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Strategies for overcoming barriers to engagement in continuing professional development (CPD) activities in radiography: Exploratory study in Malawi

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ABSTRACT

Introduction: Continuing Professional Development (CPD) involves the systematic maintenance, improvement, and broadening of knowledge, skills, and personal qualities necessary for executing professional and technical duties throughout a professional's work life. Radiographers must stay up to date with the latest knowledge and technological advancements to maintain best practices. Previous studies have highlighted time constraints, a lack of motivation and insufficient resources as barriers to engaging in CPD activities among radiographers. Notably, there is a paucity of literature documenting strategies to overcome these barriers from the perspective of key stakeholders, including radiographers, their employers and the professional body. This study aimed to explore the perspectives of radiographers, employers and the professional body on strategies to improve CPD engagement by radiographers.
Methods: A qualitative exploratory study was employed using purposive sampling to select 15 radiographers, 3 employers and a representative from the professional body in Malawi. After obtaining ethical approval and signed consent from the participants, one-to-one and face-to-face interviews were conducted with participants, audio recorded with their permission, and transcribed verbatim before analysis. Tesch's eight steps of data analysis were used to analyse the data and develop themes related to the strategies to overcoming barriers to CPD engagement by radiographers.
Results: The study yielded three themes, namely: Promoting a supportive mindset to alleviate attitudinal barriers, enhancing accessibility and infrastructure, and establishing organisational support.
Conclusion: A comprehensive and multi-faceted approach incorporating employer support, accessible resources, and regulatory frameworks is essential to facilitate optimal CPD engagement among radiographers, thereby enhancing professional practice, patient care outcomes and overall healthcare care quality.
Implications for practice: Implementing strategies that foster a supportive mindset, enhance accessibility, and establish organisational support can help overcome barriers to CPD engagement among radiographers in Malawi, ultimately improving the quality of radiography services and patient care.
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Introduction

Continuing Professional Development (CPD) is defined as any type of learning designed to help individual professionals update and advance their knowledge, skills, and professional proficiency throughout a professional's career.[1] Through engagement in CPD activities, professionals can develop, maintain, and expand their knowledge and skills.[2] Globally, CPD has become imperative for radiographers, enabling them to deliver high-quality, patient-centred care and remain competitive in an interconnected healthcare environment.[3,4] In Malawi, the regulatory framework mandates that fully registered radiographers accumulate at least 30 CPD points annually to renew their practicing license, with 50 percent of these points derived from activities accredited by the relevant specialty body, with noncompliance potentially resulting in punitive measures.[5]

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However, despite its global relevance, radiographers' engagement in CPD is hindered by multifaceted barriers.[6,7] In particular, literature relating to CPD for radiographers indicates that their engagement in CPD activities is below the desired level, and barriers persist.[8,9] Failure to engage in CPD poses significant risks to radiographers' competence, patient safety, and the overall quality of imaging services due to a reduction in professional lifelong learning.[7,10] This is particularly concerning in the rapidly evolving healthcare landscape, where advances in technology and clinical practice necessitate ongoing education and skills enhancement.[4,6]

Previous studies have identified various barriers hindering radiographers' engagement in CPD activities.[3,11,12] For example, cost constraints, staff shortages, limited resources, and inadequate activities hindered participation.[13] Additional challenges comprised perceived irrelevance of topics, lack of motivation, time constraints, financial limitations, geographical distance to CPD events, poor communication, and insufficient support.[7] Apart from that shift work and lack of time have also been reported as significant obstacles to CPD engagement.[12] A qualitative systematic review on radiographers revealed key factors influencing participation in postgraduate education, including individual motivation and the absence of employer strategies, inadequate stakeholder collaboration, and challenges with regulatory enforcement of mandatory CPD for registrants.[14] A study in Nigeria assessed the willingness of radiographers to participate in CPD and revealed that financial limitations and the location of training programmes were significant predictors of CPD engagement, negatively impacting radiographers' participation in professional development activities.[15] Additionally, literature on factors that impede radiographers' participation in CPD highlights several key challenges, including staff shortages and a notable lack of collaboration between academic institutions, the society for radiographers, employers, and the healthcare industry.[16–18]

