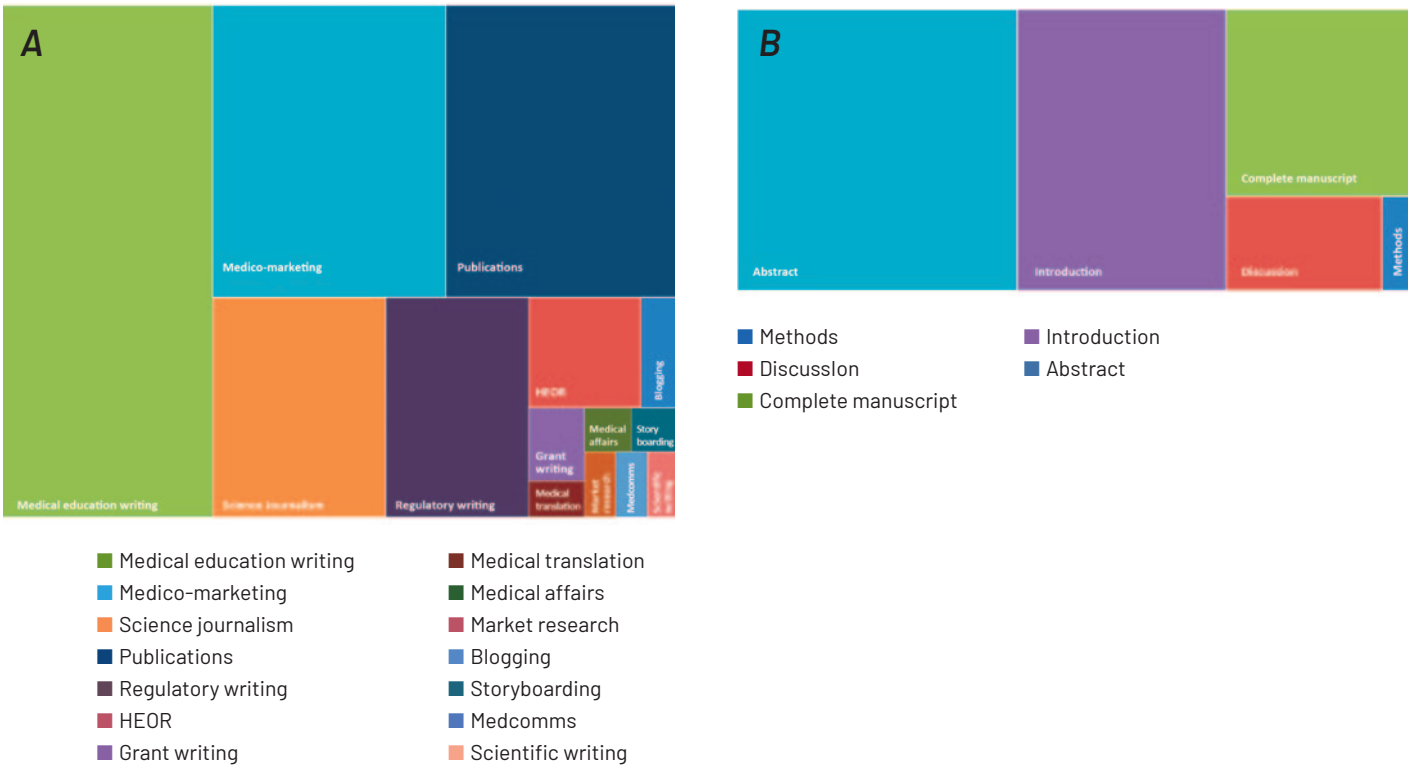

Figure 6. In the opinion of the respondents, ChatGPT is suitable for writing: A. Different types of content, B. Different parts of a manuscript

