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Evaluating the integration of assistive devices in occupational therapy across North India

Shivani Bhardwaj*, Bilal Ahmed, Saba Irem, Saqueba Shahi, Nikhat Sultana

Department of Occupational Therapy, SAHSR, Jamia Hamdard University, India.

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ABSTRACT

Background: Assistive devices (ADs) are central to occupational therapy (OT) for enhancing independence and participation, yet their use in North India remains underexplored.

Objectives: This study aimed to evaluate how occupational therapists in North India utilize assistive devices, their level of knowledge and training, and the barriers influencing ADs prescription. Understanding these patterns is essential, as improved ADs integration can strengthen rehabilitation outcomes, reduce long-term disability burden.

Materials and methods: A descriptive cross-sectional survey was conducted using a structured, self-administered questionnaire developed from existing literature and validated by three OT experts. The instrument captured demographic details, types and frequency of assistive devices (ADs) use, knowledge and training related to ADs, and perceived barriers. Participants were recruited through purposive and snowball sampling across hospitals, rehabilitation centers, community health facilities, and private clinics in North India. Data were collected online via Google Forms over a three-month period, and descriptive and chi-square analyses were performed.

Results: A total of 51 occupational therapists participated in the study. Mobility and self-care devices were the most frequently prescribed, with 88.2% of respondents reporting some level of ADs use. Major barriers included limited availability (37%), lack of training (25%), high cost (21%), and client reluctance (17%).

Conclusion: Although occupational therapists value ADs, systemic and cultural challenges limit their integration. Improved training, access to affordable devices, and contextually relevant strategies are needed to optimize ADs use in OT across North India.

Introduction

Assistive devices (ADs) are an essential component of modern rehabilitation practice. They encompass a wide range of tools, equipment, and technologies that support individuals with disabilities in performing activities of daily living, participating in education, maintaining employment, and engaging in social life.[1] The World Health Organization (WHO) estimates that more than 2.5 billion people globally require one or more assistive products, a figure projected to rise to 3.5 billion by 2050.[2] Yet, despite this need, only about 10% of people worldwide currently have access to Ads.[2,3] This inequity highlights a critical challenge in rehabilitation and public health.

* **Corresponding contributor.**
Author's Address: *Department of Occupational Therapy, SAHSR, Jamia Hamdard University, India*
E-mail address: Shivani@jamiahamdard.ac.in
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In occupational therapy (OT), ADs are central to practice because they directly address limitations in self-care, productivity, and leisure, the three core areas of occupational performance. OT practitioners prescribe, adapt, and train clients in the use of ADs such as mobility aids, self-care tools, communication devices, and environmental modifications.[4] A growing body of research demonstrates that ADs improve functional independence, reduce caregiver burden, and enhance quality of life for individuals with physical, sensory, or cognitive impairments.[5-7] Furthermore, ADs are cost-effective interventions: by enabling independence, they reduce long-term health expenditures and reliance on institutional care.[8]

Despite these documented benefits, challenges to ADs integration persist worldwide. In high-income countries, barriers often relate to device design, training needs, and user adherence.[9] In contrast, in low- and middle-income countries (LMICs), systemic issues such as high costs, limited production, weak supply chains, and sociocultural stigma create significant obstacles.[10-12] A scoping review of global ADs access reported that affordability and lack of trained professionals are the two most frequently cited barriers in LMICs.[13] Additionally, inappropriate devices that do not match users' cultural or environmental contexts often result in abandonment.[14]

The global discourse has increasingly recognized assistive technology as a human right. The 2022 WHO-UNICEF Global Report on Assistive Technology (GReAT) emphasized the need for universal access to ADs as part of primary health care.[2] This framework stresses integration of ADs services into rehabilitation systems, development of national assistive technology policies, and inclusion of assistive products in universal health coverage packages. Occupational therapists are pivotal to this agenda, as they are trained to assess functional needs, select appropriate devices, and facilitate their effective use.[15]

In recent years, research in diverse regions has provided insights into ADs utilization. For example, studies from Europe and North America indicate that ADs significantly reduce participation restrictions among older adults and those with chronic illnesses.[16,17] In Scandinavian countries, policies that guarantee ADs provision as part of welfare systems have led to high levels of user satisfaction.[18] Conversely, research in Africa, Latin America, and South Asia reveals major disparities in availability and use.[19-21] In these regions, access to ADs is frequently dependent on non-governmental organisations or charity program rather than systematic public provision.[22]

