



Use of artificial intelligence tools by audiologists and speech-language therapists: an international survey of academicians

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ABSTRACT

Purpose: Artificial intelligence (AI) is developing across the world in every domain, such as finance, manufacturing, entertainment, agriculture, retail, healthcare, and law. Its use in the education sector has exponentially increased. The present global survey explored the utilization of AI among academicians in audiology and speech-language therapy (ASLT) and their willingness to use AI tools in their academic work. **Method:** This study used a cross-sectional survey design. One hundred and six ASLT academicians participated in the survey (February 2024 to April 2024). The questionnaire contains 18 items, which included a five-point rating scale, yes-no, and open-ended questions. Descriptive statistics were used for analysis. **Results:** Most of the participants were from Asia and North America, followed by Africa. Nearly sixty-eight percent of the academicians used AI tools in their practice. The major concerns reported by the participants were the authenticity of the data, security, the addition of irrelevant information, and incorrect citations. The participants also mentioned that the frequent use of AI tools can reduce a person's ability to devise novel ideas. AI tools such as ChatGPT, Canva, Grammarly AI, Mentimeter, QuillBot, ResearchRabbit, and Scribd were reported by participants. **Conclusions:** The present study highlights the use of AI tools among ASLT academicians. However, only a few academicians have prior experience in AI courses. This indicates the pressing need for training concerning the appropriate use of AI in academia and support from universities. Furthermore, AI should be incorporated into academia with appropriate monitoring and ethical considerations.

KEYWORDS

artificial intelligence, education, audiology, speech-language therapy, academicians.

1 Introduction

Artificial intelligence (AI) is an evolving technology that simulates human intelligence using a machine or system and encompasses various subfields, including machine learning and deep learning (Xu et al., 2021). Problem-solving behaviors, designing and analyzing the language used by humans, analyzing images, and performing speech recognition are simulation functions of AI (Collins et al., 2021). In simpler terms, AI replicates human cognitive behaviors involving perception, reasoning, learning, planning, calculation, and so on. AI has drawn the attention of the entire world with widespread effects on various facets of human life, including the economy, law, healthcare, science, and education (Kamalov et al., 2023).

Over the past few years, the use of AI has become popular and has revolutionized many aspects of life; including academia. In the education sector, AI has established an innovative and transformative influence, offering potential applications, such as improved

learning, adaptive teaching, solving queries, instantaneous feedback, and educational administration (Chiu et al., 2023). Additionally, AI has been utilized in various ways. These include, personalized learning, effective outcomes, efficiency, assignment scoring, automated student grading, monitoring students' progress, teacher-student collaboration, and access to global education (Celik et al., 2022; Kamalov et al., 2023). A recent study reported other benefits such as predicting students' performance, determining risk factors affecting students' achievements, and conducting performance estimation (Bozkurt et al., 2021). It has been reported that in higher education, AI-powered tools can comprehend drop-out and retention risks, accuracy of course content, evaluation of lectures, crafting of teaching material on the basis of student needs, etc. (Zawacki-Richter et al., 2019). Despite the several advantages of AI, the use of AI in academia is in its early stages, and institutions and universities have different approaches to AI implementation.

Exploring the perspective of AI among academicians is impor-

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tant for comprehending the advantages and concerns associated with its implementation. Recent studies reported positive attitudes, high acceptance among schoolteachers towards AI, and high motivation to introduce AI education to students (Darayseh, 2023; Polak et al., 2022). In contrast, university teachers are skeptical about the reliability of the information, and amateurs because of insufficient knowledge and infrastructure (McGrath et al., 2023). Recently, several studies related to AI implementation have been conducted on various healthcare professionals. They reported positive attitudes towards AI applicability; however, job security was one of the main concerns among pharmacists and radiologists (Caparrós Galán & Sendra Portero, 2022; Hasan et al., 2024).

