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Evaluating the Impact of Zoo Visitation on Public Attitude towards Wildlife Conservation

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Abstract: This study investigates visitor experiences and their impact on wildlife conservation perceptions at a state zoological park. It is a crucial aspect of modern zoo functions that have evolved from mere entertainment venues to *ex-situ* conservation and education centers. Understanding how zoo visits shape public attitudes and actions toward wildlife is essential for effective conservation efforts. This research examines Animal-Visitor Interaction (AVI), acknowledging visitor presence's complex, positive, negative, or neutral impacts. A mixed-methods approach, incorporating structured questionnaires, observations, and pilot surveys were employed to collect data from 1200 visitors. The study assessed socio-demographic characteristics, visit frequency, motivations, satisfaction levels, changes in knowledge, attitudes, and perceptions regarding wildlife conservation before and after their zoo visit. Furthermore, visitor suggestions for improvement were gathered. The findings reveal a significant association between visit frequency, post-visit knowledge, and pro-conservation behavior. Overall, visitor satisfaction was high, although suggestions for enhancements included the addition of exotic species, availability of verbal guides, improved signage, eye-catching navigation, greater keeper engagement in animal welfare and conservation messaging, and enhanced public awareness initiatives. This research contributes valuable insights into zoo evaluation and its influence on visitor experiences, offering practical recommendations for strengthening zoological parks' educational and conservation impact.

Keywords: Animal-visitor interaction, Visitor experiences, Wildlife conservation, Zoo visitation, Sustainable Development Goals

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Introduction

Zoos have evolved from mere entertainment venues into critical institutions for wildlife

conservation and education (Fernandez *et al.*, 2009; Ikram and Khalid, 2025a). Amidst

increasing habitat loss and human-wildlife conflict, zoos are essential in cultivating public awareness, fostering positive interspecies relationships (Carr, 2016), and providing refuge for endangered species. They offer educational opportunities and contribute to conservation through research and public outreach (Fernandez *et al.*, 2009; Ikram and Khalid, 2025c).

The historical study of captive animals' dates back over 2300 years to Aristotle's "History of Animals." The term "zoo" gained prominence with the London Zoological Gardens (1828 for scientific study, 1847 for public access), and Carl Hagenbeck's Tierpark, Hagenbeck in Germany is recognized as the first modern zoo. Modern zoos, transcending their menagerie origins, are now pivotal in conservation, leveraging their expertise to support Sustainable Development Goals (SDGs 15.5, 15.7) and Global Biodiversity Framework (GBF) targets (Ikram and Khalid, 2025a).

Animal-visitor interaction (AVI), encompassing both direct and indirect encounters, is a common feature in zoos and aquaria, impacting both animals and visitors (Doodson *et al.*, 2024). AVIs, ranging from observation to physical contact, influence the visitor experience, defined as the impact of animals on visitors (Godinez and Fernandez, 2019; Fernandez and Chiew, 2021). This reciprocal effect can be assessed through various methods examining visitor attitudes, perceptions, behavior, and learning. Positive visitor experiences are crucial for cultivating long-term support for conservation and promoting pro-conservation behaviors, all while upholding high animal welfare standards (Chiew *et al.*, 2024).

The World Association of Zoos and Aquariums (WAZA, 2024) provides 26 AVI recommendations, with only seven addressing visitor-centric aspects like safety and responsible conservation messaging. Further research is needed to develop comprehensive recommendations for zoos to ensure positive visitor experiences and identify influencing factors. Visitors often arrive with pre-existing beliefs that shape their attitudes and

behaviors (Learmonth *et al.*, 2021). While zoos prioritize education, the integration of education and conservation is a widely recognized core mission (Patrick *et al.*, 2013), aiming to balance recreational expectations with raising awareness about nature and conservation (Yilmaz and Alpak, 2019).

Indian zoos attract 60 million annual visitors, yet few actively engage in *in situ* conservation or offer robust educational programs (Mallapur *et al.*, 2008). This study aims to investigate how zoo experiences influence visitors' perceptions of wildlife, appreciation for biodiversity, and willingness to support conservation efforts through visitor data analysis, pre- and post-visit surveys, and public opinion assessment. The findings of this research will provide valuable insights for zoo management policymakers and conservation organizations, helping to inform strategies for enhancing the effectiveness of zoos as tools for promoting wildlife conservation, animal welfare, and public awareness.

Materials and Methods

Study Area

Lucknow, the capital and largest city of Uttar Pradesh, India, is a multicultural hub situated on the banks of the Gomti River (Fig. 1) and its captivating heritage, royal history, British-era architecture, and culinary delights make it a popular tourist destination in Uttar Pradesh, attracting an estimated 480 million visitors in 2023 (Wikipedia, 2024).

The Lucknow Zoological Park, officially the Nawab Wajid Ali Shah Prani Udyan, but commonly known as the Lucknow Zoo, was established on November 29, 1921, to commemorate the Prince of Wales's visit. Originally named the Prince of Wales Zoological Gardens, the park was renamed Lucknow Zoological Garden in 2001 and Nawab Wajid Ali Shah Prani Udyan in 2015. Located in the city's heart, the 29-hectare zoo is the second largest in Uttar Pradesh, categorized as a large zoo. Its well-maintained landscape includes lush greenery, a children's park, a toy train, a butterfly

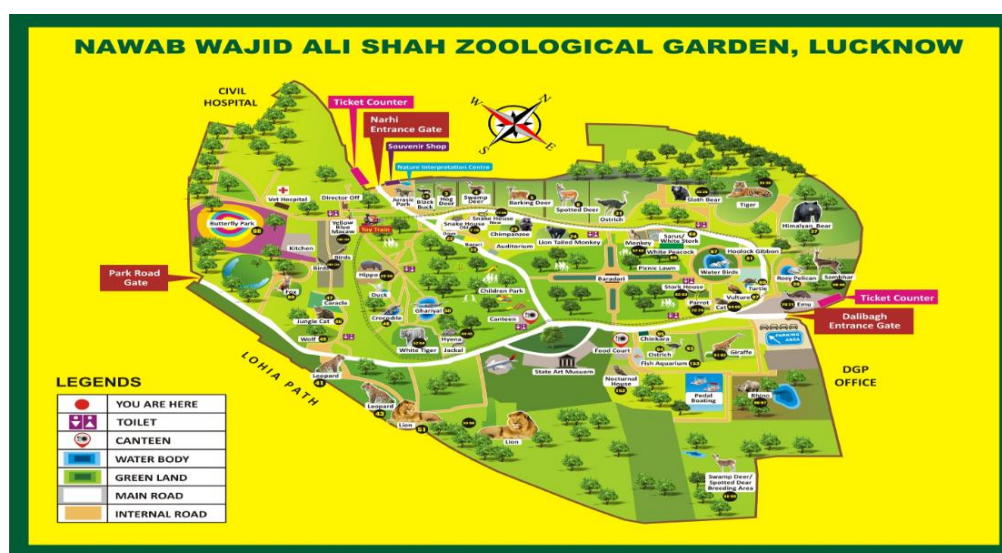


Fig. 1: Map of Lucknow Zoo (Nawab Wajid Ali Shah Zoological Garden, Lucknow, India). (Source: Lucknow Zoo)