Abbreviations: HEOR, Health Economics and Outcomes Research

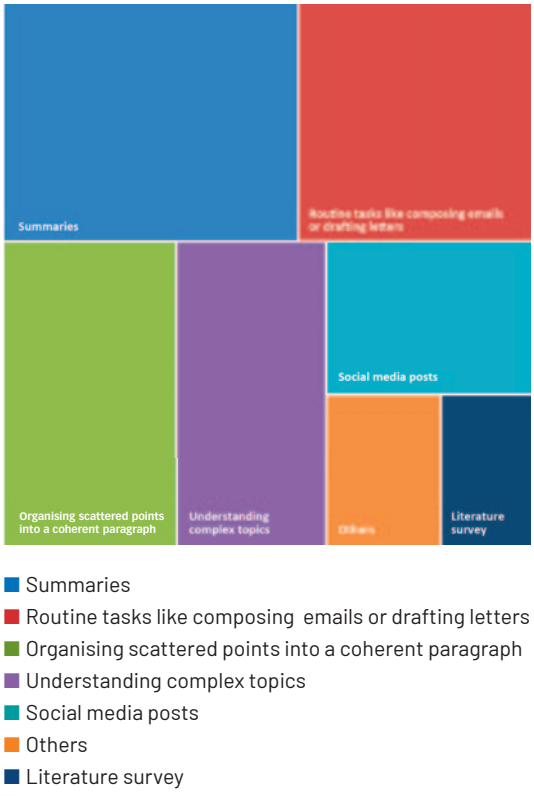

Figure 7. Respondent data on ChatGPT use for different types of content

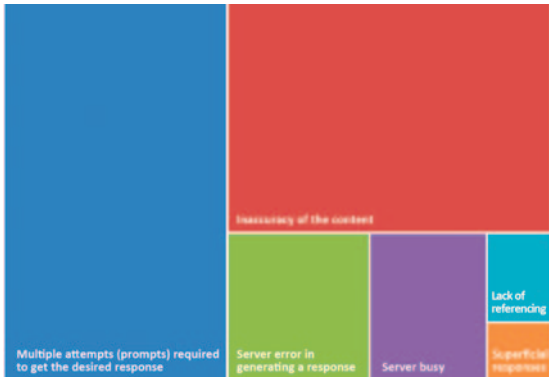

Figure 8. Challenges faced by respondents while using ChatGPT

Table 2. ChatGPT practice patterns of respondents

How often do you use ChatGPT?					
Never	Rarely	Sometimes	Always		
21 (19.8)	27 (25.5)	42 (39.6)	16 (15.1)		
In your experience, ChatGPT is easy to use for medical writing:					
Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
3 (2.8)	16 (15.1)	35 (33.0)	26 (24.5)	12 (11.3)	14 (13.2)
How do you rate the quality of the content generated by ChatGPT?					
Poor	Fair	Good	Excellent	Not applicable	
6 (5.7)	45 (42.5)	34 (32.1)	4 (3.8)	17 (16.0)	
Would you recommend using ChatGPT to other medical writers?					
No	Yes	May be			
15 (14.2)	40 (37.7)	51 (48.1)			
Does your organisation/institution allow you to use ChatGPT?					
No	Yes	There are no guidelines	Do not know		
15 (14.2)	33 (31.1)	36 (34.0)	22 (20.8)		
Do you think ChatGPT has improved your writing efficiency?					
No	Yes	May be	Not applicable		
14 (13.2)	30 (28.3)	39 (36.8)	23 (21.7)		

Correlation analyses

The respondents from the medical communications sector are associated with high knowledge levels of ChatGPT whereas those from the healthcare sector tend to have lower knowledge levels compared to other sectors (p=0.001) (Table 3).

Most of the survey respondents, especially those with high or average knowledge tend to agree or strongly agree on the utility of ChatGPT in saving time while writing (p<0.001). There was also a clear variation in responses that co-related with different knowledge levels on accuracy and data privacy concerns with ChatGPT. The respondents with high knowledge tend to agree strongly with the concerns while those with low knowledge are predominantly neutral (p=0.001). Similarly, respondents with high knowledge appear to align more strongly with the need for guidelines for using ChatGPT and other AI tools (p<0.001).