A study conducted in 2020 exploring the barriers to CPD in radiography in Africa identified three main themes, namely: attitudinal, physical, and structural barriers.[7] Attitudinal barriers include a lack of self-motivation and a negative feeling that topics were irrelevant on study days.[11,19] Physical barriers include time constraints, financial constraints, distance to CPD events and limited resources.[4] Structural barriers encompass a lack of knowledge about learning opportunities, a shortage of staff, poor notification and communication regarding study days and a lack of support.[12]

Previous studies focused on individual radiographer-level strategies to improve CPD activity engagement among radiographers. While these strategies are essential, they have overlooked the critical roles that employers and the professional bodies play in facilitating CPD engagement. This study addresses this gap by exploring the perspectives of radiographers, employers and the professional body to identify a multi-stakeholder strategy for improving CPD engagement in radiography. This approach ultimately leads to a more comprehensive understanding of how to overcome barriers to CPD engagement and promote a culture of ongoing learning in radiography. This study is the first to understand and describe the mitigating strategies from the perspective of stakeholders in Malawi. The aim is to discover potential strategies to enhance CPD engagement by radiographers from the viewpoints of radiographers, employers, and the professional body.

Methods

Design

The study employed a qualitative approach with a case study design to explore strategies for overcoming barriers to CPD engagement in radiography. A qualitative exploratory study was deemed suitable for this research as it allows for an in-depth understanding of complex phenomena, particularly in areas where limited research exists.[20] A qualitative exploratory study was conducted using individual face-to-face interviews to examine experiences and perspectives of radiographers, employers and the professional body representative regarding CPD in radiography. The research design was appropriate for the researcher to discover potential mitigating strategies to improve CPD engagement by radiographers from the perspective of radiographers, employers and the professional body.

Population and eligibility criteria

Participants included radiographers from selected hospitals in Lilongwe district, Malawi, along with their employers and representatives from the professional body in the country. The radiographers were registered with the professional body, had at least two years of clinical experience, and were engaged in CPD activities. All other participants also had experience with CPD engagement. Radiographers and their employers worked at hospitals with Radiography Departments in Lilongwe district, while the representative from the professional body served in the Radiographers Association of Malawi (RAM) office.

Sample

A purposive sampling strategy was used[21] to recruit participants from the three groups: radiographers, employers, and the professional body representative. Radiographers with 2–30 years of work experience from three hospitals were selected to provide insights into their engagement in CPD activities, experiences, and barrier mitigation strategies. Employers were recruited to share their perspective on facilitating engagement in CPD activities by radiographers. The professional body representative was selected to provide insights into organisational-level strategies and policies supporting CPD engagement in radiography. Data saturation was reached when no new relevant information emerged from interviews, and no further coding was feasible during data analysis saturation.[22] A total of 19 participants were interviewed, comprising 15 radiographers, 3 employers and the professional body representative.

Recruitment

For the recruitment of the radiographers and employers, email invitations were sent to all who at the time of data collection were working at the sampled hospitals. The emails with the letter of information about the study were sent to the employers at the hospitals and the professional body in Malawi. Snowballing technique[23] was used where radiographers who participated recommended potential radiographers within Lilongwe District to be interviewed. Interested potential participants were able to contact the researcher and were allowed to ask any questions related to the study. Potential participants' eligibility was checked and they were given participant information sheets and a consent form. The researcher then contacted participants who sent back a consent form to book an interview date and time.

Inclusion criteria

The study included three distinct participant groups. Employers were included if they represented hospitals with radiography departments in the Lilongwe district. Radiographers were eligible if they had more than one year of work experience, were registered with the professional body and worked in Lilongwe

district, Malawi. The professional body representative was from the professional body for radiographers in Malawi.

Exclusion criteria

Participants were excluded if they did not meet the specified criteria. Employers from hospitals without radiography departments or outside Lilongwe district were excluded. Radiographers working outside Lilongwe district with less than one year of experience, as well as those who refused to participate, were also excluded. Additionally, representatives from professional bodies other than radiographers in Malawi were not included in the study.