park, a *baradari*, and a nature interpretation center. It is home to more than 1000 animals representing 97 species of mammals, birds, and reptiles, and offers a variety of activities and services.

Data Collection and Analysis

This study, conducted from September 2023 to January 2025, employed a comprehensive research design to investigate the influence of the AVI zoo experience on visitors' perceptions of biodiversity and their conservation knowledge. Data were collected through a combination of quantitative and qualitative methods, including questionnaire surveys, direct observation, and interviews.

Methodology

- **Questionnaire Surveys:** Structured, self-administered questionnaires were administered to one randomly selected adult per visiting group at the zoo's entrance and exit. This allowed for the collection of pre- and post-visit data, enabling the identification of shifts in understanding (Yilmaz and Alpak, 2019). The pre-visit questionnaire consisted of 4 closed-ended questions and gathered demographic information, while the post-visit questionnaire contained 11 un-identical closed-ended

questions. Both questionnaires explored visitation patterns, satisfaction levels, attitude changes, and conservation knowledge, with space for visitor suggestions. Data collection spanned over a year, encompassing all seasons, weekdays, weekends, and holidays to ensure diverse visitor demographics. Of the 1540 questionnaires distributed, 1200 were deemed usable for analysis; 340 were excluded due to time constraints, scheduling conflicts, or incomplete responses.

- **Direct Observation and Interviews:** Contextual information regarding the zoo's mission, vision, and animal collection was gathered through direct observation and interviews with zoo authorities and staff.

Data Analysis

Data analysis involved both descriptive and inferential statistics. Descriptive statistics included measures of central tendency (mean, median), dispersion (standard deviation), and frequency and percentage calculations. Inferential statistical methods, specifically Z-value and p-value, were employed for data analysis.

Results

Pre-Visit Attitudes, Knowledge, and Perceptions in

Terms of AVI

This section details the pre-visit data collected to establish participants' initial attitudes, knowledge, and perceptions regarding the zoo before their experience. Understanding these pre-existing views is crucial for accurately evaluating the impact of the zoo visit on visitor perceptions and knowledge acquisition (Falk, 2009). This baseline assessment allows researchers to measure the effect of the zoo experience precisely.

The study aimed to assess participants' initial awareness of zoo conservation efforts, their expectations for the visit, and their preconceived notions about animal welfare in zoo environments. Recognizing these existing perceptions is vital, as they significantly influence visitor experiences and learning within informal settings like zoos (Anderson *et al.*, 2002). Furthermore, documenting pre-existing public perceptions regarding the zoo's role in conservation and animal welfare is essential, as these perceptions shape visitor expectations and overall experiences (Fernandez, 2009). The data gathered here serves as a critical baseline for comparison with post-visit evaluations.

Pre-Visitation Results

(a) Socio-Demographic Characteristics of Visitors

The visitor population demonstrated with 56.8% of respondents being male and 43.2% female (Fig. 2), translating to a male-to-female ratio of approximately 1.46:1. The majority of visitors, 54.4%, resided in rural or peri-urban areas surrounding the zoo, while 43.6% hailed from urban centers, with a small 2% representing international tourists (Fig. 3). The age distribution was concentrated within the 16-50 age bracket, encompassing 70.95% of the visitors (Fig. 4). Marital status indicated a slight predominance of single visitors at 52.67%, compared to 47.33% who were married. In terms of educational attainment, a significant 46.17% of visitors possessed higher education, followed by 30.83% with secondary education (Table 1, Fig. 5)

(b) Visitation Characteristics

A substantial 78.6% of visitors were repeat attendees, suggesting a high level of sustained interest in the zoo, while only 21.2% were first-time visitors (Fig. 6). Visitor spending was primarily allocated towards admission tickets, with families accompanied by children exhibiting increased expenditure on attractions such as the toy train, zoo café, children's park, and gift purchases. The primary source of awareness about the zoo was through family and friends, accounting for 67.5% of responses, followed by social media at 17.5%, print media at 7.7%, and the zoo's website at 7 (Table 2, Fig. 7).

(c) Purpose of Zoo Visitation

The primary motivations for visiting the zoo were multifaceted, with 26.3% of respondents citing children's education about animals as the leading reason. Spending time with family and friends was the second most common motivation, at 22.5%, followed closely by a desire to learn about wild animals at 21.5%. Entertainment was a significant factor for 16.8% of visitors, while 12.8% cited seeing live animals as their primary purpose (Fig. 8). Visitors perceived the zoo's goals as primarily educational, with 44.5% emphasizing education, followed by 42.5% emphasizing entertainment. Conservation was considered a goal by 12.5% of respondents, and research was perceived significantly less as a goal by only 0.5% (Table 2, Fig. 9).

Visitors' Post-Visit Experience: Knowledge, Attitude, and Perceptions in Terms of AVI

Zoos are vital educational and recreational institutions that offer unique opportunities for animal-visitor interactions and wildlife observation in controlled settings (Moss *et al.*, 2014). Understanding visitor satisfaction and overall experience is crucial for zoos to effectively fulfill their missions. This is assessed through post-visitor perceptions, focusing on the image of the animals and the image of the zoo. Public perceptions of both significantly influence visitor experiences (Fernandez, 2009), with a positive image contributing to satisfaction.

