

Awareness and perception of open access among researchers in Indian higher education

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ABSTRACT

Open-access scholarly literature has increased in significance in terms of accessing and disseminating information and research and development activities in Indian higher education. Consequently, this study was conducted to understand the awareness and use of open-access scholarly communication among research scholars in Indian higher education. The study employed a combination of multi-stage cluster sampling and simple random sampling as its methodological framework. The study's participants included researchers from six universities with potential for excellence (UPE) universities, who were tasked with data collection. The study identified a total population of 3,218. The Qualtrics sample size calculator was a tool that can be used to determine the minimum number of samples required to achieve a desired sample size of 344. The study's findings revealed the growing awareness of open-access literature among researchers in higher education. However, the level of acceptance of this concept among scholars varied depending on the specific discipline. The study's findings indicated that research scholars held a favorable perception of open access. The study found that open-access resources, including Google Scholar (96.95%), SpringerOpen (90.30%), Sci-Hub (90.02%), Open Science Elsevier (86.7%), Wiley Open Access (82.82%), Shodhganga (71.46%), and PubMed Central (68.97%), have garnered over 50% awareness among research scholars. The study observed that the majority of respondents access open scholarly literature for their research work (92.5%) and paper writing (78.1%). The study demonstrated that research scholars concurred on the positive impact of open access on their research. Specifically, the scholars acknowledged that open access increased research paper visibility, improved access to education, facilitated wider circulation of research papers, and increased citations. By addressing the challenges associated with open access and by engaging in training opportunities, we can achieve excellence in the realm of open-access scholarship, information dissemination, and collaboration.

KEYWORDS: open access; scholarly communication; open-access literature; user study; higher education; UPE universities.

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1. INTRODUCTION

OPEN ACCESS has had a profound impact on the landscape of scholarly communication, influencing both the ease of access to information and the dissemination of research findings (Kankam *et al.*, 2024). The open access movement endeavors to provide unrestricted access to scholarly research, thereby democratizing information and expanding the reach of scientific productions. As the digital era progresses, the significance of open access becomes increasingly evident, fostering enhanced collaboration, novel ideas, and inclusivity within the global scientific community (Thibault *et al.*, 2023). Conventionally, access to scholarly journals was restricted by subscription costs, thereby limiting readership primarily to institutions that could cover these expenses. Open access eliminates these monetary obstacles by permitting any person with internet access to read, review, and use the research results (Björk, 2004). This development has been predominantly advantageous for researchers in underdeveloped nations or in smaller organizations, where financial support for subscriptions may be inadequate.

A body of research indicates that underdeveloped countries tend to publish and refer to open-access research results at higher rates in comparison to developed countries (Iyandemye & Thomas, 2019; Karlström *et al.*, 2024). This tendency underscores the significance of facilitating unrestricted access to expertise from research scholars in underrepresented nations, thereby enabling them to disseminate their research findings to a global audience that might otherwise overlook their contributions (Piwowar *et al.*, 2018). The benefits of open access extend beyond research scholars, encompassing policy designers, consultants, and the general public. It facilitates the development of widely accepted judgments that reinforce recent scientific findings (National Academies of Sciences *et al.*, 2018). Notwithstanding the advantages of open-access models, challenges persist in their extensive implementation. Concerns regarding factors such as grants for publication costs, fluctuations in organizational support levels, and challenges related to quality management persist in influencing its intake (Vervoort *et al.*, 2021). To address these issues,

it is imperative that research scholars, organizations, funding bodies, and governing bodies commit to a diligent and sustained effort. This collective effort is crucial to fostering an environment that fosters morality and to establishing open access as the prevailing standard in scientific communication.

2. RELATED LITERATURE

Sahu and Arya (2013) examined the evolution of open-access initiatives in India, concluding that open-access publishing and awareness have seen significant growth in recent years. A review of research on open-access awareness and usage in Indian higher education reveals a combination of findings. Recent studies indicate a high level of awareness among researchers regarding open-access resources (Hadagali & Gurikar, 2020; Nagaraj & Bhandi, 2016). Dulle and Minishi-Majanja (2009) reveal that university research scholars would prefer to access open-access scholarly literature for their research work rather than disseminate their own published research findings in open access. The prevailing sentiment among researchers is in favor of open access; however, concerns regarding quality control, authenticity, and ownership have been expressed. Another study by Mammo and Ngulube (2015) found that university researchers viewed open access as an alternative model to traditional subscription-based content. It was further anticipated that library professionals would disseminate and advocate for the utilization and accessibility of open-access literature. A study revealed that 81.5% of research scholars were aware of open-access literature. Many of these scholars employed it for various academic purposes, including research activity and knowledge updating (Singh & Arya, 2023).