Data collection

Study participants were interviewed by the researcher using a face-to-face and one-to-one interview between August 2023 and September 2023. The primary question asked by the researcher was "What can be done to improve radiographers' engagement in CPD activities?" Thereafter, the researcher used probes and paraphrasing to explore a deeper meaning and understanding of the responses that followed. The researcher also wrote field notes containing objective information, such as the date, time, and place of the interview, to track the research's progress. The participants' anonymity was maintained throughout the process by utilising codes. After obtaining written informed consent, interviews were conducted in English and audio-recorded with participants' permission. Exclusive access to the audio recordings was limited to the authors. Bracketing was employed to set aside the researcher's assumptions, including personal judgments and biases, to accurately describe participants' views.[24] Fifteen radiographers, three employers and the representative from the professional body were interviewed until data saturation was reached. Data saturation indicated that interview information became repetitive and additional interviews could not further contribute to the research study.[25] All the interview data were transcribed verbatim before data analysis.

Data analysis

The 19 interviews, each lasting 30–60 min were audio recorded and transcribed using a strict *verbatim* transcription protocol. Transcripts were prepared in 12-point Arial font, with double spacing, and yielded a total of 496 pages of text. Data analysis was guided by Tesch's eight steps of data analysis,[26] to develop themes from the transcribed interview data. An inductive data analysis approach was used, enabling themes to emerge from the data without preconceived notions. The analysis involved a systematic and iterative process, including familiarisation with the data, initial coding, coding scheme development, coding refinement, theme identification, theme labelling, theme definition and theme categorization.[27] Data saturation was achieved, and themes were well-established and understood within the data. The resulting themes were then reported clearly and concisely, providing a rich and nuanced understanding of the research phenomenon. The method revealed three key themes that described strategies to facilitate CPD engagement.

Trustworthiness

To ensure rigour and trustworthiness, several strategies were employed, including purposive sampling of radiographers, employers and the professional body representative, data collection until saturation and thematic data analysis using Tesch's eight steps. Additionally, an audit trail was maintained to document research decisions and procedures, enhancing transparency and credibility. The researcher, a radiographer by profession, employed reflexivity throughout the study by maintaining a reflexive journal to systematically document methodological decisions, assumptions, and potential biases. Regular peer debriefing sessions were conducted to validate thematic interpretations and mitigate the researcher's influence on data analysis. Data source triangulation was used for cross-validation, comparing findings from radiographers, employers and a professional body representative. These measures enhanced the credibility, dependability and transferability of the findings, thereby ensuring a rigorous exploration of barriers to CPD engagement in radiography and informing evidence-based strategies to address these challenges.

Results

Participants

Participants consisted of 15 radiographers, 3 employers and one radiographer representative from the professional body. Radiographers' age ranged from 20 to 60 years old with a minimum of two years clinical experience. Employers' ages ranged from 30 to 60 years, with a minimum of one year of work experience. The radiographers' representative from the professional body's age range was 40–49 with 10 years of work experience. Interviews' duration ranged from 30 to 60 min.

Three themes were identified from the interview data following the data analysis: Promoting a supportive mindset to alleviate attitudinal barriers, enhancing accessibility and infrastructure to overcome physical barriers, and establishing organisational support to address structural barriers (see Table 1).

Promoting a supportive mindset to alleviate attitudinal barriers

In this study, respondents recommended promoting the value of CPD to radiographers in the course of performing their professional roles. Sensitizing radiographers about the significance of CPD in maintaining competence, improving patient care, and career progression can help improve their engagement in CPD activities.

> *".. radiographers themselves need to study because normally what happens in our setup is that, after graduation, someone stops studying, so self-drive, self-study can help improve skills and knowledge and also build confidence."* (Radiographer 8)

Encouraging a growth mindset and embracing lifelong learning can help improve engagement in CPD

> *"… As individual professionals, radiographers should also have that mentality of learning new things every day."* (Professional body representative)

Addressing negative perceptions and misconceptions about CPD and offering inclusive CPD opportunities to all radiographers and ensuring that CPD topics are relevant and aligned with the professional interests and career goals of radiographers are options that can improve engagement.

> *"… radiographers need to be told the advantages of CPD, they need to be told that medicine is dynamic [they] will meet some challenges in [practice] so [they] need to [engage] themselves in CPD activities."* (Radiographer 14)

> *"… for the departmental presentation, before the presentation day, the radiographer needs to share the topic with the seniors in the*

Table 1
Themes and subthemes.