Academicians in every discipline are adapting AI in their practice, with or without knowledge, familiarity, experience, or availability of infrastructure. Nonetheless, the audiology and speech-language therapy (ASLT) field are well poised to benefit from technological advancements. Adopting these advances can bring many benefits to clinical education, such as simulating complex situations for students to experience before encountering them in clinical settings and sharpening specific skills for their learning (Morgan et al., 2022). Hence, both ASLT academicians and students can incorporate clinical simulation into the educational setting in a constructive manner without risking efficient patient care in real clinical scenarios. However, studies on the use of AI among academics specializing in ASLT are lacking. By evaluating the current trend of AI in ASLT practice, we can obtain valuable insights into how ASLT academicians perceive and take advantage of this emerging technology. The current study investigated the global perspective towards use of AI among academicians specializing in ASLT.

2 Method

2.1 Study design

A cross-sectional study design was used to carry out the study. Every approach used in research involving human subjects complied with equivalent ethical norms, and Helsinki Declaration guidelines ("World Medical Association Declaration of Helsinki," 2013), and the study was approved by the ethical committee of Amity University, India.

2.2 Materials

A questionnaire was developed, containing 17 questions. The questionnaire included demographic details (age, experience, institution, country), 15 closed-ended questions, and two open-ended questions. The developed questionnaire was piloted with five academicians with over five years of experience each, before being distributed to participants. Each question was graded on a four-point rating scale: not relevant, somewhat relevant, quite relevant, and relevant. Content validity was determined by a Scale-level Content Validity Index (S-CVI) (Polit & Beck, 2006). A S-CVI score of 0.89 was obtained, which indicated good content validity for the developed questionnaire (Polit & Beck, 2006). Appropriate modifications were made on the basis of the feedback, and one more question was included in the questionnaire. The final version of the developed questionnaire was used for collecting data.

The final version of the questionnaire contained 18 questions, including 16 closed-ended and two open-ended questions. The questionnaire was designed to examine the following: demographics, education, experience, work setting, country, and use of

AI tools. Twelve questions were recorded on a 5-point Likert scale. Three open-ended questions were framed which sought information on types of AI tool used, their purpose and challenges faced while using AI. Two questions were recorded yes or no, referring to the use of AI tools in academic practice, and courses related to AI tools. Finally, one question was framed to understand the need for training for AI tools. All the questions were compulsory to fill out and submit the questionnaire. The questionnaire is available on request.

2.3 Data collection

The data were collected using the Google Forms platform (forms.google.com) from February 2024 to April 2024. For the purpose of this survey, academicians referred to ASLT professionals, who were employed at a college or university as a faculty member of any rank. These professionals were recruited through professional connections of all the investigators involved in the study adopting purposive sampling. The respondents were also asked to forward the survey to other fellow academicians using snowball sampling. There was no cutoff maintained for academic experience for being included in the study in order to have maximum participation.

The questionnaire was distributed through email and advertised on social media platforms. All the participants received an email with a questionnaire link. At the start of the questionnaire, the participants were notified of their voluntary participation and maintained anonymity. All participants were required to fill out electronic informed consent embedded in the questionnaire. Only those who consented to participate were directed to the demographic section of the questionnaire followed by the main questions section. If not, the participants were directed to the end of the survey. The participants were not provided with any compensation for their participation.

2.4 Statistical analysis

The data collected was exported to an Excel sheet. Descriptive statistics obtained for the closed-set questions using SPSS version 22 for analysis (SPSS Inc., Chicago, IL). The Open-ended questions were analyzed using summative content analysis. Author II categorized the data into codes and generated themes. The three authors reviewed the generated themes and discussed the final categories mutually.

3 Results

The questionnaire was distributed to 640 academicians. One hundred and six audiologists and speech-language pathologists working in the academic setup participated in the study with a response rate of 16 %, of which 36 (34%) were males and 70 (66%) were females. In this survey, there was no attrition, as all participants completed the questionnaire in its entirety. All fields were mandatory for submission, ensuring comprehensive responses across all items. The participants were from different continents: Africa (Ghana, South Africa), Asia (Bangladesh, India, Malaysia, Qatar, Saudi Arabia, Sri Lanka, Taiwan of China, UAE), Europe (Ireland, United Kingdom), North America (Canada, United States of America), and Oceania (Australia, New Zealand), where Asia stands with the highest number of participants, followed by North America and Africa. Figure 1 illustrates the distribution of participants from different countries.

Among the participants, 47 (44.3%) were from government institutions and 59 (55.7%) were working in private institutions.