According to the findings of Ofua (2023), 65% of the respondents indicated that they became acquainted with the concept of open access by attending conferences and workshops. Furthermore, 63% of respondents who sought out open-access resources encountered them online. Additionally, 59.5% of respondents reported learning about open access from colleagues and their peers. The concept of open access is gaining traction due to its simplicity and the increasing accessibility of global research,

which has resulted in a significant increase in citations (Mangai & Ganesan, 2023; Palla *et al.*, 2022). However, factors such as a lack of familiarity with open-access journals, substantial publication fees, and copyright concerns impede the adoption of these practices (Mangai & Ganesan, 2023; Palla *et al.*, 2022). Students require guidance from instructors when utilizing open-access resources (Sahu & Arya, 2013). To address these challenges, recommendations have been made, including increasing awareness through institutional efforts, promoting open-access publishing, and developing literacy instructions (Mangai & Ganesan, 2023; Palla *et al.*, 2022). A comprehensive review of extant literature indicates that while open access is gaining traction in the Indian higher education sector, there is considerable room for improvement with respect to awareness and utilization.

3. RESEARCH OBJECTIVES

Research objectives constitute a critical component of any research study. The primary objective of this study is to evaluate the awareness, perception, and utilization of open-access scholarly literature among research scholars in India. The specific objectives are to:

- Evaluate the awareness of selected open-access resources by the research scholars.
- Determine the perception of open-access scholarly communication among research scholars.
- Examine the impact of open-access literature on the research of scholars.
- Evaluate the problems faced while using open access.

4. HYPOTHESIS

H₁: A notable disparity exists in the awareness of open-access resources among research scholars.

5. METHODOLOGY

The study employs a combination of multistage cluster sampling and simple random sampling. A select group of six universities has been identified as universities with potential for excellence (UPE). The 15 UPE universities have been

formally recognized by the University Grant Commission (UGC), India, as part of the XII five-year plan. These universities have demonstrated exceptional performance in a particular domain of research, as evidenced by their consistent success in specific academic fields (Ministry of Education, 2025). Specifically, the institutions include Banaras Hindu University (BHU), Varanasi, from the Central zone (with a focus on materials and genomics and proteomics); Jadavpur University (JU), Kolkata, from the Eastern zone (with a focus on nanoscience and mobile computing); Jawaharlal Nehru University (JNU), New Delhi, from the Northern zone (with a focus on genetics, genomics, and biotechnology); University of Hyderabad (UOH), Hyderabad, from the Southern zone (with a focus on interface studies and research); North Eastern Hill University (NEHU), Shillong, from the North-Eastern zone (with a focus on biosciences and area studies); and Savitribai Phule Pune University (SPPU), Pune, from the Western zone (with a focus on biochemistry and biotechnology). Consequently, UPE universities were allocated financial resources to facilitate their comprehensive development.

The efficacy of survey research is predicated on its capacity to efficiently collect data from a substantial sample size, thereby providing insights into public opinion, behaviors, and demographic characteristics. The study employed a survey method to collect data from respondents. The online questionnaire was prepared using Google Forms. The instrument under review consists of closed-ended questions, including multiple-choice and Likert scale responses. The questions were meticulously organized to circumvent any potential bias and ensure optimal clarity. The study identified a total of 3,218 subjects in the study population. The Qualtrics sample size calculator is a tool that can be used to determine the minimum number of samples required to achieve a desired sample size of 344. The email addresses of the research scholars were collected, and questionnaires were mailed to them and subsequently returned, yielding a total of 414 responses. The curation and coding of the data were conducted using MS Excel. Following the organization of the datasets, it was determined that a total of 53 responses were deemed redundant or invalid. The remaining 361 responses were subsequently utilized for

the study. The open-source statistical software Jamovi was utilized for the analysis of descriptive statistics, the testing of hypotheses, and the data tabulation. The Zotero software was utilized for the management of references and citations.