In the Indian context, the situation mirrors these LMIC challenges but with unique regional variations. India has an estimated 26.8 million people with disabilities, representing 2.2% of the population.[23] Many of these individuals would benefit from ADs, yet only a small fraction has consistent access.[24] Government schemes such as the Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliances (ADIP) program have attempted to bridge this gap, but distribution is uneven and often limited to mobility aids.[25] Studies have shown that rural populations, women, and people from lower socioeconomic strata are disproportionately underserved.[26,27]

Occupational therapy has been practiced in India since the mid-20th century, with a growing workforce concentrated in urban centers.[28] Indian occupational therapists are increasingly engaged in ADs prescription, particularly for individuals with neurological, musculoskeletal, and developmental disabilities.[29] However, professional challenges remain, including limited exposure to assistive technology in undergraduate curricula, inadequate clinical training, and lack of interdisciplinary collaboration.[30] Research from Tamil Nadu and Maharashtra suggests that although therapists recognize the importance of ADs, their use is often restricted by limited availability and client reluctance.[31,32] Stigma associated with disability and assistive product use is a further cultural barrier that reduces acceptance.[33]

Within this broader national picture, North India presents specific challenges. The region comprises several populous states with diverse socioeconomic conditions, including rural, peri-urban, and metropolitan areas. Rehabilitation services are unevenly distributed, with well-resourced tertiary centers in metropolitan cities and severe shortages in rural districts.[34] Occupational therapy practice is largely concentrated in pediatric and physical dysfunction specialties, with limited infrastructure for community-based rehabilitation.[35] However, systematic evidence on ADs integration in OT practice in this region is scarce.

Research gaps are notable in three areas. First, there is limited data on the types of ADs most prescribed by occupational therapists in North India. Second, little is known about therapists' knowledge, training, and perceptions regarding ADs. Finally, few studies have examined the systemic and cultural barriers that restrict effective integration. Without such evidence, efforts to improve access and build capacity remain fragmented. Therefore, the present study was designed as a cross-sectional study to evaluate the integration of ADs into occupational therapy practice in North India.

Specifically, the study aimed to a) describe the frequency and types of ADs prescribed, b) assess occupational therapists' knowledge and training, c) identify barriers to ADs utilization, and d) examine associations between therapist demographics, practice characteristics, and ADs prescription. By addressing these objectives, this study contributes to the growing evidence base on assistive technology in LMICs and offers insights to guide policy, education, and clinical practice in the Indian context.

Materials and methods

This study employed a descriptive, analytical cross-sectional design, suitable for assessing practices,

perceptions, and barriers related to the use of ADs among occupational therapists. The study was conducted in North India, encompassing multiple states with varied socioeconomic contexts. Occupational therapists were recruited from hospitals, rehabilitation institutes, community health centers, and private clinics. Eligibility criteria included, Registered or practicing occupational therapists, Minimum of one year of professional experience, currently involved in clinical service provision.

Therapists working exclusively in administrative or academic roles without direct client care were excluded. A total of 51 occupational therapists participated, after accounting for exclusions due to incomplete responses.

Sampling and recruitment

Participants were recruited through purposive and snowball sampling. Invitations were distributed electronically via email, professional networks, and institutional contacts. To increase participation, follow-up reminders were sent after two weeks. The sampling strategy was chosen to ensure representation from both urban and semi-urban clinical contexts, given the uneven distribution of occupational therapy services in North India.

Sample size

To determine the required sample size for this study, we use the formula for a single proportion:

$$N = (Z^2 \times p \times (1 - p)) / E^2$$

where:

- N = required sample size
- Z = Z-score corresponding to the desired confidence level (1.96 for 95% confidence)
- p = Estimated proportion of occupational therapists aware of assistive technology Based on the previous study, 85% (0.85) of respondents have prescribed an assistive device.
- E = Margin of error (precision level, usually 10% or 0.10

Thus, the minimum required sample size for the study is 49 to ensure statistically reliable results with a 95% confidence level and a 10% margin of error.[36,37]

Data collection tool

Data were collected using a structured, self-administered questionnaire, developed following a review of existing literature on ADs use in rehabilitation. The tool included four domains: demographic details, types and frequency of ADs prescription, knowledge and training related to assistive technology, and perceived barriers. Its content validity was reviewed by three senior OT experts, yielding a scale-level CVI of 0.89. The questionnaire was pilot tested with five therapists to ensure clarity and usability, and internal consistency for key domains ranged from 0.74 to 0.82, indicating acceptable reliability.[35] Data were collected online via Google Forms over a three-month period (January-March 2024).