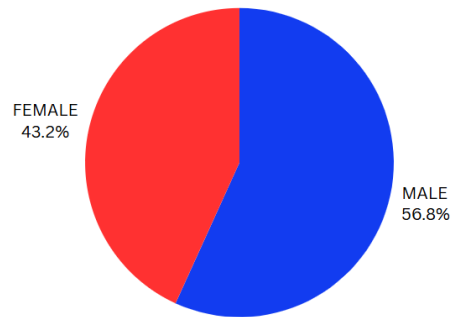


Fig. 2: Percentage of male and femaleVisitors.

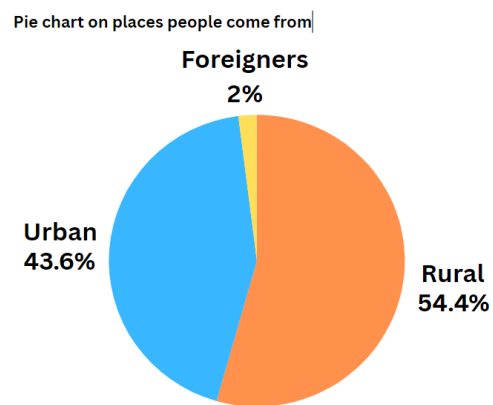


Fig. 3: Geographical presentations of visitors.

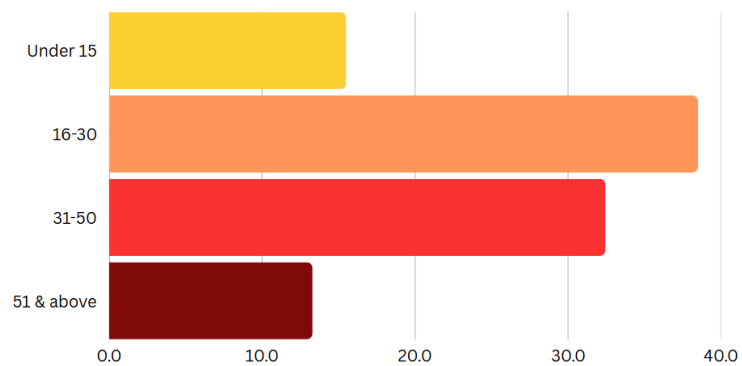


Fig. 4: Histogram shows different age groups of visitors.

Table 1: Socio-demographic data of zoo visitors at Lucknow Zoo

Characters	Variables	Frequency	Percentage
Gender	Male	682	56.8%
	Female	518	43.2%
Marital status	Single	632	52.67%
	married	568	47.33%
Age	Under 15	186	15.5%
	16-30	464	38.5%
	31-50	388	32.45%
	51 and above	162	13.3%
Educational status	No formal education	60	5%
	Primary (up to 8 th)	216	18%
	Secondary (9 th – 12 th)	370	30.83%
	Higher (above 12 th)	554	46.17%
Place	Rural	652	54.4%
	Urban	524	43.6%
	Foreigners	24	2%

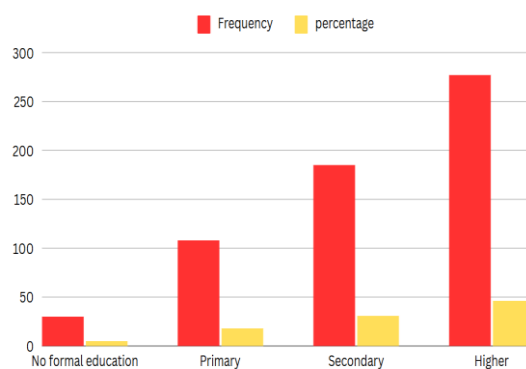


Fig. 5: Educational status of visitors.

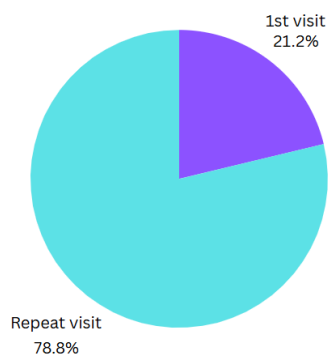


Fig. 6: Visitation pattern of Zoo visitors.

Table 2: Pre-visit questionnaire to evaluate visitors' awareness and knowledge about zoo

(1) Purpose of visiting the zoo	Frequency	Percentage
To get to know about wild animals	258	21.5%
For entertainment	202	16.8%
To spend time with family and friends	270	22.5%
For children to know about animals	316	26.3%
To see live animals	154	12.8%
(2) Frequency of visit		
First-time visit	256	21.2%
Repeat visit	944	78.6%
(3) Sources of Awareness of the Zoo		
Family and friends	810	67.5%
Social media	210	17.5%
Zoo websites	88	7.3%
Print media	92	7.7%
(4) What is the goal of the zoo from the visitor's view		
Entertainment	510	42.5%
Education	534	44.5%
Conservation	150	12.5%
Research	6	0.5%

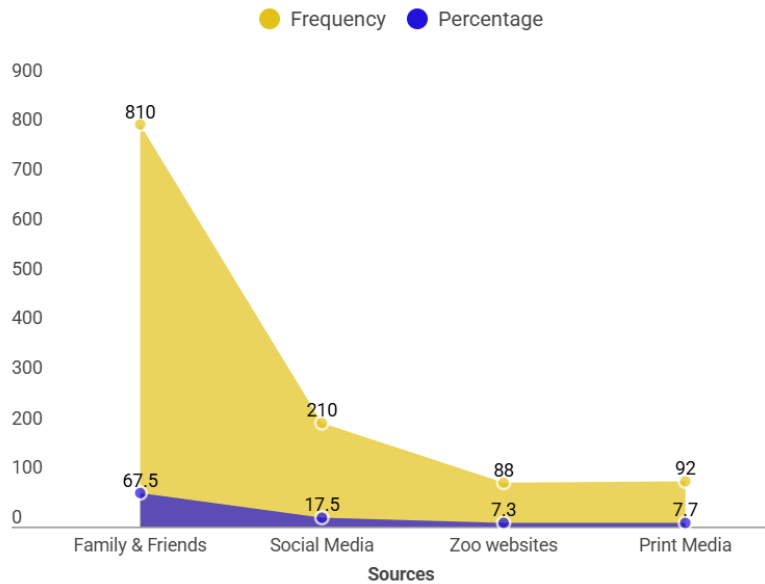


Fig. 7: Sources of Awareness of the Zoo.