6. RESULTS INTERPRETATION AND ANALYSIS

6.1. Demography

Table 1 presents the demographic information of the respondents. The total number of respondents is 361, with 52.35% (189) identifying as

male and 47.65% (172) identifying as female. The mean score of JNU ($M = 1.65$) and SPPU ($M = 1.51$) indicates that a greater proportion of female respondents compared to male respondents have responded in these two universities. The table also reveals the designation-wise distribution of respondents, out of which 91.69% of respondents are PhD scholars, followed by postdoctoral fellows (PDF) (4.43%), project fellows (3.32%), and research assistants (0.55%). The table also indicates the distribution of respondents' age groups; the majority of them fall under the age group of 25-27 (35.18%) years, followed by ≥ 31 years (32.41%), 28-30 years (26.32%), and 21-24 years age group (6.09%).

University	(N=361)	BHU (n=86)	JNU (n=66)	JU (n=55)	NEHU (n=40)	SPPU (n=45)	UOH (n=69)
Gender							
Male	189	47	23	37	23	22	37
Female	172	39	43	18	17	23	32
Mean		1.45	1.65	1.33	1.43	1.51	1.46
Designation							
PDF	16	5	3	5	1	1	1
PhD scholar	331	78	62	49	34	42	66
Project fellow	12	3	0	1	5	1	2
Research assistant	2	0	1	0	0	1	0
Age group (years)							
21-24	22	8	3	4	3	3	1
25-27	127	36	30	14	14	10	23
28-30	95	26	17	14	8	11	19
≥ 31	117	16	16	23	15	21	26
Note: 1 = Male; 2 = Female							

Table 1. Demographic information.

6.2. Open access awareness

Table 2 discloses the awareness and usage of open-access resources among research

scholars. The majority of researchers are aware of and utilize open-access resources (70.36%), while the remaining researchers are aware of these resources but have never employed

University name	Yes, I use often	Aware, but never used	Mean	SD
BHU	67	19	1.22	0.417
JNU	51	15	1.23	0.422
JU	40	15	1.27	0.449
NEHU	25	15	1.38	0.49
SPPU	29	16	1.36	0.484
UOH	42	27	1.39	0.492

Note: 1 = Yes, I use often; 2 = Aware, but never used. SD: Standard deviation.

Table 2. Awareness and use of open-access resources.

them. The researchers from BHU ($M = 1.22$, $SD = 0.417$), JNU ($M = 1.23$, $SD = 0.422$), and JU ($M = 1.27$, $SD = 0.449$) demonstrated heightened awareness and exhibited a greater propensity for utilizing open access among

research scholars from six UPE universities. The UOH ($M = 1.39$, $SD = 0.492$) and NEHU ($M = 1.38$, $SD = 0.49$) have the least awareness and use of open-access resources among the six UPE universities.