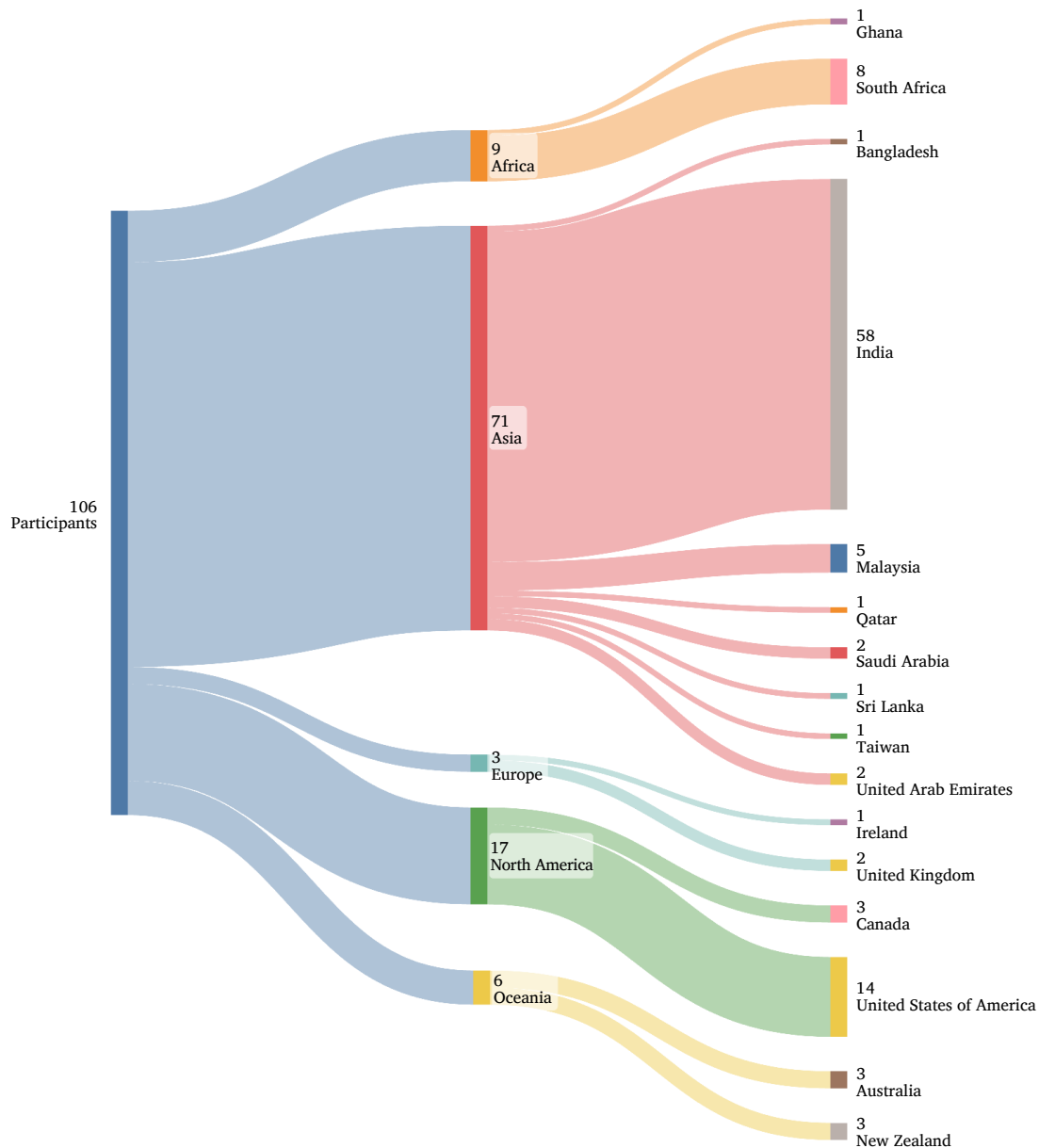


Figure 1 Distribution of participants

Table 1 presents the demographic details of the professionals who participated in the study.