Immediately following their visit, participants completed a structured questionnaire. This aimed to capture their perceptions of the zoo's image and the animals' health, with questions specifically designed to evaluate the visit's impact on their attitudes, knowledge, and perceptions. Inquiries covered exhibit quality, animal appearance, and overall satisfaction (Table 3). The collected data

provides insight into the zoo's effectiveness in delivering a positive and impactful visitor experience.

Post-Visitation Results

Visitors reported a significantly positive experience overall, with 92% enjoying their trip (Fig. 10) and 97.41% recommending the zoo (Fig.

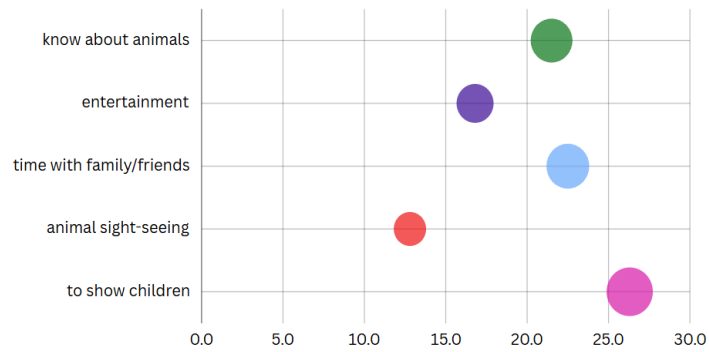


Fig. 8: Purpose of visiting the zoo.

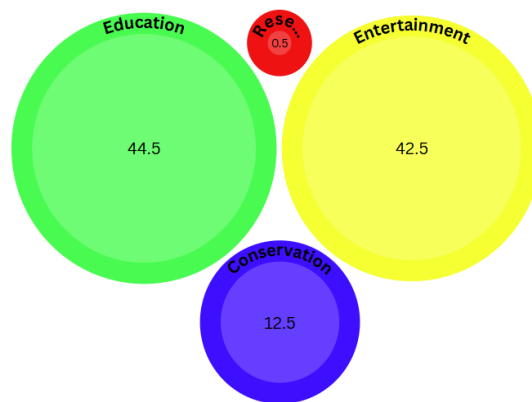


Fig. 9: Goal of the zoo from the visitor's view (percentage in packed circle chart).

11). Exhibits were perceived as informative (76%) and increased understanding of wildlife conservation (74.25%) (Fig. 12). Zoo staff were viewed as cooperative and friendly (77.54%) (Fig. 13). However, perceptions regarding animal exhibit cleanliness (58.7%) (Fig. 14) and animal health (58.6%) (Fig. 15) were notably lower, and canteen hygiene was not significantly different from 50% (48.9%), indicating areas of concern. Awareness of captive breeding (33.2%) and adoption programs (31.2%) was low, highlighting a need for improved communication. The mammal exhibit was the most popular (91.5%) (Table 4, Fig. 16). One-sample proportion z-tests confirmed that all "Yes" responses, except canteen hygiene, were statistically significant ($\alpha = 0.05$), supported by 95% confidence intervals. These findings suggest a

generally positive visitor experience, but also underscore the importance of addressing concerns regarding cleanliness, animal health, canteen hygiene, and increasing awareness of conservation programs.

The majority of zoo visitors surveyed were male (56.8%), with a relatively balanced distribution between single (52.67%) and married (47.33%) individuals. The largest age group was 16-30 years old (38.5%), followed by 31-50 years old (32.45%). A significant portion of visitors had higher education (above 12th grade, 46.17%). The sample was predominantly composed of visitors from rural areas (54.4%), followed by urban areas (43.6%). Foreign visitors accounted for 2% of the sample. This demographic profile provides valuable context for understanding the zoo's

Table 3: Post-visit experience of the zoo visitors

Questions	Frequency	Percentage	Mean value	Standard deviation (for binary)	Standard Error	Z-Value	p-Value	Confidence Interval (95%)	Significance level ($\alpha=0.05$)	Interpretation
(1) Did you enjoy your trip?										
Yes	1104	92%	0.92	0.27	0.0078	30.8866	0.0000	(0.9047, 0.9353)	Significant	Very strong statistical evidence ($Z=30.8866, p<0.001$) that significantly more than 50% visitors enjoyed their zoo visit [92% with 95% CI: (0.9047,0.9353)]
No	96	8%								
(2) Did you feel the exhibit was informative?										
Yes	912	76%	0.76	0.427	0.0123	16.6667	0.0000	(0.7366, 0.7834)	Significant	Very strong statistical evidence ($Z=16.6667, P<0.001$) that significantly more than 50% of visitors found the exhibit informative [76.00% with 95% CI: (0.7366,0.7834)].
No	288	24%								
(3) Did you feel the animal exhibit was clean?										
Yes	722	60.16%	0.6016	0.4896	0.0141	4.4921	0.0000	(0.5738, 0.6294)	Significant	Very strong statistical evidence($Z=4.4921, p<0.001$)that significantly 50%of visitors felt the animal exhibit was clean [60.16% with 95% CI: (0.5738,0.6294)].
No	508	42.33%								
(4) Do you think animals looked healthy?										
Yes	704	58.6%	0.586	0.4926	0.0142	3.6515	0.0000	(0.5580, 0.6140)	Significant	Very Strong statistical evidence($Z=3.6515, p<0.001$) that significantly more than 50% found that animals looked healthy [58.60% with 95% CI: (0.5580,0.6140)].
No	496	41.33%								
(5) Do you think the service of the zoo canteen was hygienic?										
Yes	587	48.9%	0.489	0.499	0.0144	-0.2041	0.8383	(0.4608, 0.5172)	Not Significant	No statistically significant evidence($Z=-0.2041, p=0.8383>0.05$) to suggest a difference from 50% in opinions on canteen