Open-access resources	Mean	SD	One sample t-test	p
Google Scholar	0.9695	0.172	107.03	<0.001
SpringerOpen	0.903	0.296	57.91	<0.001
Sci-Hub	0.903	0.296	57.91	<0.001
Open Science Elsevier	0.867	0.34	48.45	<0.001
Wiley Open Access	0.8283	0.378	41.67	<0.001
Shodhganga	0.7147	0.452	30.03	<0.001
PubMed Central	0.6898	0.463	28.29	<0.001
Indian Academy of Sciences Journals	0.5596	0.497	21.39	<0.001
PLoS Journals	0.554	0.498	21.15	<0.001
SWAYAM	0.5457	0.499	20.8	<0.001
National Science Digital Library of India	0.4931	0.501	18.71	<0.001
National Digital library of India	0.4737	0.5	18	<0.001
LibGen	0.4737	0.5	18	<0.001
World Digital Library	0.4488	0.498	17.12	<0.001
BioMed Central	0.4432	0.497	16.93	<0.001
Directory of Open Access Journals (DOAJ)	0.4238	0.495	16.27	<0.001
Semantic Scholar	0.3795	0.486	14.84	<0.001
Open book publishers	0.3657	0.482	14.41	<0.001
E-PG Pathashala	0.3407	0.475	13.64	<0.001
Directory of Open Access Repositories (OpenDOAR)	0.3296	0.471	13.31	<0.001
ArXiv.org	0.3213	0.468	13.06	<0.001
E-Gynakosha	0.3158	0.465	12.89	<0.001
CSIR Repositories	0.3075	0.462	12.64	<0.001
MIT OpenCourseWare	0.2881	0.454	12.07	<0.001
Microsoft Academic	0.2548	0.436	11.1	<0.001
Directory of Open Access Books (DOAB)	0.2438	0.43	10.77	<0.001
CSIR-NISCAIR Online Periodicals	0.2216	0.416	10.12	<0.001
Registry of Open Access Repositories	0.2161	0.412	9.96	<0.001
CiteSeerX	0.1773	0.382	8.81	<0.001
CSIR Listing of Open Access DataBases	0.1662	0.373	8.47	<0.001
ePrints@IISc repository	0.1607	0.368	8.3	<0.001
Creative Commons	0.1607	0.368	8.3	<0.001
OAPEN Library	0.1468	0.354	7.87	<0.001
Project Gutenberg	0.1385	0.346	7.61	<0.001
Bioline International	0.1191	0.324	6.98	<0.001
Carnegie Mellon University Open Learning Initiative	0.097	0.296	6.22	<0.001
NDLTD	0.0886	0.285	5.92	<0.001
Bielefeld Academic Search Engine (BASE)	0.0831	0.276	5.71	<0.001
Budapest Open Access Initiatives	0.0831	0.276	5.71	<0.001
SHERPA Project-RoMEO/JULIET	0.0831	0.276	5.71	<0.001
Berlin Declaration	0.0665	0.249	5.06	<0.001
re3data.org	0.0582	0.234	4.72	<0.001

Note: $H_a \mu \neq 0$. 1 = Aware; 0 = Not aware. SD: Standard deviation.

Table 3. Awareness of selected open-access resources.

6.2. Awareness of selected open-access resources

As illustrated in Table 3, a survey was conducted to assess the awareness of research scholars regarding selected open-access resources. A comprehensive array of open-access resources has been requested, encompassing open-access repositories, journals, books, initiatives, courseware, tools, and databases, among others. The mean score of the table shows that Google Scholar ($M = 0.9695$, $SD = 0.172$), SpringerOpen ($M = 0.903$, $SD = 0.296$), Sci-Hub ($M = 0.903$, $SD = 0.296$), Open Science Elsevier ($M = 0.867$, $SD = 0.34$), Wiley Open Access ($M = 0.8283$, $SD = 0.378$), Shodhganga ($M = 0.7147$, $SD = 0.452$), PubMed Central ($M = 0.6898$, $SD = 0.463$), Indian Academy of Sciences Journals ($M = 0.5596$, $SD = 0.497$), PLoS Journals ($M = 0.554$, $SD = 0.498$), SWAYAM ($M = 0.5457$, $SD = 0.499$) are widely aware open-access resources. Conversely, re3data.org ($M = 0.0582$, $SD = 0.234$), the Berlin Declaration ($M = 0.0665$, $SD = 0.249$), the SHERPA Project-RoMEO/JULIET ($M = 0.0831$, $SD = 0.276$), the Budapest Open Access Initiatives ($M = 0.0831$, $SD = 0.276$), and the Bielefeld Academic Search Engine (BASE) ($M = 0.0831$, $SD = 0.276$) are the least aware open-access resources among the listed information resources.

6.3. Perceptions on open access

As illustrated in Table 4, the respondents' perceptions of open-access scholarly communication are elucidated. The results of the study indicate that research scholars have a favorable opinion of open access. The mean of the given statements indicates that researchers have reached a consensus on positive statements and a consensus on negative statements regarding open access. The mean score of the statements indicates that open-access resources are beneficial for research ($M = 1.61$, $SD = 0.723$), that every institution should adopt an open-access policy ($M = 1.62$, $SD = 0.783$), that open access offers greater visibility compared to subscribed journals ($M = 1.71$, $SD = 0.777$), that open access is a valuable resource for research in developing countries ($M = 1.72$, $SD = 0.847$), that open access facilitates collaborative research ($M = 1.77$, $SD = 0.757$), and that open-access journals have a larger readership compared to subscribed journals ($M = 1.82$, $SD = 0.828$). Researchers have expressed positive agreement with these statements. Conversely, the statements made by researchers have indicated a paucity of quality in open access resources ($M = 3.02$, $SD = 1.03$) and the absence of fundamental benefits derived from open-access publications ($M = 3.41$, $SD = 1.015$).