The respondents with limited understanding of the technology behind ChatGPT tend to use it less frequently, whereas those with a deeper understanding of its underlying technology are more likely to use it (p<0.001). The knowledge levels also directly determine the tendency of respondents to recommend the use of ChatGPT to others. Respondents with limited knowledge of ChatGPT are more likely to answer "Maybe" or "No", indicating uncertainty, while those with a greater knowledge are more likely to answer "Yes", demonstrating a willingness to recommend ChatGPT to others (p=0.016). This indicates that the knowledge of ChatGPT plays a pivotal role in the adoption and utilisation of ChatGPT among medical writers.

Discussion

The results of this survey present the knowledge, attitude, and practices of medical writers regarding ChatGPT. The responses reflected a varied trend of ChatGPT usage among medical writers. The ChatGPT knowledge levels showed certain significant correlations with the attitude and practice of ChatGPT, indicating that the knowledge about this tool influences the attitudes and practices of medical writers.

Medical writers, including scientific and regulatory writers, use different tools and resources to be updated on the constantly growing medical literature as well as content formulation and presentation.[17,24] There have been several reports for and against the utility of AI tools like ChatGPT in medical writing. However, it is important to understand the actual perspectives and practices of medical writers to understand the current pulse of the field.[20] Even though there are several studies demonstrating the application of ChatGPT and other AI tools in different aspects of medical writing, there is no information on the actual implementation by medical writers.[25,26] This is the first study, to our knowledge, that has assessed the knowledge, practice, and attitude of practicing medical writers towards ChatGPT globally via an online survey.

The first version of the survey questionnaire was generated by ChatGPT based on a specific prompt provided by the authors. It gave a basic framework of the questionnaire that had to be modified extensively to align it as per the requirement of the survey. This is in line with several recent studies that recommend using ChatGPT for simple tasks and emphasise the responsibility of writers in authorship and accountability of the content generated by AI.[27–29] In this survey, 15.1% of respondents used ChatGPT for routine tasks like composing emails or drafting letters.

The survey respondents were from all over the world, mainly from India. The majority (47.2%) of the respondents were new writers with an experience of ≤5 years. The respondents had diverse specialisation under the umbrella of medical writing but less than half of them reported having any experience of using AI tools for their writing. This suggests that the use of AI tools in medical writing is yet to become a norm among the writers as there may still be an inhibition or dilemma due to the apparent limitations of these tools.[30]

Most of the medical writers who participated in the survey have an intermediate knowledge of ChatGPT. The ones with high knowledge predominantly belong to the medical communications sector, whereas those with low knowledge are associated with the healthcare sector. The medical communications field is an ever-evolving field demanding medical writers to stay updated with recent advances.[20,31] This may explain the high knowledge of the respondents from the medical communications field. The usage of AI tools for writing in healthcare sectors may be preferentially less due to challenges related to legal ethics, patient privacy, and the accuracy and reliability of information.[32] The writers may prefer to be self-reliant to avoid errors and maintain the integrity and trust of the healthcare profession. However, some tasks do not jeopardise data privacy and ethics, and most of the survey respondents largely use ChatGPT for understanding complex topics, organising scattered points into a coherent paragraph, and

Table 3. Correlation between knowledge, demographics, attitude, and practice responses