										hygiene [48.90% with 95% CI: (0.4608, 0.5172)].
No	613	51.08%								
(6) Do you think the zoo staff was cooperative and friendly?										
Yes	930.5	77.54%	0.7754	0.4173	0.012	13.6515	0.0000	(0.7520, 0.798)	Significant	Very strong statistical evidence (Z=13.6515, p<0.001) that significantly more than 50% found the staff cooperative [77.54% with 95% CI: (0.7520, 0.798)].
No	260.5	21.70%								
(7) Did your visit to the zoo increase your understanding of wildlife conservation?										
Yes	891	74.25%	0.7425	0.4373	0.0126	11.6667	0.0000	(0.7180, 0.7670)	Significant	Very strong statistical evidence (Z=11.6667, p<0.001) that significantly more than 50% felt their understanding of wildlife conservation increased [74.25% with 95% CI: (0.7180, 0.7670)].
No	309	25.75%								
(8) Would you like to recommend the zoo to family and friends?										
Yes	1169	97.41%	0.9741	0.1588	0.0046	30.0000	0.0000	(0.9656, 0.9826)	Significant	Overwhelming statistical evidence (Z=30.0000, p<0.001) that significantly more than 50% would recommend the zoo to family and friends [97.41% with 95% CI: (0.9656, 0.9826)].
No	31	2.58%								
(9) Are you likely to engage in WL conservation activities than before your visit?										
Yes	1046	87.16%	0.8716	0.3346	0.0097	23.0000	0.0000	(0.8526, 0.8906)	Significant	Very strong statistical evidence (Z=23.0000, p<0.001) that significantly more than 50% are more likely to engage in wildlife conservation than before their visit [87.16% with 95% CI: (0.8526, 0.8906)].

No	152	12.6%								
(10) Do you know about the zoo captive breeding program?										
Yes	398	33.2%	0.332	0.471	0.0136	-7.4565	0.0000	0.3053, 0.3587	Significant	Very strong statistical evidence($Z=-7.4565, p<0.001$) that significantly less than 50% know about the breeding programs [33.20% with 95% CL: (0.3053, 0.3587)].
No	802	66.8%								
(11) Do you know about zoo adoption programs?										
Yes	374	31.2%	0.312	0.463	0.0134	-8.1429	0.0000	0.2859, 0.3381	Significant	Very strong statistical evidence($Z=-8.1429, p<0.001$) that significantly less than 50% of visitors know about the adoption programs [31.20% with 95% CI: (0.2859, 0.3381)].
No	826	68.8%								

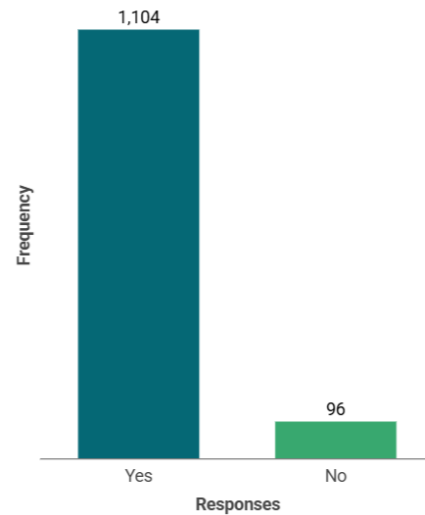


Fig. 10: Enjoyment of the trip by visitors in percentage.

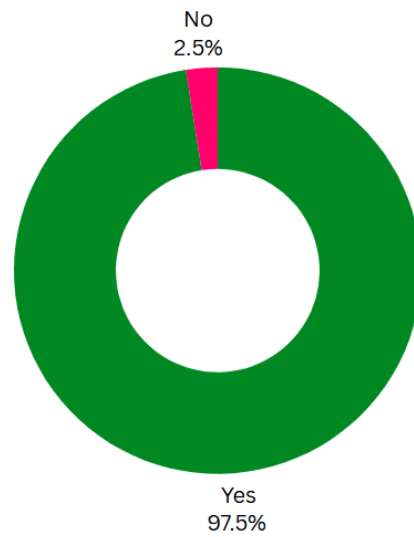


Fig.11: Recommendation of the zoo visit by visitors.

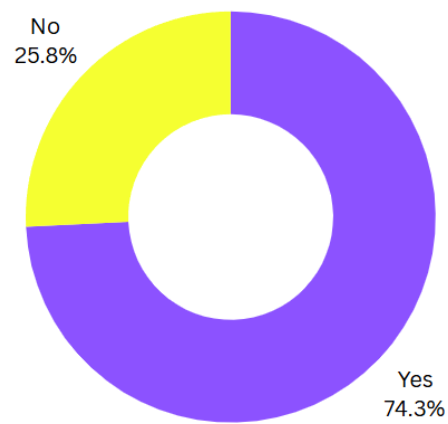


Fig. 12: Enhancement of knowledge of conservation post-zoo visit.

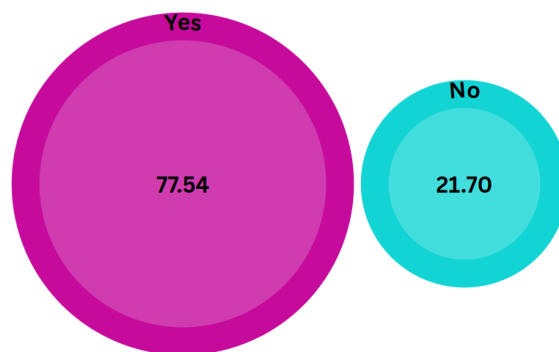


Fig. 13: Cooperative behavior of the zoo staff.

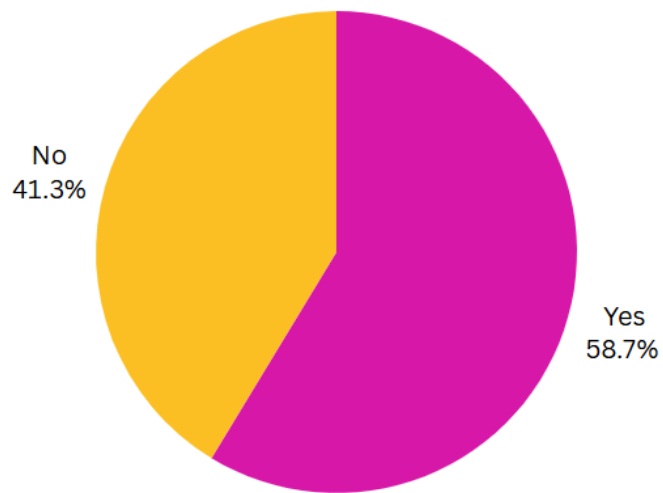


Fig. 14: Cleanliness of the exhibit of animals according to visitors.