Open-access statements	Mean	SD
Open-access resources are helpful for research	1.61	0.723
Every institution should have open-access policy	1.62	0.783
Open access offers higher visibility than subscribed journals	1.71	0.777
Open access is gift for developing country research	1.72	0.847
Open access is open door for collaborative research	1.77	0.757
Open-access journals have a larger readership than subscribed journals	1.82	0.828
Open access enables public-funded research available for public freely	1.85	0.84
I need training and orientation on open-access resources	1.95	0.934
Open access is a bridge between information haves and have nots	1.97	0.797
Open-access journals attract more citation than subscribed journals	2.00	0.944
Open-access journals have faster publication than subscribed journals	2.27	0.905
Open access avoids duplication of research	2.27	0.919
Commercial publications have no future	2.69	1.037
Open access easy to plagiarize the contents	2.73	1.082
Undermines peer review process	2.86	0.967
Open-access resources are with lack of quality	3.02	1.03
No basic benefits from open-access publications	3.41	1.015
Note: 1 = Strongly agree; 2 = Agree; 3 = Uncertain; 4 = Disagree; 5 = Strongly disagree.		

Table 4. Perceptions on open-access scholarly communication.

6.4. Open access impact on research

As illustrated in Table 5, the impact of open-access literature on research is evident. The mean score of five statements has demonstrated that open-access literature impacts research. The findings suggest that the mean score of the following statement has a positive impact on research: increased visibility of the research paper ($M = 1.83$, $SD = 0.714$),

improved access to education ($M = 1.86$, $SD = 0.723$), wider circulation of the paper ($M = 1.89$, $SD = 0.739$), increased citations ($M = 1.92$, $SD = 0.771$), and improved quality and scope of research ($M = 1.96$, $SD = 0.772$). The mean scores of the statements, i.e., enable the opportunity for collaboration ($M = 2.02$, $SD = 0.804$) and strengthening scholarship ($M = 2.23$, $SD = 0.866$), are uncertain for respondents.

Impact of open access	Mean	SD
Increased the visibility of my research paper	1.83	0.714
Improving access to education	1.86	0.723
Wider circulation of my paper	1.89	0.739
Increased my citations	1.92	0.771
Improving quality and scope of research	1.96	0.772
Enable the opportunity for collaboration	2.02	0.804
Strengthening scholarship	2.23	0.866
Note: 1 = Strongly agree; 2 = Agree; 3 = Uncertain; 4 = Disagree; 5 = Strongly disagree.		

Table 5. Impact of open-access literature on research.

6.5. Problems of open access

As illustrated in Table 6, researchers encounter various challenges when attempting to access open-access resources. The mean score of the statement open access lack of quality of research papers ($M = 3.04$, $SD = 1.044$) was met with disagreement by the researchers. The mean scores for the remaining statements indicate a degree of uncertainty among respondents, suggesting

a lack of a cohesive platform for searching open-access sources ($M = 2.42$, $SD = 1.014$), a paucity of open-access sources relevant to their research topics ($M = 2.75$, $SD = 1.042$), and an experience of information overload ($M = 2.79$, $SD = 0.983$). Additionally, respondents reported a lack of time to search for open-access resources ($M = 2.96$, $SD = 1.02$) and a failure of open-access resources to appear in Google searches ($M = 2.96$, $SD = 1.061$).

Researchers problems	Mean	SD
No uniform platform to search open-access sources	2.42	1.014
Lack of open-access sources on my research topic	2.75	1.042
Information overload	2.79	0.983
Lack of time to search open-access resources	2.96	1.02
Open-access resources not appear in Google search	2.96	1.061
Lack of quality of research papers	3.04	1.044

Note: 1 = Strongly agree; 2 = Agree; 3 = Uncertain; 4 = Disagree; 5 = Strongly disagree.

Table 6. Researchers' problems while accessing open access.