Demographics	AI knowledge levels Low	Average	High	p value[a]
In which sector do you work?				
Academic institution	4	2	5	0.001
Healthcare organisation	11	5	5	
Medical communications	5	20	34	
Pharmaceutical Industry	5	3	1	
Others	3	1	2	
Attitude				
Do you think that ChatGPT can help save time while writing?				
Strongly disagree	1	0	0	<0.001
Disagree	0	1	0	
Neutral	10	5	2	
Agree	14	12	35	
Strongly agree	3	13	10	
Are you concerned about accuracy and data privacy while using ChatGPT in medical writing?				
Strongly disagree	0	1	0	0.001
Disagree	0	1	0	
Neutral	13	8	3	
Agree	9	10	20	
Strongly agree	6	11	24	
Do you think ChatGPT and other AI technologies require guidelines for use in medical communications?				
Strongly disagree	0	1	0	<0.001
Disagree	0	0	1	
Neutral	13	2	2	
Agree	8	9	12	
Strongly agree	7	19	32	
Practice				
How often do you use ChatGPT?				
Never	15	4	1	<0.001
Rarely	4	10	14	
Sometimes	8	12	22	
Always	1	5	10	
Would you recommend using ChatGPT to other medical writers?				
No	6	4	5	0.016
Maybe	19	12	20	
Yes	3	15	22	

[a]Values with statistical correlation. Fisher's Chi square test (Monte Carlo simulations)

drafting letters, emails, and social media posts.

One of the most recognised utilities of ChatGPT is its potential to save time in writing by helping with the more mundane tasks like data screening, organisation, simplification, and summarisation.[20] This was also reflected across the respondent population, especially in the respondents with high knowledge of ChatGPT. Knowledge of ChatGPT seems to play a significant role in the adoption of ChatGPT in practice as writers with higher knowledge use it more frequently in practice and also show a greater propensity of recommending ChatGPT to other medical writers.

A significant amount of AI-generated text is finding its way into scientific papers.[33] This is a concerning trend since the unethical use of AI may result in inaccuracy of the reported data, plagiarism, and even citations from non-existent references. Several leading scientific journals have highlighted the risks of using ChatGPT without caution which may lead to serious breaches in data integrity and article retractions.[34] Such scientific misconduct is often a by-product of a lack of attention both from the writers and the reviewers.[33] As per a study by Gao et al., reviewers missed up to 32% of abstracts generated wholly by ChatGPT, despite a thorough screening process.[35] A study by Alser et al. found plagiarism ranging from 5% to 49% in published and pre-print articles authored by ChatGPT with some phrases copied verbatim from sources like LinkedIn and Wikipedia.[36] This number is not too different from the plagiarism or self-plagiarism found in human-authored articles (similarity reports ranging from 0% to 60%) and has led to the implementation of strict plagiarism-related policies by several journals.[37] Similarly, AI-generated content also warrants careful and critical evaluation with meticulous human supervision throughout the process.[37-39] Many journals have now started formulating guidelines and editorial policies on either complete barring of AI-generated text or figures or giving full disclosure of its use in the relevant sections.[13]

> In our survey, medical writers with high knowledge of Chat GPT acknowledged concerns regarding the data accuracy and privacy concerns while using it.

The strength of this study lies in being the first of its kind to give insights into the actual perspectives and practicing habits of ChatGPT among medical writers. The survey responses yielded a very diverse dataset due to the diverse demographics of the survey respondents that enriched our understanding of the current trends in the field.

The study has certain limitations. First, the sample size is small, which may prevent the findings from being extrapolated to the field as a whole and may undermine the validity of the results.[40] Hence, Pearson's Chi-square analysis with Monte Carlo simulation was used to ensure the significance of findings even with the small sample size. Second, there may be an inherent bias in the sampling as the mode of dissemination of the survey was only through an online

medium, yet the respondents of this survey had varied demographics. Third, there may be a potential language barrier in survey participation as the survey was in English, although this can be justified as up to 95% of the scientific publications are in English.[41] Fourth, the survey was conducted in 2023 and may not reflect the latest trend in the field. However, the incidents of AI-generated errors in published articles in peer-reviewed journals are still frequently observed.[42] Walters et al. studied a particular hallucination frequently observed with ChatGPT and found that 55% of GPT-3.5 and 18% of GPT-4 generated citations for literature reviews were fabricated.[43] Thus, the results of this study are still relevant.