Themes	Subthemes
Theme 1: Promoting a supportive mindset to alleviate attitudinal barriers	• Fostering motivation and enthusiasm for CPD among radiographers • encouraging a growth mindset and embracing lifelong learning • addressing negative perceptions and misconceptions about CPD • Building confidence and self-efficacy in participating in CPD activities
Theme 2: Enhancing accessibility and infrastructure to overcome physical barriers	• improving geographical access to CPD training programs and resources • Leveraging technology to facilitate online CPD opportunities • providing adequate resources and facilities for CPD activities • offering CPD activities that accommodate varying work schedules
Theme 3: Establishing organizational support to address structural barriers	• Securing organisational commitment and support for CPD participation • allocating sufficient time and resources for CPD activities • Strengthening the CPD policy and enforcing implementation • promoting stakeholder collaboration

department or someone who can help to perfect the presentation so that everything should be delivered to the expectation … for hospital grand rounds if someone is going to present, before presentation day, presentations should be sent to the CPD committee so that they can access the topic if it is worth the ground round presentation or not." (Radiographer 8)

"… the association, before the scientific conference, you know it's a big function, when they are organizing, they need to do vetting of presentations, they need to look at the topics critically …" (Radiographer 9)

Building confidence and self-efficacy in participating in CPD activities through awards that can instil motivation among radiographers is also another way to help improve the engagement of radiographers in CPD activities.

"… motivation can be [by the] introduction of radiographer of the year. … [through this] way, a lot of radiographers will be participating in CPD activities." (Radiographer 2)

"… other professional bodies like the nurses' council they do come up with the best nurse of the year, it is attached with renumeration, this is a very good approach. we are considering of starting this approach." (Professional body representative)

Enhancing accessibility and infrastructure to overcome physical barriers

The study identified the need for CPD activities accessibility improvement through improving geographical access to CPD training programs and resources, to ensure that radiographers' access CPD activities.

"… The other approach is using the Zoom platform that can reach anybody at their respective workplaces, for everybody to attend CPD activities." (Professional body representative)

Leveraging technology to facilitate online CPD opportunities, such as online learning platforms or webinars, to allow radiographers to participate in CPD can help improve radiographers' engagement in CPD, as this approach can help participation in CPD activities remotely, thereby reducing the need for physical presence at CPD activities.

"… I have seen some others organizers [of online CPD activities], they provide [internet] bundle to everyone who wants to attend, my request to all the stakeholders, especially if they organize something [to do with CPD] they [need to shoulder] some of these costs, that's the only way we can improve." (Radiographer 10)

"… we need to have a Zoom platform every three months where people share emerging updates about our profession, [where] one would present and share these new concepts to other radiographers." (Professional body representative)

"… I feel if we can have libraries with internet in radiology departments where someone can have access, because in other departments internationally they have libraries where people have time to study, not only physical books but also using the internet, this can help to improve the participation …" (Radiographer 6)

Providing adequate resources and facilities for CPD activities can help improve radiographers' engagement in CPD activities

"… providing more resources to this profession will improve our participation in CPD, whether locally or internationally." (Radiographer 5)

"… we [plan to] organize fully funded CPDs so that [we just] invite our members, we accommodate them [for free], then we share professional information." (Professional body representative)

" …. we need resources, to come up with a rewarding system [for] the best radiographer of the year, we need to reward with material items …" (Employer 3)

"… But resources allowing I think even very simple motivations would make things different, let's say we have CPD this afternoon and we are going to have drinks, you will wonder how many people will show up, when they attend apart from the drinks, they also learn something and improve their skills …" (Employer 1)

Participants suggested offering CPD sessions and flexible time, including online or virtual options to accommodate different work schedules and ensure more inclusive engagement.

"… we can set up specific days not combining CPD activities with work-related issues, so we can set a date, [let's say] Wednesdays starting from 6:00 am to 8:00 am [should be CPD [activity hours] …" (Radiographer 8)

Establishing organisational support to address structural barriers

Securing organizational commitment and support for CPD participation through timely communication of invitations to radiographers and ensuring the availability of adequate human resources in the radiography department can improve participation. Additionally, offering finances to offset costs associated with CPD activities participation, such as registration fees or travel expenses and accommodation, can help improve radiographers' engagement in CPD activities.