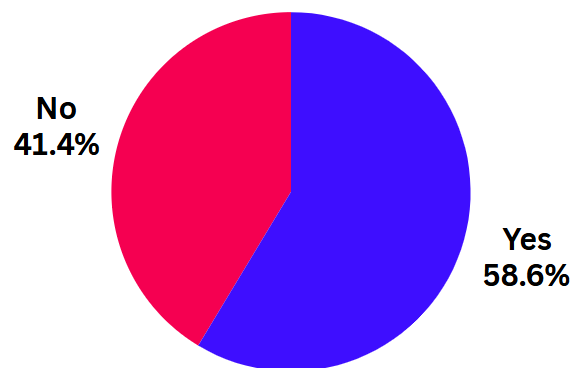


Fig. 15: Visitors' perception about animals' health status.

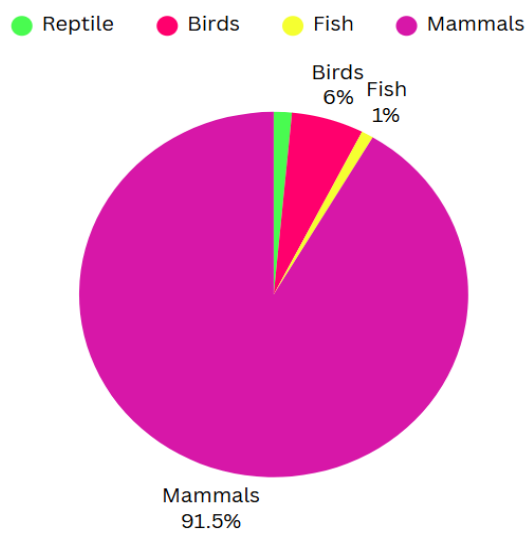


Fig. 16: Visitors' enclosure preference in terms of animal liking.

Table 4: Most enjoyable exhibit for the zoo-visitor

Which exhibit do you find most enjoyable?	Frequency	Percentage
Reptiles	18	1.5%
Birds	72	6%
Fish	12	1%
Mammals	1098	91.5%

Table 5: Visitor Suggestions Frequency and Descriptive Statistics

Variables	Frequency	Percentage
Add entertainment	18	1.5%
Add more information/ navigation	204	17%
Add no. of species	306	25.5%
Animal hygiene	46	4.66%
Add verbal guidance	210	17.5%
Add an interactive session with staff and the keeper	170	14.16%
Sanitation	64	5.33%
Awareness programs	182	15.16%

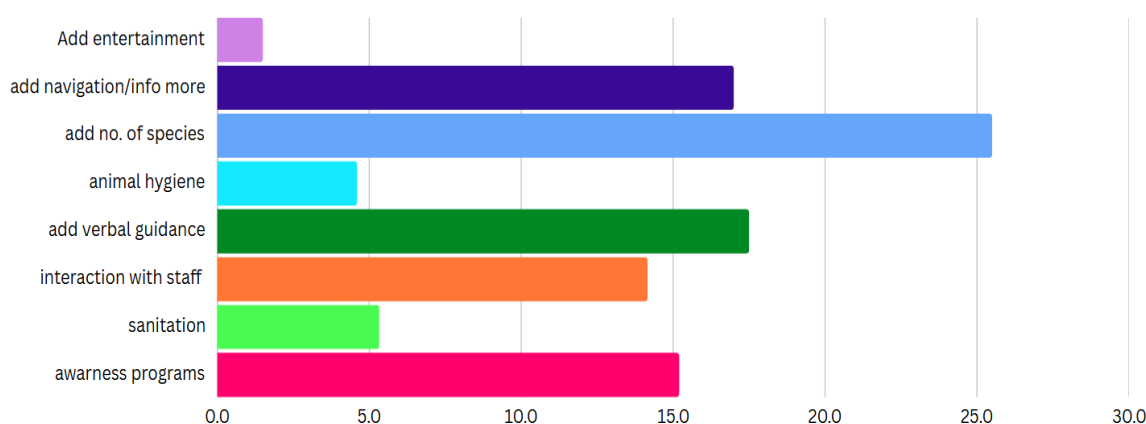


Fig. 17: Overall Suggestions from visitors.

visitor base and tailoring programs and services to meet their needs and interests.

The survey asked visitors which exhibit they found most enjoyable. The results indicate a strong preference for the mammal exhibit, with 1098 respondents (91.5%) selecting it. The bird exhibit was the second most popular, with 72 respondents (6%). The reptile exhibit received 18 responses (1.5%), and the fish exhibit received 12 responses (1%) (Table 4, Fig. 16).

The visitors' Suggestions, recommendations, and their Results

The analysis of visitor suggestions revealed a distinct distribution of preferences for zoo improvements. The most frequently cited suggestion was "Add no. of species," with a frequency of 306, representing 25.5% of the total responses (Table 5, Fig. 17). Following this, "Add verbal guidance" (210 responses, 17.5%) and "Add more information/navigation" (204 responses, 17%) were also prominent. "Awareness programs" (182 responses, 15.16%) and "Add interactive sessions with staff and keeper" (170 responses, 14.16%) indicated a significant interest in enhanced educational and

interactive experiences. Conversely, "Sanitation" (64 responses, 5.33%), "Animal hygiene" (46 responses, 4.66%), and "Add entertainment" (18 responses, 1.5%) received comparatively lower frequencies. The overall distribution of suggestions highlights a wide range of visitor preferences, with a strong emphasis on expanding the zoo's animal collection and improving education (Table 5, Fig. 17).

Discussion

Pre-visit data underscores the zoo's established role as a valuable educational and familial destination, highlighting its significance as a community resource. The strong emphasis on children's education and family time, coupled with high rates of repeat visitation, suggests robust visitor loyalty and satisfaction. Notably, a perceptual gap exists regarding the zoo's conservation and research initiatives, indicating a need for enhanced communication strategies to bridge this divide. While word-of-mouth (WOM) marketing has proven highly effective, the limited impact of digital and print media necessitates a reevaluation of current communication approaches.

The demographic analysis revealed a visitor profile skewed towards males; a finding consistent with studies conducted in other zoological settings. Specifically, Hun and Anuar (2014) reported 56% of male visitors at the Malaysian National Zoo, while Agyeman and Asebah (2022) found 70.9% of male visitors at the Kumasi Zoological Park in Ghana. Furthermore, the majority of visitors were identified as single, young adults with higher education, residing in nearby areas. This aligns with research by Adetola and Akinboboye (2020) on visitor connections with ex-situ conservation and with findings by Adetola and Adedire (2018) at the University of Ibadan (UI) Zoo, which also highlighted a predominantly youthful demographic. Similar patterns were observed in studies by Hun and Anuar (2014) in Malaysia, Mallapur, Waran and Sinha (2008) in Indian zoos, and Adetola and Oluleye (2017), who posited that young, single

individuals possess greater discretionary time for leisure activities, including zoo visits. The study also revealed a predominantly domestic visitor base, with minimal foreign tourist presence, a trend corroborated by Adetola *et al.* (2016), who reported that 98.8% of visitors were Nigerian in their study.