Conclusion

This study represents a small but one of the first snapshots of the trends of AI tool usage in the field of medical writing. An understanding of the perspectives of the medical writers will help in adopting these tools with proper policies in place. A correct perspective on ChatGPT and other latest AI tools relies on a good understanding of these tools, which is essential to both formulate and follow guidelines related to the use of LLMs in medical writing. The guidelines will support medical writers to produce quality work and maintain publication ethics while minimising errors and overcoming limitations.

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Disclaimers

None

Disclosures and conflicts of interest

The authors declare no conflicts of interest.

Data availability statement

For inquiries about data and other supplemental information, please contact the corresponding author.

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Appendix 1. Survey questions

Section 1 of 5:

The purpose of this survey is to gather information on the use of ChatGPT in medical communications. Your participation in this survey is completely voluntary. All responses are anonymous and confidential. By completing this survey, you are giving your informed consent to participate in this study. The data collected will be used for research purposes and may be published in a scientific journal. If you have any question or concern about the survey, please contact the study organisers at sujatha.v@hashtagco.in. Please note that this survey may have limitations, such as potential biases in the sampling or the self-reported nature of the responses.

*Single choice; † Short answer; ¥ Multiple choice

Section 2 of 5:Demographic information

Q1: What is your age?*
- ☐ Under 25
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ Over 65

Q2: What is your gender?*
- ☐ Male
- ☐ Female
- ☐ Non-binary
- ☐ Prefer not to say

Q3: What is the highest level of education?*
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Doctoral degree
- ☐ Other_____

Q4: In which sector do you work?*
- ☐ Pharmaceutical industry
- ☐ Medical communications
- ☐ Academic institution
- ☐ Healthcare organisation
- ☐ Other_____

Q5: How many years of experience do you have in medical communications?*
- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ Over 15 years

Q6: What is your primary country of residence?†

Q7: Which type of medical writing do you specialise in?¥
- ☐ Regulatory writing
- ☐ Medical education writing
- ☐ Publications
- ☐ Medico-marketing
- ☐ Market access writing/ Health Economics and Outreach Research
- ☐ Science journalism
- ☐ Other_____

Q8:Do you hold any professional certification in medical writing or editing? *
- ☐ Yes
- ☐ No
- ☐ If you have selected 'yes' for the previous question, please specify below: †

_____

Q9. Are you a member of any professional organisation for medical communications?*
- ☐ Yes
- ☐ No
- ☐ If you have selected 'yes' for the previous question, please specify below: †

_____

Q10: Have you received any formal training in medical writing or medical communications?*
- ☐ Yes
- ☐ No

Q11: Do you have experience using AI-powered tools for medical communications?*
- ☐ Yes
- ☐ No
- ☐ If you have selected 'yes' for the previous question, please specify below: †

Section 3 of 5: Knowledge Questions

Q1: What is ChatGPT?*
- ☐ ChatGPT is a social media app designed to generate human-like text based on the input provided to it
- ☐ ChatGPT is a large language model based on the GPT architecture, designed to generate human-like text based on the input provided to it
- ☐ ChatGPT is an open-source live chat software by OpenAI designed for answering questions in a conversational manner
- ☐ ChatGPT is a virtual personal assistant that can answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests
- ☐ I don't know

Q2: Do you have a general idea of how ChatGPT works?*
- ☐ Yes
- ☐ No

Q3: ChatGPT cannot perform the following task:*
- ☐ Assist in generating text for medical content
- ☐ Suggest wording and phrasing in medical writing for sorting jargon
- ☐ Perform literature survey
- ☐ Assist in writing plain language summaries from provided content
- ☐ I don't know

Q4: While using ChatGPT, what is the phenomenon of hallucination?*
- ☐ Plausible-sounding but inaccurate information
- ☐ Harmful content
- ☐ Information from spurious sources
- ☐ Overuse of certain phrases
- ☐ I don't know