"… there is a need for resources to address the issue of financial limitations to attendance of CPD activities." (Radiographer 6)

"… if there can be enough human resource it can help improve the participation in CPD, for example, you want to attend a certain training course but sometimes you find that the department has got a shortage of staff so they will not allow you to go there, adequate human resource can improve the participation in CPD activities." (Radiographer 11)

"… when sending [CPD activity] invitations apart from sending to the hospital director they should copy direct to the one who they want to attend the CPD, this can help because one cannot miss if you have been copied in such emails …" (Radiographer 8)

"… we are approaching several stakeholders to source adequate funds to carry out CPD activities for radiographers so that we can encourage our members to participate actively in these CPD activities." (Professional body representative)

Securing organizational commitment and support for CPD participation by ensuring availability of online learning facilities such as reliable internet and subscription to online journals, thereby removing all constraints associated with travelling, boarding and lodging when attending CPD activities, can help encourage engagement of radiographers in CPD activities.

"… the institutions should have internet which can be accessed by everyone … the institution can subscribe to publishers, so that they can easily access books." (Radiographer 13)

"… radiographers need to take advantage of these virtual presentations for CPD attendance." (Employer 3)

Allocating sufficient time and resources for CPD activities can help improve participation

"… we want to start doing a detached CPD, where we have a specific day for the CPD that will be for each department …" (Employer 3)

Strengthening CPD Policy and enforcing implementation can help improve adherence of radiographers to CPD requirements, thereby improving engagement in CPD activities. The professional body and regulatory body need to strengthen the implementation of CPD requirements for radiographers on registration and renewal of membership for registrants.

"… Medical Council is supposed to make sure that those who don't attend CPDs are not registered." (Employer 2)

"… these CPD activities should be cemented by the reinforcement of the medical council …" (Professional body representative)

"… *because the council overseas a lot of professions not only the radiography, we are so many professional groups and professionals', the council should mandate the Association to carry out CPD activities whereby each and every member when required to renew its practice should present with required CPD requirements adherence from the professional body."* (Professional body representative)

According to some participants, coordination and collaboration among stakeholders in radiography can improve engagement of radiographers in CPD activities. Emphasis was placed on hospitals, training institutions, the regulatory body and the professional body.

"… I look at collaboration between those who are in a hospital setting, like radiographers and those who are in academia … we can also promote the interaction of radiographers with other professionals in the hospital." (Radiographer 9)

"… there should be good coordination between the CPD coordinator at the [hospital level] and the medical council [CPD desk officer], so that we should own [CPD and] we should feel the importance of CPD, these are some of the things which can be done [to improve] CPD activities [participation]." (Radiographer 13)

"… *the radiographers association should have an annual events calendar and communicate to the radiographers, like early January throughout the year, on such date we will have radiation safety training, on such date we will have chest x-ray interpretation and so on, so that someone can prepare in advance to participate …"* (Radiographer 8)

Discussion

Implementing strategies to overcome barriers to radiographers' engagement in CPD activities can potentially improve radiographers' participation.[7,12] The study findings reveal that targeted interventions may yield significant improvements in radiographers' participation in CPD, thereby enhancing their professional development and contributing to improved healthcare outcomes. By identifying and addressing the obstacles that hinder CPD engagement, radiographers, employers and the professional body can collaborate to create effective solutions, ultimately promoting a culture of lifelong learning in the radiography profession.

One of the findings of the study is that attitude and motivation are critical components in CPD participation, alleviating attitudinal barriers through motivation and preparing relevant topics is an opportunity that can enhance engagement of radiographers in CPD. By preparing relevant topics and identifying learning needs, employers and the professional body can foster a positive attitude towards CPD engagement. This approach can enhance motivation and willingness to participate in CPD activities. Participants also emphasized the need for radiographers to cultivate an intrinsic desire to learn and acquire new knowledge rather than relying solely on existing generic knowledge. This is consistent with earlier research showing that addressing issues that hinder radiographers' engagement will result in prioritizing and willingness to use personal time for CPD activities. Additionally, motivation plays a crucial role in encouraging radiographers to be proactive and innovative in identifying and implementing CPD activities thereby promoting a culture of lifelong learning.[6,15,28] Overcoming challenges from the perspective of individual radiographers can help encourage engagement in CPD activities.