Procedure

The survey was administered in online formats. Online responses were collected through a secure Google Forms link. Informed consent was obtained electronically or in writing prior to participation.[38] On average, the questionnaire required 10-15 minutes to complete.

Statistical analysis

Data were coded and analyzed using IBM SPSS Statistics version 25.0. Descriptive statistics (frequency, percentages, means, and standard deviations) were computed to summaries demographic data, frequency of ADs use, and barriers reported. Inferential analyses included chi-square tests to examine associations between demographic/practice variables and ADs use. The significance level was set at $p<0.05$.

This approach allowed exploration of whether therapist experience, practice area, or workplace setting influenced ADs integration. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp. was used for statistical analysis. The frequency of categorical variables was reported using descriptive statistical analysis.

The total number of enrolled subjects in the study were 51. The descriptive analysis was done for each item. Analysis and interpretation were done in accordance with the objectives laid down for the study. The purpose of analysis is to reduce the data into an interpretable and meaningful form so that the result can be compared and significance can be identified.

Ethical considerations

The study adhered to the ethical principles outlined in the Declaration of Helsinki (2013 revision).[38] Participation was voluntary, and respondents were assured of confidentiality and anonymity. Data were stored securely and accessed only by the research team.

Results

Participant characteristics

A total of 51 occupational therapists participated. The majority were female (66.7%), with males comprising 33.3% (Table 1 and Figure 1). Most respondents had 1-5 years of experience (70.6%), followed by 6-10 years (15.7%), 11-20 years (11.8%), and >20 years (2.0%) (Table 2 and Figure 2). Regarding practice areas, pediatrics (60.78%) and physical dysfunction (35.3%) were the most represented specialties (Table 3). The practice areas included 31 participants working in pediatric settings, 18 in physical dysfunction (orthopedics/neurology), 1 in community-based rehabilitation, and 1 in the "other" category, who reported working as a home-based occupational therapist.

Table 1. Gender distribution of participants.

Gender	Number	Percent
Female	34	66.7
Male	17	33.3

Table 2. Years of professional experience.