The use of AI tools among ASLT academicians revealed that 73 (68.9%) of the academicians used AI tools. The respondents were asked if they had taken any specific courses on AI, only 9 (8.5%) responded affirmatively. Regarding the level of training they needed for AI tools, 58 (54.7%) responded as beginner, 35 (33%) as intermediate, and 13 (12.3%) as advanced. Only fifteen percent of the participants used AI tools for teaching and scientific writing very often, whereas 35.8% of the participants used them sometimes. Sixty-four percent of the participants rated their ability to use AI tools as average or below. Sixty percent of participants were confident or slightly confident in using AI tools. Fifty percent of the participants reported being neutral about recommending AI tools to colleagues. The responses to the other questions regarding the use of AI tools are tabulated in **Table 2**.

Among the AI tools listed by the academicians, ChatGPT (55.7% respondents) was the most popular, followed by QuillBot's

(11.3%), Google Generative (6.6%) The other AI tools included Bing AI (0.9%), ChatPDF (3.8%), Canva AI tools (1.9%), DALL-E (0.9%), Elicit (1.9%), Explainpaper (0.9%) Gemini (2.8%), Grammarly's AI (10.4%), Invideo (0.9%), LivePlan (0.9%), Medidata AI (0.9%), Mentimeter AI (0.9%), OpenAI (0.9%), Otter.ai (0.9%), Perplexity AI (0.9%), Quizizz (1.9%), ResearchRabbit (3.8%), SciSpace (0.9%), SpinBot's (0.9%), Scite (0.9%), Scribd AI (0.9%), Speaker Coach in PowerPoint (0.9%), and Writefull (0.9%).

The AI tools were used by participants for numerous purposes, such as academic and research writing, student interaction and class management, and therapy planning. The participants used AI tools for plagiarism checks, paraphrasing, article summarization, data analysis and management, grammatical editing, critical evaluation, seeking comprehensive information, and innovative ideas. Additionally, participants benefited from AI tools to allocate assignments, make presentations, increase student engagement, use case examples, conduct clinical teaching, have discussions, schedule class tests, design brochures, and prepare quizzes. AI

Table 1 Demographic details of participants.

		Number (Percentage)
Age (in years)	< 30 years	23 (21.7%)
	31 to 40 years	45 (42.5%)
	41 to 50 years	22 (20.8%)
	51 to 60 years	8 (7.5%)
	> 60 years	8 (7.5%)
Qualification	Graduate Degree	5 (4.7%)
	Masters in Audiology & Speech Language Pathology	7 (6.6%)
	MSc Audiology	24 (22.6%)
	MSc Speech Language Pathology	14 (13.2%)
	Ph.D.	34 (32.1%)
	Ph.D. Audiology	9 (8.5%)
	Ph.D. Speech Language Pathology	13 (12.3%)
Position	Lecturer	15 (14.2%)
	Clinical Faculty	13 (12.3%)
	Assistant Professor	45 (42.5%)
	Associate Professor	18 (17%)
	Professor	15 (14.2%)
Experience (in years)	< 5 years	21 (19.8%)
	6 – 10 years	27 (25.5%)
	11 – 15 years	24 (22.6%)
	16 – 20 years	10 (9.4%)
	21 – 25 years	7 (6.6%)
	26 – 30 years	2 (1.9%)
	> 30 years	15 (14.2%)

tools assisted participants in making session plans, developing therapy goals, robotics-assisted therapy, drafting letters, generating caption emails, report writings, streamlining workloads, and time management.

The participants reported various challenges associated with the use of AI tools. The primary belief was that AI tools are not 100% reliable, resulting in doubtful data authenticity, breaches of data privacy, and insufficiently accurate responses. Secondly, challenges were related to documentation, such as the addition of jargon and irrelevant information, wrong citations, overly lengthy sentences, ethical issues for research purposes, and a decrease in the documentation proficiency of students. Frequent use of AI tools can reduce a person's ability to devise original thoughts and innovative ideas. Other reported challenges were related to connectivity and internet issues, a lack of infrastructure, the complexity of AI tools, difficulty understanding the latest versions, a lack of expertise and proper training about the applicability of the AI tools, unfamiliarity with the features of tools, limited access and time to learn, affordability, and restricted acceptance at the workplace.