Q5: ChatGPT is being further trained by:*
- ☐ Collecting data from ChatGPT users wherein the users vote the responses and submit additional feedback
- ☐ Storing input data and using it to improve the performance of the module
- ☐ Using 175 billion parameters that enable the model to learn more complex patterns
- ☐ Asking clarifying questions when provided with an ambiguous query/prompt
- ☐ I don't know

Q6: The content provided by ChatGPT is:*
- ☐ Subject to potential bias
- ☐ Free of any kind of bias
- ☐ I don' t know

Q7: What is the knowledge cut-off date of ChatGPT?*
- ☐ There is no cut-off date. ChatGPT has current information.
- ☐ Sept 2021
- ☐ April 2023
- ☐ Nov 2022
- ☐ I don't know

Q8: The responses provided by ChatGPT to the same prompt: *
- ☐ Can vary with different users
- ☐ Can vary for the same user at different time points
- ☐ Both 1st and 2nd options are correct
- ☐ Do not vary in core content
- ☐ I don't know

Section 4 of 5: Attitude Questions

Q1: Do you believe that ChatGPT can improve the quality of medical writing?*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q2: Do you think that ChatGPT can help save time while writing?*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q3: Are you concerned about accuracy and data privacy while using ChatGPT in medical writing?*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q4: Do you think ChatGPT and other AI technologies require guidelines for use in medical communications?*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q5: Do you think ChatGPT can replace human medical writers?*
☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

Q6: Do you think you need formal training to use ChatGPT for medical communications?*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q7: In your opinion, ChatGPT is most suitable for writing:¥
☐ Slide decks
☐ Patient brochures
☐ Manuscripts
☐ Plain language summaries
☐ Medical education content
☐ Books
☐ Blogs

Q8: In your opinion, ChatGPT is most suitable for writing which portion of the manuscript?*
☐ Complete manuscript
☐ Abstract
☐ Results
☐ Introduction
☐ Methods
☐ Discussion
☐ None

Section 5 of 5: Practice Questions

Q1: How often do you use ChatGPT?*
☐ Always ☐ Rarely
☐ Sometimes ☐ Never

Q2: What do you use ChatGPT largely for?*
☐ Understanding complex topics
☐ Literature survey
☐ Summaries
☐ Organising scattered points into a coherent paragraph
☐ Routine tasks like composing emails or drafting letters
☐ Social media posts
☐ Not applicable

Q3: In your experience, ChatGPT is easy to use for medical writing:*
☐ Strongly agree ☐ Agree
☐ Neutral ☐ Disagree
☐ Strongly disagree

Q4: What challenges have you faced while using ChatGPT for medical writing?¥
☐ Server error in generating a response
☐ Server busy
☐ Inaccuracy of the content
☐ Multiple attempts (prompts) required to get the desired response
☐ Not applicable
☐ Other_____

Q5: Do you think ChatGPT has improved your writing efficiency?*
☐ Yes ☐ No
☐ Maybe
☐ Not applicable

Q6: How do you rate the quality of the content generated by ChatGPT?*
☐ Excellent ☐ Good
☐ Fair ☐ Poor
☐ Not applicable

Q7: Would you recommend using ChatGPT to other medical writers?*
☐ Yes ☐ No
☐ Maybe

Q8: Does your organisation/ institution allow you to use ChatGPT?*
☐ Yes ☐ No
☐ There are no rules or guidelines
☐ I don't know

*Single choice; † Short answer; ¥ Multiple choice

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AI in medical writing – tools, tantrums, and testimonies

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Abstract

This article explores the impact of artificial intelligence (AI) on medical writing from an insider's perspective. It discusses the various AI tools available, and the practical benefits observed through real-world applications. It also addresses the initial resistance and fears surrounding AI adoption. The article emphasises the importance of critical thinking and human oversight in using AI tools effectively, highlighting the balance between embracing technology and maintaining the unique skills of medical writers. The future is bright for medical writers – this article explains why!