The significant proportion of repeat visitors observed in this study is consistent with findings from various other reports. Adetola *et al.* (2016) reported 61% repeat visitors at UI, and Adetola and Akinboboye (2020) also noted a high prevalence of repeat visitation in Nigerian zoos. Similarly, Knezevic *et al.* (2016) found that 88% of Zagreb Zoo visitors were repeat visitors. The study also showed that most visitors were day visitors from nearby locations. Ridgway *et al.* (2005) found in their research that the majority of visitors lived in the same city or a different city but in the same state. Family-oriented and educational motivations emerged as the primary drivers for zoo visits, reinforcing the notion that zoos serve as popular family-oriented leisure destinations, typically involving one-day excursions (Ryan and Sward, 2004).

Word-of-mouth (WOM) recommendations were identified as the most influential source of information regarding the zoo, emphasizing the critical role of positive visitor experiences. This finding is supported by research from Yager *et al.* (2015), and Puan and Zakaria (2007), all of whom highlighted the significant impact of friends and family in attracting new visitors. Moreover, WOM is a key factor contributing to high rates of repeat visitation, underscoring its reliability as an information source.

The demographic profile of zoo visitors reveals a diverse audience, providing valuable context for understanding visitor experiences. The slight male dominance (56.8%) observed in this study aligns with the study of Agyeman and Asebah (2022), suggesting potential gender-specific patterns in leisure activities. However, it is important to note that leisure participation can be influenced by a myriad of sociocultural factors,

and further research is needed to explore the specific motivations driving male visitation to this particular zoo.

The near-equal distribution of single (52.67%) and married (47.33%) visitors suggests that the zoo caters to a broad spectrum of individuals, irrespective of marital status. This diversity is a strength, highlighting the zoo's potential as a multi-generational and inclusive recreational space.

The concentration of visitors within the 16-50 age bracket (70.95% combined) supports the notion that zoos are popular among young adults and families (Ballantyne *et al.*, 2008). This age group often includes parents with young children, aligning with the zoo's role as a family-oriented destination. The presence of younger visitors (under 15) reinforces this point.

The high proportion of visitors with higher education (46.17%) is noteworthy. This finding suggests that the zoo attracts an educated audience, which may be receptive to its educational programs and conservation messages. This aligns with research that highlights the role of zoos in fostering environmental literacy and promoting science education (Falk, 2009). The accessibility of the zoo to people with all educational backgrounds is also a positive observation.

The predominance of rural visitors (54.4%) over urban visitors (43.6%) is a significant finding. This could potentially be attributed to the zoo's location, accessibility for rural populations, or successful outreach efforts. It may also reflect a desire among rural residents to connect with nature and wildlife, which is consistent with the study of Ajayi and Tichaawa (2020) in the case of Nigerian Zoos. The presence of a small percentage of foreign visitors (2%) indicates the zoo's appeal to tourists, highlighting its potential as a regional attraction.

In conclusion, the demographic data provides insights into the zoo's visitor base, highlighting its diversity and potential for engagement.

Understanding these characteristics can inform strategic planning, program development, and outreach initiatives to enhance the visitor experience and maximize the zoo's impact on conservation and education.

The post-visit results indicate a strong positive visitor experience at the zoo, characterized by high enjoyment and a willingness to recommend the facility. This aligns with findings that zoos can offer engaging and enjoyable experiences (Moss *et al.*, 2014). The perception of exhibits as informative and contributing to increased understanding of wildlife conservation supports the educational role of zoos (Ballantyne and Packer, 2016). The positive evaluation of staff friendliness underscores the importance of human interactions in shaping visitor experiences (Myers *et al.*, 2004).

However, the findings also highlight areas that need improvement. The lower ratings for animal exhibit cleanliness and animal health suggest a need for enhanced maintenance and animal care practices. This is crucial, as visitor perceptions of animal welfare are paramount to overall satisfaction (Ward *et al.*, 1998). Fernandez (2009) demonstrated ethical considerations and animal welfare standards significantly influence public perception of zoos. The lack of a significant difference from 50% regarding canteen hygiene indicates a potential issue that needs immediate attention, as it can negatively impact visitor experiences.

The low awareness of captive breeding and adoption programs points to a gap in communication and outreach. Zoos have a responsibility to educate the public about their conservation efforts (Conde *et al.*, 2011; Barongi *et al.*, 2015), aligning with Fernandez *et al.*'s (2021) emphasis on zoos as vital centers for conservation education and action. Increased promotion of these programs is essential. The statistical significance of the "Yes" responses (excluding canteen hygiene) reinforce the robustness of the findings. The 95% confidence intervals further

support the reliability of the observed proportions.

In conclusion, while the zoo provides a generally positive experience, addressing concerns about animal exhibit cleanliness, animal health, and canteen hygiene is crucial. Furthermore, enhancing communication about conservation initiatives, in line with Fernandez *et al.* (2021) advocacy for zoos as conservation hubs, will improve visitor satisfaction and fulfill the zoo's educational and conservation missions.

The overwhelming preference for the mammal exhibit underscores the enduring appeal of charismatic megafauna in zoo settings. This observation aligns with research indicating that large, visually appealing, and often anthropomorphic animals tend to attract the most visitor attention (Mohapatra *et al.*, 2010; Spiezio *et al.*, 2023). The popularity of mammals can be attributed to their perceived intelligence, social complexity, and physical attractiveness, which often elicit strong emotional responses and enhance visitor engagement (Clayton *et al.*, 2009). The strong preference for mammals has practical implications for zoo management and exhibit design. Zoos can leverage the popularity of these animals to enhance visitor engagement and promote conservation messages (Fernandez, 2019; Fernandez *et al.*, 2021). Educational programs, interactive displays, and keeper talks can be strategically integrated into mammal exhibits to maximize their impact.