Overall, the results suggest acceptance of the use of AI in academia. However, some concerns can be addressed with the use of proper training on AI tools among academicians. There is also a need to crosscheck AI-generated information, as it may not be 100 % reliable. AI is an add-on support for academicians in the field of audiology and speech-language therapy if appropriately used along with proper training.

4 Discussion

Technology has played a crucial role in education and AI utilization has become more prevalent than ever before. The effective implementation of AI in higher education requires diligent preparation, precise execution, and ethical considerations (Bates et al., 2020). AI has been proven to be effective in several fields covering audiology and speech-language therapy. Computational audiology

Table 2 Response to the use of AI tools.

	Always n (%)	Very Often n (%)	Sometimes n (%)	Rarely n (%)	Never n (%)
How frequently do you use AI tools for your teaching?	03 (2.8%)	16 (15.1%)	38 (35.8%)	24 (22.6%)	25 (23.6%)
How frequently do you use AI tools for scientific writing?	1 (0.9%)	16 (15.1%)	38 (35.8%)	25 (23.6%)	26 (24.5%)
Do you agree AI tools improve class interaction?	30 (28.3%)	03 (2.8%)	06 (5.7%)	62 (58.5%)	05 (4.7%)
Do you agree AI tools reduce the workload?	51 (48.1%)	02 (1.9%)	10 (9.4%)	38 (35.8%)	05 (4.7%)
Do you agree AI tools can make your teaching practice more effective & efficient?	48 (45.3%)	02 (1.9%)	10 (9.4%)	41 (38.7%)	05 (4.7%)
Do you agree AI tools can be used to enhance student engagement?	52 (49.1%)	02 (1.9%)	09 (8.5%)	41 (38.7%)	02 (1.9%)
Do you agree institutions should promote use of AI tools and arrange training sessions or workshops?	56 (52.8%)	01 (0.9%)	28 (26.4%)	19 (17.9%)	02 (1.9%)
Do you agree to recommend the usage of AI tools in teaching?	46 (43.4%)	02 (1.9%)	17 (16%)	37 (34.9%)	04 (3.8%)
Do you agree AI tools have potential to replace human educators?	09 (8.5%)	31 (29.2%)	02 (1.9%)	26 (24.5%)	38 (35.8%)
	Very Poor	Below Average	Average	Above Average	Excellent
How would you rate your ability to use AI tools?	14 (13.2%)	25 (23.6%)	43 (40.6%)	20 (18.9%)	04 (03.8%)
	Not at all confident	Slightly confident	Somewhat confident	Quite confident	Extremely confident
How confident are you using AI tools?	15 (14.2%)	24 (22.6%)	40 (37.7%)	21 (19.8%)	06 (5.7%)
	Extremely Likely	Likely	Neutral	Unlikely	Extremely unlikely
Would you recommend the use of AI tools to your colleagues?	11 (10.4%)	03 (2.8%)	53 (50%)	36 (34%)	03 (2.8%)

is an upcoming domain based on machine learning and data mining for developing diagnostic and rehabilitation judgments (Wasmann et al., 2021). Moreover, AI has been used as a potential method for speech analysis of several disorders such as Alzheimer's disease, cleft lip and palate, and dementia (de la Fuente Garcia et al., 2020; Shi et al., 2023; Zhang et al., 2023). Thus, AI ensures advancements in hearing and speech-language rehabilitation services in this technological era. The present study identified the use of AI tools among ASLT academicians, comprising a sample of 106 academicians from 16 countries worldwide. The participants were predominantly women. The participants were diverse in terms of age, experiences, qualifications, and academic position.

The present study revealed that most ASLT academicians (68.9%) use AI tools in their practice; only 8.5% of academicians have taken specialized courses related to AI. Rahiman and Kodikal (2024) surveyed faculties from higher educational institutions and universities from different regions of Asia to identify the level of awareness towards AI and its applicability. The results suggested that faculties considered AI adoption in higher education and have positive attitudes towards AI in their routine academic work, depending on the availability of facilities.

AI has reshaped traditional classroom teaching methods, academic writing, and administrative processes. Almost 50% of the participants agreed that AI reduces workload and enhances teaching skills. AI has increased efficiency in education, particularly in teaching and administration, such as in reviewing student assignments, grading, and receiving feedback on work, subsequently impacting students' learning (Chen et al., 2020). The ability of AI to generate personalized assignments and handle enormous amounts of data can revolutionize medical education (Mir et al., 2023).