Photo: Freepiok

The term "artificial intelligence" or 'AI" is ubiquitous at the moment. It has become part of everyone's lives, and everyone is wondering how we will be affected by it, both personally and professionally. AI is now advancing into "Generative AI" or "GenAI", where innovative ontologies and graph models are applied to create semantic text relationships. These technologies are now being explored as powerful tools to aid medical writers in their work, opening up new possibilities for enhancing productivity and efficiency.

Medical writers, too, are experiencing the transformation that AI brings. But before diving into the potential impacts of AI, it's essential to clarify what we mean by the term. "AI" is a catch-all term that is often misused, conflated, or misinterpreted, and encompasses everything from machine learning and natural language processing through to ChatGPT! For the purposes of this article, I will use AI to mean any tool that is using automation, including generative and rule-based elements, to complete tasks in the production of medical writing documents.

The rise of AI tools

By the time this article goes to press, the landscape of AI tools available to medical writers will have likely expanded even further, with new releases and updates continually reshaping the field. This renders any discussion of "available tools" almost meaningless. It would also be inappropriate here to name any commercial products or imply any kind of advocacy for them.

However, the incredible promises surrounding AI in terms of time and cost savings speak volumes. It's clear that medical writing is ripe for a technological revolution.

There is no doubt that there are routine aspects to a medical writer's job – summarisation of large amounts of dense text, combing through pages and pages of data tables to identify signals or anomalies, even compilation of summary tables or subset tables … the list goes on! Most of us would happily hand these tasks to a computer to parse the data and present us with a neat, concise summary. These tasks are perfect candidates for automation, freeing up time for medical writers to focus on higher-level analysis and creative problem-solving. The good news is that AI tools already exist to assist with these mundane tasks, significantly boosting efficiency and accuracy.

Sophisticated AI: A helping hand

AI tools today range from those using rule-based engines, where the machine follows pre-programmed instructions to process data and text, to more advanced generative systems, which learn from vast datasets to generate new, contextually relevant content. This can lead to "hallucinations" – errors put into the data or text as the machine fills in the gaps or makes a conclusion, and this issue is being actively addressed. AI systems are constantly improving, and methods for detecting and correcting these errors are emerging, providing greater confidence in their reliability. Additionally, not all hallucinations are errors. It can be argued that a tool producing a conclusion may not be incorrect, and if viewed as a "suggestion" could even help the medical writer as a starting point for their own conclusion, offering valuable suggestions that can serve as starting points for further human analysis. There is also some very interesting work happening that is using one AI tool to "QC" another to check for hallucinations. Although in its infancy, the problem of hallucinations is already being actively addressed.

Tantrums – or is AI an ally for medical writers?

The initial belief that medical writing can be completely accomplished through AI is not only technically unrealistic because of the concerns around accuracy (hallucinations) and security of the highly confidential data being parsed, but also risks doing a grave disservice to the end users of the document being produced. Whether the document is a dossier for the regulatory agencies or a plain language document aimed at the

general public, the medical writer offers much more to the process than the ability to summarise complex data and information. Medical writers offer what computer algorithms cannot – critical thinking, contextualisation, and a nuanced understanding that AI cannot replicate. However, AI can assist by taking on repetitive, data-intensive tasks, allowing human writers to focus on higher-level judgment, contextualization, and decision-making. Therefore, it is important to explore where it is appropriate to apply AI, and what the experienced medical writer should be looking for in the evaluation of technology to ensure it is truly helping them with their work.

At Trilogy, we've embraced AI as a powerful tool that has already led to significant time savings and positive outcomes (see "Testimonies"). One of the most compelling benefits we've seen is AI's ability to detect important signals in data that human writers may have overlooked. AI tools can also be used to verify signals identified by human writers, ensuring greater consistency and accuracy in clinical data analysis. This is particularly valuable as clinical trials grow in complexity.