Experience (years)	Number	Percent
1-5	36	70.6
6-10	8	15.7
11-20	6	11.7
>20	1	2.0

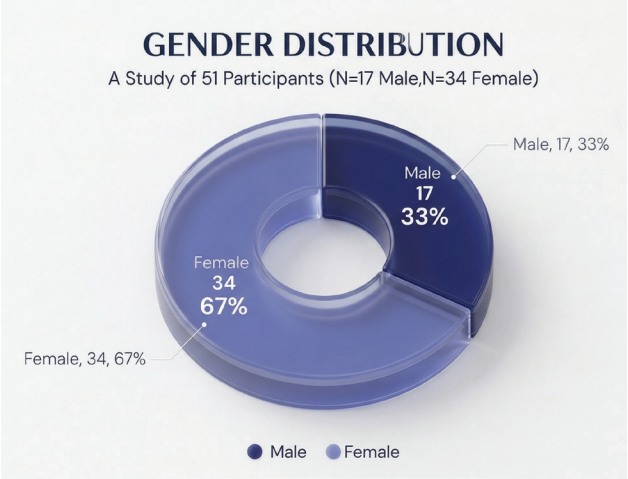


Figure 1. *Gender distribution of participants.*

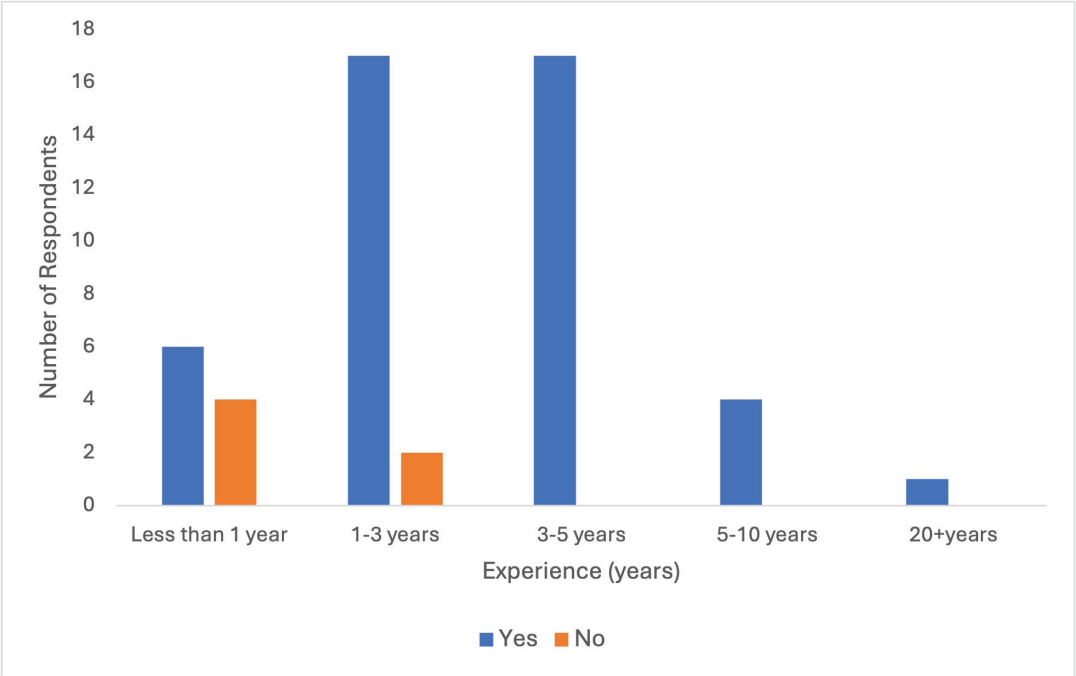


Figure 2. *Assistive devices prescription with years of professional experience.*

Table 3. Practice areas of participants.

Area of practice	Count	Percentage
Pediatrics	31	60.78
Physical dysfunction (orthopedics/neurology)	18	35.29
Others (please specify)	1	1.96
Community-based rehabilitation	1	1.96

Use of assistive devices

Out of 51 therapists, 88.2% reported prescribing assistive devices, while 11.8% had not. Frequency of prescription varied: "Sometimes" (47.1%) was most common, followed by "Rarely" (27.5%), "Often" (23.5%), and "Never" (2.0%) (Table 4 and Figure 3).

Table 4. Frequency of assistive device prescription.

Frequency	Count	Percent
Often	12	23.5
Sometimes	24	47.0
Rarely	14	27.5
Never	1	2.0