7. DISCUSSION AND CONCLUSION

Research and development (R&D) in the field of higher education has been identified as a catalyst for national growth. Higher education is a significant contributor to the R&D sector,

accounting for 6.8% of the national R&D expenditure in 2017-2018 (Department of Science & Technology, 2020). A recent study has indicated a positive correlation between educational attainment and economic growth, as measured by gross domestic product (GDP),

as well as productivity levels. For instance, a study that examined data from 38 countries found that a higher percentage of the population with a higher degree of education is positively connected with economic performance, particularly in terms of social and economic growth (Li *et al.*, 2024). Information is a vital component of R&D, influencing knowledge acquisition, decision-making, collaboration, innovation capability, and the ability to overcome challenges (Asim & Sorooshian, 2019). Despite the fact that Sci-Hub is an infringing website, it is widely used by research scholars because it primarily offers access to millions of paywalled research articles. A study conducted by Valladares-Garrido *et al.* (2023) surveyed the use of Sci-Hub in Latin American nations, finding that it is particularly prevalent among medical students. The study revealed that 10.3% of respondents utilized the Sci-Hub website on a weekly basis.

The open-access paradigm signifies a substantial advancement in the realm of scholarly communication, promoting equitable access to research outputs (Cordón-García *et al.*, 2013). The objective of this study is to examine the awareness, attitude, and utilization of open-access scholarly communication among research scholars in India. A substantial body of research has been dedicated to assessing the awareness and stance of library users regarding open access. However, there is a paucity of research that has measured the awareness and use of a wide range of open-access information resources. Consequently, the study enumerated 42 open-access resources, including open-access journals, open-access books, open-access repositories, open courseware, mandates, and so forth. The study found that 10 open-access resources, including Google Scholar (96.95%), SpringerOpen (90.30%), Sci-Hub (90.02%), Open Science Elsevier (86.7%), Wiley Open Access (82.82%), Shodhganga (71.46%), PubMed Central (68.97%), Indian Academy of Sciences Journals (55.95%), PLoS Journals (55.4%), and SWAYAM (54.57%), account for 23.81% (10) of the total awareness among research scholars. The remaining 76.19% (32) of the open-access resources are known by less than 50% of the respondents. The study indicates that, while researchers have a high level of awareness

regarding open access, they are not cognizant of the extensive array of open-access information resources available.

The extant studies have examined the perception of open access (Mangai & Ganesan, 2023; Serrano-Vicente *et al.*, 2016; Turgut *et al.*, 2022). This study inquired about respondents' perceptions of open access by means of 17 statements designed to assess their attitudes. The study enumerates a range of statements, both positive and negative, concerning open access. The majority of respondents expressed agreement with the positive statements and disagreement with the negative statements. This finding indicates that researchers have come to accept the use of open access as a reliable source of information. The study observed that the majority of respondents access open scholarly literature for their research work (92.5%) and paper writing (78.1%). This conclusion was corroborated by subsequent investigations (Hadagali & Gurikar, 2020; Ross-Hellauer *et al.*, 2017). Despite their high level of awareness, researchers must continue their efforts to eliminate barriers to understanding different open-access models and copyright concerns. The implementation of open-access policies in academia would be facilitated by greater institutional backing. Accordingly, the study by Kankam *et al.* (2024) posits that open-access resources are better positioned to innovate successfully and significantly influence research funding by establishing requirements for how research outputs must be shared and disseminated.

The study's findings indicate that open-access literature exerts a favorable influence on research outcomes. The researchers posit that open-access literature offers enhanced visibility, facilitating wider access to education and a more extensive dissemination of research papers, which in turn increases citations. These findings are corroborated by the findings of seminal research studies (Ale Ebrahim & Bong, 2017; Majhi *et al.*, 2023; Soroya *et al.*, 2022). The study also affirms that no uniform platform is available to search all open-access resources on one platform, and the lack of availability of open-access sources on particular research topics are the major problems encountered by researchers. In essence, open access has evolved into a potent instrument

for augmenting the accessibility of information and cultivating a collaborative research environment. Open access has been demonstrated to enhance the dissemination of research findings, notwithstanding the persistent challenges posed by administrative procedures and quality control mechanisms. Open access has been demonstrated to have a multifaceted impact on the dissemination of information, with notable benefits including the democratization of knowledge and the acceleration of scientific progress and innovation across a wide range of disciplines.

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Conflict of interest

The author declares that author do not have any conflict of interest.

Statement of data consent

The type of data generated during the development of this study has been included in the manuscript.

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