One of the key (and arguably the most important) skills needed by any medical writer is that of critical thinking. It is crucial in every aspect of our work to critically appraise the information before us, to question the sources, and to ensure that the conclusions can be supported and are fair and unbiased. These skills have never been more necessary than when appraising an AI tool. There are lots of astonishing figures and claims made by AI companies in terms of time saving and efficiencies, but these should be looked at through the lens of any extra checks and balances that will be needed – along with any changes to inputs for the tool to function and outputs that will be generated.

Testimonies

It is absolutely true that humans also make mistakes, and also need to have checks and balances to ensure that errors are identified and corrected.

Therefore, the need for checks and balances aside, there is no doubt that there is a very important role for AI tools to play in the medical writing world. I have seen this first hand with software that detected an important signal that the sponsor's human medical writers had missed. We have been using an AI tool not only to help detect signals and relationships within data, but also to double check that the signals and relationships that human medical writers have identified are the same as those identified by the tool. This is a significant step towards uncovering many signals and relationships within clinical data that might otherwise be overlooked, especially with the increasing complexity of trials, such as platform and umbrella study designs.

A balanced approach to AI integration

The "human in the loop" is of vital importance in the medical writing world – people's lives are literally at stake – and so passing the task of medical writing to a computer without a critical human mind being involved is utterly irresponsible.

However, it is equally irresponsible to ignore the potential of AI tools to relieve writers from time-consuming tasks and allow them to focus on their unique skills. With AI handling data parsing, signal detection, and even suggesting potential conclusions, medical writers can devote more time to high-level thinking, contextualisation, and collaboration with clinical teams.

The ability of an AI tool to "double check" signal detection, parse huge amounts of data quickly, and to suggest possible conclusions, not only provides a layer of comfort that nothing has been missed, but frees the medical writer to focus on the higher-level tasks and have meaningful discussions with the clinical team at a much earlier stage.

The future of medical writing

Looking to the future, emerging AI technologies will continue to evolve, potentially reaching a point where AI can function autonomously in some areas, learning independently and enhancing its own capabilities. The upcoming "agentic"AI (the use of agents that do not need humans to provide prompts or guide the system to make decisions) will allow AI tools to work with minimal or no human input and to "learn" independently, turbo-charging the ability of AI and freeing more time for humans to use their critical thinking skills to enhance and evaluate the outputs.

As with most aspects of life – this is not "black or white". Using an AI tool should not be a binary choice, any more than it should signal the end of the medical writing profession. Rather, it's about finding the right balance between human expertise and machine assistance. Our experience has been that the current breed of AI tools, with the promised pipeline of increasing number of applications and documents to which they can be applied, offer huge advantages to medical writers. By embracing the tools available today, medical writers can significantly enhance their efficiency and effectiveness. AI tools are not here to replace the medical writing profession; they're here to help it evolve, offering incredible potential to tackle complex tasks with ease.

As we move forward in this paradigm shift, what is needed is critical appraisal and the medical writing experience to know which tool is the right tool for the job. It's crucial for medical writers to critically evaluate each tool, considering its strengths, limitations, and the specific tasks it can enhance. The rapid pace of AI development means that staying informed and adaptable is essential. Plus – in this fast-moving area of computer science – how future-proof is the tool? What pipeline does it offer?

The future of medical writing is bright. Embracing AI will undoubtedly lead to greater opportunities, benefiting both medical writers and the industry as a whole. It's exciting, but it's more important than ever to embrace the technology that can enhance and make our tasks more efficient, whilst ensuring that a human's ability to sense-check is retained. If we can crack that combination, great things are in store for all of us!

Disclosures and conflicts of interest

The author is employed by Trilogy Writing, an Indegene company, which produces AI tools for healthcare companies.

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