More than 50% of the participants agreed that AI increases students' engagement and that universities should arrange training sessions focused on the effective use of AI. AI facilitates personalized learning and customized content according to student's level of understanding, promoting students' engagement (Oseremi Ones-Ozigagun et al., 2024). Universities are influential stakeholders in AI adoption. Expanded AI implementation may encourage universities to allocate funds for training and infrastructure and deliver the required resources for faculties to support AI-driven systems (Sharma et al., 2022). In the present study, a minimal percentage (5.7%) of the participants expressed their ability to use AI confidently. This gap could be possible due to the lack of formal training. Therefore, it highlights the need to organize training and workshops at universities.

Only a few academicians have reported the use of AI tools for scientific writing. A recent article highlighted that AI has revolutionized academic writing through noble ideas, content organization, literature synthesis, data management, and editing (Khalifa & Albadawy, 2024). Most academicians indicated the use of ChatGPT, Gemini, Grammarly, and QuillBot AI-driven tools in their practice. AI tools such as ChatGPT are convenient for language translation, data summary, management, interpretation, and documentation (Islam et al., 2023). However, ChatGPT can lead to issues such as misinformation, ethical concerns and plagiarism (Livberber & Ayvaz, 2023). A recent article reported that Grammarly is an AI tool that is advantageous for grammar checks, plagiarism detection, and text generation abilities, which are pivotal for drafting academic content (Khalifa & Albadawy, 2024).

Several challenges can contribute to the implementation of AI in academia. First, the participants indicated issues with the authenticity and accuracy of the data offered by the AI tools. In

addition, The participants highlighted the alarming rise in the adoption of AI tools by students, which has led to ineffective learning practices and raised concerns about privacy. The other challenges expressed by the participants were related to the lack of specific and formal training to use AI and poor acceptance in the workplace. Undoubtedly, AI is spreading in the education sector with the risk of poor decision-making skills, increasing security issues, and laziness by automating work (Ahmad et al., 2023).

Interestingly, the results of the present study showed a positive use of AI among ASLT academicians. These findings indicate that improving the proficiency and awareness of AI among ASLT academicians may lead to increased acceptance and adoption of AI tools in academia. Moreover, the results revealed significant concerns such as data privacy, authenticity, and limited support from institutions. Altogether, AI can be a potential companion for academicians in improving the quality of teaching and advancing academic practice. However, it is essential to continue monitoring the impact of AI data security reliability and job security to address any potential concerns. Conclusively, AI can be integrated into academia if it is used responsibly and ethically.

5 Study limitations and future directions

The limitation of the present study is that the sample size was not large enough to represent each country. Although responses were obtained from 16 countries, with India and the USA contributing 54% and 13%, respectively, the study has limited data to reflect the uniform spread of ASLT academicians across the globe. Therefore, the results with regard to country specificity should be interpreted with caution. The responses for the question on the work setting (government or private) were based on how the respondent interpreted the question and could be variable across different countries. Future studies should examine how AI tools affect academic and research activities as well as how academicians resolve (or not resolve) new challenges. Specifically, integrating AI tools into academic and research activities is a potential avenue for future research.

6 Conclusion

This study revealed that AI integration varies among ASLT academicians. The transformative potential of AI in academia is widely acknowledged by ASLT academicians. Although many engage with AI tools in their practice, only a few have received formal training. This knowledge gap increases challenges, resulting in inconsistent responses and a lack of proficiency which restricts academic activities. The vast majority of academicians suggested a pressing need for comprehensive training to unlock the full potential of AI in academia. Despite the modernity of AI, there appears to be a crucial question of whether AI can develop as an impartial learning assistant for students and aid for academicians. This study highlights the necessity of identifying the potential benefits of AI tools that may encourage academicians to continue AI adoption. Moreover, addressing limitations such as ethical frameworks is compulsory for fostering robust and responsible utilization of AI in academia. When positive aspects and challenges are addressed, AI can be incorporated into academics.

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Declaration of interest statement

No potential conflict of interest was reported by the author(s).

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