The bird exhibit, while less dominant, still garnered a notable portion of visitor interest (6%). With their diverse plumage, intricate behaviors, and vocalizations, birds provide a stimulating and engaging experience (Khan *et al.*, 2025). Their ability to fly and interact with their environment uniquely contributes to their appeal. With their lower popularity, the reptile and fish exhibits may require further evaluation. These exhibits often face challenges in terms of visitor engagement, potentially due to perceptions of limited interactivity or the inherent difficulties in observing underwater behaviors, aligning with the

study of Moss *et al.* (2014). This disparity in visitor preference highlights the need for innovative exhibit design and interpretation strategies to enhance engagement with less charismatic taxa (Falk, 2009).

However, ensuring that other exhibits receive adequate attention and resources is equally important. Zoos should strive to create a balanced and diverse collection that showcases the richness of the animal kingdom. This can be achieved through innovative exhibit design, targeted educational programs, and effective marketing strategies that highlight the unique characteristics and conservation needs of all species.

The data highlights the significant appeal of mammals in zoos, while also underscoring the need to enhance visitor engagement with other animal groups. By creating engaging and educational experiences for all animals, zoos can maximize their impact on conservation awareness and promote a broader appreciation for biodiversity.

The visitor suggestions data reveal a clear emphasis on enhancing the zoo's animal collection, with "Add no. of species" being the most frequent suggestion. This aligns with the well-documented phenomenon of visitors' strong attraction to charismatic megafauna (Vaz *et al.*, 2017) and the general desire for diverse wildlife experiences. Zoos are often seen as repositories of biodiversity, and visitors' expectations may be shaped by this perception (Moss *et al.*, 2014; Ikram and Khalid, 2025b).

The high frequency of suggestions related to educational enhancements, such as "Add verbal guidance", "Add more information/navigation", and "Add interactive sessions with staff and keeper", underscores the zoo's role as a site for informal learning (Falk, 2009). Visitor interest in interactive experiences resonates with research highlighting the importance of active learning in zoos (Ballantyne and Packer, 2016). Furthermore, the desire for direct interaction with keepers aligns with the understanding that personal

encounters can significantly enhance visitor engagement and learning (Myers *et al.*, 2004; Clayton *et al.*, 2009).

The comparatively lower frequencies of suggestions concerning "Animal hygiene" and "Sanitation" should not be misinterpreted as a lack of importance. Visitor perceptions of animal welfare are paramount, and even infrequent concerns can have a significant impact on overall satisfaction (Ward *et al.*, 1998; Fernandez *et al.*, 2009). Zoos have an ethical responsibility to maintain high standards of animal care and hygiene, and transparency in these practices is crucial (Learmonth, 2020).

The minimal frequency of "Add entertainment" suggests that visitors primarily perceive the zoo as an educational and conservation-focused institution. However, integrating educational entertainment elements may enhance the visitor experience without compromising the zoo's core mission (Ballantyne and Packer, 2016).

The heterogeneity of visitor preferences, as reflected in the range of suggestions, highlights the need for a multifaceted approach to zoo management. Addressing the most frequent suggestions while maintaining high standards in less frequently mentioned areas is essential for ensuring a positive and ethical visitor experience. Future research should explore the specific motivations behind these suggestions and investigate the impact of implemented changes on visitor behavior and conservation awareness.

Suggestions and Recommendations

Based on comprehensive visitor feedback, several key recommendations emerge to enhance the zoo experience and its conservation impact. Prioritizing hygiene and cleanliness across all areas, particularly animal exhibits and the zoo canteen, is paramount. This necessitates a rigorous cleaning schedule, regular hygiene audits, and increased sanitation stations to address perceived deficiencies critical for both visitor satisfaction and animal welfare. Furthermore, the

zoo should enhance communication regarding animal health through educational displays, clear informational signage, and potentially offering behind-the-scenes tours to foster trust in animal care practices.

To maximize educational impact, strengthening existing programs is essential. This includes enhancing exhibit content, developing interactive activities, and offering guided tours focused on wildlife conservation. Simultaneously, increasing the visibility of captive breeding and adoption programs through comprehensive communication strategies and targeted campaigns will raise public awareness and participation in these vital conservation efforts. Given the overwhelming popularity of the mammal exhibit, prioritizing its development and diversifying exhibit offerings will cater to a wider range of visitor interests. Maintaining and enhancing staff friendliness through ongoing training and recognition will continue to contribute to positive visitor interactions. Implementing regular visitor feedback mechanisms, such as digital surveys, will ensure continuous improvement and allow for prompt responses to visitor concerns. Finally, a strategic marketing and communication plan highlighting the zoo's conservation efforts and educational programs will enhance its reputation and attract more visitors. Implementing these recommendations will solidify the zoo's role as a leading institution for both entertainment and conservation.

Conclusion

This pioneering study provides a valuable resource for policy development at the Lucknow Zoo, generating data across multiple domains. It captured insights into visitor experiences, encompassing general satisfaction and detailed feedback on facilities, information dissemination, and staff conduct. Furthermore, the research documented visitor suggestions regarding the animal collection and their understanding of conservation strategies imparted through informal education. Consequently, this study has significantly fostered a stronger connection and

understanding between the zoo administration and its visitors.

The study unequivocally demonstrates that the zoo provides a significantly positive and impactful experience. High levels of enjoyment and strong visitor recommendations underscore its success in creating engaging and memorable visits. Notably, the zoo effectively fulfills its educational role, promoting increased understanding of wildlife conservation and offering informative exhibits. Positive interactions with staff further enhance the visitor experience. These findings reinforce the zoo's potential as a valuable community asset and a powerful platform for conservation education.

While the study identified areas for improvement, such as animal exhibit cleanliness, animal health communication, and canteen hygiene, the overwhelming positive feedback indicates a robust foundation for future enhancements. Addressing these concerns and enhancing communication about vital conservation programs will further solidify the zoo's position as a leading institution for wildlife education and preservation. The popularity of the mammal exhibit underscores the potential for targeted educational initiatives focused on charismatic species to drive broader conservation awareness. Ultimately, the zoo's capacity to inspire and educate visitors presents a crucial opportunity to foster a deeper connection with the natural world and encourage active participation in conservation efforts.

Ethical Statement

This study does not involve experiments on animals or human subjects, hence Ethical Approval not required.

Author Contributions

Each author has contributed equally in designing the research, conducting thorough analysis, drafting the manuscript, and refining its content. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare no conflicts of interest.

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