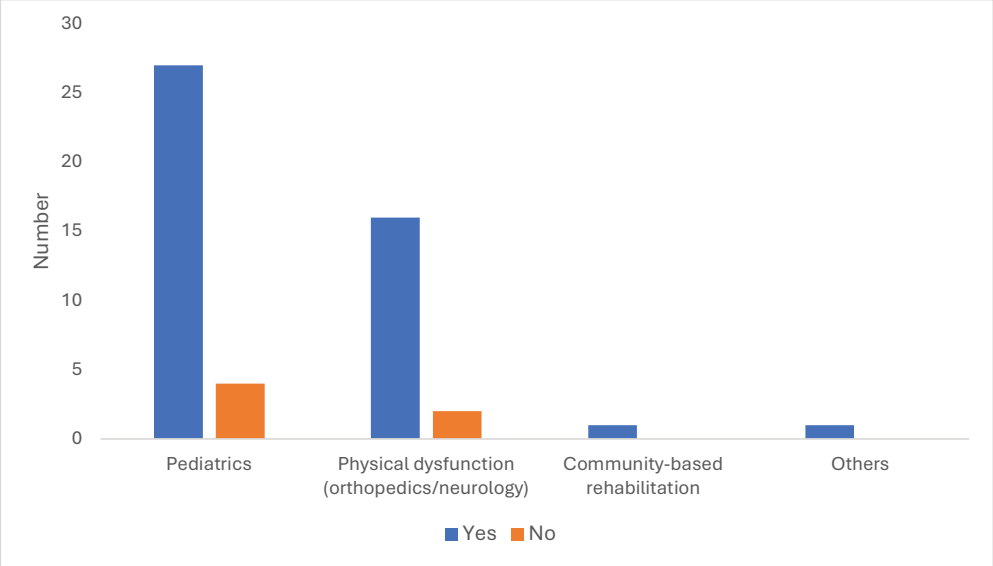


Figure 3. *Frequency of assistive device prescription by practice area.*

Barriers to integration

The most frequently reported barriers were limited availability (37%), lack of training (25%), high cost of devices (21%), and client reluctance due to stigma or cultural factors (17%) (Table 5 and Figure 4).

Table 5. Barriers to assistive device integration.

Barrier*	Percent
Limited availability	37
Lack of training	25
High cost	21
Client reluctance	17

Note: Multiple responses were chosen.

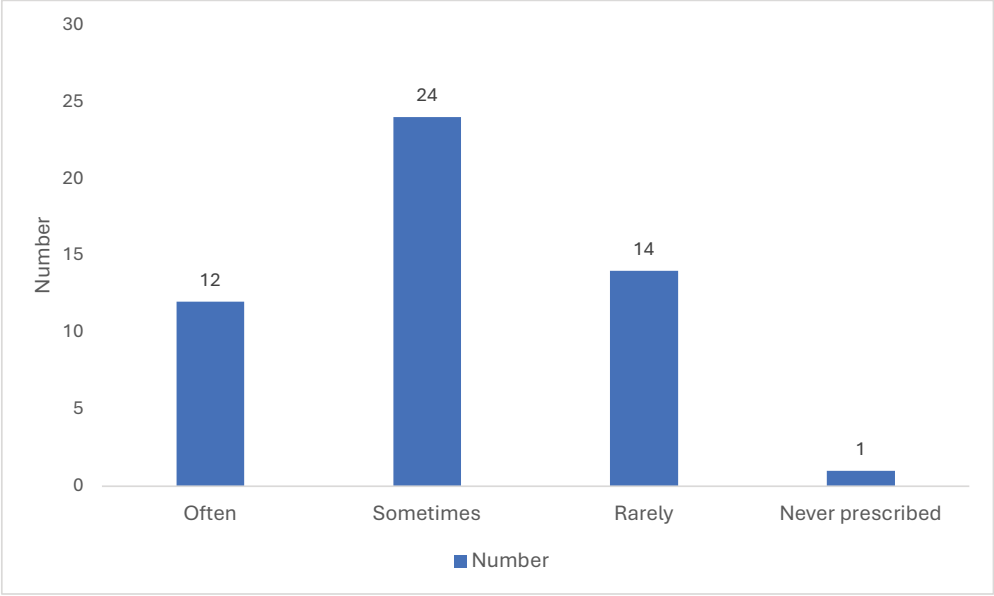


Figure 4. *Frequency of assistive devices prescription.*

Association with professional characteristics

Chi-square analysis revealed a significant relationship between years of experience and frequency of ADs prescription (χ^2=10.64, p=0.0309). Therapists with greater experience were more likely to prescribe ADs frequently. However, no significant relationship was found between practice area and ADs prescription (p=0.9576) (Table 6).

Table 6. Associations with professional characteristics.

Chi-square	*p* value	Degrees of Freedom	Significance
10.64	0.0309	4	Significant

Discussion

This study evaluated the integration of ADs in occupational therapy (OT) practice in North India. Findings indicate that while most occupational therapists prescribe ADs, usage is not yet routine, with most reporting that they prescribe "sometimes" rather than consistently. Mobility and self-care devices were the most prescribed, which aligns with international evidence highlighting mobility aids as the most widely used and accepted category of assistive products.[17,22]