Another finding of this study is that employers' support through the provision of incentives and funding towards CPD activities motivates engagement in CPD. Additionally, enhancing accessibility to CPD activities is vital for overcoming physical barriers. By providing flexible scheduling, funding, and incentives, employers can create an environment that supports participation in CPD, ultimately leading to improved professional development and quality health care. This is consistent with previous studies where participants believed that professionals will strive to acquire competencies required for professional advancement if physical barriers are alleviated.[6,12] A study with radiographers from various disciplines found that scheduling CPD activities at the convenience of radiographers improves participation. Employers' support through the provision of incentives and funding towards CPD activities motivates engagement in CPD.[12] Again, the need for radiographers to collaborate with providers of CPD to allocate flexible CPD options was indicated as one crucial approach in alleviating physical barriers.[6,12] Alleviating physical barriers to

CPD engagement is one strategy in ultimately improving the engagement of radiographers in CPD learning activities.

Apart from that, the findings of this study propose that collaboration between radiographers, radiography training institutions, hospitals, employers, the regulatory body and the professional body on the development of CPD programmes, CPD policy implementation, and CPD requirements enforcement could help improve participation. By providing dedicated time for CPD, offering mentorship programmes, encouraging teamwork, relief from heavy workloads and availability of support from organisational leadership towards CPD engagement, employers can create an organisational culture that promotes CPD engagement. The proposed strategies align with previous research highlighting the importance of employers and professional bodies establishing policies and frameworks that foster an organisational culture and professional environment conducive to CPD engagement, thereby promoting ongoing learning and professional growth.[29–31] Additionally, the findings correspond with earlier studies where it was established that the Society of Radiographers plays a key role in supporting the education, continuous learning, and professional development of its members.[29,32] Again, the need to partner with tertiary institutions when developing CPD activities was emphasized as another strategy to improve the engagement of radiographers in CPD.[33] Establishing organisational support to mitigate structural barriers can create a conducive environment that fosters radiographers' participation in CPD, ultimately leading to improved job satisfaction and enhanced quality of service provision in radiography.

Study limitations

This study, being qualitative research, the findings are limited by its geographical scope to Lilongwe district; hence, generalisability may not be an expected attribute. The study's reliance on in-depth interviews conducted by the researcher may be subject to interview bias. Additionally, the limited number of employers and the professional body participants may limit the effectiveness of proposed strategies. Furthermore, the study relied on participants' self-reported experiences and perceptions, which may be subject to biases or inaccuracies.

Conclusion

The findings bring to light mitigating strategies to help alleviate barriers to radiographers' engagement in CPD activities and ultimately improve the engagement of radiographers. Previous findings support the need to alleviate barriers to radiographers' engagement in CPD; however, the focus was on other health professionals and those that focused on radiographers concentrated on radiographers alone. However, this study focused on the three stakeholders: radiographers, employers and the professional body. These stakeholders unveil mitigating strategies that can help improve the engagement of radiographers in CPD activities and ultimately lead to improved quality of service delivery in radiography.

The Ministry of Health (MOH) in Malawi should review the implementation of CPD policies as indicated by participants in this study. The Radiographers Association of Malawi is to review the CPD adherence policy for its registrants. This study engaged three stakeholder groups: radiographers, employers, and the professional body. A quantitative study to include radiographers, professional bodies, employers, and regulators to have a complete understanding of the barriers to CPD in radiography should be conducted. A similar study should be conducted in other districts of Malawi to ascertain if similar barriers exist to strengthen the suggestions that are made in this study. The implementation of the mandatory engagement policy in CPD being provided by the MCM should be reviewed.

Animal welfare

N/A.

Informed consent

Informed consent was obtained from all participants before conducting the interviews.

Ethics approval

Ethical approval to conduct this study was granted by Durban University of Technology and the Institutional Research and Ethics Committee (IREC 065/23). Furthermore, ethical clearance was obtained from the Department of Health Sciences Research at the Ministry of Health in Malawi (23/06/4074).

Availability of data

Data required for this study may be made available by the author(s) upon reasonable request.

Author contributions

PB*&PB: Conceptualisation.
PB*&PB: Methodology.
PB*&PB: Validation.
PB*&PB: Formal Analysis.
PB*&PB: Investigation.
PB*&PB: Resources.
PB*&PB: Writing - Original Draft.
PB*&PB: Writing - Review & Editing.
PB*&PB: Visualisation.
PB*&PB: Supervision.
PB*&PB: Project Administration.

Generative AI use

Not applicable.

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Conflicts of interest

The authors declare that they have no competing interests.

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