A critical observation was the significant association between therapist experience and likelihood of prescribing ADs. This suggests that clinical exposure and accumulated practice knowledge positively influence integration, echoing earlier findings that professional confidence and competence are crucial for effective ADs use.[9] Conversely, "Although no significant association was found between practice area and the frequency of ADs prescription, this result should be interpreted cautiously. Other descriptive data from other studies show that many commonly prescribed ADs (e.g., heavyweight writing utensils, pencil grips, and fine-motor grippers) are predominantly pediatric-focused, likely reflecting the higher proportion of therapists practicing in pediatrics in India. However, global literature consistently identifies older adults as the major consumer group for ADs, suggesting that ADs needs vary substantially across specialties. Because our sample included few practitioners from geriatric rehabilitation, the study may not have fully captured specialty-specific prescribing trends.[34]

Reported barriers—limited availability, inadequate training, high device costs, and client reluctance-mirror challenges documented in other LMICs.[13,19] Limited device availability reflects weak supply chains and inconsistent governmental support, issues noted in both South Asia and sub-Saharan Africa.[11] The training gap underscores a broader concern regarding the limited inclusion of assistive technology in OT curricula in India, as reported by Arya and Pandey.[30] Cost and affordability remain central obstacles, with many families unable to purchase devices despite government schemes.[24] Finally, stigma and cultural reluctance remain significant deterrents to acceptance, consistent with qualitative evidence from India and other Asian contexts.[33]

Together, these findings reinforce the need for multipronged strategies to strengthen ADs integration. Education reforms should embed practical training on device assessment, selection, and customization. At a policy level, equitable distribution through national schemes such as ADIP must be improved, with broader coverage beyond mobility aids. Locally manufactured, cost-effective devices could reduce financial barriers. Finally, culturally sensitive awareness campaigns may improve acceptance among clients and caregivers.

Limitations

This study was cross-sectional, limiting causal inference. The sample size, although adequate for descriptive and chi-square analyses, was modest and region-specific, potentially limiting generalizability to all of India. Reliance on self-reported data may also have introduced reporting bias. Additionally, qualitative insights were limited, suggesting that future research should include interviews or focus groups to capture in-depth perspectives. One of the other limitations identified was that the questionnaire primarily focused on assistive device use in basic ADLs and did not comprehensively capture other occupational domains such as IADLs, work, education, and social participation, which may limit the understanding of the full scope of assistive device utilization in practice.

Conclusion

This cross-sectional study highlights that while occupational therapists in North India recognize the importance of ADs, their integration into routine practice remains inconsistent. Prescription is more frequent among experienced practitioners, suggesting that clinical exposure strongly influences utilization. However, systemic barriers-including limited availability, inadequate training, high device costs, and cultural reluctance-continue to restrict effective adoption. Addressing these challenges requires coordinated action through education, policy, and service delivery. Strengthening OT curricula with hands-on ADs training, expanding government schemes for equitable device provision, and promoting culturally sensitive awareness campaigns could substantially enhance ADs integration. Broader, multi-center research with larger samples is warranted to inform scalable interventions. Ultimately, improving access to and use of ADs has the potential to significantly enhance independence, participation, and quality of life for persons with disabilities in India.

Implications for rehabilitation

The findings of this study highlight the need for structured training programs that emphasize hands-on instruction in assistive devices (ADs) prescription, selection, and adaptation. Incorporating practical workshops, case-based learning, and supervised clinical exposure into undergraduate, postgraduate, and continuing professional development programs may enhance occupational therapists' competence and confidence in AD-related decision-making. Such training can directly improve the appropriateness and effectiveness of device prescription in diverse clinical settings.

In low-resource contexts, the promotion of affordable and locally produced assistive devices may help address financial barriers faced by clients. Collaboration between occupational therapists, local manufacturers, and rehabilitation engineers can support the development of cost-effective, culturally appropriate devices, thereby improving accessibility and long-term device use.

At the systems level, expansion and strengthening of national assistive device schemes are necessary to ensure equitable access across regions and practice settings. Policy initiatives that integrate occupational therapists into procurement, prescription, and follow-up processes may enhance service delivery and reduce disparities in device provision.

Finally, public awareness initiatives led by rehabilitation professionals can play a critical role in reducing stigma and improving client and family acceptance of assistive devices. Education through community outreach, counselling, and advocacy may promote positive attitudes toward ADs use, ultimately supporting participation in daily activities and social inclusion.

Ethical approval

Ethical clearances not required & Informed written consent taken from all subjects.

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Conflict of interest

'The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article'.

CRediT authorship contribution statement

All authors have equally contributed to this research.

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